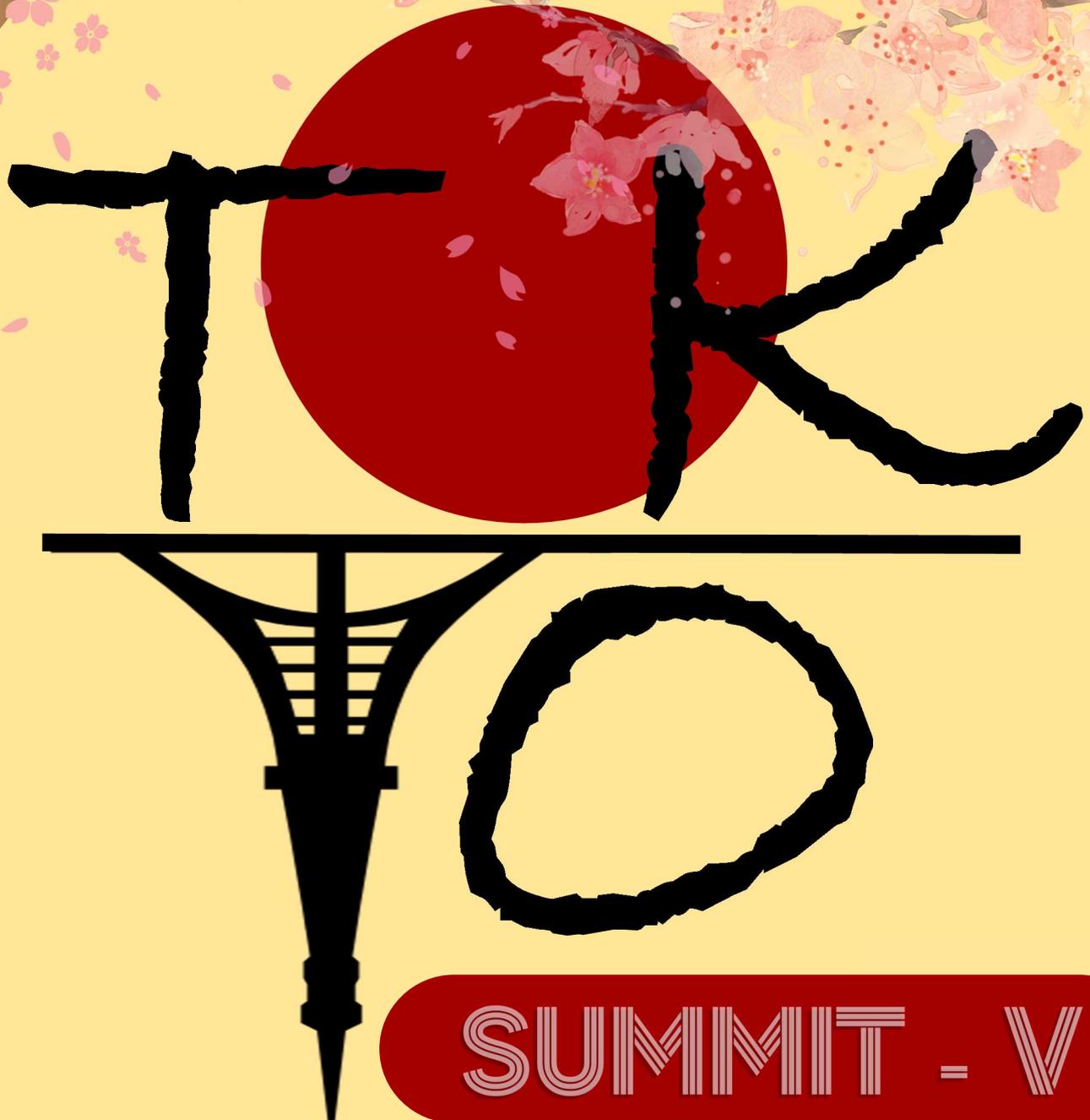


5TH INTERNATIONAL CONFERENCE
ON INNOVATIVE STUDIES OF
CONTEMPORARY SCIENCES

January 14-16, 2022 / Tokyo - Japan



Proceedings Book

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**5TH INTERNATIONAL CONFERENCE
ON INNOVATIVE STUDIES OF
CONTEMPORARY SCIENCES**

January 14-16, 2022 / Tokyo - Japan

TOKYO SUMMIT-V

Proceedings Book

Edited by

Dr. Minh, Le THI

by

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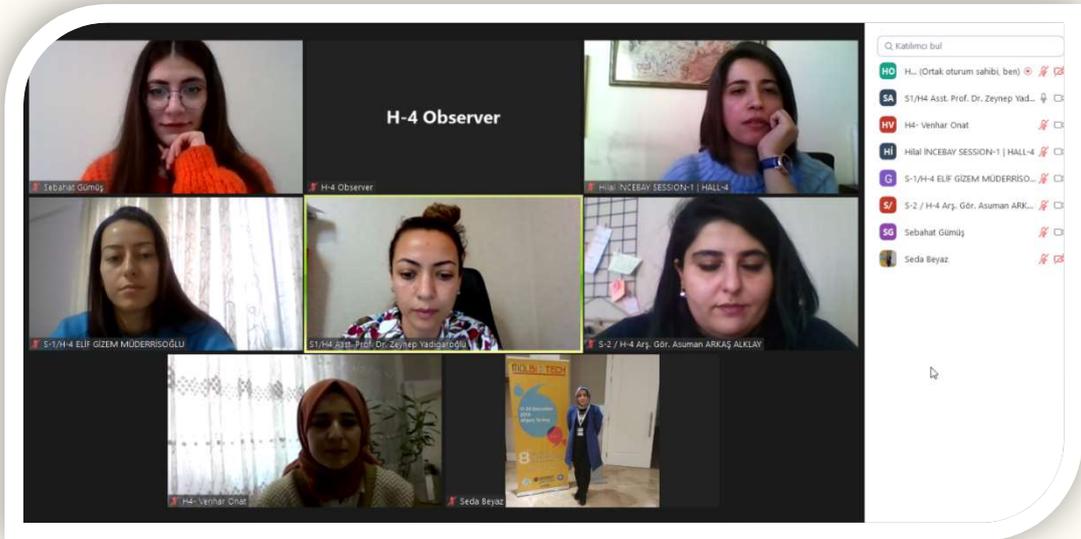
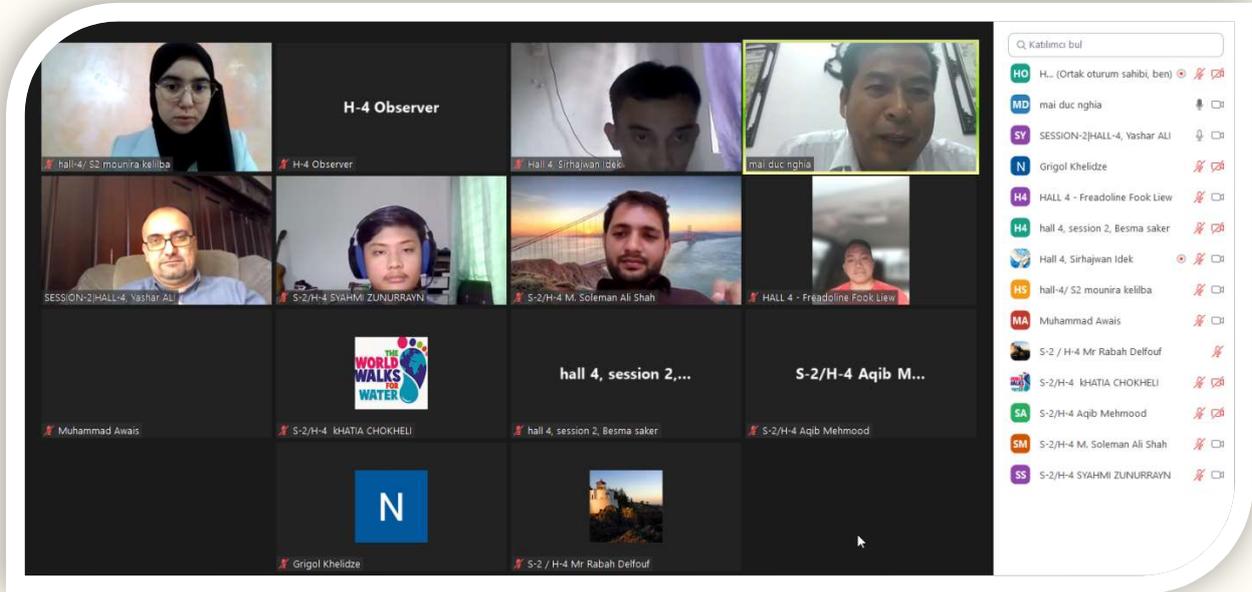
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Medical University
 Department of Human Anatomy
 and Medical Terminology



Professor
Huseynova Gulgiz Agahasan,
 e-mail: gulgiz65@mail.ru



TOKYO SUMMIT - V
 5TH INTERNATIONAL
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 January 14-16, 2022 / Tokyo - Japan

**PECULIARITIES OF THE GLANDS WITH DIVERTICULA
 IN THE GENERAL EXCRETORY DUCT OF THE
 HUMAN URINARY BLADDER WALLS**

**İNSAN İDRAR KEŞİ DUVARLARINDA
 GENEL DUKTUSUNDA GENİŞLEMELER
 OLAN BEZLERİN MORFOLOJİK ÖZELLİKLERİ**

1 unassigned participant

Observer hall 2

Observer hall 2

H2-Rena Kerimova

Hall 2: Adil Geybull

SESSION 1, HALL 2 - Huseynova Gul...

H2-Farid Mursiyev

H2-Rena Kerimova

1 unassigned participant

Start Video

Participants

Chat

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PowerPoint Recording

Breakout Rooms

Reactions

Observer hall 2

Participants (10)

Find a participant

- Observer hall 2 (Co-host, me)
- Naila Mammadova
- Afaq Nurullayeva
- Elçin Mustafayeva
- H2-Farid Mursiyev
- H2-Rena Kerimova
- Hall 2: Adil Geybull
- S-1, H-2 Aygun Jafarova
- S-1/H-2 Tarhana Jafarova
- SESSION 1, HALL 2 - Huseynova...

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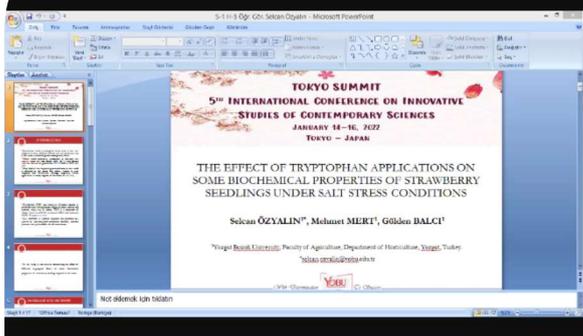
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Reactions

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5-11-3 Qp. Q5-50dan Oqun - Microsoft PowerPoint



TOKYO SUMMIT
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 JANUARY 14-16, 2022
 TOKYO - JAPAN

**THE EFFECT OF TRYPTOPHAN APPLICATIONS ON
 SOME BIOCHEMICAL PROPERTIES OF STRAWBERRY
 SEEDLINGS UNDER SALT STRESS CONDITIONS**

Selcan ÖZYALIN¹, Mehmet MERT¹, Gülşen BALCI¹

¹Yığılca Biyoloji Bölümü, Faculty of Agriculture, Department of Horticulture, Yığılca, Turkey
selcan.ozyalin@trn.edu.tr

Observer hall-5

Observer hall-5

H2-Di Ermen Çelik Çankaya

S-1/H-2 Qp. Q5- Selcan Özyalin

S-1/H-2 Di Aliyev

Not ölkemizin kızı

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Participants

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Breakout Rooms

Reactions

Zoom Meeting: Hall 1, S-2/H-1 Dr. Minh, Le Thi (ekran görüntüsü) | Gözetli Sekme

virtual currency
cryptocurrency, digital currency

3 atananmış katılımcı

3 atananmış katılımcı

Zoom Meeting: Hall 1, S-2/H-1 Dr. Minh, Le Thi (ekran görüntüsü) | Gözetli Sekme

Katılımcılar (13)

- IKSA... (Ortak oturum sahibi, ben)
- SD S-2/H-1 Dr. Minh, Le Thi
- Dalal maturi
- HS H-1.5-2 Samyah hani alouty
- HD H1-Furkan Durmaz
- Hall 1, Session 2, Ophelia Kaneva
- HA Hall-1, Alia Saad
- MG Marina Gladko
- MA Milena Apostolovska
- S/ S-2 / H-1 Assist. Prof. Dr. Maria...
- SD S-2/H-1 Dr. Hau Vo Trung
- SD S-2/H-1 Dr. Sareh Larjany
- SH S_2_h_1Eccam foad rashed

Zoom Meeting: Hall 2 | View

Eljan Mustafayev

Hall 2: Adil Geybulla

Zoom Meeting: Hall 2 | View

Participants (10)

- OH Observer hall 2 (Co-host, me)
- Hall 2: Adil Geybulla
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- Ataq Nurullayeva
- Eljan Mustafayev
- H2-Farid Moseybov
- H2-Rena Kerimova
- S-1, H-2 Aygun Jafarova
- S-1/H-2 Tarlana Jafarova
- SESSION-1, HAAL-2, Huseynova

Zoom Meeting: Hall 4 | View

1. INTRODUCTION

Vietnam is a country with a large sea area, so the number of fishing vessels of Fishermen is increasing, especially fishing vessels with small power, working in the sea area near the mainland. However, due to operating in conditions near the mainland, Fishermen often have a subjective habit, not caring much attention to factors that can cause unsafety such as fuel leakage from the pump, leakage in the fuel tank, pipeline leak, lubricating oil leak [9]. These leaks, if not detected in time will cause great damage such as engine damage, fuel spillage that can cause fire and explosion [2]. In addition, most of the gas tanks used for cooking food on the ship are located near the engine room, because fishing vessels near the mainland are small ships, other spaces on the ship are often used for seafood, ice storage, and fishing tool.

Fishine vessels in Vietnam

Zoom Meeting: Hall 4 | View

Katılımcılar (12)

- H/ (Ortak oturum sahibi, ben)
- MODERATOR mal bar rights
- Hall 4, session 2, Betina saller
- Hall 4/ S2 enoelira kaibba
- Muhammad Anas
- S-2 / H-4 M. Rabah Delfoul
- S-2/H-4 BANETA CHOCHKELI
- S-2/H-4 Agbi Mahmood
- S-2/H-4 M. Soliman Al Shah
- S-2/H-4 SYAHRA ZUPARRAN
- SESSION-2/HALL-4, Yehar ALI
- S-2/H-4 Muhammad Naveem

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Tokyo

15.01.2022 | SESSION-1 | HALL-1



Tokyo Local Time: 14⁰⁰-16³⁰



Ankara Local Time: 08⁰⁰-10³⁰

HEAD OF SESSION: Assist. Prof. Dr. Kadir Ocalan

Assist. Prof. Dr. Kadir Ocalan	Necmettin Erbakan University, Turkey	A PHENOMENOLOGICAL STUDY OF HIGHER-ORDER PREDICTIONS FOR THE WEAK BOSON PRODUCTION RATIOS THROUGH (N)NLO IN QCD
Furkan Durmaz Elif İnce Handenur Yaşar Mahir İnce Abdullah Uslu	Gebze Technical University, Turkey	ADVANCED TREATMENT OF COKING WASTEWATER TREATED IN ANOXIC OXIC MEMBRANE BIOREACTOR
Hayreddin BOZTAŞ Bengü AKIN Esmâ KESKİN Prof. Dr. Hayrettin AHLATCI Assoc. Prof. Dr. İsmail ESEN Assoc. Prof. Dr. Yunus TÜREN Assist. Prof. Dr. Süleyman YAŞIN	Karabük University, Turkey	INVESTIGATION OF WEAR PERFORMANCE OF SILICON CARBIDE AND ALUMINIUM NITRIDE REINFORCED AZ91 ALLOY
Bedriye Ucpinar Durmaz Elnura Artykbaeva Ayse Aytac	Kocaeli University, Turkey	BIO-BASED POLYAMIDE 11/poly(lactic acid) BLEND: EFFECTS OF GRAPHENE NANOPATELET REINFORCEMENT
Yusuf Aslan Serhat Dazkır Şükran Katmer Ulvi Şeker	Gazi University, Turkey Oerlikon Balzers Kaplama Sanayi ve Ticaret Ltd. Şti., Turkey Ata Kalıp Sanayi ve Ticaret A.Ş., Türkiye	THE EFFECTS OF AlCrN BASED PVD COATING ON THE MOULD WEAR IN PLASTIC INJECTION MOULDING PROCESS
Kübra Tekin Hasan Güler	Hakkari University, Turkey Firat University, Turkey	ACTIVE FILTER DESIGN USING CCII AND CCCII
Samet KARABULUT Doç. Dr. İsmail ESEN	Karabük University, Turkey	EXPERIMENTAL AND FINITE ELEMENT METHOD INVESTIGATION OF THE EFFECT OF PROCESS PARAMETERS ON SPRING-BACK BEHAVIOR OF SCGADUB1180 HIGH STRENGTH SHEET IN U BENDING PROCESS
Serhat BAŞAK Aydın Atamer ATABEY Yusuf KARACA Ahmet FEZİOĞLU	Sar Makina Sanayi ve Ticaret A.Ş., Kocaeli, Türkiye Marmara University, Turkey	DEVELOPMENT OF MONO WIRE DRAWING MACHINE DESIGN
Cemal Kazım GONCA Seda METE Abdullah Can TEKİN Ahmet FEYZİOĞLU	SuperPay Ödeme Hizmetleri ve Elektronik Para A.Ş., Turkey Marmara University, Turkey	REVIEW OF THE NEED FOR ONLINE HEALTH SERVICES AND DEVELOPMENT OF AN ONLINE HEALTH PLATFORM



Tokyo

15.01.2022 | SESSION-1 | HALL-2



Tokyo Local Time: 14⁰⁰-16³⁰



Ankara Local Time: 08⁰⁰-10³⁰

HEAD OF SESSION: Prof. Dr. Adil Geybulla

Dr. Kərimova Rəna Cabbar kızı Rzayeva Sürəyya Cabbar kızı Əzizova Əsmət Nizami kızı Dr. Paşayeva Cahan Yusif kızı Səlimli Təhminə Azər kızı	Azerbaijan Medicine University	STRESS AND BIOLOGICAL REACTIONS OF SOME HEAVY METALS IN THE HUMAN BODY
Dr. Kərimova Rəna Cabbar kızı Həsənova Xumar Əliövşət kızı Cəfərova Qumru Kamil kızı Yusifova Mətanət Yusif kızı Yaqubova Vəfa Nadir kızı	Azerbaijan Medicine University	DISEASES CAUSED BY COMPLICATIONS AND DEFICIENCIES OF HEAVY METALS IN THE HUMAN BODY
Məmmədova N.A. İsmailzadə R.S. Aleskerova G.A Nasirli A.	National Oncology Center of Azerbaijan Republic	ERYTHROPOIESIS IN CHILDREN WITH MEDOLOLASTOMA. HEMATOLOGICAL DISORDERS
Hüseynova Gulgiz Agahasan	Azerbaijan Medical University	PECULIARITIES OF THE GLANDS WITH DIVERTICULA IN THE GENERAL EXCRETORY DUCT OF THE HUMAN URINARY BLADDER WALLS
Tarlana Jafarova	Azerbaijan Medical University, Azerbaijan	INTESTINAL DYSBACTERIOSIS AS A FACTOR IN PREGNANCY DISRUPTIONS
Müseyyibov F.M Khalilov V.H Guliyeva N.T Aliyeva S.İ	Azerbaijan Medical University, Azerbaijan	MODERN APPROACHES TO THE TREATMENT OF TUMORS
Afag N. Nurullayeva Arif A. Mehdiyev Elshan D. Mustafayev	NAS of Azerbaijan	STUDYING THE RADIOPROTECTIVE PROPERTIES OF SEROTONIN-MODULATED PROTEIN
Ass. Jafarova A.M. Ass. Eminova G.A.	Azerbaijan Medical University	CORRELATION INDICATORS OF EEG POTENTIALS OF VARIOUS BRAIN FORMATIONS IN A CONDITIONS OF A "NON - SIGNAL" SITUATION - "FACTOR OF RANDOMITY"
Prof. Dr. Adil Geybulla	Azerbaijan Medical University	BLOOD REINFUSION PRACTISE IN THE PATRIOTIC WAR OF AZERBAIJAN (1993-2020)



Tokyo

15.01.2022 | SESSION-1 | HALL-3



Tokyo Local Time: 14⁰⁰-16³⁰



Ankara Local Time: 08⁰⁰-10³⁰

HEAD OF SESSION: Rodolfo Reda

Rodolfo Reda Alessio Zanza Luca Testarelli	Spienza University of Rome, Italy	ULTRASOUND IMAGING IN DENTISTRY: A LITERATURE OVERVIEW
Ivelin Iliev Nadya Agova Sylvia Stamova Svetlana Georgieva	Medical university 'Prof. dr. Paraskev Stoyanov', Bulgaria	TOXICOLOGICAL CLASSIFICATION AND PROBABLE ACUTE ORAL TOXICITY OF GENERATED TRIFAROTEN METABOLITES USING IN SILICO METHODS
Billel Smaani Mohamed Salah Benlatreche Yassine Yakhelef Mohamed Fouad Bouklachi Nouh Mohammed Sahnoun	Centre Universitaire Abdel Hafid Boussouf, Mila, Algeria Boumerdes university, Boumerdes, Algeria	DESIGN AND IMPLIMENTATION OF A REAL-TIME SYSTEM FOR THE CLASSIFICATION OF PHARMACEUTICAL PRODUCTS CATEGORIES
Ahmad Azmi M.Ariffin Norzalita A.Aziz Bama V.V.Menon Norhayati M.Zain	Universiti Kebangsaan Malaysia KPJ Healthcare University College, Malaysia	THE DIMENSIONALITY OF INPATIENT SERVICES IN THE PRIVATE HOSPITAL SETTING
Temirgalieva E.M. Kiyekova B.X. Chaynyiet A.S. Yeskhozhaeva M.B. Dzhuzbanova A.U.	Kazakh National Medical University, Kazakhstan	THE USE OF CITRULLINE MALATE IN CHILDREN WITH AUTONOMIC NERVOUS SYSTEM DYSFUNCTIONS WITH BENIGN INTRACRANIAL HYPERTENSION
Dr. Denisa Veseli (Bego)	University of Medicine, Tirana, Albania	DIABETIC NEUROPATHY IN DIABETES MELLITUS TYPE 2
Alkhaibari, Reeham Forsyth, Rowena Smith Merry, Jennifer	The University of Sydney, Sydney, Australia	PATIENT-CENTERED CARE IN THE MIDDLE EAST AND NORTH AFRICAN REGION: A SYSTEMATIC MAPPING REVIEW
Galina Mratskova Nedko Dimitrov Damyam Petrov	Trakia University, Stara Zagora, Bulgaria University Hospital "Prof. Dr. St. Kirkovich" AD, Trakia University, Stara Zagora, Bulgaria	USE OF DEEP OSCILLATION AND THERAPEUTIC EXERCISES IN FUNCTIONAL RECOVERY OF PATIENTS WITH KNEE JOINT OSTEOARTHRITIS



Tokyo

15.01.2022 | SESSION-1 | HALL-4



Tokyo Local Time: 14⁰⁰-16³⁰



Ankara Local Time: 08⁰⁰-10³⁰

HEAD OF SESSION: Dr. Zeynep YADİGAROĞLU

Seda BEYAZ Ozlem GOK Abdullah ASLAN Ibrahim Hanifi OZERCAN Can Ali AGCA	Firat University, Turkey Bingol University, Turkey	THE EXPRESSION OF THE THERAPEUTIC EFFECT OF FULLERENE C60 NANOPARTICLE AGAINST HEART TISSUE DAMAGE ON TNF- α AND COX-2 GENE EXPRESSIONS
Ömer YAPRAKCI Sebahat GÜMÜŞ	Harran University, Turkey	DETERMINATION OF OXIDATIVE STRESS IN BITCHES WITH TRANSMISSIBLE VENEREAL TUMOR
Venhar ONAT Dr. Öğr. Üyesi Tuba KARABEY	Tokat Gaziosmanpaşa University, Turkey	THE IMPORTANCE OF TRIAGE IN EMERGENCY SERVICES AND THE ROLE OF THE NURSE
Ömer ATALAR Asuman ARKAŞ ALKLAY	Fırat University, Turkey Dicle University, Turkey	MORPHOLOGICAL AND MORPOMETRIC INVESTIGATION OF THE KNEE JOINT IN CATTLE WITH MAGNETIC RESONANCE (MR) IMAGES
Hilal İNCEBAY	Nevşehir Hacı Bektas Veli University, Turkey	ELECTROCHEMICAL CHARACTERIZATION AND PREPARATION OF AN ECONOMICAL AND EASY NANOHYBRID
Elif Gizem MÜDERRİSOĞLU	Hitit University, Turkey	THE RELATIONSHIP BETWEEN INTERNET ADDICTION AND PHYSICAL ACTIVITY LEVEL IN ADOLESCENTS
Dr. Zeynep YADİGAROĞLU	Aksaray University, Turkey	EXAMPLES of GOAL-ORIENTED FUNCTIONAL WARM-UP EXERCISES IN CHOIR EDUCATION



Tokyo

15.01.2022 | SESSION-1 | HALL-5



Tokyo Local Time: 14⁰⁰-16³⁰



Ankara Local Time: 08⁰⁰-10³⁰

HEAD OF SESSION: Ekrem Cem Çankırılıgil

Turkan Hasanova Allahverdi Rena Mirze-zade Islam	Azerbaijan National Academy of Sciences	DYNAMICS OF DECOMPOSITION IN SOILS OF DRY STEPPE OF AZERBAIJAN
Kürşat ALKOYAK Süleyman ASLAN Yusuf KAPLAN Özden SARIKAYA	Ministry of Agriculture and Forestry, Turkey	NATIONAL ANATOLIAN WATER BUFFALO BREEDING PROJECT CARRIED OUT IN TURKEY AND ITS APPLICATION PRINCIPLES
Selcan ÖZYALIN Mehmet MERT Güliden BALCI	Yozgat Bozok University, Turkey	THE EFFECT OF TRYPTOPHAN APPLICATIONS ON SOME BIOCHEMICAL PROPERTIES OF STRAWBERRY SEEDLINGS UNDER SALT STRESS CONDITIONS
Okahu Alpheus Chijindu Anaackwe Nicholas O.	Alex-Ekwueme"(Alex- Ekwueme Federal University, Nigeria	FORMULATION AND PRODUCTION OF EMULSION PAINT FROM ENYIGBA CLAY
Mulatu Liyew Berihun Atsushi Tsunekawa Nigussie Haregeweyn Mitsuru Tsubo Ayele Almaw Fenta Kindiye Ebabu Dagnenet Sultan	Bahir Dar University, Ethiopia Tottori University, Japan	MODELING THE IMPACT OF LAND USE AND MANAGEMENT OPTIONS ON RUNOFF AND SEDIMENT LOSS IN THE ETHIOPIAN HIGHLANDS
Ekrem Cem Çankırılıgil	Sheep Breeding Research Institute, Balıkesir, Turkey	DETERMINATION OF AMINO ACID COMPOSITION, COLOR AND TEXTURE PROFILE OF FRESH AND PROCESSED SEA CUCUMBER (HOLOTHURIA TUBULOSA)
VAISHALI KARDAM SAMIKSHA JAIN	Indra Gandhi National Open University, India Amity University, India	RELATIONSHIP between RELIGION and MENTAL HEALTH among WORKING WOMEN and HOUSEHOLD WOMEN
Shaymaa S. Lafa Fered Saadoon. A Luma Khairy. H	University of Baghdad, Iraq Processing, Ministry of trade, Iraq	The Influence of Utilizing Shea Butter Mixture on Physical and Organoleptic Properties for Chocolate Manufacturing



Tokyo

15.01.2022 | SESSION-2 | HALL-1



Tokyo Local Time: 17⁰⁰-19³⁰



Ankara Local Time: 11⁰⁰-13³⁰

HEAD OF SESSION: Assoc. Prof. Dr. Ophelia KANEVA

Dr. Minh, Le Thi Dr. Hau, Vo Trung	Thu Dau Mot University, Vietnam	LEGAL FRAMEWORK FOR ISSUING, TRADING VIRTUAL CURRENCY, AND PREVENTING VIRTUAL CURRENCY CRIME IN VIETNAM
Essam Fuoad Rasheed Mariam Ibrahim Hamood Al Karaawi Samyiah Hani Alouity	Najaf Governorate. Iraq University of Kufa, Iraq	E-LEARNING AND ITS IMPACT ON IMPROVING THE QUALITY OF THE EDUCATIONAL PROCESS: ANALYTICAL STUDY IN TEACHING ISLAMIC EDUCATION
Prof. Milena Apostolovska Stepanoska	Ss.Cyryl and Methodius University in Skopje, Makedonya	THE IMPORTANCE OF THE DECISION-MAKING CRITERIA IN DECISION MAKING PROCESS
Dalal Adnan Amer Maturi	King Abdulaziz University, Saudi Arabia	THE SUCCESSIVE APPROXIMATION METHOD FOR SOLVING FREDHOLM INTEGRAL EQUATION USING MAPLE
Assoc. Prof. Dr. Ophelia KANEVA	Varna Free University & Plovdiv University, Bulgaria	SUPERVISION IN A PEDAGOGICAL ENVIRONMENT: AN INNOVATIVE WAY TO SUPPORT PROFESSIONAL AND PERSONAL DEVELOPMENT OF PEDAGOGUES
Dr. Sareh Larijany	Ahlul Bayt International University, Iran	INTENTIONALITY AND THE QUR'AN
Asst. Prof. Dr. Alia Osman Sayed Saad	Imam Abdulrahman Bin Faisal University, Saudi Arabia	IMPACT OF SOCIOECONOMIC DEVELOPMENT ON FERTILITY TRANSITION: VECTOR AUTOREGRESSIVE MODEL
Assoc. Prof. Gladko A. Maryna	Minsk State Linguistic University, Belarus	RECREATION FUNCTION OF THE TV NEWS DISCOURSE
Tran Nhu Mai Van Hong Hanh	People's Police Academy, Vietnam	OVERVIEW OF THE PRESS WITH THE PROBLEM OF WRONGFUL CONVICTIONS



Tokyo

15.01.2022 | SESSION-2 | HALL-2



Tokyo Local Time: 17⁰⁰-19³⁰



Ankara Local Time: 11⁰⁰-13³⁰

HEAD OF SESSION: Prof. Hajar Huseynova

Sinem Kultural Karakundakoglu Behçet Behiç Olgun	Dokuz Eylul University, Turkey	FUNCTIONAL POSITION OF ART MANAGEMENT UNIT IN ART MUSEUMS
Lalə Məmmədova	Mingəçevir Dövlət Universiteti, Azərbaycan	MATHEMATICAL INEQUALITIES
Prof. Hajar Huseynova	Azerbaijan State Pedagogical University	AZERBAIJAN'S SYSTEM OF SPECIAL NAMES - HYDRONYMS
Alakbarova Khumar Elqam	Institute of Oriental Studies of ANAS	THE REFLECTION OF PROBLEMS OF ARAB IMMIGRANT WOMEN IN LITERATURE
Fatma Merve Uğur Prof. Dr. Seçil Şatır	Fatih Sultan Mehmet Vakıf University, Turkey	TURKISH AND JAPANESE HOUSES, THEIR ENVIRONMENTS AND THEIR NATURE IN THE CONTEXT OF THE LIVES OF THE TURKISH AND JAPANESE PEOPLE
Res. Assist. Dr. Ozlem ALKAN Seval AKCELIK	Ardahan University, Turkey Ataturk University, Turkey	THE USE OF SPICES IN THE NEAR EAST IN ANCIENT AGES
Lect. Dr. Naeema Arzeen Lect. Dr. Saima Arzeen Lect. Farhana Naureen	National University of Modern Languages, Pakistan University of Peshawar, Pakistan	THE ROLE OF PERSONALITY HARDINESS, SELF- EFFICACY, AND SOCIAL SUPPORT IN PREDICTING RESILIENCE AMONG HEALTHY PERSONS AND IN PATIENTS WITH NON-COMMUNICABLE DISEASES
Farhad Mikayilov	Ministry of Economy of the Republic of Azerbaijan	AZERBAIJAN'S ECONOMY AT A NEW STAGE OF DEVELOPMENT: ACHIEVEMENTS, PROSPECTS



Tokyo

15.01.2022 | SESSION-2 | HALL-3



Tokyo Local Time: 17⁰⁰-19³⁰



Ankara Local Time: 11⁰⁰-13³⁰

HEAD OF SESSION: Dr. Diego Norena-Chavez

Dr. Diego Norena-Chavez	Pontificia Católica del Perú- Centrum Catolica	INFLUENCE OF SARS-CoV-2 ON THE MEDIATING EFFECT OF ENTREPRENEURIAL PASSION IN THE RELATIONSHIP BETWEEN ENTREPRENEURIAL SELF-EFFICACY AND INNOVATIVE BEHAVIOR
Tuğba ÖZBÖLÜK	Bozok University, Turkey	FROM CLASS TO MASS: CONSUMER MOTIVATIONS FOR SECOND HAND LUXURY
Tamar Gamsakhurdia Lamara Kadagidze	Grigol Robakidze University, Georgia	FINTECH EVOLUTION AND REVOLUTION AND A NEW PARADIGM FOR THE OVERALL FINANCIAL SYSTEM
Vu Thi Hoa Dang Hoang Xuan Huy	Nha Trang University, Vietnam	BUILDING A TOURISM MARKETING STRATEGY FOR THE SOUTH-CENTRAL REGION OF VIETNAM IN ADAPTING TO THE COVID-19 PANDEMIC
Dr. Amina Zgarni	University of Tunis El Manar, Tunisia	ARE TUNISIAN BANKS MOVING MORE TOWARDS CAPITAL MANAGEMENT RATHER THAN EARNINGS MANAGEMENT?
Dang Hoang Xuan Huy Vo Dinh Quyet	Nha Trang University, Vietnam	FACTORS AFFECTING ECONOMIC GROWTH IN KHANH HOA PROVINCE, VIETNAM
Dr. Zeynep HÖBEL	Pamukkale University, Turkey	TAXATION IN DIGITALIZED ECONOMY
Ly Dai Hung	Vietnam Institute of Economics, Hanoi	PUBLIC INVESTMENT IN VIETNAM ECONOMY
Praveen K Krishnan L.R.K	VIT Business School, India	Impact of Artificial Intelligence on HR Practices in Information Technology Companies



Tokyo

15.01.2022 | SESSION-2 | HALL-4



Tokyo Local Time: 17⁰⁰-19³⁰



Ankara Local Time: 11⁰⁰-13³⁰

HEAD OF SESSION: Dr. Mai Duc Nghia

Farid H. Arna'ot Yashar Ali Nildem Tayşi Mustafa Özakça	Gaziantep University, Turkey	BEHAVIOR OF STEEL TUBE COMPOSITE BEAMS UNDER PUSH-OUT TEST
Besma SAKER Rachid CHAIB Mounira KELILBA	University Frères Mentouri Constantine 1, Algeria	USING THE SWOT APPROACH FOR EFFICIENT MANAGEMENT OF A CEMENT PLANT STUDY OF THE HAMMA BOUZIANE CEMENT PLANT IN CONSTANTINE, ALGERIA
Mounira KELILBA Rachid CHAIB Besma SAKER	University Frères Mentouri Constantine 1, Algeria	FOR A BETTER SYNTHESIS OF THE SITUATION IN URBAN TRANSPORT BY BUS IN THE CITY OF CONSTANTINE
Syahmi Zunurrayn Sanjay	Keningau Vocational College, Sabah, Malaysia	MODIFYING MACPHERSON SPRING COMPRESSOR FOR GREATER EFFICIENCY
Khatia Chokheli Grigol Khelidze	Georgian Technical University, Georgia	MULTIFACTORIAL FORECAST OF RIVER RUNOFF FOR RESERVOIR UNDER LIMITED INFORMATION CONDITIONS
Rabah Delfouf Nacerdine Bouzit Nacerdine Bourouba Salah Tlili Abdelhalim Brahimi	University Ferhat Abbas Sétif 1, Algeria Kasdi Merbah Ouargla University, Algeria University Ferhat Abbas Sétif 1, Algeria	DIELECTRIC BEHAVIOR OF TERNARY COMPOSITE MATERIALS: APPLICATION TO THE MINIATURIZATION OF MICROWAVE ELECTRONIC CIRCUITS
Mai Duc Nghia	Air Force Officer's College, Vietnam	SOLUTIONS FOR EARLY DETECTION OF UNSAFE INCIDENTS IN THE ENGINE ROOM OF THE FISHING VESSELS
Aqib Mehmood Waqar Ahmad Qureshi Ajaz Bashir Janjua Muhammad Naem Muhammad Soleman Ali Shah Ghulam Murtaza	University of Engineering and Technology, Taxila, Pakistan	3D CNC Plotting Machine
Dr. Taimoor Salahuddin Muhammad Awais	Mirpur university of science and technology (MUST), AJK. Pakistan	Carreau fluid model near the parabolic surface with slip velocity



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A PHENOMENOLOGICAL STUDY OF HIGHER-ORDER PREDICTIONS FOR THE WEAK BOSON PRODUCTION RATIOS THROUGH (N)NLO IN QCD**Kadir ÖCALAN**

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ABSTRACT

Higher-order theoretical predictions are presented for the differential cross sections ratios of the W^\pm and Z weak boson production in their subsequent electron decay channels in proton-proton (pp) collisions at different center-of-mass energies of 8, 13, and 14 TeV. The W^+/W^- and W/Z ratios are predicted through the inclusion of the next-to-leading order (NLO) and the next-to-NLO (NNLO) corrections in the domain of the perturbative quantum chromodynamics (QCD). The differential ratio distributions are provided as functions of the important kinematical observables including the boson transverse momentum and the leading associated jet transverse momentum and pseudorapidity which exhibit sensitivity to the perturbative QCD corrections. The predicted distributions are compared with the pp collision data recorded by the ATLAS experiment at the CERN LHC. The ratio distributions are justified to be under good control by the (N)NLO calculations for most of the phase space regions. Reduction of the estimated theoretical uncertainties due to scale variations in the cross section calculations is highlighted at both NLO and NNLO accuracies. Tests of different parton distribution function (PDF) models with the predicted ratio distributions are also reported.

Keywords: high-energy particle physics, W and Z boson, (N)NLO perturbative QCD, W and Z bosons production ratios

INTRODUCTION

Weak vector boson (W and Z bosons) production constitutes prominent benchmark processes at past and present hadron colliders including the CERN Large Hadron Collider (LHC). Production of W and Z bosons through their subsequent leptonic decay channels, $W \rightarrow \ell \nu$ and $Z \rightarrow \ell \ell$ (where, ℓ refers to a lepton which is either an electron e or a muon μ), offers precision tests of the quantum chromodynamics (QCD) and electroweak (EW) sectors of the standard model (SM) of high-energy physics. Leptonically decaying W and Z bosons are produced in abundance in proton-proton (pp) collisions with experimentally clean final states and high reconstruction efficiencies. These processes are important to improve modeling of backgrounds to rare SM processes and beyond the SM signatures such as supersymmetry and dark matter. Ratios of production cross sections of W^\pm and Z bosons, $\sigma(W^+)/\sigma(W^-)$ and $\sigma(W^\pm)/\sigma(Z)$, simply denoted as W^+/W^- and W^\pm/Z in this context, provide several important features. In these ratios, experimental uncertainties partially cancel paying the way for more precise experimental tests. Furthermore, the ratios are sensitive to ratios of densities of different quark flavors from the colliding protons and provide inputs for improving existing constraints on the parton distribution functions (PDFs) in the proton. The large amount of data acquired at 8 TeV and 13 TeV center-of-mass energies at the LHC has enabled its experiments to produce many recent measurements with greater precisions. The level of precision achieved by the LHC experiments demand theoretical calculations to advance through inclusion of higher-order corrections in the perturbative QCD expansions. As a consequence, the corrections beyond leading order (LO) which are next-to-LO (NLO) and next-to-NLO (NNLO) are needed to be calculated in an automated way by computational programs for calculations of production cross sections towards percent level or even per mille level precision. Therefore, it is the goal of this report to highlight two recent phenomenological studies (Ocalan, 2021) of the cross section ratios W^+/W^- and W^\pm/Z , presented at (N)NLO QCD either inclusively or differentially for several important kinematical observables.

The phenomenological results presented in this report are based on higher-order cross section calculations that are carried out within the Matrix computational framework (Grazzini, Kallweit and Wiesemann, 2018; Catani et al., 2009). Soft and collinear divergences that emerge in the perturbative expansion of cross section calculations in strong coupling constant α_s are cancelled by using the so-called q_T -subtraction method (Catani and Grazzini, 2007, Catani et al., 2012). The Matrix framework allows calculations of integrated cross sections and fully differential cross sections in realistic fiducial phase spaces for important SM processes including $pp \rightarrow W^+X \rightarrow e^+v_e+X$, $pp \rightarrow W^-X \rightarrow e^- + \bar{\nu}_e+X$, and $pp \rightarrow Z \rightarrow e^+e^-+X$ (where X stands for additional parton emission, i.e., a jet). In the calculations of W^+/W^- and W^+/Z ratios, fiducial phase space selection cuts are adopted consistently from the 8 TeV (M. Aaboud et al., 2018) and 13 TeV (G. Aad et al., 2016) ATLAS reference measurements, respectively. Various PDF sets are tested along with the calculations including the base NNPDF3x PDF sets as well as CT14, MMHT2014, and ABMP16 PDF sets. The PDF sets are all based on $\alpha_s=0.118$ and are exploited at appropriate perturbative orders. In the computations, the residual dependence parameter r_{cut} is evaluated with the choices of fixed-cut option $r_{\text{cut}} = 0.15\%$ for the differential results only and extrapolation limit $r_{\text{cut}} \rightarrow 0$ for both inclusive and differential results. Moreover, the central scales for the renormalization and factorization scales are fixed to the physical mass of the W boson as $\mu_R=\mu_F=m(W)= 80.38$ GeV for the W-boson decay process and to the Z boson mass as $\mu_R=\mu_F=m(Z)= 91.18$ GeV for the Z-boson decay process in the computations. Theoretical uncertainties due to scale choices are estimated by varying the scales μ_R and μ_F by a factor of 0.5 and 2.0 while imposing the constraint as $0.5 \leq \mu_R/\mu_F \leq 2.0$. The numerical uncertainties are found negligible in the calculations as they make up less than 1% of the estimated scale uncertainties. Theoretical scale uncertainties are accompanied with the central predictions of the ratios at (N)NLO QCD, which are highlighted briefly in the following.

PHENOMENOLOGICAL RESULTS

The W^+/W^- cross section ratios are predicted at (N)NLO differential in the W-boson transverse momentum $p_T(W)$ and the leading jet transverse momentum $p_T(j1)$ and compared with the 8 TeV ATLAS data (M. Aaboud et al., 2018) in Figure 1. The predicted $p_T(W)$ and $p_T(j1)$ are observed to be in very good agreement with the data throughout the entire ranges of these observables including the higher regions. The scale uncertainties are reduced significantly in going from NLO to NNLO predictions, where NNLO prediction provide a better description of the $p_T(W)$ over NLO. By the same token, the NLO prediction is observed to converge for a better description of the $p_T(j1)$ over LO for the entire ranges including also higher region. The $p_T(W)$ and $p_T(j1)$ distributions serve as an important role as part of the validation effort of the (N)NLO predictions for the W^+/W^- ratios at higher center-of-mass energies. The leading jet absolute rapidity $|y(j1)|$ in addition to the $p_T(W)$ and $p_T(j1)$ variables are predicted in perturbative QCD at 13 TeV. The 13 TeV predictions at (N)NLO are given in Figure 2 using NNPDF30, CT14, MMHT2014, and ABMP16 PDF sets for the aim of distinguishing among these PDF models. The predictions using different PDF sets are generally in agreement with each other but reveal some tensions in the higher ranges of the $p_T(W)$ and $p_T(j1)$ observables within larger scale uncertainties. The predictions using different PDF sets are in better agreement among each other in the central $|y(j1)|$ region, however they tend to distinguish among different PDF sets towards more in the forward $|y(j1)|$ region. In addition, the fiducial W^+/W^- ratios are predicted numerically at both 8 TeV and 13 TeV as provided in Table 1. The best predictions of the fiducial W^+/W^- ratios are obtained when using the slicing parameter with the fixed-cut option $r_{\text{cut}} = 0.15\%$ at NNLO QCD with a precision level of scale uncertainties down to 2.1%. In all the predictions, the differential distributions for the W^+/W^- ratios are under good control with the inclusion of higher-order perturbative QCD corrections.

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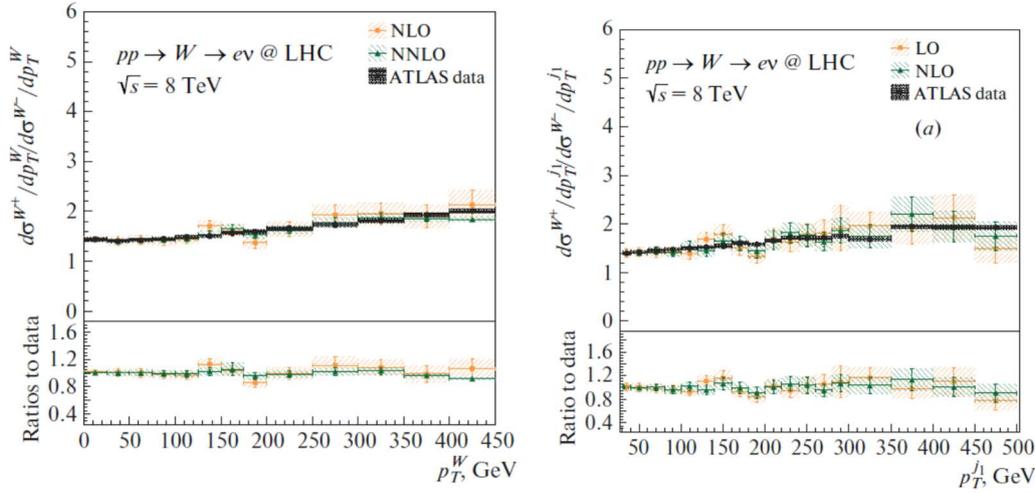


Figure 1. The differential W^+/W^- cross section ratio distributions as functions of $p_T(W)$ (left) and $p_T(j_1)$ (right). The (N)LO predictions are shown with theoretical uncertainties including scale, PDF, and α_s and are compared with the 8 TeV ATLAS data. The ratios of the predicted W^+/W^- ratios to data are provided in the lower panel.

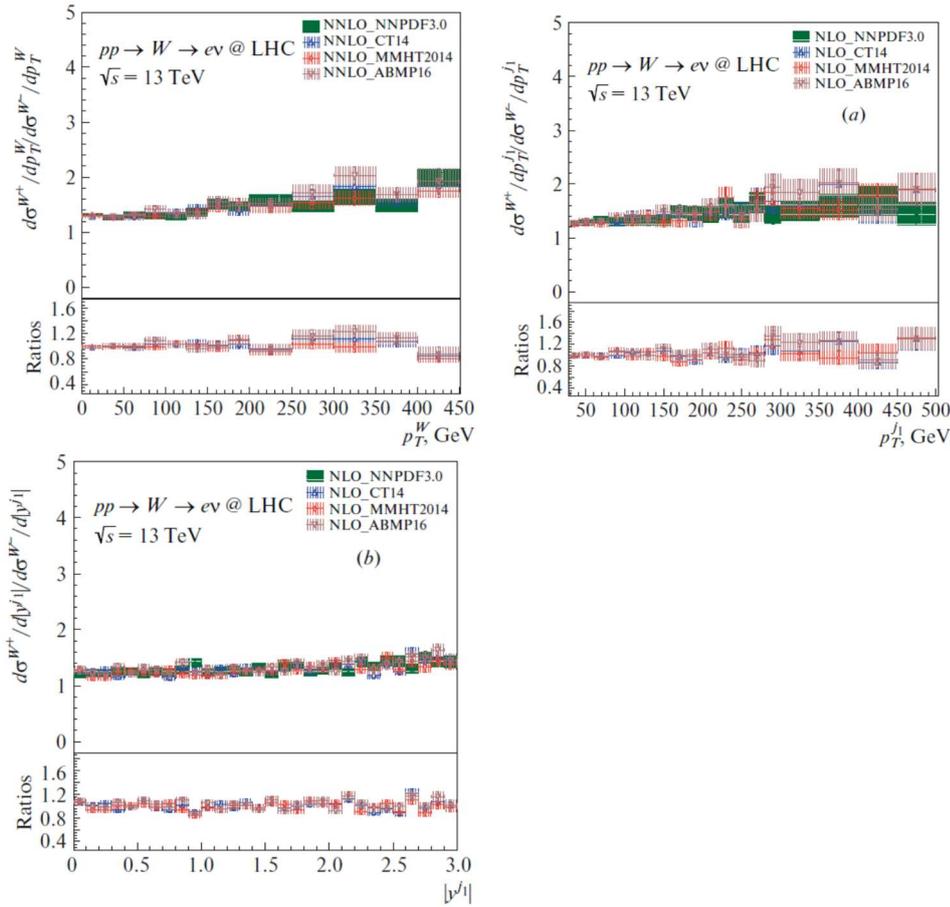


Figure 2. The differential W^+/W^- cross section ratio distributions as functions of $p_T(W)$ (top left), $p_T(j_1)$ (top right), and $|y(j_1)|$ (bottom). The (N)LO predictions are shown with theoretical uncertainties including scale, PDF, and α_s and are compared among different PDF models. The ratios of the predicted ratios from calculations using CT14, MMHT2014, and ABMP16 PDF sets to the predicted ratios from calculations using NNPDF3.0 PDF set are provided in the lower panel.

Table 1. The W^+/W^- fiducial cross section ratios at both 8 and 13 TeV, calculated at LO, NLO, and NNLO using NNPDF3.0 PDF sets. The (N)NLO cross sections are reported for a fixed cut-off value and the extrapolation limit of r_{cut} . The total uncertainties are accompanied with the central results in percent.

$\sigma_{\text{fiducial}}^{W^+}/\sigma_{\text{fiducial}}^{W^-}$	8 TeV	13 TeV
LO	$1.48 \pm 11.4\%$	$1.33 \pm 14.6\%$
NLO ($r_{\text{cut}} = 0.15\%$)	$1.45 \pm 4.0\%$	$1.30 \pm 4.7\%$
NLO ($r_{\text{cut}} \rightarrow 0$)	$1.45 \pm 4.1\%$	$1.28 \pm 4.8\%$
NNLO ($r_{\text{cut}} = 0.15\%$)	$1.44 \pm 2.1\%$	$1.31 \pm 2.3\%$
NNLO ($r_{\text{cut}} \rightarrow 0$)	$1.44 \pm 2.2\%$	$1.31 \pm 2.4\%$

The predicted W^\pm/Z ratios at (N)NLO QCD are justified using the 13 TeV pp collision data based on the ATLAS (G. Aad et al., 2016) and CMS (CMS Collaboration, 2015) measurements using inclusive production cross sections of the bosons in the fiducial phase space. The predicted W^- , W^+ , and Z boson cross sections together with the W^\pm/Z ratios are obtained at LO, NLO, and NNLO accuracies and compared with the LHC data as tabulated in Table 2. The predicted results are observed to be in consistent agreement with the data results, where the predicted ratio of the W^\pm/Z ratio to data are evaluated to be 1.025 ± 0.007 and 1.008 ± 0.007 by the ATLAS and CMS measurements, respectively. The W^\pm/Z ratios as a function of the final states with and without an associated jet are also predicted at LO and NLO QCD for both 13 TeV and 14 TeV energies as provided in Table 3. From LO to NLO accuracy, the ratios with respect to 0-jet and 1-jet final states are predicted with more reduced uncertainties as anticipated. Moreover, a number of distributions for the predicted W^\pm/Z ratios are provided at both 13 TeV and 14 TeV energies comprising boson transverse momentum $p_T(V)$ and $p_T(j1)$ observables. The predicted distributions are given in Figure 3 and Figure 4 for different PDF models. The predicted distributions clearly show sensitivity to NNLO predictions towards higher ranges of the $p_T(V)$, where scale uncertainties grow more. The same observation is true also for the $p_T(j1)$ where the predictions using different PDFs fluctuate towards higher region. On these distributions, the predicted ratios are found to be consistent among different PDF sets within uncertainties; however, tails of the distributions can potentially provide additional information for constraining PDF uncertainties. The $p_T(V)$ spectrum is more sensitive to higher-order corrections towards its higher ranges, where the NNLO predictions using NNPDF3.1 and CT14 PDF sets exhibit better agreement with each other apart from other PDF sets. On the other hand, the $p_T(j1)$ spectrum is challenging to model at NLO accuracy due to uncertainties, whereas the ratio distribution shapes are consistently predicted by using several PDF sets. The prediction using MMHT2014 PDF set exhibit some tensions in the intermediate region of the $p_T(j1)$.

Table 2. The 13 TeV predicted fiducial cross sections for the W^- , W^+ , and Z bosons and W^\pm/Z cross section ratios at LO, NLO, and NNLO accuracies. The predicted results in the combined electron and muon decay modes are compared with the data and fiducial phases of the ATLAS measurement (top) and of the CMS measurement (bottom). The ratios of the predicted NNLO results to CMS data ($\sigma_{\text{NNLO}}/\sigma_{\text{Data}}$ or $\sigma_{\text{NNLO/Data}}$) are also included. Scale uncertainties are reported along with the predicted central results. Data results are given with total experimental uncertainties.

Channel	σ_{LO} , nb	σ_{NLO} , nb	σ_{NNLO} , nb	σ_{Data} , nb	$\sigma_{\text{NNLO}}/\sigma_{\text{Data}}$
W^-	3.18 ± 0.42	3.45 ± 0.11	3.53 ± 0.02	3.50 ± 0.10	1.008 ± 0.006
W^+	4.18 ± 0.54	4.48 ± 0.15	4.53 ± 0.03	4.53 ± 0.14	1.000 ± 0.007
W^\pm	7.36 ± 0.96	7.93 ± 0.26	8.06 ± 0.05	8.03 ± 0.24	1.004 ± 0.006
Z	0.637 ± 0.078	0.752 ± 0.021	0.762 ± 0.005	0.779 ± 0.017	0.978 ± 0.006
	$\sigma_{\text{LO}}^{W^\pm}/\sigma_{\text{LO}}^Z$	$\sigma_{\text{NLO}}^{W^\pm}/\sigma_{\text{NLO}}^Z$	$\sigma_{\text{NNLO}}^{W^\pm}/\sigma_{\text{NNLO}}^Z$	$\sigma_{\text{Data}}^{W^\pm}/\sigma_{\text{Data}}^Z$	$\sigma_{\text{NNLO/Data}}^{W^\pm/Z}$
W^\pm/Z	11.56 ± 1.51	10.55 ± 0.35	10.57 ± 0.07	10.31 ± 0.20	1.025 ± 0.007

Channel	σ_{LO} , nb	σ_{NLO} , nb	σ_{NNLO} , nb	σ_{Data} , nb	$\sigma_{\text{NNLO}}/\sigma_{\text{Data}}$
W^-	3.07 ± 0.52	3.75 ± 0.12	3.86 ± 0.03	3.87 ± 0.14	0.998 ± 0.008
W^+	4.00 ± 0.52	4.94 ± 0.14	4.99 ± 0.04	4.97 ± 0.18	1.004 ± 0.008
W^\pm	7.07 ± 1.04	8.69 ± 0.26	8.85 ± 0.06	8.84 ± 0.32	1.001 ± 0.007
Z	0.612 ± 0.076	0.643 ± 0.018	0.660 ± 0.004	0.665 ± 0.034	0.992 ± 0.006
	$\sigma_{\text{LO}}^{W^\pm}/\sigma_{\text{LO}}^Z$	$\sigma_{\text{NLO}}^{W^\pm}/\sigma_{\text{NLO}}^Z$	$\sigma_{\text{NNLO}}^{W^\pm}/\sigma_{\text{NNLO}}^Z$	$\sigma_{\text{Data}}^{W^\pm}/\sigma_{\text{Data}}^Z$	$\sigma_{\text{NNLO/Data}}^{W^\pm/Z}$
W^\pm/Z	11.55 ± 1.70	13.52 ± 0.40	13.41 ± 0.09	13.29 ± 0.48	1.008 ± 0.007

Table 3. The differential W^\pm/Z cross section ratios as a function of jet multiplicity N_{jet} at LO and NLO accuracies. The NLO-to-LO ratios of the predicted ratios are also provided. The ratios are predicted exclusively up to one jet at both 13 TeV (top) and 14 TeV (bottom) pp collision energies. Scale uncertainties are reported along with the predicted central results.

N_{jet}	13 TeV		
	$d\sigma_{\text{LO}}^{W^\pm/Z}/dN_{\text{jet}}$	$d\sigma_{\text{NLO}}^{W^\pm/Z}/dN_{\text{jet}}$	$d\sigma_{\text{NLO/LO}}^{W^\pm/Z}/dN_{\text{jet}}$
= 0	11.26 ± 0.51	11.44 ± 0.27	1.016 ± 0.024
= 1	8.19 ± 0.87	8.65 ± 0.31	1.056 ± 0.038

N_{jet}	14 TeV		
	$d\sigma_{\text{LO}}^{W^\pm/Z}/dN_{\text{jet}}$	$d\sigma_{\text{NLO}}^{W^\pm/Z}/dN_{\text{jet}}$	$d\sigma_{\text{NLO/LO}}^{W^\pm/Z}/dN_{\text{jet}}$
= 0	11.22 ± 0.51	11.41 ± 0.28	1.017 ± 0.025
= 1	8.21 ± 0.88	8.66 ± 0.33	1.055 ± 0.040

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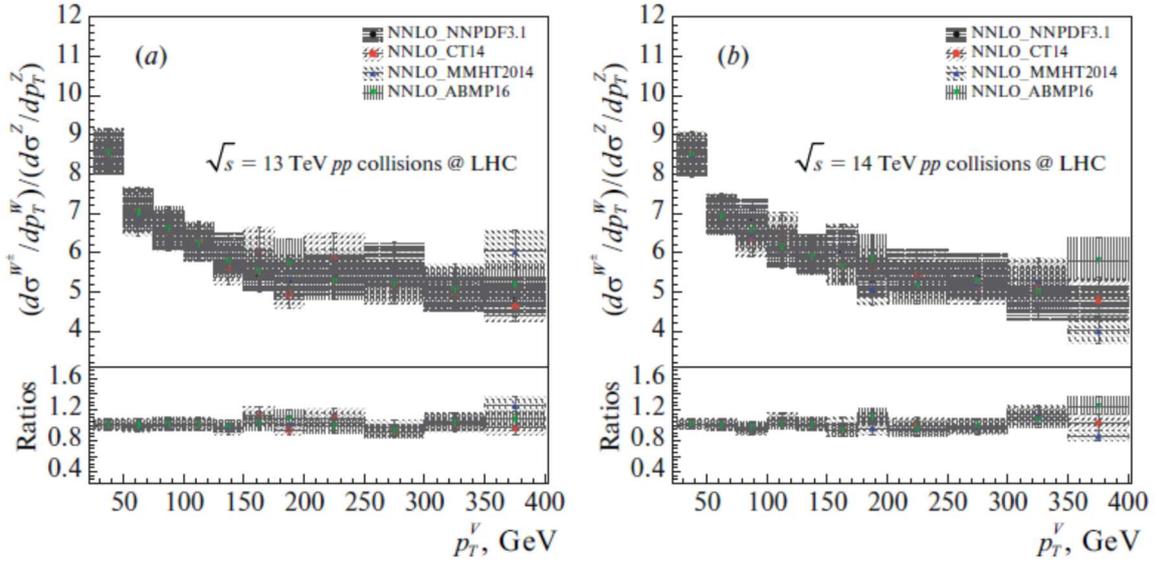


Figure 3. The differential W^+/W^- cross section ratio distributions as a function of the $p_T(V)$. The differential W^+/Z cross section ratios at both 13 TeV (a) and 14 TeV (b) for the $p_T(V)$ are provided. The differential distributions are predicted at NNLO accuracy using several PDF sets. The ratios of the differential ratios predicted using CT14, MMHT2014, and ABMP16 PDF sets to the differential ratios predicted using NNPDF3.1 PDF set are given in the lower panels. Scale uncertainties are represented by hatched bands around the predictions.

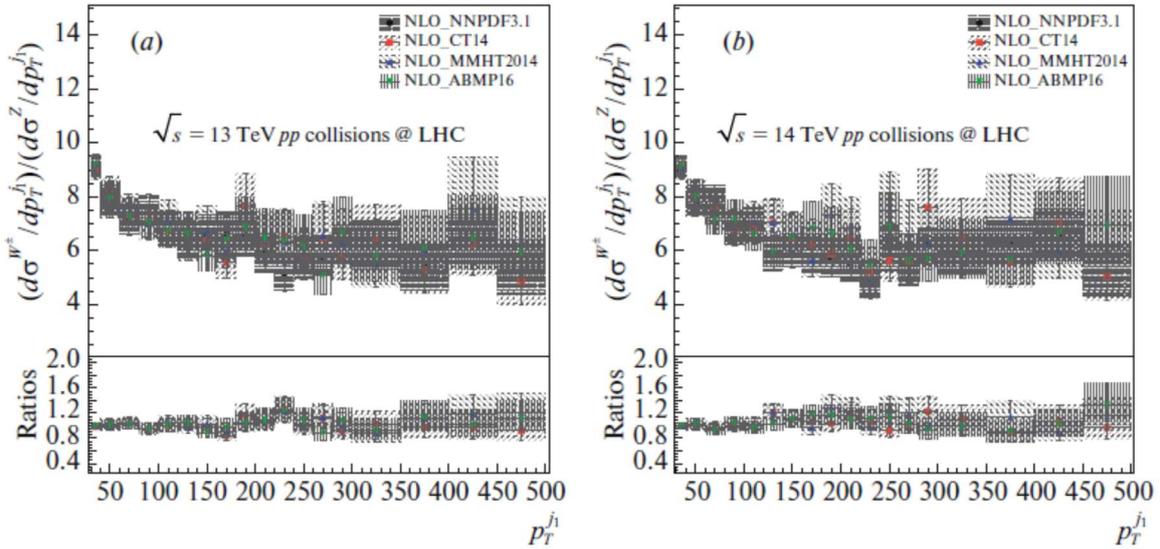


Figure 4. The differential W^+/W^- cross section ratio distributions as a function of the $p_T(j_1)$. The differential W^+/Z cross section ratios at both 13 TeV (a) and 14 TeV (b) for the $p_T(j_1)$ are provided. The differential distributions are predicted at (N)LO accuracy using several PDF sets. The ratios of the differential ratios predicted using CT14, MMHT2014, and ABMP16 PDF sets to the differential ratios predicted using NNPDF3.1 PDF set are given in the lower panels. Scale uncertainties are represented by hatched bands around the predictions.

CONCLUSION

In this report phenomenological, studies of the cross section ratios W^+/W^- and W^{\pm}/Z for the weak gauge boson production in their leptonic decay modes in pp collisions are highlighted based on the detailed literature works (Ocalan, 2021). The predictions are achieved at (N)NLO accuracy in the QCD perturbation theory for the W^+/W^- and W^{\pm}/Z ratios and are justified using the inclusive and differential measurements of pp collision data

at the LHC. In both W^+/W^- and W^\pm/Z ratios, description of the kinematical observables $p_T(W)$, $p_T(j_1)$, and $|y(j_1)|$ are notably improved with the inclusion of (N)NLO corrections. The scale uncertainties in the calculations are reduced in the higher-order corrections. The predictions from different PDF sets including NNPDF3x, CT14, MMHT2014, and ABMP16 PDF are tested for the differential distributions of the ratios which provide additional information for assessing sensitivity to PDF parametrizations. The ratio distributions shapes are consistently reproduced by the predictions using all the PDF sets for the bulk of the ranges except for some tensions induced by the ABMP16 PDF set. The results suggest that the ratio distributions can be precisely and accurately at NNLO QCD exploiting NNPDF3x, CT14, and MMHT2014 PDFs. Moreover, fiducial W^+/W^- and W^\pm/Z cross section ratios are also predicted at LO, NLO, and NNLO. The precision level improves down to 2% scale uncertainties at NNLO QCD. The best predictions for the fiducial W^+/W^- ratios are acquired at NNLO as $1.44 \pm 2.1\%$ at 8 TeV and $1.31 \pm 2.3\%$ at 13 TeV. The most precise prediction for the fiducial W^\pm/Z ratios are obtained as 10.57 ± 0.07 at 13 TeV and 13.41 ± 0.09 at 14 TeV at NNLO QCD. The results clearly show that (N)NLO predictions of the W^+/W^- and W^\pm/Z ratios are vital and can be used as important probes for providing additional information on precise PDF determinations.

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ADVANCED TREATMENT OF COKING WASTEWATER TREATED IN ANOXIC OXIC MEMBRANE BIOREACTOR

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ABSTRACT

Coal coking wastewater is usually produced by coal coking at high temperatures (900-1100°C), washing coke oven gas, and producing by-products. Coking wastewater contains a high concentration of phenolic, recalcitrant organic pollutants and inorganic pollutants such as ammonia, thiocyanate, and cyanide. Biological treatment such as Anoxic Oxic Membrane Bioreactor (A₂O-MBR) methods of coking wastewater cannot treat coking wastewater efficiently [Pal and Kumar, 2014]. The main purpose of this study was in order to meet discharge standards implemented by the Ministry of Environment, Urbanization and Climate Change (CSB) of the Republic of Turkey (Chemical Oxygen Demand (COD) ≤ 100 mg/L, Phenol ≤ 0.5 mg/L, Total Cyanide (TCN) ≤ 0.5 mg/L) [The Ministry of Environment Urbanization and Climate Change, 2004], the effluent of A₂O-MBR was further treated by Nanofiltration (NF), Powder Activated Carbon-Microfiltration (PAC-MF), and PAC-NF. The COD, phenol, and TCN concentrations of the effluent of A₂O-MBR were 371 mg/L, 0.64 mg/L, and 1.2 mg/L, respectively. Among the applied processes, NF met the discharge standard for TCN and phenol, but not for COD. PAC-MF, on the other hand, provided the standard for only phenol. However, the PAC-NF hybrid process achieved to meet the discharge standards in all parameters (COD = 97.6 mg/L, phenol < 0.01 mg/L, TCN < 0.025 mg/L).

Keywords: Coking Wastewater Treatment, Total Cyanide, Phenol, Nanofiltration (NF), Powdered Activated Carbon-Microfiltration (PAC), Powdered Activated Carbon-Nanofiltration (PAC-NF)

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INVESTIGATION OF WEAR PERFORMANCE OF SILICON CARBIDE AND ALUMINIUM NITRIDE REINFORCED AZ91 ALLOY

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ABSTRACT

Metal matrix composites are used in aerospace, automotive and manufacturing industries. High strength, hardness and lightness are at the forefront in these application areas. For this reason, metal matrix composites can meet the specified properties more than conventional alloys. Tribological properties can be improved by adding alloys or fibers of hard ceramic particles coaxially dispersed in the soft matrix phase. In this study, hybrid composite production is carried out by adding 15% SiC micro particles (60 µm) and 0.5% AlN nanoparticles (790 nm) to magnesium AZ91 alloy. The microstructure, mechanical properties and wear behavior of the produced hybrid composites are investigated. During the preparation of powder mixtures, liquid-based mixing method is used in order to ensure homogeneous dispersion of the additives without clumping. The production of composites is carried out by melt-based induction mixing, alloying and casting method. Finally, the casting samples are extruded at a ratio of 9:1. The AZ91 microstructure characterization has typical dendritic structure and the reinforcements showed a homogeneous distribution. SEM and EDS analyses are performed to prove the presence of supplements. On the other hand, in the microstructure images after extrusion, grain size reduction occurred in all alloys due to dynamic recrystallization. The mechanical properties of the samples are determined using a Brinell hardness device with a ball diameter of 2.5 mm and a

load of 187.5 N. The reinforcements added to the AZ91 alloy increased the hardness 1.16 times. The wear test is carried out under a load of 20 N, at a speed of 0.01 m/sec, and at a total sliding distance of 1000 m at 200 m intervals in a ball-on-flat reciprocating wear test device. The mass loss of AZ91 matrix is 0.0367 g, it is 0.0312 g in hybrid composite and the abrasion resistance is found to be parallel to hardness values. Moreover, the coefficient of friction of the AZ91 alloy is 0.126, this value decreased to 0.070 with the hybrid reinforcement. The wear rate and coefficient of friction of the hybrid composite are lower than the unreinforced alloy. The reason for this is thought to be the lubricating effect of the reinforcements in the contact area between the ball and the sample surface.

Keywords: AZ91, Silicon carbide, Aluminium nitride, Ball-on-flat reciprocating wear test.

ÖZET

Metal matrisli kompozitler havacılık, otomotiv ve imalat sektöründe kullanılmaktadır. Bu uygulama alanlarında yüksek mukavemet, sertlik ve hafiflik ön plandadır. Bu nedenle belirtilen özellikleri metal matrisli kompozitler geleneksel alaşımlara göre daha çok karşılayabilmektedir. Tribolojik özellikler, yumuşak matris fazında eşksenel dağılmış olan sert seramik partikül alaşımları veya fiberler ilave edilerek geliştirilebilir. Bu çalışmada magnezyum AZ91 alaşımına %15 SiC mikro partikül (60 µm) ve %0.5 AlN nanopartikül (790 nm) takviyesiyle hibrit kompozit üretimi gerçekleştirilmiştir. Üretilen hibrit kompozitlerin mikroyapısı, mekanik özellikleri ve aşınma davranışları incelenmiştir. Toz karışımlarının hazırlanması aşamasında takviyelerin topaklanmadan homojen dağılmasını sağlamak amacıyla sıvı bazlı karıştırma yöntemi kullanılmıştır. Kompozitlerin üretimi ise ergiyik bazlı indüksiyon karıştırma ile alaşımlama ve döküm yöntemiyle gerçekleştirilmiştir. Son olarak döküm numuneleri 9:1 oranında ekstrüze edilmiştir. AZ91 mikroyapı karakterizasyonu tipik dentritik yapıya sahiptir ve takviyeler homojen bir dağılım sergilemiştir. Takviyelerin varlığını ispatlamak için SEM ve EDS analizleri yapılmıştır. Ekstrüzyon sonrası mikroyapı görüntülerinde ise bütün alaşımlarda dinamik yeniden kristalleşme (DYK) sebebiyle tane boyutlarında küçülme meydana gelmiştir. Numunelerin mekanik özellikleri Brinell sertlik cihazıyla 2.5 mm bilye çapı ve 187.5 N yük kullanılarak belirlenmiştir. AZ91 alaşımına ilave edilen takviyeler sertliği 1.16 kat artırmıştır. Aşınma testi 20 N yük altında, 0.01 m/sn hızında ve 200'er metre aralıklarla toplamda 1000 m kayma mesafesinde ileri geri aşınma test cihazında yapılmıştır. AZ91 matrisin de kütle kaybı 0.0367 g olurken hibrit kompozitte 0.0312 g kadar olmuştur AZ91'in $3.825 \cdot 10^{-5}$ g/m olan aşınma hızı hibrit kompozitte $3.052 \cdot 10^{-5}$ g/m'ye düşmüştür ve aşınma direnci 1.25 kat artmıştır. Aşınma direnci sertlik testi ile paralel sonuçlar vermiştir. AZ91 alaşımının sürtünme katsayısı ise 0.126 iken hibrit takviyesiyle bu değer 0.070 e düşmüştür. Hibrit kompozitin aşınma oranı ve sürtünme katsayısı takviyesiz alaşımdan daha düşüktür. Bunun nedeni takviyelerin bilya ile numune yüzeyi arasındaki temas bölgesinde sağlamış olduğu yağlayıcı etki olduğu düşünülmektedir.

Anahtar Kelimeler: AZ91, Silisyum karbür, Alüminyum nitrür, İleri-geri aşınma testi.

INTRODUCTION

Pure magnesium is mostly known for its lightness, but it is rarely used as a structural material due to its poor mechanical properties (Song, et al., 1998). The magnesium alloys, which are produced to find solutions to the ever-increasing fuel price and weight reduction in the aviation and automotive sectors, are finding an increasing number of uses, as they are the lightest structural metallic materials and have the highest specific strength (Poddar, et al., 2007). The most popular ones are the AZ91 magnesium aluminum zinc alloys and these alloys offer a good combination of castability, corrosion resistance, and mechanical properties (Lü, et al., 2000). However, the need to develop materials with better mechanical properties continues due to poor creep resistance and decreased strength at high temperatures. Therefore, Magnesium metal matrix composites (MMC) have many advantages over magnesium alloys due to their high specific strength and stiffness, high elastic modulus, as well as improved creep and wear resistance (García-Rodríguez, et al., 2017).

In order to improve the mechanical and wear properties of magnesium alloys, hard ceramic particles must be included in the matrix. Therefore, silicon carbide (SiC), preferred the first reinforcing constituent in this study, exhibits various attractive properties such as high strength, general chemical inertness, low specific mass, and

low coefficient of thermal expansion at high temperatures exceeding 1500 °C (Katoh, et al., 2007). Secondly, we consider the other reinforcing constituent as aluminium nitride (AlN) because of its excellent thermal properties such as low thermal expansion coefficient and high thermal conductivity (Júnior, et al., 2016). The AlN exhibits good electrical insulation because of its low dielectric constant. The size of the SiC powder used in this study is 60 μm , and the size of the AlN powder is 790 nm. There is limited information in the literature regarding the use of nano aluminum nitride and micro silicon carbide powder as reinforcement of the Mg matrix (García-Rodríguez, et al., 2017; Poddar, et al., 2007; Sankaranarayanan, et al., 2015; Fathi, et al. al., 2020; Wang, et al., 2012; Vanlı, et al., 2018). The combination of SiC and AlN particles as reinforcements to the AZ91 matrix was first used in this study.

It is a very difficult issue to ensure homogeneous dispersion of reinforcement powders during the production of hybrid composite materials. Therefore, in this study, homogeneous dispersion of micro SiC and nano AlN powder in the matrix without agglomeration was achieved by using the liquid-based mixing method. The hybrid nanocomposite material with AZ91 matrix was produced by using melt-based induction mixing, alloying and casting process and finally extrusion method. The microstructure, hardness and wear resistance properties of the produced hybrid nanocomposites were investigated and evaluated.

MATERIAL AND METHOD

In this study, the liquid-based mixing method is used to mix the matrix and reinforcement materials homogeneously without clumping (Figure 1). In the V-type mixing equipment used as the mixing device, 9% Al and 15% SiC microparticle powders are blended for 1 hour. The blended powder mixtures are kept in $\text{C}_2\text{H}_5\text{OH}$ solution in a temperature-controlled ultrasonic vibration device, and as a result of this process, the mixture is stirred in a magnetic stirrer for 3 hours. At the end of the process, 15% SiC (mp) and 15% SiC (mp) + 0.5% AlN (np) mixtures are obtained and these mixtures are pressed with a 30 tons hydraulic press at 350 °C. The pre-sintering of the pressed capsules is carried out at 500 °C for 3 hours.

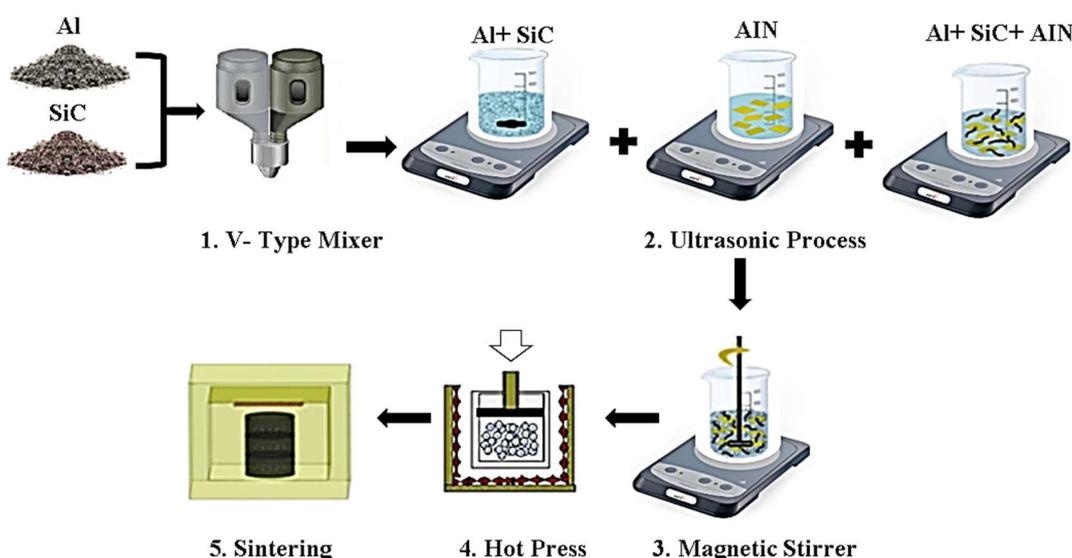


Figure 1. Preparation of powder mixtures.

The alloys are melted in an induction casting unit under a shielding gas consisting of a mixture of $\text{CO}_2+0.8 \text{ SF}_6$ and argon (Ar) gas (Figure 2). In the melting process of the alloys, while the melt was in a semi-solid state (450 °C), it was mixed with a graphite-based mechanical mixer rotating at 200 rpm for half an hour. Then, casting samples were obtained by pouring the molten metal into the mold at 750 °C.

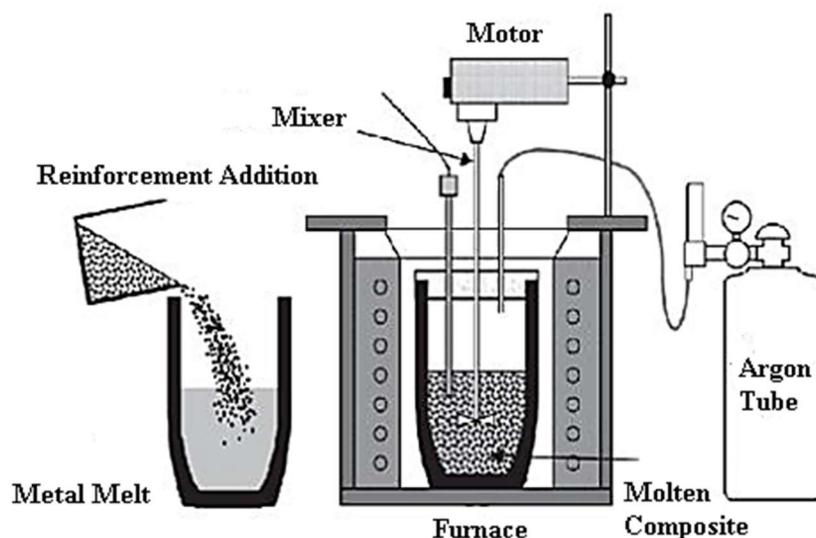


Figure 2. Schematic representation of mixing casting.

The homogenization process is carried out at 420 °C for 24 hours before extrusion to prevent micro segregations that may occur in the structure of hybrid composites whose casting process has been completed, and to provide a coaxial distribution. After the homogenization process extrusion process is carried out at 400°C at an extrusion rate of 9:1 and an extrusion speed of 0.3 mm/sec.

Surface preparation for microstructure investigations of the produced hybrid composites is done with sandpaper coated with SiC particles. The sanding process is applied from coarse to fine (240, 400, 600, 800, 1000, 1200 and 2500 grit) serially and polishing is done on the polishing felt with 1µm alumina paste. After polishing, the surfaces are etched with picral and microstructure examinations of the samples are made using the Carl Zeiss Microscope device. In addition, SEM and EDS analyzes are performed for detailed microstructure investigations. The Carl Zeiss Ultra Plus Gemini FE-SEM device is used for SEM analysis.

The measurements of hardness are made by leaving a trace in a Brinell hardness device under a force of 187.5 N with a 2,5 mm diameter steel ball.

The wear test of the alloys is carried out on a wear tester that moves ball-on-flat reciprocating, under a load of 20 N, at a speed of 0.01 m/s and a sliding distance of 1000 m. During the wear test, the friction force is measured by the load cell attached to the tribometer arm and recorded instantly on the computer.

EXPERIMENTAL RESULTS

Microstructure Results

Figure 3 - Figure 6, show microstructure images of AZ91 alloy and reinforced AZ91 (R-AZ91) with SiC and AlN at 20x and 50x magnification. As can be seen from the figures, a significant reduction in grain size occurred in all alloys due to dynamic recrystallization (DRC) during hot extrusion. It is seen that there is a bimodal grain structure consisting of coarse grains elongated in the extrusion direction in the samples parallel to the extrusion direction. The SiC and AlN grains are black and intermetallic β -Mg₁₇Al₁₂ phases are seen around the grain boundaries as indicated by the arrows in Figure 5. In addition, it is seen that the SiC and AlN reinforcement materials are homogeneously dispersed in the matrix.



Figure 3. Sectional microstructure images of the unreinforced AZ91 sample perpendicular to the extrusion direction

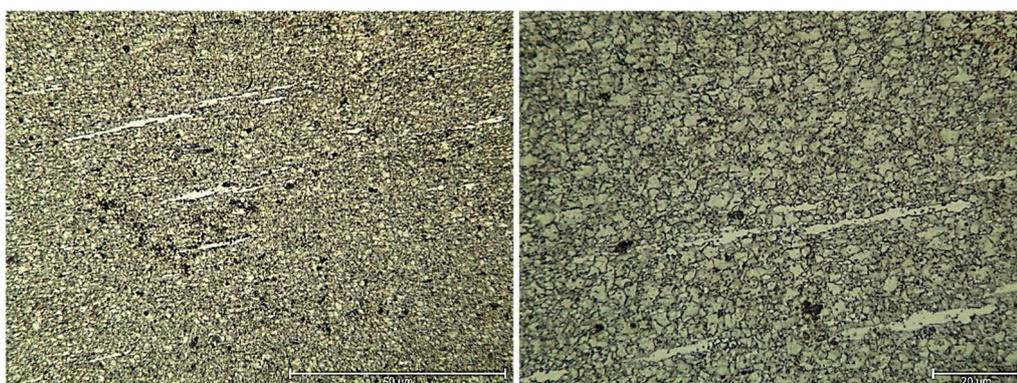


Figure 4. Sectional microstructure images of the unreinforced AZ91 sample parallel to the extrusion direction

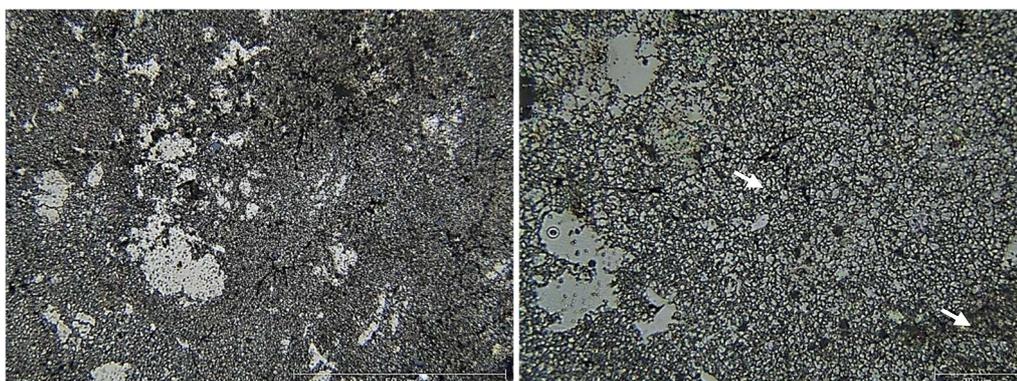


Figure 5. Sectional microstructure images of the R-AZ91 sample perpendicular to the extrusion direction

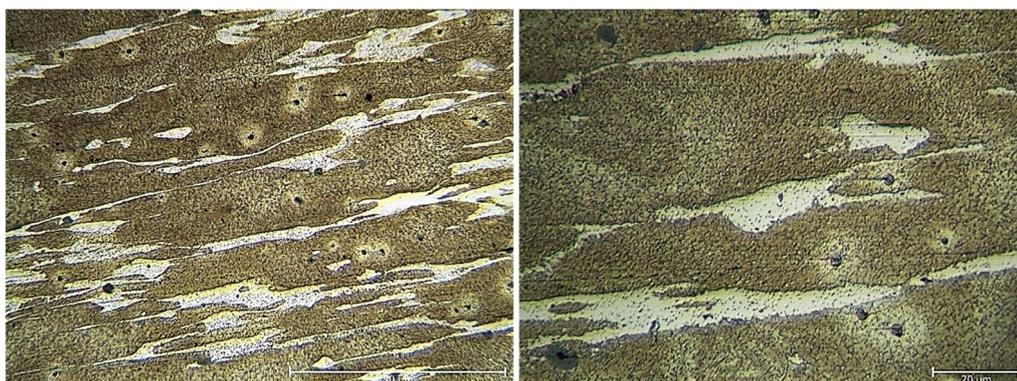


Figure 6. Sectional microstructure images of the R-AZ91 sample parallel to the extrusion direction

SEM-EDX Results

The SEM and EDX images of SiC and AlN reinforcements are given in Figures 7 and 8. Since the size of the AlN nano powder was used at 790 nm during the study, the AlN particles could be visualized at 50kx during SEM analyses, and Al and N containing particles (1 and 2 in Fig. 7b) are visible. Figure 6 shows the EDX analysis results of particles containing SiC and AlN.

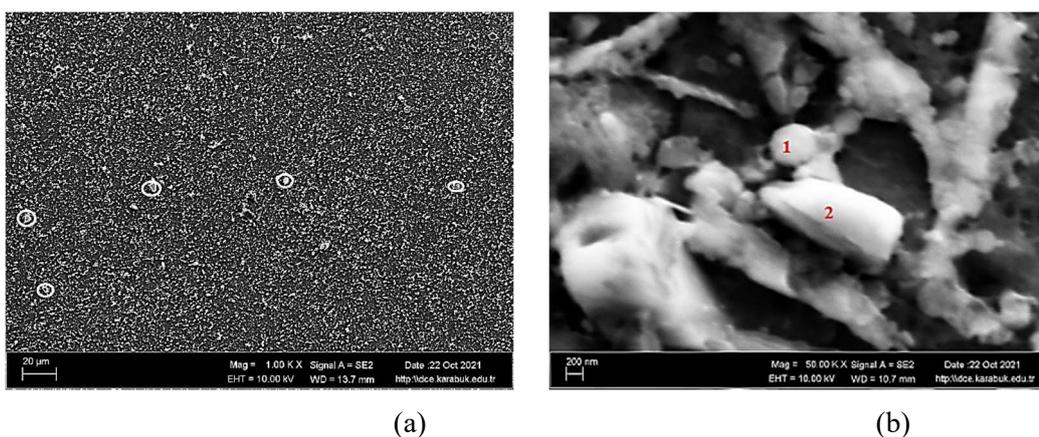


Figure 7. Sample containing (a) SiC and (b) AlN SEM analysis.

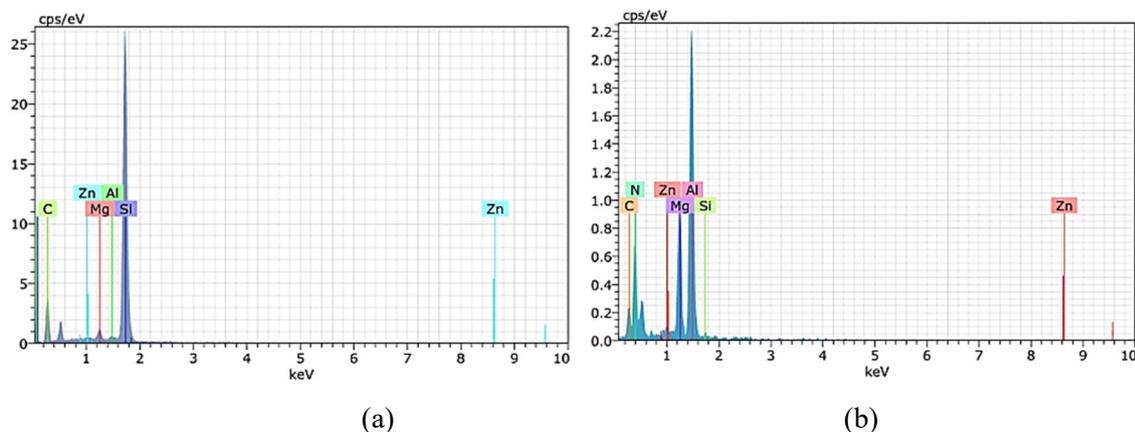


Figure 8. Sample containing a) SiC and b) AlN EDX analysis.

Brinell Hardness Results

Figure 9 shows the average values of the hardness measurements conducted for the AZ91 and R-AZ91 samples. The hardness of AZ91 is measured as 86 HB, however, Ocak et al. reported the hardness of AZ91 as 72 HB in their study and Vanlı et al. measured the hardness of AZ91 as 68.6 (Ocak, et al., 2019; Vanlı, et al., 2018). These studies show the addition of 15% SiC and using powder metallurgy cannot increase sufficiently the hardness of the composite. Since they only use powder metallurgy in the production of AZ91 samples but we used a new method with liquid-based mixing in this study. Thus, it has been shown that the method of preparation of the reinforcement samples used is the most effective factor in increasing the hardness of AZ91 alloys.

In Figure 9, it is seen that the hardness value increased considerably with the SiC and AlN reinforcement added to the AZ91 alloy. This is attributed to the intense and homogeneous distribution of SiC and AlN additions between the α -Mg and β -Mg₁₇Al₁₂ phases in these samples produced by the extrusion method. In addition, it is thought that the homogeneous distribution of AlN particles has an effective role in preventing dislocation movement. The reduction of the grain size due to the extrusion process and the addition of nano-sized reinforcement also provide an increase in strength by restricting the dislocation movement.

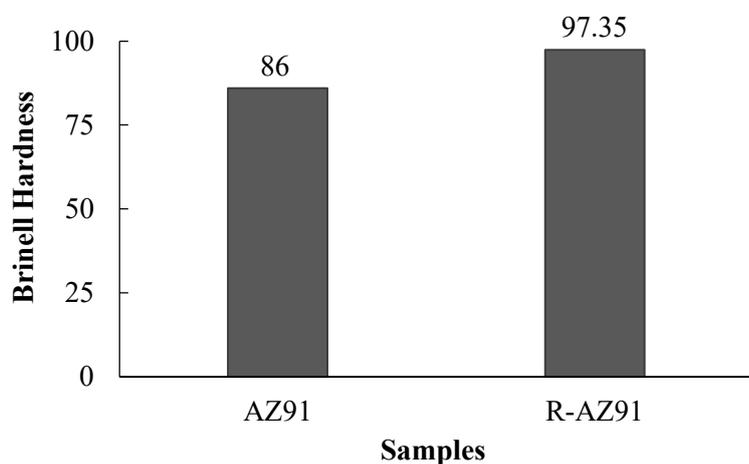


Figure 9. The hardness values of samples

Wear Test Results

When the results of weight loss test of the AZ91 and R-AZ91 samples given in Figure 10 are examined, it can be seen that the change in weight loss and sliding distance is linear. While the mass loss of the AZ91 matrix was 0.0367 g, it was 0.0312 g in the hybrid composite. The lowest weight loss is seen in the R-AZ91 sample while AZ91 exhibited the highest weight loss at a given sliding distance. This is due to the presence of added reinforcements (SiC and AlN) and the refinement of the grains with the extrusion method. In addition, as can be seen in Table 1, the wear rate of AZ91, which was 3.825×10^{-5} g/m, decreased to 3.052×10^{-5} g/m in the hybrid composite. When the wear resistance of the AZ91 sample is taken as the basis, the wear resistance of the R-AZ91 samples increases by 1.25 times, respectively. And the wear resistance results are parallel to the hardness test results.

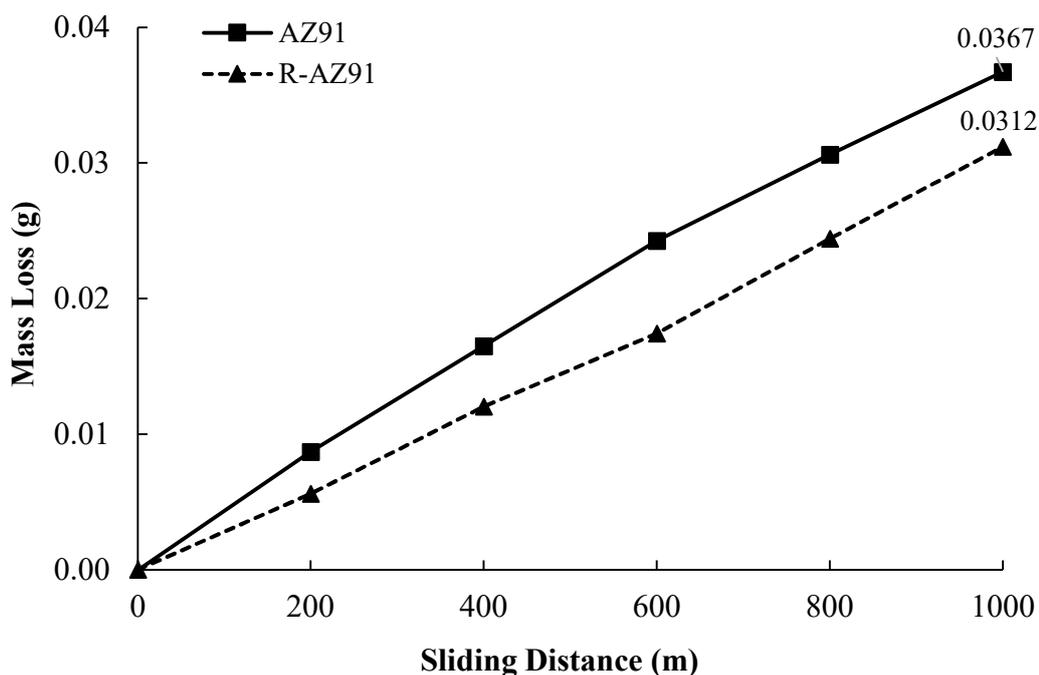


Figure 10. Mass Loss-Sliding Distance graph of samples

Table 1. The wear resistance relative rises of samples.

Sample	Wear Rate ($\times 10^{-5}$ g/m)	Wear Resistance Relative Rises
AZ91	3.825	1.00
R-AZ91	3.052	1.25

When the friction coefficients of the samples given in Table 1 are examined, the friction coefficient of AZ91 is about 0.126 and this value decreased to 0.070 with the addition of reinforcements in R-AZ91. As a result, it was concluded that the addition of reinforcement material to the AZ91 matrix caused a decrease in the coefficient of friction. Since the AZ91 sample is softer, the abrasive ball adheres to the material surface more and therefore the friction coefficient is high. This is evident from the discontinuous wear lines in the wear surface images in Figure 11.

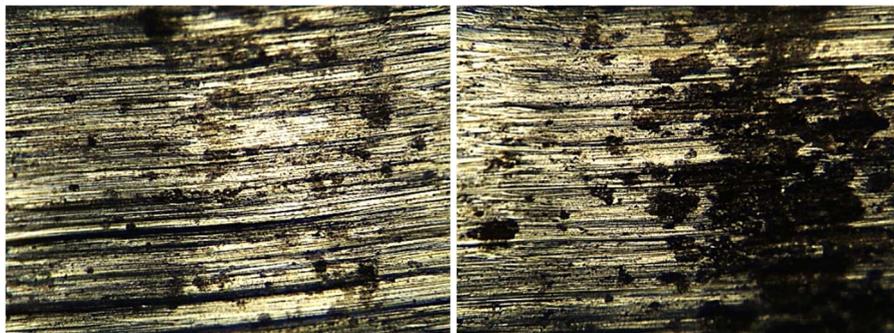


Figure 11. Surface images of the wear test samples a) AZ91 b) R-AZ91

As seen from the figures there are continuous grooves on the surface of the AZ91 sample. In addition, the wear surface of R-AZ91 shows adhesion which is seen as black and grey spots in the figures. The wear mechanism of the AZ91 sample is abrasive, while the one of the R-AZ91 is sticky. The black and grey stains observed on the wearing surfaces of the composites are depended to the formation of iron oxide on the wearing surfaces. According to Ahlatcı et al., the iron oxide film could cause a lubricating effect on the wear surface (Ahlatcı, et al., 2010). Moreover, the decrease in friction coefficient and increase in wear resistance of reinforced AZ91 matrices is related to the formation of the iron oxide film. Since the iron oxide film acts as a lubricant between the surfaces.

CONCLUSION

In this study, the hybrid composite sample with 0.5% AlN nanoparticle reinforcement in AZ91 matrix is produced by liquid-based mixing and induction melting method. The microstructure, hardness, and wear behaviour of these produced samples are examined and the following results are obtained.

It has been found that the β -Mg₁₇Al₁₂ intermetallic phases are dispersed homogeneously around the grain boundaries in the AZ91 matrix reinforced with SiC and AlN composites. The grains of the as-extruded composites are refined because of the dynamic recrystallization mechanism and elongated in the extrusion direction.

The hardness of the AZ91 sample is measured as 86 HB and because of the addition of 15% SiC and 0.5% AlN, the hardness value increased to 97.35 HB. The homogeneous distribution of nanoparticles in the structure, the production method used in the powder mixing stage and the thinning of the grains by the extrusion method are thought to be the reasons for the increase in hardness.

The mass loss of AZ91 matrix is 0.0367 g, it is 0.0312 g in R-AZ91, and the wear resistance is found to be parallel to hardness values. Moreover, the coefficient of friction of the AZ91 alloy is 0.126, this value decreased to 0.070 with the R-AZ91.

ACKNOWLEDGMENT

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BIO-BASED POLYAMIDE 11/POLY(LACTIC ACID) BLEND: EFFECTS OF GRAPHENE NANOPATELET REINFORCEMENT**Bedriye Ucpinar DURMAZ***Kocaeli University, Department of Chemical Engineering, Kocaeli, Turkey
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ORCID:0000-0002-9566-7881***ABSTRACT**

Polyamide 11 (PA11) and poly (lactic acid) are bio-based, semicrystalline thermoplastic polymers. PA11, which has features such as high impact resistance and flexibility, has a relatively low modulus and tensile strength. On the other hand, PLA exhibits high tensile strength and modulus but is rather brittle. The blending of PA11 and PLA (60/40 wt/wt %) provides high tensile strength and modulus compared to PA11 while providing considerably higher elongation and thermal stability compared to PLA. Moreover, this polymer blend, which is biobased and partially biodegradable, has the potential to be used instead of synthetic polymers. Further development of the properties of the PA11/PLA blend for use in specific applications such as automotive, electronics, and aerospace is an area of active research. Herein, reinforcing the blend with nanofillers is a preferred approach. Graphene nanoplatelets (GNP's) are >5nm thick materials consisting of 2-5 layers. They stand out with their high electrical conductivity, excellent mechanical properties, and large surface area. The addition of GNP to the polymer matrix has the potential to increase mechanical and thermal properties. Therefore, this paper examined the properties of PA11/PLA/GNP nanocomposites at various GNP amounts. The nanocomposites were fabricated by using commercial extrusion and injection molding methods. As expected, the tensile strength, Young modulus, storage modulus of the PA11/PLA blend improved with the addition of GNP. In general, GNP improved the thermal stability of the matrix by creating a "tortuous path" effect. In addition, differential scanning calorimeter results showed that GNP increased crystallinity by acting as a nucleating agent in the matrix.

Keywords: polyamide 11, poly (lactic acid), graphene nanoplatelet, thermal stability

INTRODUCTION

Polyamide 11 (PA11) is a high-performance thermoplastic produced from castor oil. It is bio-based and biocompatible, but not biodegradable. It exhibits some desired properties such as; high elasticity, impact strength, thermal stability, acceptable tensile strength, and high chemical resistance (Rashmi et al., 2018; Ucpinar Durmaz & Aytac, 2022). By blending PA11 with a biodegradable and bio-based polymer such as poly(lactic acid) (PLA), an environmentally friendly material can be obtained and the disadvantages of both polymers can be overcome. PLA is a polyester that exhibits low flexibility, higher Young's modulus, and tensile strength than PA11, and lower thermal stability and crystallization than PA11. In our previous study, it was observed that blending slightly improved the relatively weak properties of PA11 and PLA (Ucpinar Durmaz & Aytac, 2022). However, the properties of this blend are not at the desired level for high-performance applications. To improve the mechanical and thermal properties of the PA11/PLA blend and expand the usage areas, nanofiller reinforcement can be used.

Among the various nanofillers, graphene nanoplatelets (GNPs) are attractive due to their good mechanical properties, thermal stability, electrical and thermal conductivity, low cost (Rashmi et al., 2018; Zeng et al., 2020). GNPs are materials with a thickness of $>5\text{nm}$ consisting of 2-5 layers according to the production method (Safdari & Al-Haik, 2018). Graphene is a two-dimensional (2-D) single sheet of sp^2 -bonded carbon atoms packed in a honeycomb lattice. It has been reported that incorporation of GNP into PA11, increased Young's modulus, tensile strength, and also crystallinity of PA11 matrix (Rashmi et al., 2018). Moreover, Zeng et al. reported that the addition of GNPs significantly improved the thermal stability, tensile strength, and modulus of the PLA/PEO blend (Zeng et al., 2020).

Therefore, in this study PA11/PLA/GNP nanocomposites were fabricated by melt compounding and injection molding. The effects of various amounts of GNPs (0.5-1-3-5-10 wt.%) on the mechanical, thermo-mechanical, rheological, and thermal properties of PA11/PLA (60/40 wt/wt) blend were investigated.

MATERIALS AND METHODS

Materials

Commercial PA11 (Rilsan, BESNO P40 TL, density of 1.04 g/cm^3 and melting temperature of $181\text{ }^\circ\text{C}$) and commercial PLA (Ingeo 2003 D, density of 1.24 g/cm^3 melting temperature of $155\text{ }^\circ\text{C}$) were used as matrix materials. GNP (xGNP M-5) with a surface area of $120\text{-}150\text{ m}^2/\text{g}$, a thickness of $6\text{-}8\text{ nm}$, and an average particle size of $5\text{ }\mu\text{m}$ supplied from xG Sciences.

Methods

The nanocomposites were prepared by using a co-rotating twin-screw lab-scale extruder (Xplore 15 ml Micro-compounder). The extrusion parameters were barrel temperature of $210\text{ }^\circ\text{C}$, screw speed of 75 rpm , and 8 min residence time. The compounded melts were subsequently injection molded by using a laboratory scale injection molding machine (Xplore 12 ml Micro-injection Molder). The melt and mold temperatures were $210\text{ }^\circ\text{C}$ and $30\text{ }^\circ\text{C}$, respectively and injection pressure was 10 bars . A blend of 60/40 PA11/PLA by weight was used as the matrix. 0.5-1-3-5-10 wt.% GNP was added to this matrix.

The prepared nanocomposites were characterized by tensile test (ISO-527), dynamic mechanical analysis (DMA), rheological analysis, differential scanning calorimeter (DSC), thermogravimetric analysis (TGA).

RESULTS

Tensile test

The Tensile test was used to determine the effects of GNP inclusion into the PA11/PLA blend. The tensile strength, strain at break, and Young's modulus values were given in Table 1. The results showed that the PA11/PLA matrix exhibited a ductile behavior with a tensile strength of 47 MPa and an elongation of 258% . The modulus of the matrix is around 1870 MPa . With the addition of GNP to the PA11/PLA blend with these properties, the tensile strength first increased and decreased with the increasing amounts of GNP. When the amount of GNP increased to $10\text{ wt.}\%$, there was a sharp decrease in tensile strength by 24% . A similar trend was observed in the strain at break values.

Table 1. Mechanical properties of the samples

Sample	Tensile Strength (MPa)	Strain at Break (%)	Modulus (MPa)
PA11/PLA	47 ± 1.3	258.1 ± 6.4	1870 ± 200
0.5GNP	51.6 ± 1.3	292.4 ± 4.7	1386.3 ± 42.9
1 GNP	49.1 ± 0.7	257.0 ± 12.0	1360.4 ± 131.2
3GNP	47.6 ± 1.2	251.3 ± 11.5	1489.0 ± 32.3
5GNP	45.6 ± 0.4	225.5 ± 6.7	2192.5 ± 144.8
10GNP	35.4 ± 1.1	15.2 ± 2.6	2348.4 ± 41.2

The strain value of the composite containing 10 wt.% GNP decreased to 15% and this nanocomposite exhibited a brittle structure. The decrease in tensile strength and elongation can be attributed to weak interfacial interaction between GNP particles and matrix, and agglomeration with increased GNP amount (Alam et al., 2019; Zeng et al., 2020). Considering the effect of GNP addition on the modulus values, it is seen that 0.5-3% GNP addition causes a decrease in the modulus. This can be attributed to the weak matrix-fill interfacial interaction. When the GNP addition increased to 5wt.% and 10wt.%, it was observed that there was a significant increase in the modulus of the blend. The addition of rigid additives improved the nanocomposite's capacity to carry the stress applied to it.

Dynamic Mechanical Analysis

Thermo-mechanical properties of PA11/PLA matrix and PA11/PLA/GNP nanocomposites were determined by DMA and changes in storage modulus (E'), loss modulus (E''), and damping factor ($\tan \delta$) depending on temperature are shown in Figures 1. According to the storage modulus-temperature curves, the matrix exhibited a storage modulus of around 1200 MPa in the glassy region and this value gradually decreased as the temperature increased. In the rubbery region, a small increase in the storage modulus in the range of 100-130 °C is due to the cold crystallization behavior of PLA in the blend matrix (Walha et al., 2018). With the addition of GNP to the matrix, the E' increased with increasing GNP amount in both the glassy and rubbery regions. The storage modulus of the matrix, which was 1200 MPa at 30 °C, remained almost the same with the addition of 0.5-1% GNP. When the amount of GNP increased to 3wt.%, there was an increase of 15%, and 25% in the GNP content of 5 wt.%, 5%, and 10 wt.%, respectively. GNP restricted the mobility of polymer chains and formed harder interphase and composite structure. Similarly, the loss modulus gradually increased with the addition of GNP to the matrix. It is also observed that the E'' peaks gradually widen with the increasing amount of GNP. According to this, it can be said that the high amount of GNP delays the relaxation process of the polymer chains (Jyoti et al., 2016). According to the damping factor curves in Figure 2, the glass transition temperature (T_g) of the matrix at 48 °C gradually increased with the addition of GNP. This is since the GNP layers restrict the mobility of the polymer chains.

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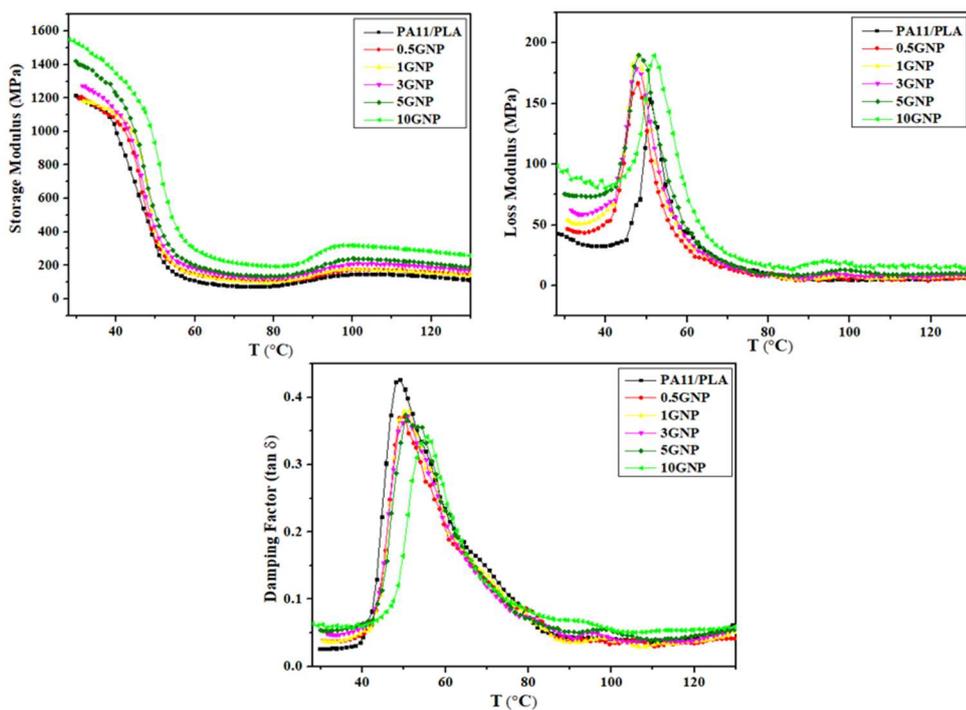


Figure 1. Thermo-mechanical properties of the samples

Rheological Properties

Frequency-dependent storage modulus (G'), loss modulus (G''), and complex viscosity curves of PA11/PLA matrix and PA11/PLA/GNP nanocomposites were given in Figure 2.

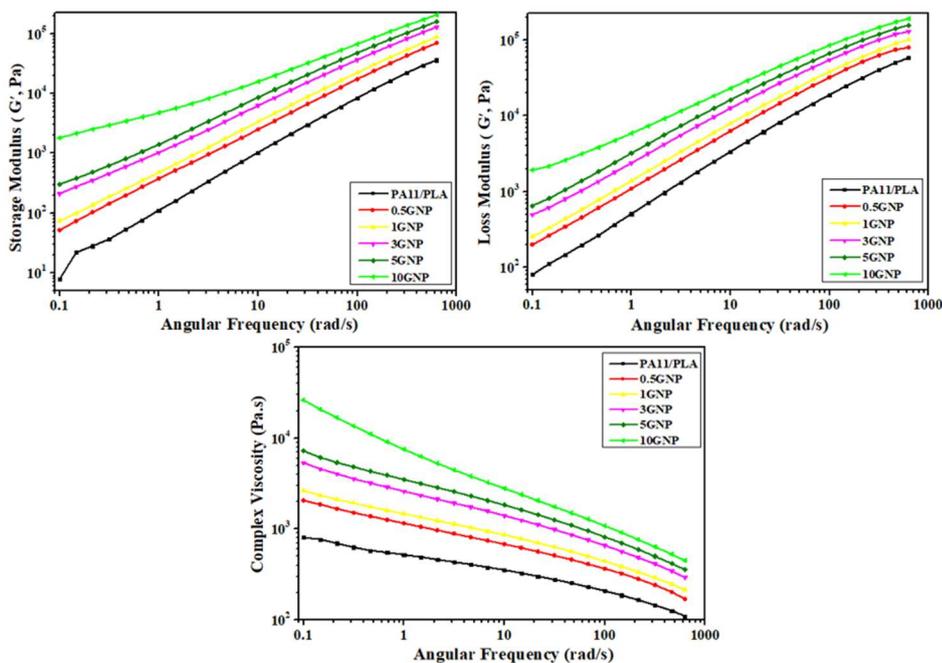


Figure 2. Rheological properties of the samples

It is seen from the angular frequency-complex viscosity graph that; the viscosity of all samples decreases with increasing frequency. This is the classical shear thinning behavior of polymers. Viscosity increased gradually with the addition of GNP to the matrix. The increase is particularly pronounced at low frequencies. GNPs, prevent the polymer chains mobility and increase the viscosity.

When the G' and G'' graphs are examined; It is seen that both modules of the matrix increase significantly with the addition of GNP. This increase can be attributed to the fact that the polymer chains are trapped between the graphene layer (Rashmi et al., 2018). Also, the modulus of all materials increased with increasing frequency. This is the typical behavior of polymers, which takes place according to the linear viscoelastic theory. A large amount of relaxation occurs in a short time by dissolving the polymer chain entanglement (Arabeche et al., 2020).

Differential Scanning Calorimeter (DSC)

DSC measurements were carried out to determine the thermal properties of the produced samples. Glass transition temperature (T_g), cold crystallization temperature (T_{cc}), melting temperature (T_m), crystallization temperature (T_c), and % crystallinity value (X_c) obtained from DSC analysis were given in Table 2. No significant difference was observed in T_g and T_m values with the addition of GNP to the PA11/PLA blend. The nanocomposites did not exhibit cold crystallization up to 10 wt.% GNP amount. Furthermore, T_c increased gradually with increasing GNP amount. This is due to the nucleating effect of GNP (Sutar et al., 2021).

Table 2. DSC data of the samples

Sample	T_g (°C)	T_{cc} (°C)	T_c (°C)	T_m^{PLA} (°C)	T_m^{PA11} (°C)
PA11	-	-	151.9	-	182.0
PLA	60.3	120.3	-	149.0	-
PA11/PLA	49.6		151.1	146.5	184.0
0.5GNP	48.3	-	154.7	145.1	183.8
1GNP	49.4	-	155.4	145.0	183.5
3GNP	50.4	-	157.2	145.2	184.6
5GNP	52.6	-	159.1	148.3	186.6
10GNP	49.2	112.3	160.0	148.4	183.8

Thermogravimetric Analysis

TGA was applied to determine the thermal stability of pure polymers, blends, and nanocomposites. The 5wt.% and 50wt.% degradation temperatures (T_{d5} and T_{d50}), maximum degradation temperatures (T_{max}), and residual char values obtained from TGA analysis were listed in Table 3. PA11 exhibited two-step degradation, the first attributable to the plasticizer in its structure and the second to the major degradation of the polyamide. Pure PLA, on the other hand, exhibited a one-step degradation starting at 300 °C.

Table 3. Thermal stability of the samples

Sample	T _{d5} (°C)	T _{d50} (°C)	T _{max-1} (°C)	T _{max-2} (°C)	T _{max-3} (°C)	Char (600 °C)
PA11	270.7	445.0	278.7	449.8	-	0.82
PLA	301.4	340.9	347.1	-	-	1.25
PA11/PLA	294.7	380.8	257.7	342.9	451.9	4.3
GNP	340	-	-	347.5	-	90.9
0.5GNP	293.8	414.6	263.2	355.9	461.6	2.5
1GNP	300.1	415.9	264.1	355.1	461.2	3.4
3GNP	295.1	429.3	274.1	353.8	459.5	4.9
5GNP	307.7	429.5	265.3	355.5	459.6	6.6
10GNP	293.8	430.2	276.6	354.2	457.4	12.1

Three-step TGA curves were obtained showing the degradation of each by blending the two polymers. It was observed that PA11 improved the thermal stability of PLA. When the thermal behavior of PA11/PLA/GNP nanocomposites is examined, it is seen that there is no regular change in T_{d5} value with increasing GNP amount, while T_{d50} temperature gradually increases. In addition, T_{max-1} and T_{max-2} values also increased. The residual amount of the matrix, which was 4.3%, first decreased with the addition of GNP and gradually increased after the addition of 3wt% GNP. In general, the addition of GNP improved the thermal stability of the matrix. The improvement in thermal stability can be attributed to the graphene sheets forming a mass transfer barrier that will delay the diffusion of decomposed volatile compounds (Sutar et al., 2021).

CONCLUSION

The GNP reinforced PA11/PLA nanocomposites were produced by using extrusion, and injection molding processes. The mechanical, thermo-mechanical, rheological, and thermal properties of samples were determined. The tensile strength, Young modulus, storage, and loss modulus of PA11/PLA blend increased with the increasing amount of GNP. The GNP addition prevents the chain mobility of polymers and increases T_g. Moreover, GNP acted as a nucleating agent. The thermal stability of the PA11/PLA blend improved by reinforcing GNP.

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**PLASTİK ENJEKSİYON KALIPLAMA PROSESİNDE AICrN ESASLI PVD KAPLAMANIN
KALIP AŞINMASINA ETKİLERİ**

**THE EFFECTS OF AICrN BASED PVD COATING ON THE MOULD WEAR IN PLASTIC INJECTION
MOULDING PROCESS**

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ÖZET

Ergiyik plastikler, özellikle lif veya dolgu malzemesi katkılı plastikler yüksek aşındırıcı akışkanlardır. Plastik enjeksiyon kalıplarında, dağıtıcı ve kalıp boşluğunun aşınma dayanımı artırmak için farklı kaplama uygulamalarına başvurulabilmektedir. Kaplama kompozisyonu, uygulanma sıcaklığı, kaplama kalınlığı, aşınma direnci, kalıp çeliği, kalıp sertliği gibi etmenler göz önüne alındığında fiziksel buhar biriktirme (PVD) kaplamaların uygulanabilirliği daha yüksek olmaktadır. PVD kaplama uygulamasıyla kalıp yüzeyinin aşınma dayanımı artırılabilir ve böylece kalıp ömrü uzatılabilir.

Bu çalışmada, aşındırıcı etkisi yüksek %30 cam elyaf takviyeli PA6 plastiklerin kalıplanması için kullanılan bir enjeksiyon kalıbına PVD Ark metodu ile AICrN esaslı kaplama uygulanmıştır. Kaplama işlemi öncesi ve sonrası ile kalıplama sonrasında, kalıp yüzey durumu incelenmiş ve kaplama karakterizasyonu yapılmıştır. Kalıplama sonrasında yapılan kaplama aşınma testleri kaplama kalınlığının 3,465 µm'dan 2,849 µm'ye düşmüş ve aşınma miktarı 0,6036 µm olarak tespit edilmiştir. Kaplamada gerçekleşen aşınmanın kalıp aşınmasına engel olduğu görülmüş ve PVD kaplama uygulaması ile kalıp ömründe iyileşme sağlanabileceği sonucuna varılmıştır.

Anahtar Kelimeler: PVD kaplamalar, plastik enjeksiyon kalıplama, AICrN kaplama, kalıp ömrü

ABSTRACT

Molten plastics, especially plastics with fibre or filler additives, are highly abrasive fluids. In plastic injection moulds, different coating applications can be applied to increase the abrasion resistance of the runner, and mould cavity. Considering factors such as coating compositions, application temperatures, coating thicknesses, wear resistances, mould steels, mould hardness, the applicability of physical vapour deposition (PVD) coatings is higher. With the application of PVD coating, the abrasion resistance of the mould surface can be increased and thus the mould life can be extended.

In this study, AICrN-based coating was applied to an injection mould used for moulding of 30% glass fibre reinforced PA6 plastics with high abrasive effect by PVD Arc method. Before and after coating process and after moulding, the surface condition of the mould was examined and the coating characterization was made.

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Coating wear tests performed after the moulding showed that the coating thickness decreased from 3.465 μm to 2.849 μm and the amount of wear was 0.6036 μm . It has been observed that the wear in the coating prevents the mould wear and it has been concluded that the mould life can be improved with the application of PVD coating.

Keywords: PVD coatings, plastic injection moulding, AlCrN coating, mould life

CCII VE CCCII KULLANARAK AKTİF FİLTRE TASARIMI

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Biyomedikal, haberleşme sistemleri gibi birçok alanda elde edilen sinyalleri, çeşitli dış etkenlerden dolayı oluşan gürültülerden arındırmak için aktif filtre devreleri sıklıkla kullanılmaktadır. Bu sinyallerin analizi için çoğunlukla Op-amp tabanlı aktif filtre yapıları kullanılmaktadır. Fakat son zamanlarda akım taşıyıcı devrelerin Op-amp'lara göre birçok avantajının saptanmasıyla, ilave olarak akım taşıyıcı tabanlı aktif filtre devreleri de kullanılmaya başlanmıştır. Bu çalışmada biyomedikal sinyallerde kullanılması için akım taşıyıcı tabanlı aktif filtre devreleri tasarlanmıştır. Akım taşıyıcı olarak ikinci nesil akım taşıyıcı (CCII) ve pozitif tip ikinci nesil akım kontrollü akım taşıyıcı (CCCII+) devreleri kullanılmıştır. Tasarlanan bu aktif filtre devrelerinin benzetimi için ORCAD Pspice programı kullanılmış ve frekans kazanç grafikleri elde edilmiştir.

Anahtar Kelimeler: Aktif filtre, Akım taşıyıcı, Pspice.

ABSTRACT

Active filter circuits are frequently used to purify signals obtained in many fields such as biomedicine and communication systems from noise caused by various external factors. Op-amp based active filter structures are mostly used for the analysis of these signals. However, recently, with the determination of many advantages of current conveyor circuits over Op-amps, additional current conveyor based active filter circuits have been used. In this study, current conveyor based active filter circuits are designed for use in biomedical signals. Second generation current conveyor (CCII) and positive type second generation current controlled current conveyor (CCCII+) circuits are used as current conveyor. For the simulation of these designed active filter circuits, ORCAD Pspice program was used and frequency gain graphs were obtained.

Keywords: Active filter, Current Conveyor, Pspice.

GİRİŞ

Akım taşıyıcılar, Op-amp gibi işlemsel kuvvetlendiricilerin alternatifi olarak geliştirilen ve akım taşıma mantığında çalışan aktif devre elemanlarıdır. Akım taşıyıcılar, ilk literatüre girdiğinden bu yana uzun bir zaman geçmiş olmasına rağmen, son yıllarda büyük ölçüde önem kazanmışlardır. Akım taşıyıcılar farklı işlevleri gerçekleştirerek ve daha iyi performans sunacak şekilde, zaman içerisinde çeşitli uygulamalarla ortaya çıkabilmektedirler. Filtre devreleri gibi işlemsel kuvvetlendirici ile oluşturulan yapıların akım taşıyıcılı alternatifleri ile ilgili birçok yayın yapılmaktadır. Son yıllarda yapılan çalışmalarda akım taşıyıcının tümdevre olarak piyasaya çıkması bu ilginin bir göstergesidir (Kuntman, 1994).

Akım taşıyıcılar, analog devre tasarımına akım modlu bir yaklaşım getirmekte ve karmaşık devrelerin fonksiyonlarını soyutlamaktadır. Akım taşıyıcıların uç denklemleri basit olmakla birlikte teorik olarak hesaplanan değerlerinin de ideal değerlere yakın olması önemlidir. Bu sayede akım taşıyıcıların fonksiyonelliği artmakta ve karmaşık devrelerin kolay bir şekilde tasarlanmasına yardımcı olmaktadır (Sedra vd., 1990). Akım taşıyıcı devrelerin kullanılmasıyla elde edilen devre ve tasarımlar daha geniş bant aralığında

çalışabilmektedirler. Bunun yanı sıra yüksek değişim oranı içermesi sayesinde yüksek frekanslarda çalışmalarını çok daha verimli ve performans bakımından iyidir (Wilson, 1986). Düşük güç tüketimi gerektiren uygulamalar için de akım taşıyıcı devreler kullanılarak yapılan devre tasarımları daha uygun olmaktadır. Tüm bunlara ek olarak, analizlerinin kolay olması, entegre devre yapılmaya uygun olmaları bir başka avantajlarıdır.

Bu çalışmanın amacı ise akım taşıyıcılar kullanarak alçak geçiren ve yüksek geçiren filtre tasarlamak ve frekans kazanç grafiklerini elde etmektir.

İKİNCİ NESİL AKIM TAŞIYICILAR (CCII)

1970 yılında Sedra ve Smith tarafından, birinci nesil akım taşıyıcılardan daha avantajlı olması sebebiyle ortaya atılmıştır (Smith ve Sedra, 1970). Şekil 1’de ikinci nesil akım taşıyıcıya ait devre yapısı verilmiştir.

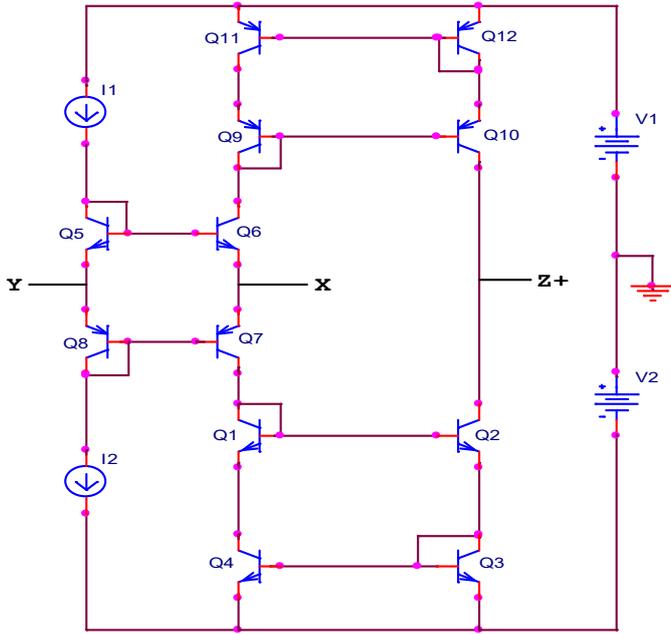


Şekil 1. CCII’nin devre yapısı

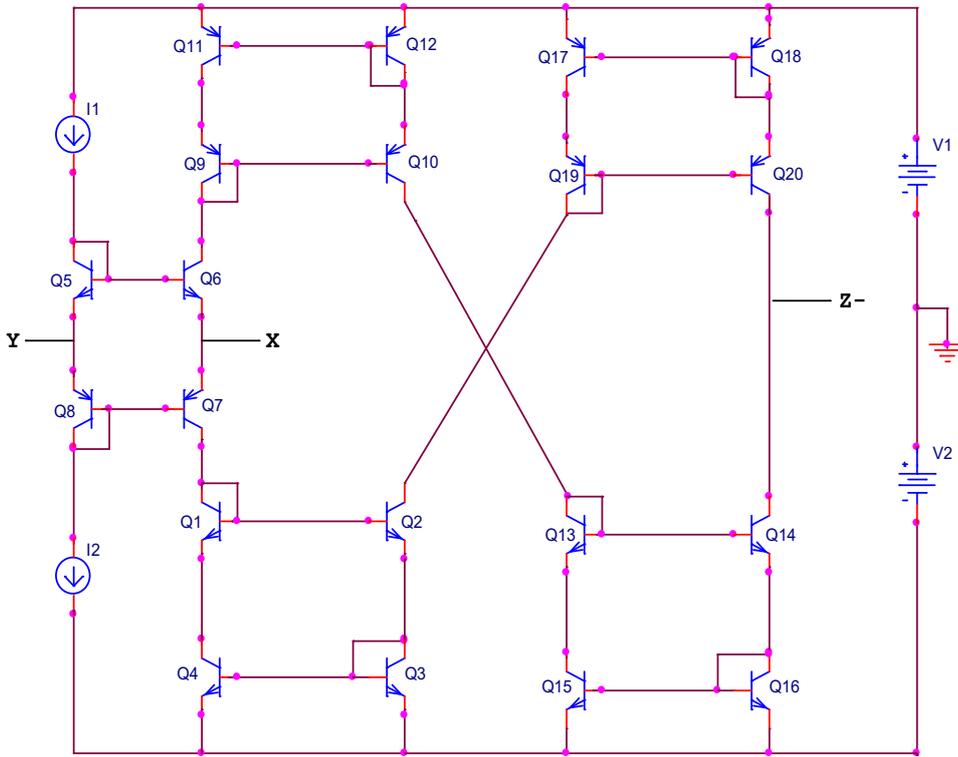
CCII 3 uçlu bir yapıya sahiptir. Y ucunda sonsuz bir giriş empedansı görülür. X ucunda görülen V_X gerilimi, Y ucuna uygulanan gerilimi takip eder, yani X ucunda sıfır giriş empedansı oluşmaktadır. X ucunda bir akım akıtılırsa aynı miktarda Z ucunda da bir akım akar. Y ucuna bir gerilim uygulandığında X ucunda da aynı miktarda bir gerilim oluşur, yani $V_X=V_Y$ olur. Aynı zamanda Y ucundan bir akım akmaz, yani I_Y akımı sıfır olur.

$$\begin{bmatrix} I_Y \\ V_X \\ I_Z \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ \beta & 0 & 0 \\ 0 & \mp\alpha & 0 \end{bmatrix} \begin{bmatrix} V_Y \\ I_X \\ V_Z \end{bmatrix} \quad (1)$$

Denklem 1’de CCII’nin matris denklemleri verilmiştir. Denklem 1’de ki γ ve α akım kazanç değerlerini, β ise gerilim kazanç değerini göstermektedir. İdeal durumlarda γ, α ve β ’nin 1 olması beklenirken ideal olmayan durumlarda bu değerler tam 1 değerini göstermez. Denklemlerdeki \mp ifadesi Z ucunda görülen akımın yönü hakkında bilgi vermektedir. Eğer + ise Z ucundaki akım devreye doğru akmakta ve pozitif tip ikinci nesil akım taşıyıcı (CCII+) olarak ifade edilmektedir. Eğer - ise Z ucundaki akım devrenin dışına doğru akmakta ve negatif tip ikinci nesil akım taşıyıcı (CCII-) olarak ifade edilmektedir. Şekil 2’de literatürde kullanılan CCII+’nin BJT ile tasarım devresi, Şekil 3’de ise CCII-’nin BJT ile tasarım devresi verilmiştir.



Şekil 2. CCII+'nin BJT ile tasarımı



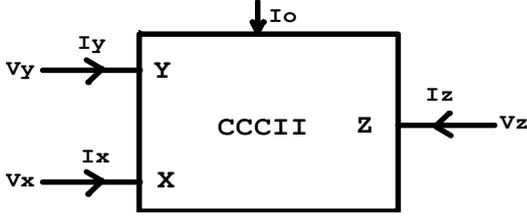
Şekil 3. CCII-'nin BJT ile tasarımı

3D CNC Plotting Machine

İKİNCİ NESİL AKIM KONTROLLÜ AKIM TAŞIYICILAR (CCII)

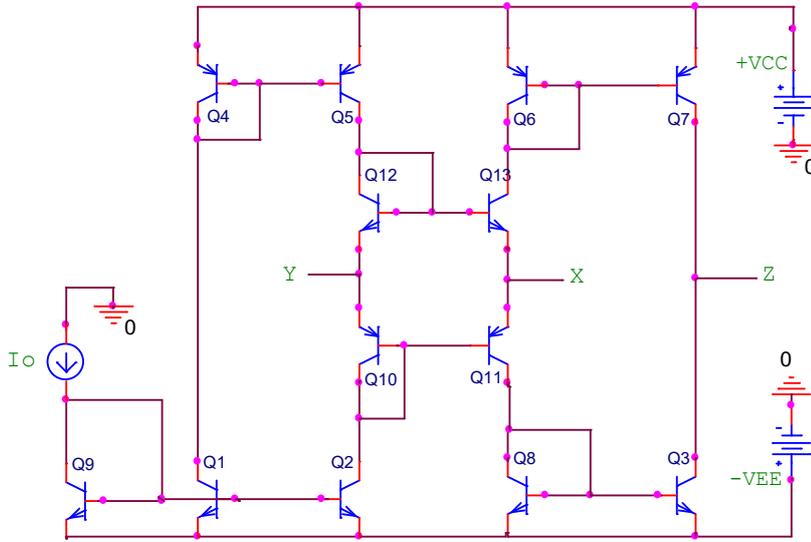
İkinci nesil akım kontrollü akım taşıyıcı devreleri, ikinci nesil akım taşıyıcıdan (CCII) türetilen ve CCII devresinin X ucunda düşük kutuplama akımlarındaki seri parazitik direncinin (R_x) akım ile kontrol edilmesiyle

elde edilen bir devredir (Fabre vd., 1995; Demirtaş, 2014). Akım kontrollü akım taşıyıcının (CCCII) blok şeması Şekil 4’de verilmiştir.



Şekil 4. CCCII’nin blok şeması

Blok şemasında da görüldüğü gibi CCCII devresi üç uçlu bir yapıya sahip ve I_0 kutuplama akımı ile kontrol edilmekte olan akım taşıyıcı devresidir. CCCII’nin Z ucunda görülen akım devreye doğru ise pozitif tip ikinci nesil akım kontrollü akım taşıyıcı (CCCII+), akım devreden dışarı doğru ise negatif tip ikinci nesil akım kontrollü akım taşıyıcı (CCCII-) olarak adlandırılır. Literatürdeki CCCII+’nin BJT ile devre yapısı Şekil 5’de gösterilmiştir.



Şekil 5. CCCII’nin BJT ile devre yapısı

Şekil 5’deki akım taşıyıcı devresine ait ideal tanım bağıntısı Denklem 2.a’da, I_X akımının kutuplama akımı (I_0) ve Termal gerilimi (V_T) arasındaki ilişki ise Denklem 2.b’de gösterilmiştir (Fabre ve Alami, 1995).

$$\begin{bmatrix} I_Y \\ V_X \\ I_Z \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 1 & R_X & 0 \\ 0 & \mp 1 & 0 \end{bmatrix} \begin{bmatrix} V_Y \\ I_X \\ V_Z \end{bmatrix} \quad (2.a)$$

$$I_X = 2I_0 \cdot \sinh(V_X/V_T) \quad (2.b)$$

Denklem (2.b)'de $V_X \ll V_T$ kabul edilirse parazitik direnç ifadesi Denklem 3'deki gibi ifade edilir.

$$R_X = \frac{V_T}{2I_0} \quad (3)$$

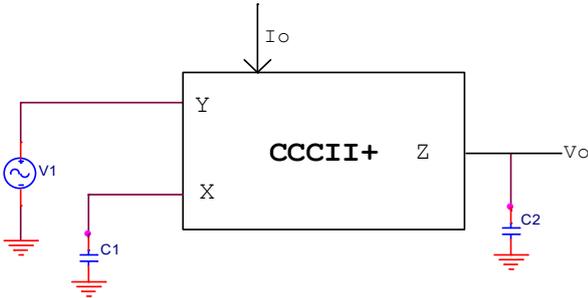
V_T ısı gerilimini göstermekte ve oda sıcaklığında değeri yaklaşık 25,85 mV kabul edilmektedir. I_0 ise kutuplama akımını göstermektedir. Uygulamalarda bu R_X direncini mutlaka göz önünde bulundurmak gerekir aksi takdirde frekans cevaplarında yanlışlıklar meydana gelir. Bu R_X direncini ve devrenin R_X 'e bağlı diğer parametrelerini kutuplama akımını (I_0) değiştirerek istediğimiz gibi ayarlayabiliriz (Demirtaş, 2014).

MATERYAL VE METOT

Bu çalışmada Pspice programı kullanılarak akım taşıyıcı tabanlı aktif alçak geçiren ve yüksek geçiren filtre devreleri tasarlanmıştır. Pspice programında benzetimi gerçekleştirilen aktif filtre devrelerinin frekans kazanç grafikleri elde edilmiştir.

CCCII+ Alçak Geçiren Filtre

İkinci nesil akım kontrollü akım taşıyıcı ile tasarlanan gerilim modlu alçak geçiren filtrenin devre yapısı Şekil 6'da verilmiştir (Fabre vd.,1996).



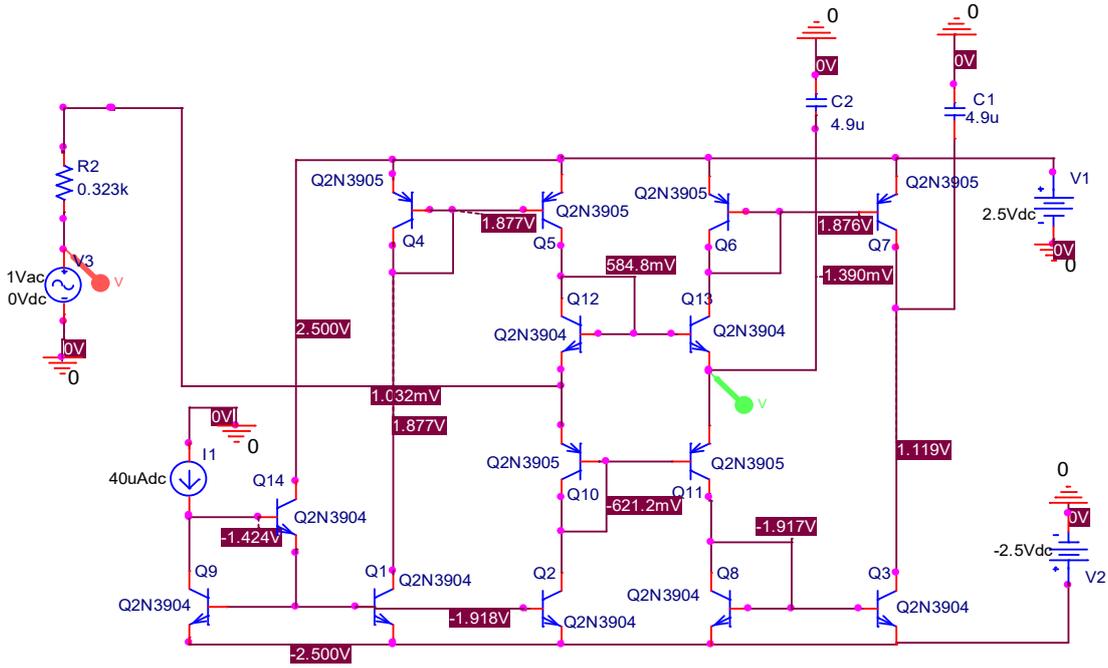
Şekil 6. CCCII+ alçak geçiren filtre devre yapısı

Bu devrede bir uçları topraklanmış 2 adet kondansatör kullanılmış ve R_X parazitik dirençten faydalanılmıştır. Devrenin çıkış ve giriş gerilimleri arasındaki ilişki ve devrenin kesim frekansı sırasıyla bağıntılarda verildiği gibidir.

$$\frac{V_{out}(s)}{V_{in}} = \frac{1}{1+sR_X C} \quad (4)$$

$$f_c = \frac{1}{2\pi R_X} \sqrt{\frac{1}{C_1 C_2}} \quad (5)$$

Pspice da gerçekleştirilen BJT ile tasarlanmış CCCII+ alçak geçiren filtrenin benzetim devresi Şekil 7'de verilmiştir.

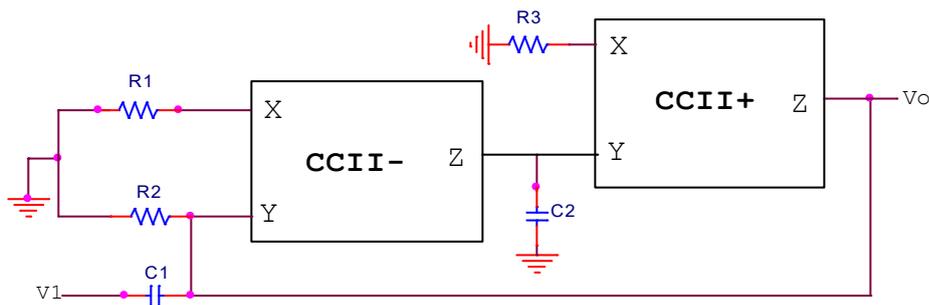


Şekil 7. CCCII+ alçak geçiren filtre benzetim devresi

Tasarlanan devrede Pspice bipolar transistörlerden yararlanılmıştır. X ve Z ucuna bağlanan kapasiteler eşit ve 4.9µF seçilmiştir. Kutuplama akım 40µA seçilmiş ve görülen parazitik direncin değeri yaklaşık 323Ω'dur. Besleme gerilimleri ise 2.5V seçilmiştir.

CCII+ ve CCII- ile Yüksek Geçiren Filtre

Yüksek geçişli bir yanıt elde etmek için CCII tabanlı yüksek geçiren filtrenin devre şeması Şekil 8'de verilmiştir (Sagbas vd.,2005).



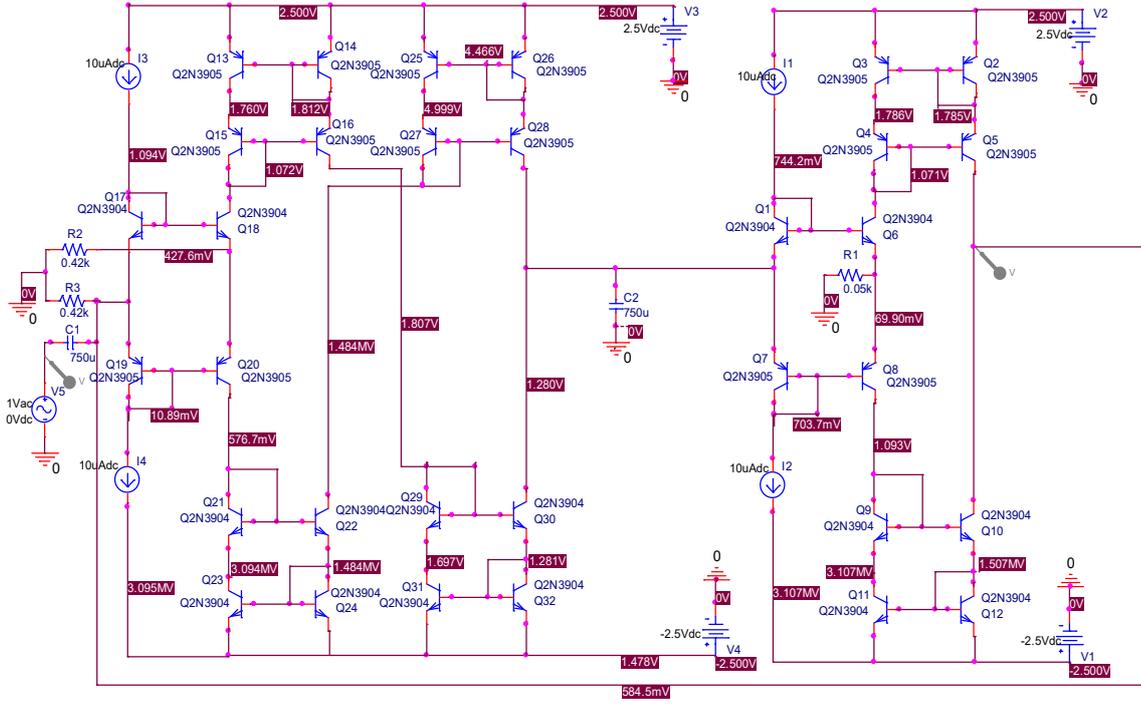
Şekil 8. CCII ile yüksek geçiren filtre devre şeması

Yüksek geçiren filtreye ait transfer fonksiyonu ve kesim frekansı aşağıdaki bağıntılarda verildiği gibidir.

$$\frac{V_0}{V_1} = \frac{S^2 R_1 R_2 R_3 C_1 C_2}{S^2 R_1 R_2 R_3 C_1 C_2 + S R_2 R_3 C_2 + R_1} \quad (6)$$

$$f = \frac{1}{2\pi\sqrt{R_1R_2R_3C_1C_2}} \quad (7)$$

Pspice uygulamasında BJT'ler ile tasarlanan CCII- ve CCII+ tabanlı yüksek geçiren filtrenin benzetim devresi Şekil 9'da verildiği gibidir.

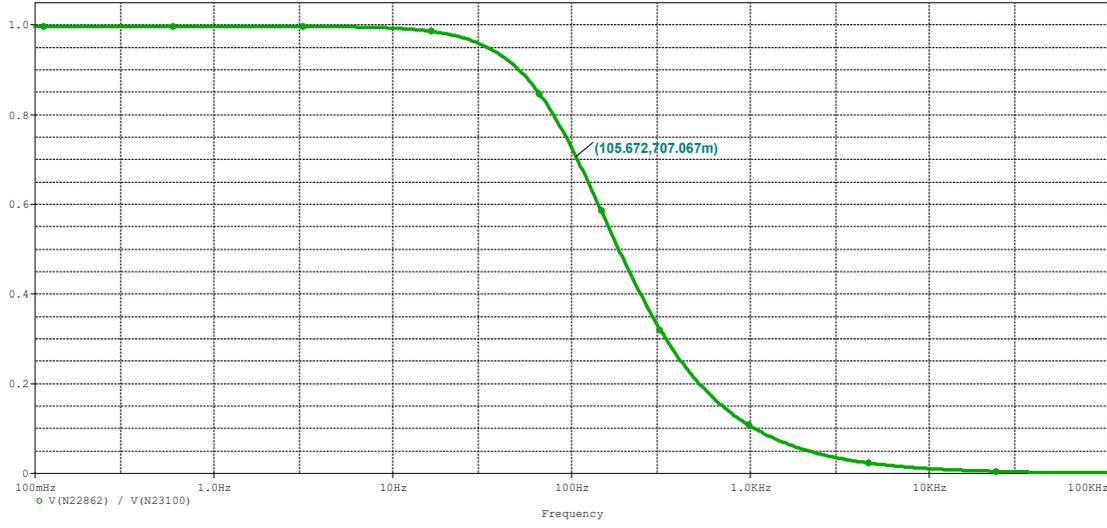


Şekil 9. CCII- ve CCII+ ile yüksek geçiren filtre devre benzetimi

Yüksek geçiren filtre devresinin yapısında hem CCII- hemde CCII+ kullanılmıştır. Devrede CCII-'nin X ve Y uçlarında $0.42k\Omega$ 'luk dirençler kullanılmıştır. Devrenin Y uçlarında $750\mu F$ kapasitelerden faydalanılmıştır. Devrede 2.5V değerinde besleme gerilimleri kullanılmıştır.

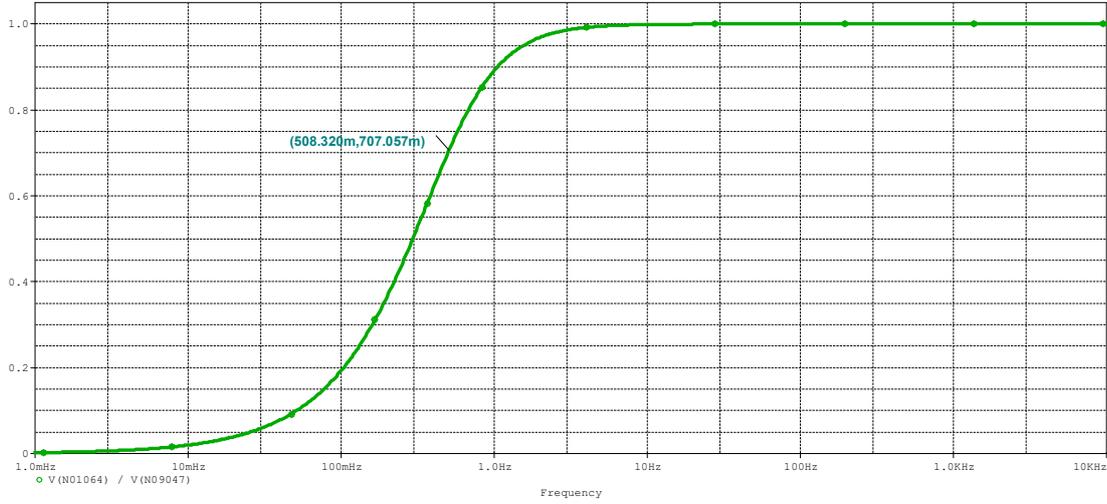
SONUÇLAR

Bu çalışmada CCCII+ kullanılarak alçak geçiren filtre, CCII+ ve CCII- kullanılarak yüksek geçiren filtre devrelerinin benzetimi Pspice ortamında gerçekleştirilmiştir. Burada, alçak geçiren filtre devresinin kesim frekansı 100 Hz, yüksek geçiren filtre devresinin ise kesim frekansı 0.5 Hz'e göre tasarlanmıştır. Her iki devrenin benzetimi Pspice programında gerçekleştirilmiş ve frekans kazanç grafikleri elde edilmiştir. Şekil 10'da CCCII+ alçak geçiren filtrenin frekans kazanç grafiği verilmiştir.



Şekil 10. CCCII+ alçak geçiren filtrenin frekans kazanç grafiği

Grafik incelendiğinde filtrenin maksimum frekans kazancı 1'dir. Filtrenin kesim frekansı 100,56 Hz hesaplanmış iken Pspice da görüntüsü elde edilen grafiğin ölçülen kesim frekansı 105,67Hz bulunmuştur. Şekil 11'de CCII kullanılarak tasarlanan yüksek geçiren filtrenin frekans kazanç grafiği verilmiştir.



Şekil 11. CCII ile tasarlanan yüksek geçiren filtrenin frekans kazanç grafiği

Tasarlanan yüksek geçiren filtre devresinin kesim frekansı 0.5Hz olarak hesaplanmıştır. Elde edilen frekans kazanç grafiği analiz edildiğinde ölçülen frekans değeri 0.508 Hz ve maksimum kazancı ise 1 bulunmuştur. Bu iki filtre devresinin hesaplanan kesim frekanslarıyla ölçülen frekans değerleri arasında küçük sapmalar olduğu görülmektedir. Yani frekans değerlerinin yaklaşık aynı değerde olduğu saptanmıştır. Bu akım taşıyıcı tabanlı alçak geçiren ve yüksek geçiren filtre devreleri biyomedikal devreler için uygundur.

TEŞEKKÜR

Bu çalışma Kübra TEKİN'nin yüksek lisans tez çalışmasının bir parçasıdır.

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SCGADUB1180 YÜKSEK MUKAVEMETLİ SACININ U BÜKME PROSESİNDE PROSES PARAMETRELERİNİN GERİ YAYLANMA DAVRANIŞINA ETKİSİNİN DENEYSEL VE SONLU ELEMANLAR METODU İLE İNCELENMESİ

EXPERIMENTAL AND FINITE ELEMENT METHOD INVESTIGATION OF THE EFFECT OF PROCESS PARAMETERS ON SPRING-BACK BEHAVIOR OF SCGADUB1180 HIGH STRENGTH SHEET IN U BENDING PROCESS

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ÖZET

Dayanımı yüksek ve hafif yüksek mukavemetli çelikler, otomotiv sektöründe yaygın olarak kullanılmaktadır. Yüksek mukavemetli sacların şekillendirilmesinde geri yaylanma, yırtılma ve incelme kadar önemli bir problemdir. Geliştirilmiş yüksek mukavemetli sacların geri yaylanma davranışı istenmeyen bir durumdur ve kalıp imalat süreçlerinden önce bilinmelidir. Literatürde, SCGADUB1180 yüksek mukavemetli çeliğinin şekillendirilmesi ve geri yaylanma problemleri ile ilgili araştırmaya rastlanmamıştır. Yüksek mukavemetli sacların şekillendirilme tahminlerinde simülasyon programlarına tanımlanan proses parametreleri önem arz etmektedir. Bu çalışmada, SCGADUB1180 yüksek mukavemetli sacının çekme testleri yapılarak mekanik özellikleri tanımlanmıştır. U büküm prosesinde, duvar açısı ve zımba formunun geri yaylanma davranışlarına etkisi deneysel ve sonlu elemanlar metodu ile araştırılmıştır. Farklı zımba formlarındaki saca meydana gelen gerilmeler ve deformasyonlar incelenmiştir. Çalışma sonucunda, zımba form değişikliğinin şekillendirmeye etkisi ortaya konularak, proses tasarımcılarına tasarım süreçlerini kısaltmada fayda sağlayacaktır.

Anahtar Kelimeler: SCGADUB1180, Yüksek mukavemetli saclar, Geri yaylanma, Sonlu elemanlar metodu

ABSTRACT

High strength and light high strength steels are widely used in the automotive industry. Springback is as important a problem as tearing and thinning in the shaping of high-strength sheets. The springback behavior of the developed high-strength sheets is undesirable and must be known before the die manufacturing processes. No research has been found in the literature on the forming and springback problems of SCGADUB1180 high strength steel. The process parameters defined in the simulation software are important in the shaping of high-strength sheets. In this study, the mechanical properties of SCGADUB1180 high-strength sheet were determined by performing tensile tests. The effects of the wall angle and punch form on the springback behavior were investigated by experimental and finite element methods in the U bending process. The stresses and deformations that occur in the sheet metal in different punch forms were investigated. As a result of the study, the effect of punch form change on shaping will be revealed, and it will benefit process designers in shortening the design processes.

Keywords: SCGADUB1180, High strength steels, Springback, Finite element method

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MONO TEL ÇEKME MAKİNESİ TASARIMI GELİŞTİRİLMESİ
DEVELOPMENT OF MONO WIRE DRAWING MACHINE DESIGN

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ÖZET

Bu çalışmada, her kasnak tahriki ayrı olarak tahrik edilebilen orta çekim mono (tekli) bakır tel çekme makinesi tasarımı geliştirilmesi amaçlanmıştır. Geliştirilen sistem, çekme kasnakları ile senkronizasyon sağlayacak şekilde tasarlanmıştır. Bu sayede çalışma verimliliği yüksek, kurulum ve bakım maliyeti düşük, çıktı kalitesi yüksek bir sistem geliştirilmiştir. Tasarım çalışmalarını takiben prototip üretimi tamamlanan sistemin 35 m/s üretim hızına ulaşması ve bakır telinin giriş çapını maksimum 3.50 mm'ye ve çıkış çapını minimum 0.30 mm'ye kadar indirebilmesi ön görülmektedir.

Çalışma konusunu belirleyen temel ihtiyaç, tel ve kablo sektöründeki firmaların makine hatlarına uygun maliyetle ulaşamayıp ihtiyaç taleplerini karşılayamamasıdır. Ayrıca yabancı kaynaklardan sağlanabilen makineler, tek ve büyük bir motor tahriki ile çalıştırılmakta ve makine üzerinde bulunan 17 hadde ile tüm kasnaklar (tüm kasnakların kullanılmasının gerekli olmadığı durumlarda bile) tahrik edilmektedir. Bu durum da kullanılmayan kasnakların boşuna çalıştırılması dolayısıyla enerji sarfı ve gereksiz yıpranmaya neden olmaktadır. Bu çalışmada geliştirilen sistem sayesinde kasnakların birbirinden bağımsız olarak tahriki ile değişik kombinasyonlar dahilinde çalışma gerektiğinde makinenin sadece gerekli kasnakları istenen tahrik oranları uygulanarak daha esnek, hızlı ve verimli çalışabilmektedir. Ayrıca yeni sistem ile kullanım kolaylığı sağlanmış, değişik hadde serilerine geçişler daha az makine hazırlık sürelerinde yapılmıştır.

Makinenin tasarımı sürecinde yerleşim planı, çalışma prensibi, ebat, kapasite ve hız gibi teknik parametreler belirlenerek bu veriler doğrultusunda tasarımlar gerçekleştirilmiştir. Tasarım çalışmalarının ilk aşamasında makine hattının katı model tasarımı, devamında ise hattı oluşturan ünitelerin ve parçalarının 2D ve 3D detaylı tasarımları oluşturulmuştur. Bu süreçte makine dinamiği ilkeleri ile kinematik hesaplar ve gerekli güçlerin hesaplanması çalışmaları yapılmıştır. Kritik parçaların analizleri Autodesk Inventor programı analiz araçları ile yapılmıştır. Simülasyon ortamında aktarma elemanlarının yapısı, büyüklüğü, karşılaşılan kuvvetlere ve yüklere karşı mekanik performansı hesaplanarak, mukavemet analizi ve yatak yüklerinin analizi çalışmaları yapılmıştır. Sonlu elemanlar yöntemi (FEM) kullanılarak yapılan analizlerde sonuçlar sayısal ve grafiksel olarak elde edilmiştir. Analiz sonuçlarına göre tasarımlar üzerinde revizyonlar yapılarak nihai tasarımlar oluşturulmuştur.

Anahtar Kelimeler: Tel Çekme Makinesi, Mekanik Tasarım, FEM.

ABSTRACT

In this study, it is aimed to develop a medium draft mono copper wire drawing machine design and each pulley process in this machine can be driven separately. The developed system is designed to provide synchronization with traction pulleys. In this way, the system has been developed which has high operating efficiency, low installation and maintenance costs, and high output quality. It is foreseen that the system, whose prototype production has been completed following the design studies, will reach a production speed of 35 m/s and reduce the input diameter of the copper wire to a maximum of 3.50 mm and the output diameter to a minimum of 0.30 mm.

The companies in the wire and cable sector cannot reach the machine lines at an affordable cost and cannot meet the demands of their needs. These main needs determined the subject of the study. In addition, the machines that can be supplied from foreign sources are operated with a single and large motor drive and all the pulleys (even when it is not necessary to use all the pulleys) are driven by the 17 rollers on the machine. This situation causes energy consumption and unnecessary wear due to the futile operation of the unused pulleys. Thanks to the system developed in this study, when the pulleys are driven independently of each other and working in different combinations, only the required pulleys of the machine will work. And it will provide more flexibly, quickly and efficiently by applying the desired drive ratios. In addition, the new system provides ease of use, and the transition to different rolling series has been made in less machine preparation times.

In the process of designing the machine, technical parameters such as layout, working principle, size, capacity and speed were determined and designs were made in line with these data. In the first stage of the design studies, the solid model design of the machine line was created, followed by 2D and 3D detailed designs of the units and parts that make up the line. In this process, the principles of machine dynamics, kinematic calculations and calculation of necessary forces were studied. The analyzes of critical parts were made with Autodesk Inventor program analysis tools. The structure of the transmission elements, their size, mechanical performance against the forces and loads encountered, and strength analysis and analysis of the bearing loads were carried out in the simulation environment. The results of the analyses performed using the finite element method (FEM) were obtained numerically and graphically. According to the results of the analysis, the final designs were created by making revisions on the designs.

Keywords: Wire Drawing Machine, Mechanical Design, FEM.

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ONLINE SAĞLIK HİZMETLERİ GEREKLİLİĞİNİN İNCELENMESİ VE ONLINE SAĞLIK PLATFORMU GELİŞTİRİLMESİ

REVIEW OF THE NEED FOR ONLINE HEALTH SERVICES AND DEVELOPMENT OF AN ONLINE HEALTH PLATFORM

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ÖZET

Sağlık teknolojileri son yıllarda en fazla rağbet gören proje konularından biri konumuna gelmiştir. Özellikle 2020 yılı itibarı ile bütün dünyayı etkisi altına almış olan COVID-19 virüsüyle birlikte artan bir ivme ile sağlık teknolojileri dikkatleri çekmeyi başarmıştır. Öncelikle Hindistan’da başlamış olan bu teknoloji akımı, günden güne Avrupa ve Amerika’ya da yayılmıştır. Türkiye’de bu alanda projeler geliştirmeye başlanmış olsa da bütün uzaktan ve/veya mobil (yerinde) verilmesi mümkün olan sağlık ihtiyaçlarını tek bir projede birleştirip kapsamlı bir online sağlık platformu olma yolunda ilerleme noktasında bir çalışmaya ihtiyaç bulunmaktadır.

Kullanıcıların, uzaktan sağlık hizmetlerinin karşılanması yolunda süreçlerin manuel ve ikili diyaloglar ile devam ediyor olması bu akışların bir dijital platforma aktarılmasının gerekliliğini doğurmuştur. Bu akışların dijital ortama aktarılması hem çevrimiçi hem de yerinde sağlık hizmetlerinin kalitesini, bilinirliğini ve ulaşılabilirliğini arttırmak için bir adımdır. Aynı zamanda yerinde sağlık hizmetleri ve online danışmanlıklar ile de kullanıcıların buldukları lokasyonlarda ihtiyaçları olan hizmetlerin karşılanması sayesinde büyük bir ihtiyacı karşılayacağı öngörülmektedir.

Hedef kitlenin yaşamış olduğu en büyük zorluklar sunulan servislere göre değişiklik göstermekle birlikte; Covid-19 salgını olmasına karşın sağlık kuruluşlarında birçok insanla muhatap olmak durumunda kalınması, sağlık kuruluşlarına giderken yaşanan zaman kaybı, sağlık kuruluşları içerisindeki planlama zorluklarından kaynaklı kaybedilen vakit ve farklı şehirlerde alanında uzman kişilerden danışmanlık hizmeti almanın maliyetinin çok yüksek olması yaşanan zorluklar içerisinde yer almaktadır. Bu çalışmada, bahsedilen problemler göz önüne alınarak mobil ve/veya uzaktan sağlık hizmetleri kapsamında online sağlık platformu geliştirilmesi amaçlanmıştır. Bu platform sayesinde kullanıcılar herhangi bir şekilde yer değiştirmeye ihtiyaç duymadan talep etmiş oldukları hizmete ulaşmış olacaklardır. Bu kapsamda kullanıcının sağlık ile ilgili herhangi bir probleminin çevrimiçi ortamlarda veya yerinde hizmet ile çözülmesi hedeflenmektedir. Bu hedeflerin getirmiş olduğu sorumluluklar ile birlikte teknik açıdan sağlam bir altyapı ortaya çıkmıştır. Bu ihtiyacı da karşılamak adına mikro servis mimarisinde bir temel atılmış olup ihtiyaçlara göre değişiklik göstererek; PHP’den Go’ya kadar çeşitli diller ile çeşitli servisler geliştirilmektedir. Bunun nedeni programlama dili-servis uyumluluğunu maksimum seviyeye getirip uygulama içerisindeki servislerin en hızlı şekilde tepki vermesini sağlamaktır. Bunların yanı sıra bir bütün olarak değerlendirilecek olan uygulama,

ilerleyen zamanlarda modüllerine ayrılarak, bu servisleri kullanmak isteyen firmalara dış hizmet sağlayıcılığını üstleniyor da olabilecektir.

Anahtar Kelimeler: Sağlık Hizmeti, Online Sağlık Platformu, Sağlık Uygulamaları.

ABSTRACT

Health technologies have become one of the most popular topics in recent years. Especially with the COVID-19 virus, which has affected the whole world as of 2020, health technologies have managed to get attention with an increasing momentum. This technology trend, which first started in India, has spread to Europe and America day by day. Although projects have been developed in this field in Turkey, there is a need to combine all remote and/or mobile (on-site) health needs into a single project and progress towards becoming a comprehensive online health platform.

The fact that the processes continue with manual and bilateral dialogues in order to meet the remote health services of the users necessitated the transfer of these flows to a digital platform. Transferring these streams to digital environment is a step towards increasing the quality, awareness and accessibility of both online and on-site health services. At the same time, it is predicted this platform will meet a great need thanks to on-site health services and online consultancy, and the services that users need in their locations.

The biggest challenges faced by the target audience are varying according to the services offered. Despite the Covid-19 epidemic, health institutions have to deal with many people. In addition, the loss of time experienced while going to health institutions and the time lost due to planning difficulties in health institutions are among these challenges. Moreover, the high cost of receiving consultancy services from experts in their fields in different cities is among the difficulties experienced. In this study, it is aimed to develop an online health platform for mobile and/or remote health services considering the mentioned problems. Thanks to this platform, users will be able to access the service they have requested without needing to change places in any way. In this context, it is aimed to solve any health-related problem of the user in online environments or with on-site service. In order to meet this need, a foundation has been laid in the microservice architecture and various services are being developed with various languages from PHP to Go, changing according to the needs. The reason for this is to maximize the programming language-service compatibility and to ensure that the services in the application respond in the fastest way. In addition to these, the application, which will be evaluated as one part, may be divided into modules in the future. And it may also be undertaking outsourcing services to companies that want to use these services.

Keywords: Healthcare, Online Health Platform, Health Applications.

İNSAN VÜCUDUNDAKI BAZI AĞIR METALLERİN STRES VE BİYOLOJİK REAKSIYONLARI
STRESS AND BIOLOGICAL REACTIONS OF SOME HEAVY METALS IN THE HUMAN BODY

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ÖZET

Metabolizmanın vücutta metal birikimi, doku dağılımı ve toksik etkiler üzerinde önemli bir etkisi vardır. Bu özellikle kronik düşük doz maruziyet durumunda geçerlidir. Bu tür etkiler, moleküllerde ve hücrelerde koruyucu süreçlere yol açabilecek seviyelere ulaşır ve metallerin subtoksik etkilere alışması ile sona erer. Canlı serbest iyonik metallerin konsantrasyonu, organizmalar için çok hassas bir şekilde kontrol edilir ve belirli proteinler ve hormonların yardımıyla gerçekleştirilir. Hücreler, bu tür öğelerin gerekli seviyesini korumak için "geri bildirim" ilkesiyle çalışan eksiksiz sistemlere sahiptir. Özellikle ağır metaller, hücre içi düzenleyici mekanizmalarda yer alan Cu ve Zn ile kompleksler oluşturabilen metalotoninlere bağlanır.

Anahtar Kelimeler: Ağır metaller, Toksik maddeler, Metabolizmanın vücutta metal birikimi

ABSTRACT

Metabolism has a significant impact on metal accumulation, tissue distribution and toxic effects in the body. This is especially true in the case of chronic low-dose exposure. Such effects reach levels that can lead to protective processes in molecules and cells and end as the metals get used to the subtoxic effects. The concentration of living free ionic metals is very precisely controlled for organisms and is carried out with the help of certain proteins and hormones. Cells have complete systems that work on the principle of "feedback" to maintain the required level of such elements. In particular, heavy metals bind to metaltonins, which can form complexes with Cu and Zn, which are involved in intracellular regulatory mechanisms.

Keywords: Heavy metals, Toxic substances, Metal accumulation in the body of metabolism

Ağır metallerle kontaminasyon, hem insan sağlığı hem de canlı organizmaların hayati faaliyetleri için çeşitli zararlı sonuçları olan, Dünya'nın biyosferi için en zararlı faktörlerden biridir. Pestisitler, dioksinler, petrol ürünleri, fenoller, fosfatlar ve nitratlarla birlikte ağır metaller medeniyetin varlığını tehdit ediyor. Artan çevre kirliliği ölçüğü, genetik mutasyonlar, kanser, kardiyovasküler ve meslek hastalıkları, zehirlenmeler, dermatozlar, bağışıklığın azalması ve buna bağlı hastalıklarda artışa yol açmaktadır.

Çoğu durumda, kirliliğin ana kaynağı çevresel olarak okuma yazma bilmeyen insan faaliyetleridir. Ağır metaller ve bunların bileşikleri, insan hayatında sürekli bir yol arkadaşı olmaları nedeniyle sağlığa zararlı maddeler arasında özel bir yere sahiptir. Ağır metallerin toksisitesi, protein sentezinin inhibisyonunun

yoğunluğu ile yakından ilişkilidir. Büyük miktarlarda ağır metaller toksik elementlerdir, ancak vücut için önemi çok farklıdır. Metal iyonları birçok biyolojik süreçte önemli bir rol oynar. Mikro besinler çeşitli metabolizma, taşıma, sentez ve kontrol formlarında yer alır (Kerimova R. C., Eyvazov T. Ə., Həsənova X. Ə., 2020). Metal iyonlarının toksisite mekanizmalarının belirlenmesi, canlı organizmalara girişlerinin farklı yollarının varlığı nedeniyle genellikle karmaşıktır. Metaller yiyecek, su yoluyla girebilir, deri yoluyla emilebilir, solunabilir vb (Дерхо М. А., Брусенцова Л. М., 2020). Toz emme, endüstriyel kirlilikte önemli bir bulaşma yoludur. Solunumun bir sonucu olarak, metallerin çoğu akciğerlerde birikir ve ancak o zaman diğer organlara yayılır. Bununla birlikte, toksik metallerin vücuda girmesinin en yaygın yolu yiyecek ve sudur.

Toksik maddelerin biyolojik olarak izlenmesinde kullanılacak biyokimyasal yöntemlerin geliştirilmesi, öncelikle kirleticilerin toksisitesinin değerlendirilmesine yönelik potansiyel yöntemlerle ilgilidir. Yöntemin kriterleri, elde edilecek bilginin niteliğini ve bu bilgilerin nasıl kullanılacağını belirler.

Nicel biyokimyasal göstergeler:

- 1) erken uyarı yeteneğine sahip olmalı, reaksiyon daha yüksek bir hasar seviyesinden önce biyolojik organizasyonun daha düşük bir seviyesinde tespit edilmelidir;
- 2) münferit kimyasallar veya tanımlamaları için mümkün olduğunca spesifik olun;
- 3) sağlığın bozulmasını açıklar;
- 4) yükün nicel parametrelerini belirlemek için bir doz-etki ilişkisi kurar;
- 5) ölçülen reaksiyonu etkileyebilecek içsel ve dışsal faktörlerin etkisini tam olarak değerlendirin.

Metabolizmanın vücutta metal birikimi, doku dağılımı ve toksik etkiler üzerinde önemli bir etkisi vardır. Bu özellikle kronik düşük doz maruziyet durumunda geçerlidir. Bu tür etkiler, moleküllerde ve hücrelerde koruyucu süreçlere yol açabilecek seviyelere ulaşır ve metallerin subtoksik etkilere alışması ile sona erer.

Canlı serbest iyonik metallerin konsantrasyonu, organizmalar için çok hassas bir şekilde kontrol edilir ve belirli proteinler ve hormonların yardımıyla gerçekleştirilir. Hücreler, bu tür öğelerin gerekli seviyesini korumak için "geri bildirim" ilkesiyle çalışan eksiksiz sistemlere sahiptir. Özellikle ağır metaller, hücre içi düzenleyici mekanizmalarda yer alan Cu ve Zn ile kompleksler oluşturabilen metalotoninlere bağlanır. Metallotioninler düşük moleküler ağırlıklı (6000-10000 D) kükürttür. Zn ve Cu gibi vücut için gerekli olan metallerin hücre içi homeostazında görev alan ve tüm canlı organizmaların karakteristiği olan (%30 mol sistein) proteinleri içerir (Jain R. B., Choi Y. S., 2016).

Bir MT molekülü 7-12 metal atomu bağlayabilir İstenen metallerin (Hg, Pb, Cd) iyonları hücreye girerse veya hücre içi Cu veya Zn seviyesi toksik seviyeyi aşarsa, sentezleyen MT artacak ve TM- MT-kompleksleri artık var olmayacak, metallerin bağlanmasıyla homeostaz geri yüklenebilir. Bununla birlikte, metaller vücuttaki diğer proteinlere bağlanabilir. Metallerin hassasiyetini değiştiren bir diğer molekül grubu da glutatyondur. Toksik metallerle çeşitli şekillerde etkileşime girebilen sülfat açısından zengin tripeptitlerdir. Bu, metallerin absorpsiyon ve sekresyon seviyesindeki bir değişiklik olabilir. Metal iyonlarının esansiyel elementlerle nükleofilik etkileşimini önleyerek hücre içi metal şelatör görevi görür. Çevre kirliliği insanları endişelendiriyor (Kerimova R. C., Eyvazov T. Ə., Həsənova X. Ə. 2020). Çevrenin bozulması nitratların artmasına neden olur. Bu nedenle, başka nedenlerle düşebilse de, bu bileşiklerin yüksek konsantrasyonu nedeniyle sebze ve patateslerin kalitesi keskin bir şekilde bozulur. Ağır metal zehirlenmesi en ciddi felç, körlük, zihinsel ve konuşma bozuklukları vakalarına neden olur. Kadmiyum zehirlenmesinin neden olduğu Itai-itai hastalığı daha tehlikeli olarak kabul edilir. Bundan muzdarip insanlar eklemlerde korkunç ağrı hissederler.

Kurşun çok zehirlidir. Bileşikleriyle zehirlenme genellikle çocuklarda bunama ve diğer olumsuz etkilerle ilişkilidir. İz elementler olarak da bilinen manganez, çinko, bakır, kobalt ve molibdenin de ağır metallere ait olması garip görünebilir. Rollerini hayvanlar ve insanlar için fizyolojik olarak bilimsel olarak kanıtlanmıştır. Bu nedenle, tarımda ve tıpta yaygın olarak kullanılmaktadırlar (Керимова Р. Дж., Гасанова Х. А... 2019). Ancak, bütün mesele konsantrasyondur. Organizmalarda eksiklik olduğunda bu bileşikler mikro elementler, aşırı olduklarında ise ağır metaller olarak kabul edilirler, yani herhangi bir elementin yüksek konsantrasyonu onu tüm canlılar için tehlikeli hale getirir. Kobalt, çinko ve bakır istisna değildir.

Ağır metaller doğanın bir parçasıdır. Kayaların, toprağın, tatlı ve deniz sularının bir parçasıdır ve bitki ve hayvan organizmalarında bulunurlar. Çevredeki ağır metallerin konsantrasyonu sürekli artmaktadır. Yakıt yanmasından, özellikle kömürden kaynaklanan emisyonlar önemli bir rol oynamaktadır. Mevcut verilere göre, çevreye bırakıldan daha fazla bireysel öge içerirler. Ayrıca, atmosfere salınan kurşun emisyonlarının çoğu karayolu taşımacılığından kaynaklanmaktadır.

Fabrikalar ve tesisler, özellikle elektrokaplama, kirliliğe katkıda bulunur. Ağır metallerle birlikte, atmosferik yağış, mineral gübreler, kanalizasyon çamuru ve evsel atıklardan oluşan çeşitli kompostlarla toprağa girerler. Bakır içeren endüstriyel atıklar, pirit cürufunun girmesi sonucu kurumuş turba kurşun alanlarına girmektedir. Verimliliği artırmak için hayvanların diyetine bakır ve çinko dahil edilir. Yem yoluyla ağır metaller gübre akışına ve ardından toprağa girer. Sıradan yatak ve kireç gübreleri ağır metallerden yoksun değildir. Kısacası, bu bileşikler doğada önceden düşünülen daha yaygındır. Ağır metaller ayrıca maksimum konsantrasyonların ayarlandığı gıda, yem ve suda da bulunur.

Ağır metaller doğada bulunur ve bir kısmı az miktarda bitki, hayvan ve insanın yaşamı için gereklidir. Fazlalıkları çevre ve insan sağlığı üzerinde zararlı bir etkiye sahiptir. Çevreye girdikten sonra, cıva gibi oldukça uçucu maddeler hava yoluyla taşınırken, kurşun ve kadmiyum gibi diğerleri tozla karışır ve uzun mesafeler kat eder.

İlginç bir şekilde, tüm ağır metaller kelimenin olağan anlamıyla gerçekten ağır değildir. Bunları toksik metaller olarak adlandırmak daha doğru olur, ancak tarihsel olarak, incelenen toksik metallerden ilkinin gerçekten yüksek bir özgül ağırlığa sahip olduğu bulunmuştur - kurşun, kadmiyum vb. Daha sonra berilyum ve lityum gibi birçok "hafif" metalin daha toksik olduğu anlaşıldı ve bu nedenle bu metal grubuna "ağır" denilmeye başlandı. Ağır metal kirliliği kaynakları madencilik ve demirli metalurji işletmeleri, makine yapım fabrikaları, galvanik atölyelerdir (Керимова Р.Дж., Гасанова Х. А...2019) Demir dışı metalurji, çevrenin ağır metallerle kirlenmesine büyük ölçüde katkıda bulunur. Demir dışı metallerin ve bunların alaşımlarının çıkarılması, zenginleştirilmesi ve eritilmesi, sanayi işletmelerinin bitiştiğindeki alanların flora ve faunasına zarar verir.

Atık suyun yakındaki su kütlelerine boşaltılması, sakinlerinin sayısız hastalığına neden olur ve bu da rezervuarların biyosistemlerinde ağır metal seviyesinde bir artışa yol açar. Ağır metal kirliliğinin kaynakları sadece sanayi kuruluşları değildir (Гулиева С.В. Керимова Р.Дж., 2018). Atmosfere zararlı kurşun emisyonlarının ana kaynaklarından biri, kurşunlu benzinle çalışan arabalardır. Karayolu taşımacılığı da şehirlerdeki diğer kirlleticilerin ana kaynağıdır ve kentsel yolların yoğunluğuna bağlı olarak atmosfere yayılan toplam kirliticilerin %30-70'ini oluşturur. Hem kullanılmış araba aküleri hem de sıradan aküler çevre için tehlikelidir. Kullanıldıktan sonra atılıyorlar ve belediye çöplüklerindeki sayılarının binlerce ton olduğu tahmin ediliyor. Ayrıştıklarında, büyük miktarlarda manganez, kurşun, kadmiyum, lityum ve diğer toksik metaller toprağa ve yeraltı suyuna girer. Ayrıca ağır metaller, gübre ve pestisit üretimi için hammaddenin bir parçası olan ve tarım alanlarından ve sebze bahçelerinden akan sularla birlikte su kütlelerine girebilen doğal safsızlıklardır.

Son zamanlarda, tüm dünya topluluğu, boyalarda kurşun kullanımına son verilmesine büyük önem veriyor. Boyayı daha güvenli hale getirmek için günümüzde pek çok alternatif var, ancak üreticiler kurşun kullanmaya devam ediyor. Ağır metaller, çocuk oyuncakları dahil olmak üzere tüketim mallarında ve izin verilen seviyeleri önemli ölçüde aşan konsantrasyonlarda da bulunur. Böylece 2012 yılında 100'den fazla ülkede sağlık ve çevre koruma alanında çalışan Uluslararası KOK Eliminasyon Ağı üyesi 6 kuruluş, marketlerden ve mağazalardan rastgele satın alınan 569 çocuk ürününün toksisitesini test etti. 164'ü tehlikeli bir konsantrasyonda bulunan altı element zehirli bir elementtir. 104 örnekte kurşun, 75 örnekte çinko, 45 örnekte arsenik ve 18 örnekte cıva bulundu (A. Buha ., et al., 2018) . Ağır metallerin olumsuz etkileri, vücutta yaşam için faydalı metallerin yerini alabilmeleri ve istenmeyen süreçleri tetikleyebilmelerinden kaynaklanmaktadır. Örneğin, bazı metaller kanserli tümörlerin oluşumuna katkıda bulunur, kadmiyum ve cıva böbrekler üzerinde güçlü bir toksik etkiye sahiptir, kurşun ve cıva sinir sistemi üzerinde zararlı bir etkiye sahiptir, kadmiyum ve kurşun erkek cinsel organlarında birikerek dejenerasyonlarına neden olur. ve üretkenliği etkiler. Ek olarak, ağır metaller solunum ve endokrin sistemlerini etkileyebilir ve bu maddelerle şiddetli zehirlenme ölümcül olabileceğinden genel toksisitesine dikkat edilmelidir.

Dolaşım sistemi hastalıkları dünyadaki en önemli hastalıklardan biridir. Şu anda, anemi sadece hastalığın bir

semptomu olarak değil, aynı zamanda vücuttaki hasarı ağırlaştırılan patojenik bir faktör olarak da kabul edilmektedir. Anemi gelişiminde konsantrasyonun tuzun rolü tanımlanmıştır (Kerimova R. C., Məşədiyeva S.Ə., Bayramov A.A., Yusifova M. Y., 2020). Çevrenin ağır metal tuzları ile kirlenmesi, nüfusun sağlığı üzerinde önemli bir etkiye sahiptir ve modern zamanların en acil sorunlarından biri olmaya devam etmektedir.

Kurşun, medeniyetin ilk günlerinden beri en yaygın olanıdır ve WHO ve YANEP tarafından öncelikli çevre kirleticileri listesine dahil edilmiştir. Kurşun atıklarının çoğu metalurji endüstrisi, yakıt ve enerji kompleksi, kimya kompleksi, patlatma tesisleri, ağaç işleme ve kağıt hamuru ve kağıt endüstrisi, savunma endüstrisi, makine mühendisliğinde atmosfere salınmaktadır (A. Buha ., et al., 2018). Benzinle çalışan her araba, yılda atmosfere 2 kg kurşun yayar. Kurşunun vücut üzerindeki etkilerinin sona ermesinden yıllar sonra bile hala ciddi bir tehdit olarak kabul edilmektedir.

Kurşun zehirlenmesi ile anemi ilk olarak MÖ 200'de Kolophon'lu Nikandr tarafından tanımlanmıştır. Genel olarak, aneminin kurşun zehirlenmesinin en erken belirtilerinden biri olduğu ve gelişiminin kandaki kurşun bileşiklerinin konsantrasyonuna bağlı olduğu kabul edilmektedir. Kurşuna bağlı aneminin patogenezinde porfirin sinüslerin bozulması, globin sinüslerin, özellikle alfa zincirinin azalması ve eritrosit yıkımının artması nedeniyle oluşur (Балтабекова А. Ж., Дерхо М. А., 2017).

Modern teknoloji her alanda işimizi kolaylaştırır da sağlığımız için büyük bir tehdit olarak görülüyor. Bugün indirimde olan birçok ürün ağır metaller açısından zengindir. Ağır metaller ev eşyalarında, kozmetiklerde, ilaçlarda, giysilerde ve her gün temas ettiğimiz daha fazlasında bulunur. Orta Çağ'da kozmetikte kurşundan birçok kişinin öldüğü biliniyor. Arsenik ağır bir metal olarak kabul edilmese de demir, çinko ve bakırın yanı sıra sağlığa zararlı olan arsenik konusunda dikkatli olmak önemlidir. Ağır metallerle kirlenmiş vücuttaki birçok organ bozulur. Sinir sistemi, kalp, akciğer, karaciğer ve böbreklerde problemler oluşur. Hastanın kansere yakalanma riski de artar. Çocuklarda fiziksel ve zihinsel gerilik görülür.

Manganez sinir hücrelerinin uçlarını bağlar. Sinir uyarılarının iletimi azalır, bu da artan yorgunluk, uyuşukluk, reaksiyon hızında azalma, verimlilik, baş dönmesi, depresyon ile sonuçlanır (David J. Jones., 2012). Manganez zehirlenmesi özellikle çocuklarda ve embriyolarda (bir kadın hamileyken) tehlikelidir. Hamile bir kadın hamilelik sırasında manganez zehirlenmesine maruz kaldığında, 100 çocuktan 96-98'i zihinsel olarak zayıf doğar (. Faheen Shah, Sasneem Gul Kazi., 2010). Erken ve geç gebelikte toksisitenin de manganezden kaynaklandığı söylenmektedir. Musluk suyu çok fazla manganez içerir. Suya ek olarak, endüstriyel emisyonlar nedeniyle havada manganez var. Doğada manganez daha sonra mantarlarda ve bitkilerde birikir ve böylece diyetle girer. Manganezin vücuttan uzaklaştırılması neredeyse imkansızdır; Manganez zehirlenmesinin teşhisi çok zordur çünkü semptomlar çok yaygın ve birçok hastalığa özgüdür, ancak çoğu zaman insanlar bunlara dikkat etmezler. Bitkilerde, hayvanlarda ve topraklarda manganezin doğal içeriği çok yüksektir. Manganez üretiminin ana alanları alaşımlar, alaşımlar, elektrik pilleri ve diğer kimyasal akım kaynaklarının üretimidir. Havadaki aşırı manganez (atmosferdeki ortalama günlük manganez MPC - yerleşim alanlarının havası - 0.01 mg / m³) insan vücudu üzerinde olumsuz bir etkiye sahiptir ve bu da aşamalı tahribatına yansır.

Alüminyum ayrıca insan vücudu üzerinde genel bir toksik ve kirlenici etkiye sahiptir. Musluk suyundaki fazlalığı, su alımından sonra demirin alüminyum sülfat ile uzaklaştırılmasından kaynaklanmaktadır. Alüminyum sülfat, demir iyonları ile reaksiyona girerek, içinde hem demirin hem de alüminyumun çöktüğü, ancak aslında hem demir hem de alüminyumun suda kaldığı, çözünmeyen bir çökelti oluşturur.

Selenyum, insanlar için çok küçük dozlarda gereklidir. Hafif bir doz aşımı ile selenyum kanserojen, mutajenik ve toksik hale gelir. Bir kişi özel mineral kompleksleri yardımıyla selenyum eksikliğini güvenle telafi edebilir, selenyum da deniz yosununda bulunur (Рыбьянова Ж. С., Дерхо М. А., 2019).

Bunu önlemek için ağır metalleri hayatımızdan mümkün olduğunca uzaklaştırmalı ve zaman zaman vücudu temizlemeliyiz. Sanayi şehirlerinde atmosfer ağır metallerin atmosfere salınmasıyla kirlenir. Demir dışı metalurji, cam üretimi, araçlardan çıkan egzoz gazları ile kirlenirler ve insan vücudu zararlı maddelerle doldurulur. Genellikle vücut bir değil, birkaç bileşenden etkilenir - kurşun, manganez, krom, arsenik, kadmiyum.

Bir sanayi kuruluşunun yakınında yaşayan bir çocuk doğduğu andan itibaren 5 yaşına kadar vücudunda

yeterince zararlı madde biriktirir. Her şeyden önce, merkezi sinir sistemi bozulmaya başlar. Kural olarak, bu tür çocuklar çok endişeli ve dikkatsizdir. Bir kişi tehlike bölgesinden çıkarsa, kandaki ağır metal konsantrasyonu giderek azalır. Bir çocuk kirli bir oyun alanında oynuyorsa elleri, oyuncakları ve kıyafetleri kirlenir. Kir ve toksinler çocuğun vücuduna girer ve kan dolaşımına girer. Hijyen konularına özel dikkat gösterilmelidir (Рыбьянова Ж. С., Дерхо М. А., 2019).

Vücutta biriken kurşunu atmak için mümkün olduğunca sık kalsiyum içeren süt ürünleri yemek gerekir. Bu nedenle kurşunlu havaya maruz kalan herkesin süt içmesi ve daha fazla süt ürünü tüketmesi tavsiye edilir. Besinlerin lif açısından zengin olması çok önemlidir. Daha fazla sebze, meyve ve tahıl yemelisiniz. Ağır metaller daha sonra gastrointestinal sisteme yerleşecek ve emilmeden atılacaktır. Yiyecekler yağlı, vitaminler ve antioksidanlar açısından zengin olmamalıdır.

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**İNSAN VÜCUDUNDAKI AĞIR METALLERİN KOMPLİKASYONLARI VE EKSİKLİKLERİNİN
NEDEN OLDUĞU HASTALIKLAR**

**DISEASES CAUSED BY COMPLICATIONS AND DEFICIENCIES OF HEAVY METALS IN THE
HUMAN BODY**

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ÖZET

Ağır metaller çevreleyen dünyada mevcuttur. Bu ne kadar doğal olsa da insan faktörünün rolü de bir nebze artıyor. Günlük hayatımızda cıva, kurşun, alüminyum, nikel ve kadmiyum gibi ağır metaller bize yakındır. Ağır metaller ayrıca kullandığımız ürünler veya yediğimiz yiyecekler, soluduğumuz hava ve içtiğimiz su yoluyla da vücudumuza girebilir. Bu ağır metallerle aşırı temas veya bunların organlarımızda birikmesi ölüme bile yol açabilir. Ağır metallerin vücut üzerindeki toksik etkilerinin derecesi değişkenlik gösterir ve bir dizi dış ve iç faktöre bağlıdır.

Anahtar Kelimeler: Ağır metallerin komplikasyonları, Eksiklikleri, Neden olduğu hastalıklar

ABSTRACT

Heavy metals are present in the surrounding world. As natural as this is, the role of the human factor also increases somewhat. Heavy metals such as mercury, lead, aluminum, nickel and cadmium are close to us in our daily life. Heavy metals can also enter our bodies through the products we use or the food we eat, the air we breathe and the water we drink. Excessive contact with these heavy metals or their accumulation in our organs can even lead to death The degree of toxic effects of heavy metals on the body varies and depends on a number of external and internal factors.

Keywords: Complications of heavy metals, Deficiency, Diseases caused

Ağır metaller insan yaşamı için önemli olan metalleri (çinko, demir, manganez, bakır) ve vücut için toksik özelliği çok yüksek olan maddeleri (kadmiyum, cıva, kurşun, nikel, krom, arsenik) içerir. Ancak yaşam için önemli olan ağır metallerin konsantrasyonu aşıldığında insanlar için tehlikeli hale gelirler. Ağır metaller insan sağlığına olan tehlikelerine göre 3 gruba ayrılır:

1. arsenik, kadmiyum, cıva, berilyum, selenyum, kurşun, çinko

2. kobalt, krom, bakır, molibden, nikel, stibium.
3. vanadyum, baryum, tungsten, manganez, stronsiyum

Ağır metaller çevreye atık su, endüstriyel işletmeler ve araçlardan çıkan gazlı atıklar olarak girer.

Ağır metaller toprakta, suda, havada, bitkilerde ve hayvanlarda bulunabilir. Farklı şekillerde emilirler - yiyecek, su, hava, cilt, ilaçlar vb. İnsan vücuduna girerler ve bir dizi biyokimyasal sürece nüfuz ederler. Küçük miktarlarda metabolizma üzerinde olumlu bir etkiye sahiptirler ve büyüme ve gelişmeyi hızlandırır. Bugün satılan ev ürünlerinin çoğu toksik maddeler açısından zengindir. Bu maddeler arasında kimyasal ve ağır metaller baskındır (. Criffi n G.D., et al.,2011).

Ağır metaller çevreye dünyada mevcuttur. Bu ne kadar doğal olsa da insan faktörünün rolü de bir nebze artıyor. Günlük hayatımızda cıva, kurşun, alüminyum, nikel ve kadmiyum gibi ağır metaller bize yakındır. Ağır metaller ayrıca kullandığımız ürünler veya yediğimiz yiyecekler, soluduğumuz hava ve içtiğimiz su yoluyla da vücudumuza girebilir. Bu ağır metallerle aşırı temas veya bunların organlarımızda birikmesi ölüme bile yol açabilir (Amit Kumar, Mani Tivari, Abbas Ali Mahdi, Fatima Zahra et al.,2012). Ağır metallerin vücut üzerindeki toksik etkilerinin derecesi değişkenlik gösterir ve bir dizi dış ve iç faktöre bağlıdır.

Kadmiyum en tehlikeli metaldir. Kalsiyum gibi kemiklere emilir ve hücre dejenerasyonu görülür. Kadmiyum esas olarak köklerde ve daha az oranda gövde ve yapraklarda lokalizedir. Ortamdaki kadmiyum miktarı keskin bir şekilde arttığından, köklerdeki konsantrasyonu yüzey kütlelerinden birkaç kat daha fazladır (. Criffi n G.D., et al.,2011). Klorofil kadmiyumun bitki dokularında birikme kabiliyetine sahip olduğu tespit edilmiştir. Bitkilerdeki kadmiyum miktarı çok yüksek olduğunda, aşağıdaki görünür belirtiler ortaya çıkar - yapraklarda kloroz, kenarlarında kırmızımsı-kahverengi renk, ayrıca büyüme geriliği ve kök sistemine zarar.

Kadmiyumun fitotoksitesisi ayrıca fotosentez, bozulmuş transpirasyon ve karbon dioksitin fiksasyonu üzerindeki inhibitör etkileri ve ayrıca hücre zarlarının geçirgenliğindeki değişiklikler ile ilişkilidir. Kadmiyum zehirli bir metaldir. Vücuda giren kadmiyumun sadece %5'i ince bağırsakta emilir ve bu da vücut tarafından besinler yoluyla emilir. Kadmiyumun emilimi kalsiyum, çinko ve bakırın varlığından etkilenir. Kadmiyum esas olarak karaciğer ve duodenumda birikir. Böbrekler kadmiyumdan daha zengindir. Bir kişi yaşlandıkça vücudundaki kadmiyum miktarı artar.

Ağır metaller doğada bulunur ve bir kısmı az miktarda bitki, hayvan ve insanın yaşamı için gereklidir. Bununla birlikte, fazlalıkları çevre ve insan sağlığı üzerinde zararlı bir etkiye sahiptir. Dolaşım sistemi hastalıkları dünyadaki en önemli hastalıklardan biridir. Şu anda, anemi sadece hastalığın bir semptomu olarak değil, aynı zamanda vücuttaki hasarı ağırlaştırıcı patojenik bir faktör olarak da kabul edilmektedir. Anemi gelişiminde konsantre tuzun rolü tanımlanmıştır. Çevrenin ağır metal tuzları ile kirlenmesi, nüfusun sağlığı üzerinde önemli bir etkiye sahiptir ve modern zamanların en acil sorunlarından biri olmaya devam etmektedir. Aneminin ana komplikasyonlarından biri demir eksikliğidir. Anemi, demir içeren hemoglobin eksikliğinden kaynaklanır (Kerimova R. C., Məşədiyeva S.Ə.,2020). Hemoglobin, vücudun tüm organlarına ve dokularına oksijen sağlayan bir proteindir. Yani vücut demir almazsa hemoglobin azalır ve bu da vücudun oksijen arzında sorunlara neden olur. Sağlıklı bir insanın vücudunda 5 gram demir bulunması gerekir. Bunun yaklaşık %70'i kanda (hemoglobin ve miyogloblin), geri kalanı ise kemik iliği, karaciğer ve dalakta bulunur. Demir kanda kırmızı bir pigmenttir - hemoglobin.

Hemoglobinin ana işlevi, vücuda oksijen sağlamak ve ondan karbondioksiti uzaklaştırmaktır. Bununla birlikte, hemoglobin, karbon monoksit ile yıkılmaz bir bağ oluşturma yeteneğine sahiptir. Bu olduğunda, hemoglobin hücrelere oksijen taşıma ve karbondioksiti vücuttan çıkarma yeteneğini kaybeder. Karbon monoksit zehirlenmesi böyle başlar.

Sağlığı etkileyen tüm hayati süreçler kırmızı kan hücrelerine bağlıdır. Kırmızı kan hücreleri mikroskopik parçacıklardır. Bu son derece küçük hücreler ortalama 280 milyon hemoglobin molekülü içerir ve her molekül bir demir atomu içerir. Bu, toplamda 1 milyardan fazla demir atomu olduğu anlamına gelir. Bildiğimiz gibi kırmızı kan hücreleri kemik iliğinde oluşur, buradan girip kanda dolaşır, daha sonra dalak ve karaciğerde parçalanarak demirlerini bu organlara aktarır. Demir sadece kırmızı kan hücreleri oluşturmak için değil, aynı zamanda kasların çalışması ve çoğu metalloenzimin oluşumu için de gereklidir. Eritrositler, akciğerlerden tüm

vücuda oksijen taşıyıcı ve vücuttan karbondioksiti uzaklaştırır. Oksijen güçlü bir oksitleyicidir, ancak hemoglobinin içerdiği demir nedeniyle oksijen taşıyabilir. İnsan vücudunda demir içeren enzimler vardır (Гулиева С.В. Керимова Р.Дж.2018). Demir içeren diğer maddeleri yapmak için kullanılan ferritin adı verilen bir protein kompleksi de vardır. Edinilmiş anemisi olan hastalarda genellikle demir eksikliği ve böbrek yetmezliği gibi anemiye neden olan başka faktörler de bulunur.

Demir tedavisi seçimi, ancak demir eksikliğine edinsel anemi eşlik ediyorsa uygun bir yaklaşım olarak kabul edilir. Demir depoları 2-3 ay içinde boşalır ve edinilmiş aneminin gerçek boyutu ancak bu dönemden sonra net olarak ortaya çıkar. Bu nedenle, demir eksikliğinin nedeninin değerlendirilmesi düşünülmelidir. Ağır metaller sağlığını çeşitli şekillerde etkileyebilir. Ağır metaller beyin hücrelerine zarar veren nörotoksinlerdir. Cıva ve kurşun, özellikle nöronal fonksiyona müdahale eden ve oksidatif stresi artıran güçlü nörotoksinlerdir.

Cıva, hem endüstriyel kirlilik hem de yer kabuğundan doğal buharlaşma, cıva cevherlerinin çıkarılması ve eritilmesi, sülfür cevherlerinden demir dışı metallerin çıkarılması, altın madenciliği, selülozun ağartılması, klor üretimi, kostik sonucu çevreye salınır. , vinil klorür, cıva ve çimento, cıva içeren pestisit kullanımı, kömür, akaryakıt ve atıkların yakılması. Ana insan yapımı cıva atığı kaynakları arasında floresan lambalar, cıva termometreleri, galvanik hücreler, piller, elektrik şebekelerindeki cıva valfleri vb. bulunur. Girilebilir (Charlier T.D., et al.,2010).Cıva en zehirli metallerden biridir ve çevrede yaygın olarak kullanılmaktadır. Cıvanın besin zincirindeki hareketi suyla başlar ve tortuları, balıkları ve insan vücudunu içerir. Sinir sistemi cıva bileşiklerine karşı çok hassastır. Vücuda giren cıvanın beyin ve böbreklerde tümörlere neden olduğu bulunmuştur. Vücuttaki yüksek cıva seviyeleri yüksek tansiyona, kalp krizine, ciltte kızarıklık ve yaralara ve göz hasarına neden olabilir. İçme suyu veya gıda yoluyla insan vücuduna giren cıva, nörolojik organlarda ve merkezi sinir sisteminde hasara, kansere, böbrek, karaciğer ve beyin dokusunda hasara ve kromozom hasarına neden olur (Керимова Р.Дж.. Гасанова Х. А.,2019).

Tıbbi termometreler bozulduğunda büyük bir kısmı çevreye girer. Herhangi bir biçimde toksiktir. Doğal koşullar altında, cıva hızla uçucu bir toksik bileşiğe - metil klorüre dönüşür. Eritrositlere, karaciğere ve böbreklere giren metil iyonları beyne yerleşir ve merkezi sinir sisteminde geri dönüşü olmayan ciddi hasarlara neden olur. Bu sonuçta genel ve serebral palsi, uzuvların, özellikle parmakların deformitesine ve ölüme yol açar.

Cıva, özellikle karbonik anhidraz, karboksipeptidaz ve alkalik fosfataz olmak üzere bir dizi önemli enzimin aktivitesini bloke eder. Hücrelere kolayca girer ve B12 vitamini ile ilişkili metabolik reaksiyonları bozar. B12 vitamini eksikliği, sinir sisteminde dejeneratif değişikliklere neden olan çeşitli anemi formlarına neden olan DNA biyosentez mekanizmasına zarar verir.

Modern koşullarda, en büyük kurşun kirliliği kaynağı, oktan sayısını artırmak için benzene tetraetil kurşun eklendiğinden, arabaların benzinli motorlarının egzoz gazlarıdır. Kurşun, biyosentezin bu aşamalarından birine müdahale eder, en güçlü nörotoksin olarak kabul edilir ve saldırganlıkta bir artışa neden olur. Kronik kurşun zehirlenmesi yavaş yavaş böbrek fonksiyon bozukluğuna, sinir sistemine, anemiye yol açar. Vücutta kalsiyum ve demir eksikliği ile kurşun toksisitesi artar (Керимова Р.Дж.. Гасанова Х. А.,2019).

Kurşun proteinlerin SH gruplarını bloke eder, nükleotidlerde ribozun fosfat gruplarıyla kompleksler oluşturur, böylece RNA'yı hızla yok eder, enzimleri, özellikle karboksipeptidazı inhibe eder (Керимова Р. Д.,Еввазов Т. Ә.,Нәсәнова Х.Ә.,2020). Kronik kurşun zehirlenmesi ve vücutta birikmesi, IQ'nun azalmasına, dikkatin bozulmasına, performans kaybına, hiperaktiviteye, davranış bozukluklarına ve gelişimsel gecikmelere yol açar. Ayrıca kurşunun gebeliğin seyrini ve sonucunu olumsuz etkilediği bilinmektedir (Charlier T.D., et al.,2010). Fetüsün organlarında, bazen plasentada kurşun bulunması, erken doğum, düşük ve fetüsün ölümüne yol açar. Kurşunun etkileri özellikle küçük çocuklar için tehlikelidir ve zeka geriliğine ve kronik beyin hastalığına neden olur.

Nikel de yaygın bir metaldir. Nikel çoğunlukla toprakta ve yeraltı sularında birikir. Bu tür topraklarda yetişen meyve ve sebzeler nikeli çeker. Bu tür ürünleri yemek akciğer ve solunum yolu hastalıklarına neden olur.

Arsenik kaynakları cam, radyo elektroniği, metalurji ve araba emisyonları olabilir. Arsenik en güçlü ve tehlikeli zehirlerden biridir. Oksijen varlığında hızla yüksek derecede toksik arsenik anhidrit oluşturur

(Kerimova R. C., Eyvazov T. Ə., Həsənova X.Ə., 2020). Oral zehirlenmelerde mide, bağırsaklar, karaciğer, böbrekler ve pankreasta yüksek konsantrasyonlarda arsenik gözlenir. Arsenik ile kronik zehirlenmelerde deri, saç ve tırnaklarda yavaş yavaş birikir. Çeşitli enzimlerin inhibisyonu metabolizmayı bozar. Zehirlenme sürecinde, öncelikle periferik nöropatiye ve uzuvların felce yol açan aksonlardan muzdariptir. Arsenik kanserojen olarak kabul edilir ve insan vücudu için çok tehlikelidir (Федотчева Т.А., Одицова Е.В., 2010).

Talyum çok zehirlidir ve genellikle "kimyasal AIDS" olarak adlandırılır. Talyum, ATP-az aktivitesini yok ederek oksidatif fosforilasyona müdahale eder. Hücre zarlarına nüfuz ederek riboflavinde çözünmeyen kompleksler gibi güçlü kompleksler oluşturur. Bu, kükürt metabolizmasının bozulmasına ve bağışıklık sisteminin tahrip olmasına yol açar. Talyum zehirlenmesi gastroenterit, periferik nefropati ve yüksek emilim ile ölüme neden olur. Küçük bir zehirlenmeden 2-3 hafta sonra kişinin saçı dökülür (Шулунов С.С., Шенин В.А., Колесникова Л.И. и др., 2011).

Çinko, iki değerli bir element olarak metabolizmada yer alan nükleik asitler de dahil olmak üzere 20'den fazla enzimde bulunan biyolojik olarak önemli bir eser elementtir. Bir yetişkinin vücudunda içeriği yaklaşık 2 gramdır. Ancak, çinko elementinin küçük miktarına rağmen yüzlerce biyokimyasal reaksiyon üzerinde büyük etkisi vardır. Çoğu çinko, prostatta en yüksek konsantrasyonla kaslarda bulunur. Kandaki eritrositlerde karbonik anhidraz kofaktörü olarak bulunur. İnsülin çinko elementini içerir. Çinko eksikliği adrenal hormonlar, tiroid bezi, büyüme hormonu (büyüme hormonu), testosteron ve östrojen üretimini engeller. Bu eser element özellikle erkek vücudu için önemlidir. Prostat bezinin ve sperm üretiminin normal işleyişini sağlar. Fazla çinko, diğer metaller arasındaki metabolik dengeyi bozar ve bağışıklık sisteminin aktivitesini düşürür. Çinko-bakır oranındaki bir dengesizlik, koroner kalp hastalığının gelişiminde ana faktörlerden biri olarak kabul edilir. Aşırı çinko tuzları alımı mide bulantısı ile birlikte akut bağırsak zehirlenmesine yol açabilir. Ek olarak çinko, sinir uyarılarının iletilmesinde rol oynar. Bu, retina hücrelerindeki yüksek içeriğinden kaynaklanmaktadır. Çinko elementi tat ve koku algısını keskinleştirir, kasların kasılmasını etkiler.

Ağır metallerin olumsuz etkileri, vücutta yaşam için faydalı metallerin yerini alabilmeleri ve istenmeyen süreçleri tetikleyebilmelerinden kaynaklanmaktadır. Örneğin, bazı metaller kanserli tümörlerin oluşumuna katkıda bulunur, kadmiyum ve cıva böbrekler üzerinde güçlü bir toksik etkiye sahiptir, kurşun ve cıva sinir sistemi üzerinde zararlı bir etkiye sahiptir, kadmiyum ve kurşun erkek cinsel organlarında birikerek dejenerasyonlarına neden olur. ve üretkenliği etkiler. Ek olarak, ağır metaller solunum ve endokrin sistemlerini etkileyebilir ve bu maddelerle şiddetli zehirlenme ölümcül olabileceğinden genel toksisitelerine dikkat edilmelidir (Ткаченко Е. А., Дерхо М. А., 2016).

Diğer biyolojik olarak aktif ağır metal bileşikleri, genel metabolizma akışına katılır ve çeşitli biyokimyasal süreçlerin normal seyrini bozar. Sonuç olarak, vücutta çeşitli patolojik durumlar, hastalıklar ortaya çıkar veya vücutta önceden var olan patolojileri ağırlaştırır. Modern teknoloji her alanda işimizi kolaylaştırır da sağlığımız için büyük bir tehdit olarak görülüyor. Şu anda satışta olan birçok ürün ağır metaller açısından zengindir. Ağır metaller ev eşyalarında, kozmetiklerde, ilaçlarda, giysilerde ve her gün temas ettiğimiz diğer şeylerde bulunur. Orta Çağ'da kozmetikte kurşundan birçok insanın öldüğü bilinmektedir. Ağır bir metal olarak kabul edilmese de sağlığa zararlı olan arsenik ile vücutta aşırı dozda alınması durumunda zehirlenmeye neden olabilecek demir, çinko ve bakır gibi elementler mutlaka dikkate alınmalıdır.

Ağır metallerle kirlenmiş vücuttaki birçok organ bozulur. Sinir sistemi, kalp, akciğer, karaciğer ve böbreklerde problemler oluşur. Hastanın kansere yakalanma riski de artar. Çocuklarda fiziksel ve zihinsel gerilik görülür. Bunu önlemek için ağır metalleri hayatımızdan mümkün olduğunca uzaklaştırmalı ve zaman zaman vücudumuzu temizlemeliyiz. Bilim adamları, kurşun gövdesini temizlemenin en güçlü yolunun C vitamini olduğunu söylüyor. Bu konuda portakal, limon, sarı ve kırmızı biber, ter, brokoli, karnabahar, kivi, çilek, domates, fasulye gibi besinler tavsiye edilir. E vitamini de ağır metallerle karşı güçlü bir etkiye sahiptir. Antioksidan etkisiyle ağır metallerin vücuda verdiği zararı azaltır. Ispanak, badem, ceviz, ay çekirdeği, avokado, alabalık, zeytinyağı, brokoli ve balkabağı E vitamini açısından zengindir bu nedenle ağır metallerden kurtulmak için bu gıdaları bolca tüketmeniz gerekir. Bu konuda potasyum da kullanabilirsiniz. Çünkü potasyum vücuttan ağır metallerin atılmasına yardımcı olur.

Bu konuda insanları bilinçlendirmek ve bilinçlendirmek gerekiyor. Bunun için kontamine alanların sürekli izlenmesi, izleme yapılması ve çevresel risklerin azaltılması gerekmektedir (Loutradis D., et al 2012).

Kirlenmiş alanların kullanımı, malzemelerin yeniden kullanımı vb. Bu tür çevresel risklerin önüne geçebilmek için halk arasında sürekli propaganda çalışmalarının yapılması önemlidir.

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ERYTHROPOIESIS IN CHILDREN WITH MEDULLOBLASTOMA. HEMATOLOGICAL DISORDERS

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ABSTRACT

Medulloblastoma (MB) is the most common Central Nervous Systems tumor in children. **The aim of the study** was to reveal hematological disorders in children with MB after surgical treatment and standard chemo and radiation therapy. Hematological disorders. **Materials and methods.** A comprehensive dynamic examination, treatment and observation of 50 children diagnosed with MB were carried out in National Oncology Center of Azerbaijan Republic. Children before hospitalization, after surgery and chemo-radiotherapy underwent an identical range of laboratory tests of venous blood and its components (in addition to the generally accepted standards for preoperative examination). A detailed blood test, general urine analysis and hemostasis parameters were determined according to regulatory documents using original reagents and consumables, respectively, on an LH750 hematological analyzer (Beckman Coulter, USA), Aution Max automatic urinary station (Arkrey, Japan) + iQ -200 (Iris, USA), automatic coagulometer Sysmex CA-660 (Sysmex, Japan). **Results.** The intensity of erythropoiesis in children during the entire observation period was reduced by an average of 18-20%. At the same time, in the course of treatment, only a tendency for a decrease in hemoglobin and erythrocytes was observed in relation to the initial level. Probably, a change in the level of the total number of erythrocytes in the peripheral blood is due to a significant decrease in the hematocrit index by an average of 13%. **Conclusions.** Analysis of hematological parameters in children with medulloblastoma of the brain, undergoing a standard course of chemoradiation therapy, revealed a number of peculiarities. First, against the background of the underlying pathology and therapy, the development of anemia and thrombocytopenia is observed, accompanied by signs of dehydration.

Keywords: Medulloblastoma. Treatment. Complications.

INTRODUCTION

Medulloblastoma (MB) accounts for about 20% of all tumors of the central nervous system (CNS) in childhood, with a frequency of 0.5-0.7 cases per 100,000 children. The peak incidence occurs at the age of 5-7 years. MB occurs in 80% of cases in the cerebellar vermis, and in 20% in its hemispheres [1]. The primary tumor often spreads to the fourth ventricle and supratentorially through the Sylvian aqueduct. The process may involve the floor of the fourth ventricle, the brainstem, the cerebral peduncles and the cerebellar angle.

Diagnosis of MB is based on clinical data supplemented by modern neuroimaging methods - computed tomography, magnetic resonance imaging.

The causes of the occurrence of Medulloblastoma remain unknown today, and it is even difficult to assume what is the cause, trigger factor or starting point. In this regard, it is quite difficult to give any recommendations for the prevention of this type of tumors [2,3,4]. In this respect, a more in-depth study of functional and

metabolic disorders at the organizational level will allow us to have more accurate ideas about the nature and pathogenesis of Medulloblastomas and diagnose, treat and prevent relapses in a timely manner [5. 6].

The aim of the study was to identify hematological disorders in children with Medulloblastoma after surgical treatment and standard chemoradiotherapy.

MATERIALS AND METHODS

We analyzed hematological disorders in 50 children diagnosed with MB who received comprehensive treatment in National Center of Oncology from 2012 to 2020. In total, 37 boys and 13 girls were treated. According to literary sources, boys become ill more often than girls. The average age of patients at the time of initial treatment at the clinic was 12 years. The minimum and maximum ages were 2 and 18 years, respectively.

The diagnosis was made based on the conclusion of MRI and histological examination of the material of the removed tumor.

During treatment, all patients underwent a standard range of laboratory tests of venous blood and its components (in addition to generally accepted standards for preoperative examination). Biochemical parameters of blood plasma, as well as the level of electrolytes, were determined using reagent kits by the immunochemical method (Cobas E 601 analyzer, Roche Diagnostics, France).

Treatment of children with MB included surgical removal of the tumor, radiation and chemotherapy according to the HIT 2000, HIT 2014, HIT 2018 protocols.

According to the therapy standards, as well as the developmental research design, MRI and computed tomography (CT) were used at the stage of diagnosing the main pathology. MRI was performed on a 1.5-Tesla magnetic resonance imaging machine (Siemens), and CT was performed on a 64-slice computed tomography from «Philips». In this case, both non-contrast and contrast tomography were used, according to the instructions.

Surgical operations were performed in the neurosurgical department of the NCO, as well as in the Neurosurgical Clinic of the Republic of Azerbaijan. In exceptional cases, the children were operated in private clinics in Baku. The removal of tumors was carried out in total and subtotal volume, within the framework of slightly-altered tissues. Total removal of the tumors was performed in 41 patients, subtotal in 9 patients. On the 20-25th day after the operation, chemoradiation was performed according to the protocol.

After surgery, histological examination of the biopsy material was carried out on the basis of the Pathomorphological Department of the National Center of Oncology of the Republic of Azerbaijan.

In total, we have treated 33 standard and 17 high-risk patients with MB. Patients in the standard risk group, after complete resection of the tumor, underwent craniospinal radiation therapy in accordance with the established procedure (25-30 Gy for the entire central nervous system and additionally 25-30 Gy for PCF) on a Varian linear accelerator, mainly on True beam STX. [5]. In parallel with radiation therapy, according to the protocol, vincristine was used at a dose of 1.5/m² once a week (for a total of 8 weeks), followed by 8 cycles of supportive chemotherapy, 42-days break, drugs-cisplatin 70 mg/m² (1 day), lomustine 75 mg/m², (1 day) vincristine 1.5 mg/m² (1, 8, 15 day).

Children in high risk group, after partial tumor resection, underwent 8 cycles of chemotherapy with drugs carboplatin 200 mg/m² (1, 2, 3 days), etoposide 150 mg/m² (1, 2, 3 days), vincristine 15 mg/m² (1 day), cyclophosphane 800 mg/m² (1, 2, 3 days) and high-dose methotrexate. Followed by craniospinal RT(in the prescribed manner 25-30 Gy for the entire central nervous system and additionally 25-30 Gy for the PCF) and 4 rounds of supportive chemotherapy according to the regimen (drugs cisplatin 70 mg / m² (1 day), lomustine 75 mg / m² (1 day), vincristine 1.5 mg / m² (1,8,15 days).

Duration of treatment according to the protocol is 12 months. The maximum duration of patient follow-up was 16 months.

Statistical data processing was carried out using the Statistica-6 program. The normal distribution of the results obtained in the variation series was assessed using the Kolmogorov-Smirnov test (σ). Data that did not follow the law of normal (Gaussian) distribution, even according to one of the methods of determination, were presented in the form of a median (Me) and an interquartile range (25th and 75th percentiles). The Mann-Whitney test was applied if the compared sets of unrelated samples did not follow the law of normal distribution. The critical level of significance of statistical hypotheses in this study was taken equal to 0.05, since the probability of difference was more than 95%.

RESULTS AND DISCUSSION

The intensity of erythropoiesis in children throughout the period of treatment and observation was reduced by an average of 35-37% (Table 1). At the same time, in the course of the treatment, there was a tendency for a decrease in hemoglobin and erythrocytes in relation to the initial level. Due to the synchronous decrease in both parameters, the hemoglobin in each erythrocyte was comparable to the physiological norm and did not differ from the normative indicators throughout the observation. Probably, the change in the level of the total number of erythrocytes in the peripheral blood is due to a significant decrease in the hematocrit index by an average of 28% in relation to the control over the observation period of 12 months. Similarly, with the dynamic changes in the red blood indicators and changes in the hematocrit level, there was only a tendency to blood thickening during the chemoradiation therapy. It is necessary to pay special attention to the fact that simultaneously with an increase in the level of hematocrit, a decrease in the number of erythrocytes by 7.2% in relation to the initial value was observed in dynamics. Consequently, it was significant that hypovolemia could lead to hemoconcentration against the background of a reduced hematocrit indicator in children with MB.

Hematological Parameters of Children with Medulloblastoma. (Tabl.1)

	Before Treatment	During the Treatment	At the End of Treatment
Hemoglobin	111,5 (101,0 119,5)	93,1 (83.1 102,4)	82,4 (65,7 88,3)
Erythrocytes	3.70 (3.20 4.00)	2.70 (2.50 3.60)	2,40 (2.10 2.60)
Color index	0,90 (0.90 0.98)	0.95 (0.91 0.99)	0.90 (0.89 0.95)
Platelets	221.0 (176.8 256,3)	94.0 (85.4 112.9)	73.2 (43.2 81.3)
ESR	26.1 (21.5 27.0)	21.0 (18.4 24.2)	18.0 (14.6 20.9)
Hematocrit	28.9 (27.0 30.9)	29.0 (26.0 30.7)	28.7 (25.0 32.0)

The initial platelet level was 25.8% less than the control, which was probably due to the relatively short time after surgery. After 23 days from the beginning of chemo therapy, the platelet level decreased by 67.5% to the minimum value during observation. In our opinion, it was associated with a number of factors caused by the therapy, its side effects and, above all, with a decrease in the intensity of energy-intensive processes occurring in megakaryocytes as the main sources of platelets. As the chemotherapy ended, the platelet count increased by 28.2%. However, it still remained less than the initial and control values by 16.6% and 37.6%, respectively.

During hospitalization of children, the erythrocyte sedimentation rate was on average 3 times higher than the norm. During the treatment, this indicator gradually decreases, reaching its minimum by the end of therapy-decreased by 42% from the initial value. However, at the end of the study, the erythrocyte sedimentation rate exceeded the control values by more than 1.5 times. In our view, an increase in the rate of erythrocyte sedimentation in the examined children was associated with a number of factors. Firstly, the previous surgical

intervention contributed to the release into the blood of factors that enhance the adhesion of shaped elements (tissue thromboplastin, catabolic pool).

Secondly, due to the aggressive effect of the used cytostatics, toxic substances were formed in the tissues, deposited on the surface of the membranes of the blood cells and changed their zeta potential. Thirdly, against the background of the therapy, the quantitative and qualitative changes in leukocytes occurred (Table. 2), which caused dysproteinemia, the imbalance of globulins and contributed to the occurrence of infectious complications.

The level of Leucocytes I the blood in children with Medulloblastoma during the treatment.(Tabl.2)

	Before treatment	During the treatment	At the end of the Treatment
Leykocytes	5.2 (4.43 6.31)	3.65 (2.1 3.99)	2,7 (2.1 2,8)
Stab neutrophils	2.0 (0 3.0)	2.0 (1.0 4.0)	2.0 (1.0 3.2)
Segmented neutrophils	71,0 (67.0 76.0)	72.0 (61.3 78.0)	72.4 (62.1 73.0)
Eusinophils	1.0 (0. 3.0)	1.0 (0 3.0)	2.0 (1.0 3.0)
Lymphocytes	17.0 (14.0 21.3)	15.0 (11.0 17.0)	15.0 (12.0 18.3)
Monocytes	5.0 (2.0 6.0)	4.0 (3.61 5.1)	5.0 (2.0 6.0)

According to the results obtained (Table. 2), the most apparent leukopenia was noted in children at the 5th month of therapy on the 10th day after the course of chemotherapy, and the normalization of leukocyte level was observed.

Throughout the observation period, the level of neutrophilic and eosinophilic leukocytes did not significantly differ from the control values. Moreover, by the end of therapy, according to hematological parameters, there was a tendency to increase the number of eosinophils, which was probably due to a decrease in the number of stress hormones in the blood and a decrease in their effects associated with the lysis of immunocompetent cells in the spleen, thymus and lymph nodes. The most significance decrease was noted in the level of lymphocytes in analysis of the second and third control points, when their number was only 64% of the control values. A significant decrease in the number of blood monocytes was noted only on the 20th day of treatment, while no significant difference was found in the remaining observation periods.

Thus, the most unfavorable in terms of the severity of leukopenia in children with MB undergoing chemoradiotherapy is the 10th day after the third cycle of chemotherapy: during these periods a combination of lymphocytopenia and monocytopenia is observed. Thus, the child's body becomes more vulnerable to both pathogenic and saprophytic microflora of both bacterial and viral etiology.

CONCLUSION

Analysis of hematological parameters in children with Medulloblastoma undergoing a standard chemoradiotherapy revealed a number of features. First, in the background of the underlying pathology and ongoing treatment, there is the development of anemia and thrombocytopenia, accompanied by signs of dehydration of the body. Secondly, bone marrow failure affects the formation of lymphocytes and monocytes. These changes indicate the need for a deeper analysis of the causes and mechanisms of their development, as well as ways to prevent and correct them.

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PECULIARITIES OF THE GLANDS WITH DIVERTICULA IN THE GENERAL EXCRETORY DUCT OF THE HUMAN URINARY BLADDER WALLS

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ABSTRACT

Introduction. The morphological features of the glands of various tubular organs and the urinary bladder in postnatal ontogenesis have been studied sufficiently. However, the morphological – age, individually and regionally peculiarities of the human urinary bladder walls glands with expansions on the general excretory duct, have not been adequately investigated.

Purpose of investigation. In connection with this, the purpose of the investigation is to learn the morphological peculiarities of the human urinary bladder walls glands with expansions on the general excretory duct, in different age periods of postnatal ontogenesis.

Material and methods. In different age periods of postnatal ontogenesis, the glands with ampoule shaped diverticula in the general excretory duct on the walls of human urinary bladder on 34 cadavers are investigated by the macro-microscopically (with Sinelnikov method) and by the histologically methods (Van Gizon's, Kreyberg's methods). Statistical data processing included calculation of arithmetic-mean values, their errors, confidence intervals.

Results. To senile age of the postnatal ontogenesis, in some general excretory duct of a glands on the walls of a urinary bladder has form an ampoule shaped expansions - diverticula. Compared with newborns, the quantity of the glands with ampoule shaped expansions, increases in the 1st maturity period is 8.3, in senile age 12.5 times. The individual minimum and maximum percentages of glands with ampoule shaped expansions on the general excretory duct in the urinary bladder walls gradually increase from the newborn to senile age. The exclusion of the minimum and maximum values of these glands also increases in maturity and old ages. These glands are also characterized by regional peculiarities. In all age groups of postnatal ontogenesis the quantity of glands with expansions ductus is less in the proximal part of the urinary bladder, than in the middle and distal parts.

Conclusion. In all age periods of postnatal ontogenesis, the glands with diverticula on the walls of the urinary bladder, are characterized by age, individually and regionally features.

Keywords: Postnatal ontogenesis, Human urinary bladder glands, Ductus diverticula

INTESTINAL DYSBACTERIOSIS AS A FACTOR IN PREGNANCY DISRUPTIONS

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ABSTRACT

Research has found that if the amount of pathogenetic intestinal level microbiota is more than normal level then it can lead to metabolic endotoxemia and reinforces some pathobiochemical reactions in the endometrium case which gives rise to cessation of pregnancy.

Analysis and confrontation of intestinal microbiocenosis and the standards of endotoxemia at the abortion and usual pregnancy in women. Sixty people, including the number of women in the two groups, were checked. Usual pregnancy group consists of 30 women while the same quantity of women were in risk of abortion. Chromate-mass spectrometry method was used to research standard of endotoxemia. In terms of microbiological examination of excrement was carried out by polymerase chain reaction. In the supervision group, essential group with patients disruptions of microbiological in the first 75%, and less than first with 25% in the second. With respect to essential group 24,3% amount of women were registered with the first degree dysbacteriosis. Furthermore, the second degree dysbacteriosis were mostly investigated by 60%, while 16,7% women were third degree. Besides normal level of microflora, there were examined a rise in pathogens. Another factor to consider is standard of endotoxemia was 0.34 nmol/mol and 0.58 nmol/mol respectively to control and main group. Obviously, endotoxemia concluded with higher level in main group. Women with abortion have a high standard of endotoxin in blood. With regarding this the intestinal microflora was examined considerable dysbiotic variations.

Keywords: pregnancy disruptions, intestinal microbiota, dysbacteriosis.

MODERN APPROACHES TO THE TREATMENT OF TUMORS

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In the world, cancer is an important health problem for almost all mortality and morbidity rates. While cancer was the 7th and 8th leading cause of death at the turn of the century, it is now the second leading cause of death in many countries after cardiovascular disease (1). Lung, breast and stomach cancers are the most common types of cancer.

According to the International Agency for Research on Cancer's GLOBACAN 2002 project, 2.9 million people (54% men, 46% women) in Europe are expected to die from cancer and 1.7 million from cancer (2). According to a 2006 report, in the United States, prostate, lung, and colon-rectal cancers account for 56% of all cancers in men, and breast, lung, and colorectal cancers account for the top three (approximately 54% of cases) in women (3).

The most common cancers in children are blood cancer, central nervous system tumors, soft tissue tumors, non-Hochkin's lymphoma, and Wilms tumor (4).

According to the National Cancer Institute's Surveillance Epidemiology and Recent Outcomes (SEER) 1999-2001, the highest incidence of cancer is between the ages of 30-34 (7.9%) and 40-49 (16%) (5). Lung cancer is the most common type of cancer in the world, and 1.35 million people are diagnosed with lung cancer each year, accounting for about 12.8% of all cancers. It is especially common in North America and Europe (2).

Despite the declining mortality rate from breast cancer, it is one of the most important health problems. Robsham and friends found that rural women had a better survival rate than urban residents, based on the socio-demographic data of 589,521 women with breast cancer (6).

Cervical cancer is the fourth most common type of cancer in women after breast and colorectal cancers. HPV infection has been found in almost all cases of cervical cancer, and hopes have been raised since the 2006 vaccination to address the current global inequality and reduce mortality from cervical cancer. The HPV vaccine has proven to be safe and effective in preventing cervical cancer by providing immunity to high-risk HPV strains. The United States, Canada, Australia, the United Kingdom, Mexico, and Hong are included in the routine vaccination program in many countries, especially in countries such as the Congo (7,8,9).

Cancer is a complex disease caused by uncontrolled cell division and proliferation, under the influence of genetic and environmental conditions. The word "cancer" comes from the Latin word "cancer" or "carcinos".

The term tumor was first coined in BC. In the 3rd century, the swollen veins around the tumor were used by Hippocrates to resemble the legs of a cancer, and the Greek physician Galen used the term "oncos," meaning swelling (10).

Cancer is the uncontrolled division, multiplication and accumulation of cells in an organism. Just as it affects a single organ, it can also spread to distant organs. Although some standards have been set, different approaches and treatments are available for each type of cancer. This is because everyone has a different DNA.

In addition to cancer treatment, the presence of cancer-causing factors, prevention of cancer, social and psychological support, and reassurance of patients and their relatives indicate that cancer is an extremely complex and major problem. There are more than 100 types of tumors that affect the human body. Because cell division and control are controlled by genes, cancer is primarily a gene-related disease. The genes on the chromosomes are tightly packed, and physical or chemical changes on these genes can directly affect cell function. Although DNA repair systems for damage to a gene try to restore gene function, they are not always able to repair the damage. In this case, more or less synthesis of proteins, which are products of genes, leads to a violation of cell function.

What are the main symptoms of cancer?

Cancer, in principle, originates from an organ or tissue. In general, the symptoms of cancer are:

1. Weakness, fatigue
2. Mass under the skin
3. Instant weight loss
4. Jaundice, bruising, redness, incurable wounds on the skin
5. Diarrhea or constipation
6. Inability to urinate
7. Prolonged cough, shortness of breath
8. Difficulty swallowing
9. Crepitation
10. Postprandial indigestion
11. Stomach pain
12. Chronic muscle and bone pain
13. Unexplained fever or night sweats
14. Unexplained bleeding or bruising on the body.

What are the risk factors for developing cancer?

1. Cancer is caused by DNA damage in cells. The main factors that cause DNA damage are:
2. Cancer is more common in older people, but there are also types of cancer in children and adolescents.
3. Smoking, excessive alcohol consumption, excessive sun exposure, overweight, sedentary life and unsafe sex can lead to cancer.
4. Having cancer patients in the family can be risky.
5. Some diseases, such as ulcerative colitis, may be prone to cancer.
6. The presence of carcinogenic chemicals or radiation in the environment in which you live or work increases the risk of cancer.
7. An unhealthy diet is also one of the important reasons.

Is cancer a congenital?

1. Family cancer is found in 5-10% of cancer patients. Genetic testing can identify the types of genes that predispose to cancer. Genes that predispose to cancer:
2. BRCA1 and BRCA2 genes: Infected for breast, ovarian and prostate cancer.
3. APC, KRAS, MSH2 and MLH1 genes: Involved in bowel cancer.

4. VHL gene: Von Hippel-Lindau Syndrome
5. STK11 gene: It belongs to Peutz-Jeggers syndrome.

People with family cancer are advised to go to a genetic diagnostic center.

How is cancer diagnosed?

The first suspicious findings may appear after listening to the patient's history and examination. We have listed above the general results seen in cancer patients. A patient who comes to the doctor with these complaints needs some tests to make a differential diagnosis of the disease. These are:

1. Blood and urine analysis

2. Studies using radiological imaging include lung radiography, ultrasound (USG), computed tomography (CT), magnetic resonance imaging (MRI), and positron emission tomography (PET).
3. Tumor markers Alpha-fetoprotein (AFP), Carcinoembryonic antigen (CEA), Beta-human chorionic gonadotropin (β -HCG), Serum immunoglobulins (multiple myeloma), BCR-ABL1 (chronic myeloid leukemia), CA 125 (tumor), CA 27-29 (breast cancer), Prostate specific antigen.
4. Biopsy and pathological examination.

Do you need a cancer test? How is cancer diagnosed?

Screening tests for cancer are performed in patients who are at risk but do not yet have symptoms. Cancer screening makes early diagnosis, simplifies treatment, and increases survival rates. Those with a family history of breast cancer can have regular mammograms. Those at risk for prostate cancer can have a prostate exam and a prostate antigen. Colonoscopy can be done for bowel cancer.

Smokers may have a CT scan of their lungs and be tested for cancer antigens. If there is a risk of gastric cancer, endoscopy and biopsy may be performed. The screening method for cervical cancer should be regular smears.

Can cancer be prevented?

We can't completely prevent cancer, but we can reduce the risk. Basic methods:

1. Quit smoking, not in smoking environments;
2. Do not stay in the sun too long, prevent sunburn;
3. Consuming whole grains rich in fruits and vegetables, reducing the consumption of processed foods;
4. Do a lot of sports outside;
5. Lack of excess weight;
6. Reduction of alcohol consumption;
7. Do not neglect cancer screening, especially if there is a genetic risk;
8. Get the hepatitis B vaccine and the HPV vaccine that protects against cancer.

Could the cancer be treated?

The treatment changes considering the type and stage of the disease. These two factors determine the ratio of survival. The term of survival is long at early stage and without metastasis in several types of the cancer.

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STUDYING THE RADIOPROTECTIVE PROPERTIES OF SEROTONIN-MODULATED PROTEIN

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ABSTRACT

Nowadays, along with the rapid development of modern industry and scientific technical progress, it is observed that the human body is exposed to heavy and long-term adverse effects of various anthropogenic factors. Both chemical and physical factors lead to mutagenic and prooxidative changes in cells of all tissues of living organisms. Among these factors, ionizing radiation is particularly noteworthy. The particular significance of ionizing radiation is related to its heavy, irreversible and destructive effects in organisms. On the other hand it is associated with severe accidents in Chernobyl and Fukushima earlier this century. Considering above mentioned reasons, the investigation of high resistance organisms to γ -irradiation through upregulation of serotonergic system is one of the necessary requirements of the present time. The significant impact of different kinds of unfavourable environmental factors on the activity of serotonergic system have been shown on numerous experimental models. For this aim in our experiments activation of serotonergic system was achieved by intraperitoneally administration of serotonin-modulating anticonsolidation protein [1] into the animals. This protein is in linear relation with serotonin level.

Keywords: serotonin-modulating anticonsolidation protein, γ -irradiation, nuclear pathologies, radiation

INTRODUCTION

Because of intensive applying of nuclear energy in modern life, the problem of elaboration of effective ways of radioprotection is extremely important. Though radiation protecting materials blocking spreading of radiation are currently widely used, however, this type of protection for many reasons has already been out of date and does not provide reliable protection of the organism's tissues.

The main adverse effects of radiation on the living organisms are related directly to upregulation of mutation level in somatic and sexual cells. So, from this standpoint one can conclude that the main pinpoint of effective radioprotection should be based on preventing and taking off mutagenic changes induced by radiation effects on the tissues of animals and humans.

Our earlier studies have shown that long-term exposure of the sturgeon juveniles in the fresh water containing crude oil leads to upregulation of mutations and downregulation of serotonin-modulating anticonsolidation protein in the somatic cells, while short-term exposure does not bring to these changes [2]. I.m. administration of SMAP prior to putting sturgeon juveniles into the water containing heavy metals and polyaromatic hydrocarbons (PAH) leads to downregulation of mutation level by over 50% [3]. So, as it issues from these data, SMAP realizes anti-mutagenic activity

MATERIALS AND METHODS

The studies were conducted on male albino rats of 160-200 g of body mass. Upregulation of serotonergic system was fulfilled by administration of SMAP. This protein was purified from the cow brains with application of two-step purification procedure as had been described earlier (Mekhtiev, 2000): 1) partial precipitation with sodium sulphate in the range of 0-40% concentration; 2) gel-chromatography on the column (3.0 X 60.0 cm) of Sephadex G-150. SMAP purification was carried out under the screening control of the indirect ELISA-test with application of anti-SMAP rabbit immunoglobulins to choose the SMAP-immune positive fractions. The protein purity was checked by electrophoresis in polyacrylamide gel. The anti-SMAP polyclonal immunoglobulins were produced through immunization of the rabbits with SMAP, using 300 µg of the protein always in mixture with the complete Freund adjuvant. SMAP and anti-SMAP immunoglobulins were frozen and kept under -70°C.

In the 1st series of studies the effects of γ -irradiation at a dose of 4 Gy on the levels of SMAP, heat shock protein with Mr 70 kDa (HSP70) and cytochrome P-450 in the bone marrow and liver was evaluated by the indirect ELISA-test with application of antibodies to these proteins on the polystyrene plates [4]. The animals were sacrificed and their livers were removed, homogenized and water-soluble proteins were extracted and used as antigens in the ELISA-test. Specific polyclonal rabbit anti-SMAP antibodies were used as the first antibodies, while the anti-rabbit goat immunoglobulins coupled with horseradish peroxidase were used as the second antibodies. Orthophenyldiamine was used as a substrate for peroxidase to visualize the results of reaction. The reaction was stopped by adding 3 M NaOH and the results were transferred into digital form in the ELISA-test reader “Molecular Devices Spectra Max 250” (MTX Lab Systems, Inc., USA) at the wavelength of 492 nm (wavelength of reference 630 nm) and analyzed with application of the t-Student criterion.

In the 2nd series of studies the effect of SMAP on synthesis of HSP70 was analyzed with application of Western blotting technique. SMAP was administered intraperitoneally into the animals (1 mg per 100 g of body mass) and in 1.5, 3 and 5 h intervals the animals were sacrificed and the liver was removed.

In the 3rd series of studies after exposure of the animals to the effects of γ -irradiation at a dose of 8 Gy, level of lipids peroxidation (LPO) in the liver was analyzed. In these series of studies the animals were divided into 3 groups: 1) intact group; 2) control group (inactive SMAP), and 3) experimental group (SMAP). Taking into account the results of the previous series, the animals of control and an experimental groups were exposed to γ -irradiation at 8 Gy dose 3 h later since i.p. injection of preparations in the 4th series of experiments. After decapitation of the animals, samples of bone marrow were taken from the animals of all the groups and the number of nuclear pathologies in 1000 erythrocytes was evaluated in a light microscope.

RESULTS

In the 1st series of studies it was shown that γ -irradiation at 4 Gy brings to downregulation of HSP70 in the bone marrow and liver, while in the liver noticeable downregulation of only cytochrome P-450 was observed

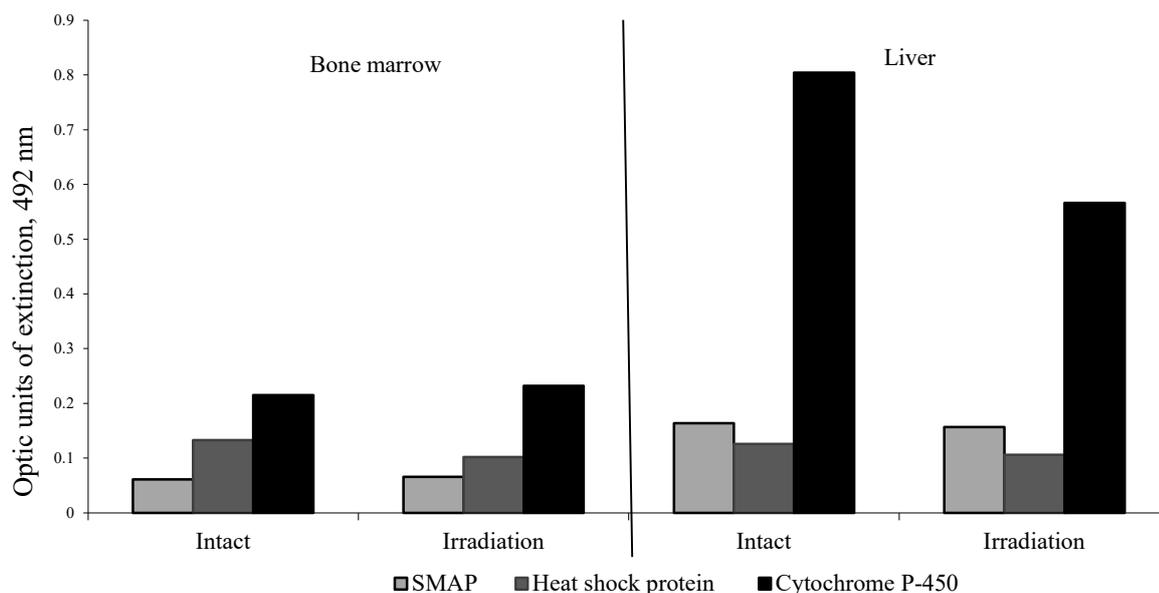


Figure 1. Effect of γ -irradiation at a dose of 4 Gy on different markers in the rat tissues.

In the 2nd series of studies the results in the Western-blotting analysis showed that after intra-peritoneal administration of SMAP the most prominent upregulation of HSP70 in the liver is revealed in a 3-hour interval. So, for further studies the 3-hour interval between SMAP administration and exposure of the rats to γ -irradiation was chosen.

In the next series of studies it was shown that under γ -irradiation significant upregulation of malone dialdehyde (MDA) was noticed in the control animals, injected with heat-inactivated SMAP, while in the experimental animals, injected with active SMAP, MDA level declined and likened to the values of the intact group ($p < 0.05$; Fig. 2).

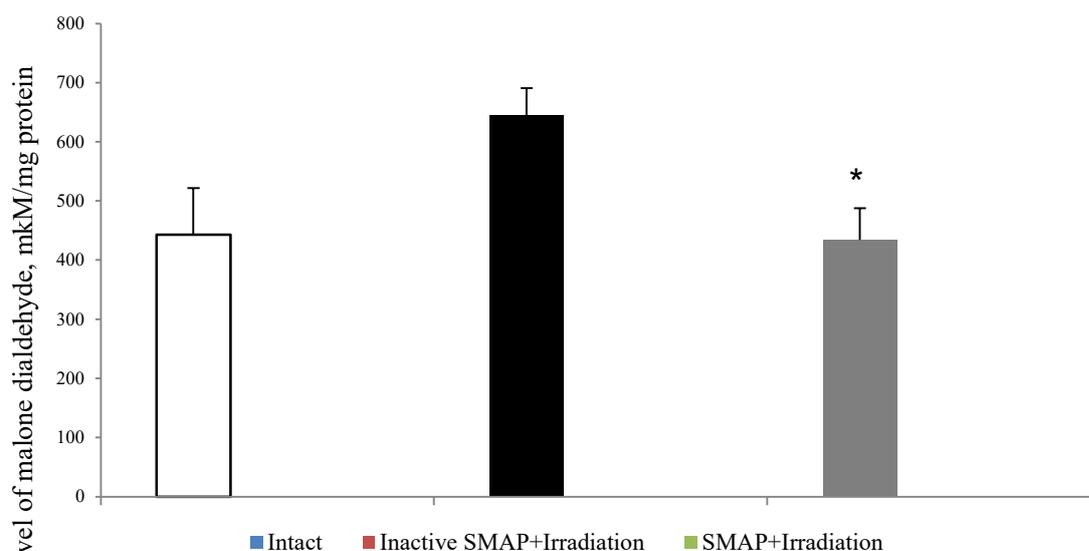


Figure 2. Effect of SMAP on the level of malone dialdehyde in the liver of the rats. * - $p < 0.05$.

The results obtained from the 4th series of investigation indicate that there is a sharp increase in the number of nuclear pathologies in the control group animals, which were injected with inactivated SMAP before radiation. At the same time, the number of nuclear pathologies in the experimental group (SMAP) downregulated by over 40% compared to the control group

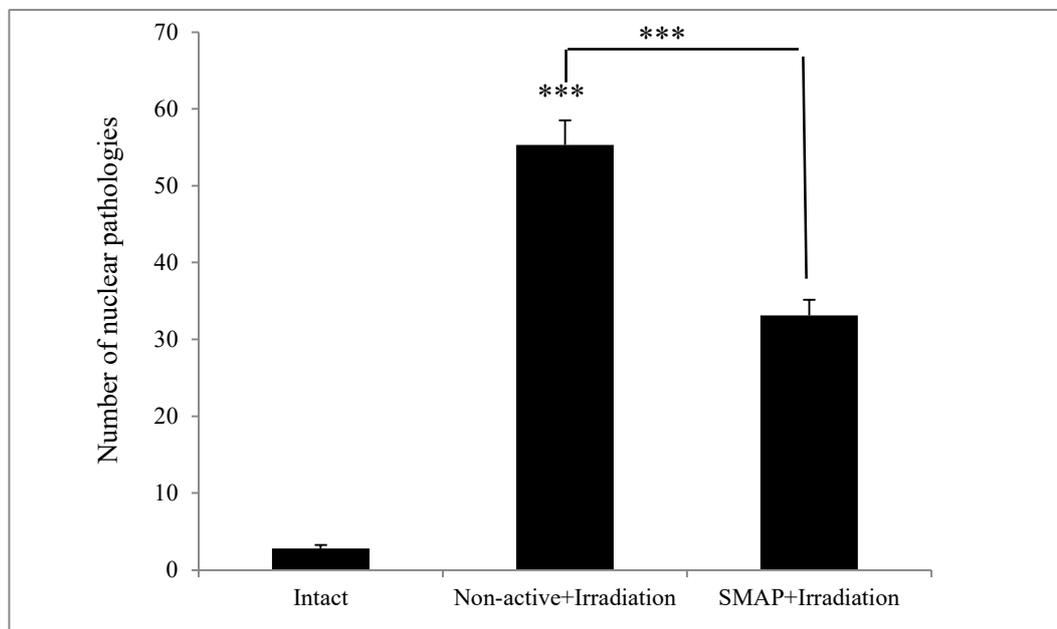


Figure 3. Effect of γ -irradiation at 8 Gy dose on level of the nuclear pathologies in the bonemarrow

CONCLUSION

So, the results indicate that active SMAP administration neutralizes pro-oxidative activity of high dose of γ -irradiation.

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CORRELATION INDICATORS OF EEG POTENTIALS OF VARIOUS BRAIN FORMATIONS IN A CONDITIONS OF A "NON - SIGNAL" SITUATION - "FACTOR OF RANDOMITY"

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ABSTRACT

Relevance: According to the biological theory of emotions, emotional stress occurs in cases where the feedback afferentation about the result of an action do not coincide with the previously prepared model of future events in the acceptor of the results of the action. In conditions of long-term mismatch, the emotional-negative tension increases and transforms into a stationary form.

Purpose: To study the EEG oscillations of brain by phase shifts and cross-correlation coefficients in emotional stressful situations.

Methodology: In this regard, in this series, the technique of repeated irregular in time (from 30 sec to 3 min) electrocutaneous stimulation of the hind limb of the 18 immobilized rabbit was chosen. The voltage increased as the animals adapted to pain stimulation, starting from 10-20 volts. The conflict situation, in which the immobilized rabbits were relieved of pain, in this series was further aggravated by the fact that the animals were exposed to irregularly timed exposure to electro-cutaneous stimuli, that is, in an atmosphere of uncertainty, called a "non-signal" situation. Under the conditions of this experiment, this led to the fact that animals experience a constant emotionally negative stress state, since with irregular painful effects, they have a low probability (or complete lack of opportunity) to foresee the moment of application of emotionally unpleasant stimuli, a large deficit of "pragmatic" information".

Results: The data obtained on the first group of rabbits showed that, before electrocutaneous exposure, the slow fluctuations of the EEG potentials of the sensorimotor, temporal and occipital regions of the cortex in relation to the posterior hypothalamus were mainly in phase or had small (2.5-16 ms) phase shifts. In this case, the posterior hypothalamus was the leading structure in terms of the tension rhythm. The functional connections, determined by the maximum of the cross-correlation functions with the inphase of slow oscillations of the voltage rhythm between the hypothalamus and the cortex, were slightly increased (0.45-0.6), and in the presence of phase shifts, they were in the average range of 0.4-0.5. The functional connections between the occipital region and the hypothalamus were slightly increased compared to those in other areas of the cortex. At the same time, in half of the rabbits between the reticular formation and the posterior hypothalamus, in-phase copper oscillations of electrical potentials were noted, and the maximum of the cross-correlation functions averaged 0.75-0.85. In the second half of the animals, there were small phase shifts (up to 25 msec) between the slow oscillations of these structures, indicating a delay in the rhythm of the tension of the posterior hypothalamus in relation to the EEG expansion of the reticular formation. In this case, the maximum of the function between them was 0.70-0.78. The frequency of respiratory movements, paid for chest excursions, averaged 40-60 / min, and heart rate - 240-250 / min. The behavioral rabbits were calm. The use of electrocutaneous stimulation against this background disrupted the synphase and caused, in relation to the electrical parts of the posterior hypothalamus, an increase in phase shifts in the rhythm of tension in all projection zones of the cortex. Otherwise, there was a phase advance of the EEG rhythm of the tension of the posterior hypothalamus in relation to the activity of the sensorimotor, temporal and occipital areas of the cortex.

Conclusions: Multidirectional and stable changes in phase shifts and the maximum of the cross-correlation functions of the stress rhythm of the cortex and subcortical formations indicate that under conditions of repeated irregular electrocutaneous stimuli, emotional-negative stress arises from the lack of "pragmatic"

information "in the acceptor of the result of actions. In relation to the latter, there are multidirectional changes in the parameters of the tension rhythm of the cortical and various subcortical structures of the brain. These changes contribute to the formation of stable negative emotional states. At the same time, in the generation of the stress rhythm, the leading role belongs to the posterior hypothalamus and the reticular formation, the excitability of which is significantly increased.

Thus, functional connections and phase shifts characterizing the spatio-temporal relationships of the analyzed brain structures can be one of the indicators of the organization of heterogeneous components of the functional system of a defensive nature.

Keywords: EEG cross-correlation analysis, functional systems, cross-correlation coefficients, emotional stress, phase shifts.

BLOOD REINFUSION PRACTISE IN THE PATRIOTIC WAR OF AZERBAIJAN (1993-2020)

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ABSTRACT

The immediate results of blood reinfusion "delipidizing" effect in 357 wounded of thoracic and abdominal organs with severe bleeding (blood loss of more than 2000 ml) in the conditions of military occupation of the territories of the Republic of Azerbaijan are analyzed.

Contraindications to blood reinfusion were: the presence of contaminants in the wound blood from injury and trauma (dirt, urine, intestinal contents) and impurities from the primary treatment of wounds (antibiotics, betadine, hydrogen peroxide, alcohol, local hemostatic drugs based on collagen).

Therefore, in case of abdominal injuries, the integrity of the hollow organs (stomach, intestines, bladder, ureters) was carefully checked. And with injuries of the chest cavity (with hemothorax), they tried to take blood, first of all, by pleural puncture.

We managed to cure the vast majority of the wounded (89.7%) who lost blood in the first 2 hours after the injury, which, of course, largely determined the fate of the victims.

Complications of the blood reinfusion technique are considered to be the following: systemic hemostasis disorders, hemolysis, air embolism and bacterial contamination of reinfusate. It should be taken into account that the device for reinfusion is able to return only washed erythrocytes into the blood, then the reason for the developing hypocoagulation becomes completely clear. Therefore, the development of systemic disorders of hemostasis in a situation of massive blood loss with its autologous replacement is a completely natural phenomenon due to a simple loss of platelets and plasma factors of hemostasis. In addition, the possible development of systemic hypocoagulation due to the ingestion of an anticoagulant (heparin, citrate) used to stabilize the outflow of blood during reinfusion is also not justified. Since, during the treatment of wound blood on the apparatus, the anticoagulant is completely washed off, and the reinfusate itself no longer causes serious disturbances in the patient's hemostasis system.

In our case, 4 wounded had only bacterial complications (in 2 cases with complete recovery, in 2 - the development of sepsis with a fatal outcome. All the wounded who received blood reinfusion in the first 3-5 days received antibiotic therapy.

Conclusion: Finally, the compensation of blood loss in case of injuries in the battlefield with the help of reinfusion of one's own blood, first of all, allows to significantly reduce the transfusion load on the wounded and injured with donor blood components. In addition, low costs, immediate availability (without delay and storage), complete biocompatibility, normothermicity, no allergic reaction, no risk of transmission of transfusion-borne disease, hypocalcemia and hyperkalemia, reduced risk of acute respiratory distress syndrome, makes autologous blood reinfusion a valuable alternative for timely, effective and vital care for those seriously suffering from massive bleeding in war.

Keywords: Wounded in the war, Blood loss, Reinfusion.

ULTRASOUND IMAGING IN DENTISTRY: A LITERATURE OVERVIEW

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ABSTRACT

Background:

Ultrasonography is a non-invasive, radiation-free, method of diagnosing periapical lesions while radiologic methods are more common. Periapical lesions due to endodontic infection are one of the most common causes of periapical radiolucency that need to be distinguished to help determine the course of treatment, this can be decisive for a correct differential diagnosis and for the prognosis of the tooth.

This review aimed to examine the accuracy of ultrasound and compare it to radiographs in distinguishing these lesions in vivo.

Methods: This review process followed the PRISMA guidelines. A literature search of databases (PubMed, Scopus, Embase, and Web of Science) was conducted without any restrictions on time. Articles available in English were included. The selection was done according to the inclusion and exclusion criteria. The QUADAS-2 tool was used to assess the quality of the studies.

Results: The search provided a total of 87 articles, out of which, five were selected for the final review. In all the studies, ultrasound had higher accuracy in distinguishing periapical lesions. All the studies indicated a risk of bias, especially in patient selection.

Conclusion: Within limitations, the study indicates that ultrasound is a better diagnostic tool to distinguish periapical lesions compared to radiographs but further studies with well-designed, rigorous protocols and low risk of bias are needed to provide stronger evidence.

Keywords: dental imaging; ultrasound; radiograph; periapical; lesions; diagnosis.

TOXICOLOGICAL CLASSIFICATION AND PROBABLE ACUTE ORAL TOXICITY OF GENERATED TRIFAROTENE METABOLITES USING *In Silico* METHODS

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ABSTRACT

In silico methods are experiments performed on computer or via computer simulation. It has the potential to speed the rate of drug development while reducing the need for expensive lab work, animal testing and clinical trials. The present work is focused in predicting probable *in vivo* rat metabolites of Trifarotene and their toxic hazard classification by Cramer along with acute oral toxicity using (Quantitative) Structure-Activity Relationships (QSAR). The parent structure (Trifarotene) is a fourth generation retinoid (selective retinoic acid receptor (RAR)- γ agonist), used in dermatology as topical treatment of *acne vulgaris*. The Cramer classification scheme (decision tree) is the best known approach to estimate the Threshold of Toxicological Concern (TTC) for a chemical substance based on its chemical structure. Most of the predicted metabolites have shown high (Class III) toxicity levels and four have shown low (Class I) toxicity levels. None were classified as Class II. Only phenyl-substituted saturated and unsaturated aliphatic aldehydes show acute oral toxicity.

Keywords: Trifarotene, QSAR, acute oral toxicity, toxic classification, in silico.

INTRODUCTION

The development of retinoid therapy has made significant progress in recent years, as a result, increased the diversity of retinoids with now both natural and synthetic are available for use. This is mainly due to their complex mechanism of action and their great potential in the treatment of various diseases. The newest addition to the retinoid family compounds is Trifarotene, approved for medical use in the United States in October 2019. More specifically, it is a first-in-class fourth-generation selective retinoic acid receptor (RAR)- γ agonist.

Trifarotene is a terphenyl acid derivative with retinoid-like activity. Its main application is for the topical treatment of *acne vulgaris*. It is available on the market as a cream for topical administration that contains 0.005% (50 mcg/g) Trifarotene. Its structure is shown in the Figure 1.

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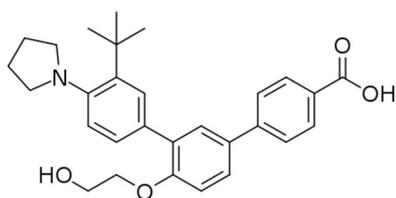


Fig. 1. 4-[3-(3-tert-butyl-4-pyrrolidin-1-ylphenyl)-4-(2 hydroxyethoxy)phenyl]benzoic acid INN: Trifarotene

Retinoids are a class of medications structurally and functionally analogous to vitamin A, though later generation retinoids such as Trifarotene and adapalene bear little structural resemblance to vitamin A and are analogous only in function [3].

The widespread use of retinoid drugs requires knowledge of the details of their pharmacological and toxicological characteristics. This includes studying the possibility of producing metabolites with potential effects. The present work is focused in predicting probable *in vivo* rat metabolites of Trifarotene and their toxic hazard classification by Cramer along with acute oral toxicity using (Quantitative) Structure-Activity Relationships (QSAR).

MATERIALS AND METHODS

For the purpose of this study we used 4-[3-(3-tert-butyl-4-pyrrolidin-1-ylphenyl)-4-(2 hydroxyethoxy)phenyl]benzoic acid (Trifarotene) as the parent structure to determine the *in vivo* rat metabolites and classifying them using the toxic classification by Cramer and determining their acute oral toxicity.

The *Organization for Economic Co-operation and Development* (OECD) (Quantitative) Structure-Activity Relationships [(Q)SARs] Toolbox (version 4.5) is a software designed to reduce the use of animals in laboratory tests, reduce the cost for testing and increase the number of chemicals which are assessed for their effects upon human health and the environment. The OECD QSAR Toolbox provides scientific computational methods and information technologies for application of the category approach for filling gap in experimental data that are necessary for hazard and risk assessment. By making use of the system, hazard and risk assessors are able to [10]:

- Use predefined categories, or to refine existing or build new categories.
- Identify analogous chemicals (or category) based on user selected characteristics. Categorize chemicals accounting for their metabolism: rate of disappearance, formation of stable metabolites, formation of high reactive intermediates, deactivation pathways, etc.
- Extract all available experimental or pre-calculated data from local and remote (web) based databases accompanied with information about their reliability: experimental error, analytical or computational method used, replicates, etc.
- Fill the gaps of missing information within the category by making use of chemometrics approaches such as read across, trend analysis, and (Q)SAR models.

QSAR predictions are accompanied with information concerning their mechanistic background, training chemicals, statistics, applicability domain and validity [10].

The OECD QSAR Toolbox is an expandable application that navigates the information flows between all of the installed components (modules): computational tools, database managers, (Q)SAR libraries, categorization models, etc. [10].

In vivo rat metabolism simulator. The current *in vivo* rat liver metabolic simulator (transformation table) represents electronically designed set of 671 structurally generalized, hierarchically arranged abiotic and enzymatic transformation reactions, which are characteristic for the metabolism for *in vivo* experimental systems such as rodent (mostly rat). The principal applicability of this simulator is associated with the

reproduction as well as the prediction of the metabolic activation reactions and pathways of xenobiotic chemicals, which may elicit *in vivo* genotoxicity effects [10].

The Toxic hazard classification by Cramer (decision tree) is probably the most commonly used approach for classifying and ranking chemicals on the basis of their expected level of oral toxicity. It was proposed by Cramer, Ford and Hall in 1978 as a priority setting tool in the safety assessment of food additives which would make expert judgements more transparent, explicit and rational, and thus more reproducible and trustworthy [9].

The Cramer decision tree is the best known approach to estimate the Threshold of Toxicological Concern (TTC) for a chemical substance based on its chemical structure. There are three Cramer classes with class III representing the most severe toxic hazard. Class III chemical compounds are assigned with the lowest TTC values [9].

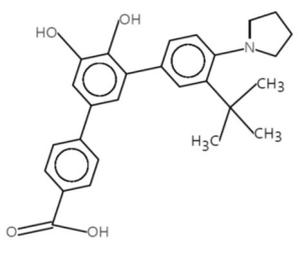
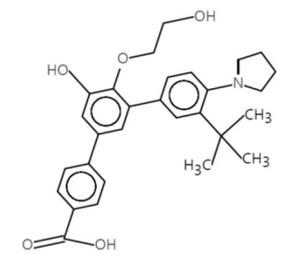
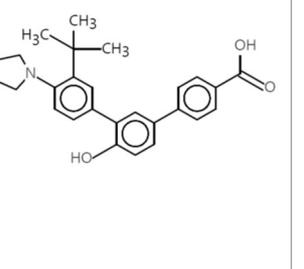
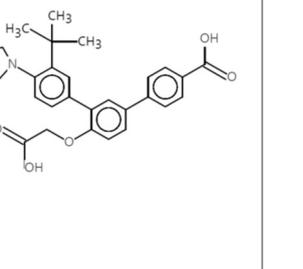
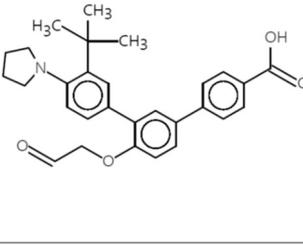
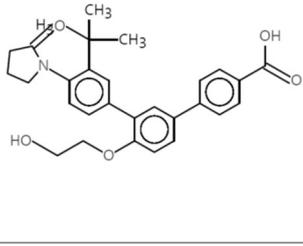
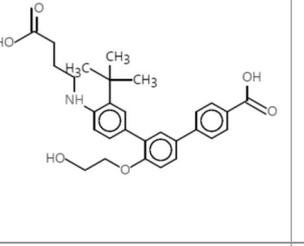
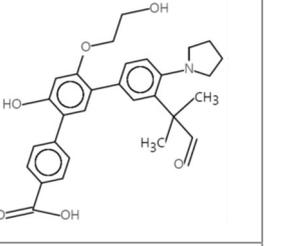
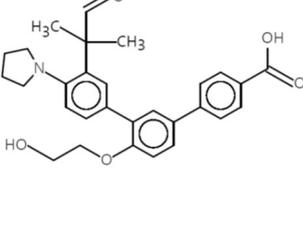
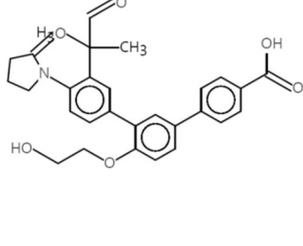
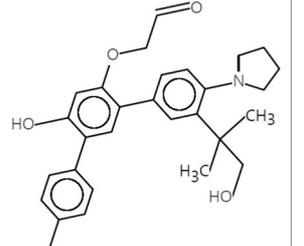
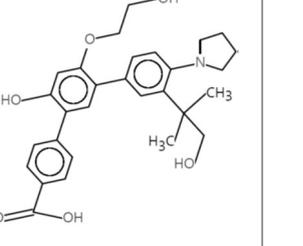
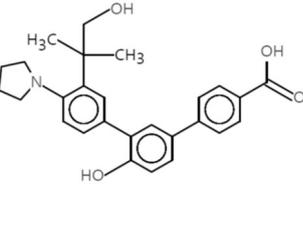
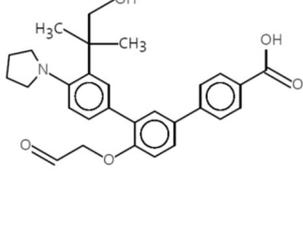
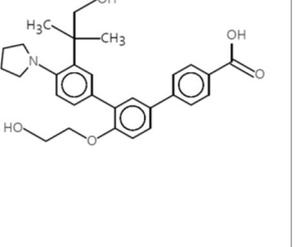
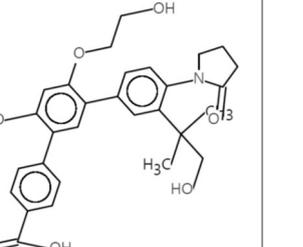
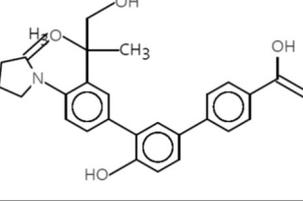
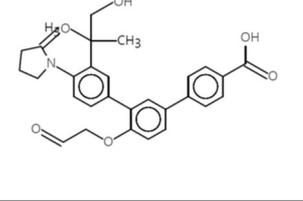
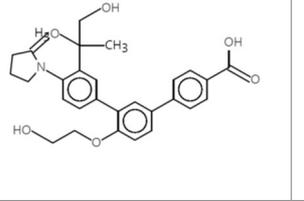
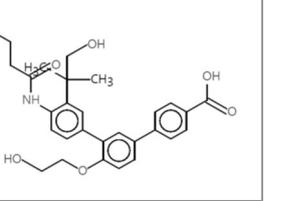
Acute oral toxicity is based on *in vivo* oral rat LD₅₀ data. Modeled endpoint is the median lethal dose of a substance that causes toxic effect to 50% (LD₅₀) of the test rodent (rat or mouse) within a designated period (24 hours) [10].

RESULTS AND DISCUSSION

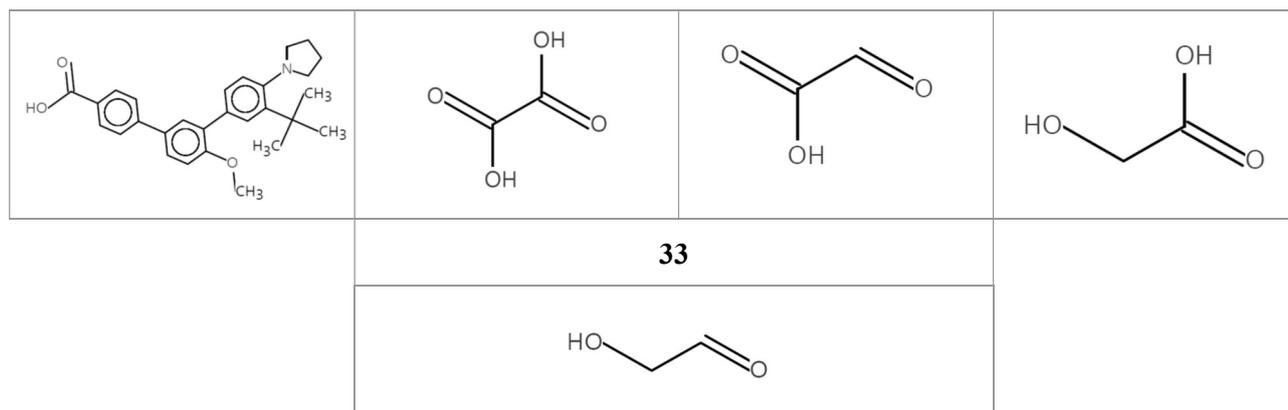
The QSAR Toolbox software (version 4.5) has been used for predicting possible metabolism of 4-[3-(3-tert-butyl-4-pyrrolidin-1-ylphenyl)-4-(2 hydroxyethoxy)phenyl]benzoic acid in the liver (*in vivo* rat). Thirty-three metabolites were predicted. Results of hepatic prediction (*in vivo* rat) of Trifarotene are present in Table 1.

Table 1. Number and structure of the predicted hepatic metabolites (*in vivo*) of 4-[3-(3-tert-butyl-4-pyrrolidin-1-ylphenyl)-4-(2 hydroxyethoxy)phenyl]benzoic acid by QSAR Toolbox.

1	2	3	4
5	6	7	8
9	10	11	12

			
13	14	15	16
			
17	18	19	20
			
21	22	23	24
			
25	26	27	28
			
29	30	31	32

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The predicted metabolites were classified using the toxic hazard classification by Cramer as shown on Table 2. The original Cramer decision tree consists of 33 questions, each answered 'yes' or 'no' and leading to another question or to the final classification into one of the three classes (I, II and III) as follows^[4]:

- Class I - Substances with simple chemical structures and for which efficient modes of metabolism exist, suggesting a low order of oral toxicity.
- Class II - Substances which possess structures that are less innocuous than class I substances, but do not contain structural features suggestive of toxicity like those substances in class III.
- Class III - Substances with chemical structures that permit no strong initial presumption of safety or may even suggest significant toxicity or have reactive functional groups.

The parent structure Trifartene is classified as Class III by the toxic hazard classification by Cramer.

Table 2. Toxic hazard classification by Cramer of generated metabolites from *in vivo* rat metabolism simulator using QSAR Toolbox.

Number of metabolite	Toxic hazard classification by Cramer
30-33	Class I
-	Class II
1-29	Class III

Class I. Substances with simple chemical structures and for which efficient modes of metabolism exist, suggesting a low order of oral toxicity^[4].

Examples of substances classified as Class I chemicals are^[4]:

- Being a normal constituent of the body. This throws into class I all normal constituents of body tissues and fluids, including normal metabolites. Hormones are excluded, as are, by implication, the metabolites of environmental and food contaminants or those resulting from a disease state.
- Being a simply branched acyclic aliphatic hydrocarbon or a common carbohydrate. This drops out the generally innocuous hydrocarbons and carbohydrates.
- Being a common terpene (D)-hydrocarbon, -alcohol, -aldehyde or carboxylic acid (not a ketone).

- Being a substance readily hydrolysed to a common terpene, -alcohol, -aldehyde or carboxylic acid.
- Bearing on every major structural component at least one sodium, potassium or calcium sulphonate or sulphamate for every 20 or fewer carbon atoms without any primary amines except those adjacent to the sulphonate or sulphamate. Na⁺, K⁺, Ca⁺⁺ sulphonate and sulphamate salts have a strong tendency to decrease toxicity by promoting solubility and rapid excretion. This is particularly noticeable, for example, with some of the food colourings. It is important that the substance bears sufficient sulphonate groups, including one on each major structural fragments into which the original compound might be metabolized. This serves to steer sulphonated compounds except those with amines non-adjacent to the sulphonate into a presumptively less toxic classification than the compounds would occupy if unsulphonated.

Class III. Substances with chemical structures that permit no strong initial presumption of safety or may even suggest significant toxicity or have reactive functional groups ^[4].

Examples of substances classified as Class III chemicals are ^[4]:

- Not being a normal constituent of the body. Containing one of the following functional groups: an aliphatic secondary amine or a salt thereof, cyano, N-nitroso, diazo, triazeno or quaternary nitrogen. Except in any of the following forms: the hydrochloride or sulphate salt of a primary or tertiary amine.
- Containing elements other than C, H, O, N or divalent sulphur. Which are not a Na⁺, K⁺, Ca⁺⁺, Mg⁺⁺ or NH₄ salt of carboxylic acid or a sulphate or hypochloride of an amine or a Na⁺, K⁺, Ca⁺⁺ sulphonate, sulphamate or sulphate.
- Not being a benzene derivative bearing substituent consisting only of hydrocarbon chain or 1 -hydroxy or hydroxy ester-substituted hydrocarbon chain and one or more alkoxy groups.
- Being a lactone condensed to another ring or 5- or 6-membered α , β -unsaturated lactone. This places certain lactones known or suspected to be of unusual toxicity in class III.
- Being a 3-membered heterocycle. This places such substances as the epoxides and ethylenimine in class III.
- Having an aromatic ring with no substituent.
- Containing three or more different types of functional groups (excluding methoxy and consider acids and esters as one functional type). Aliphatic compounds characterized by such constructions are too complex to permit satisfactory prediction of toxicity. They should go, therefore, into class III. However, it should not put polyester and similar substances in class III.

The results of acute oral toxicity prediction for the generated metabolites of 4-[3-(3-tert-butyl-4-pyrrolidin-1-ylphenyl)-4-(2 hydroxyethoxy)phenyl]benzoic acid are present in Table 3.

Table 3. Acute oral toxicity of generated metabolites from *in vivo* rat metabolism simulator using QSAR Toolbox.

Number of metabolite	Acute oral toxicity
1-15, 19-33	Not categorized
16-18	Phenyl-substituted saturated and unsaturated aliphatic aldehydes

The phenyl-substituted saturated and unsaturated non-conjugated aldehydes may cause a low order of acute oral toxicity at elevated levels of exposure. The general structure of these aldehydes is presented as presented in Figure 2:

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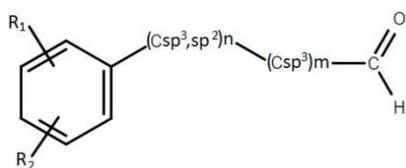


Fig. 2. General structure of phenyl-substituted saturated and unsaturated non-conjugated aldehydes, where: R_2 = H atom or C_1 - C_4 normal or branched alkyl chains, located in *ortho*-, *meta*-, or *para* positions towards aliphatic chain containing CHO group, excluding the presence of *tert*-butyl groups at the *ortho*-position; in particular, *para*- or *meta*-positions are preferred.

R_1 = H atom or CH_3 group; At $n = 0$, the aliphatic chain is saturated and m should be greater than or equal to 1; if C-atom is in sp^3 -hybridization, $n \geq 1$; and if C-atom is in sp^2 -hybridization, $n = 2$.

The phenyl-substituted saturated and unsaturated non-conjugated aldehydes can be regarded as hard electrophiles that are able to form adducts with hard biological nucleophiles such as primary nitrogen groups on lysine residues [6,7]. The electrophilic reactivity of the carbonyl group depends on the degree to which the carbonyl carbon atom bears a partial positive charge. Electron-donating substituents attached to this group will deactivate it and electron-withdrawing substituents will activate it towards protein amine nucleophiles [7,8]. Then, the toxicity of the phenyl-substituted aldehydes will depend on their ability to undergo 1,2-nucleophilic addition reaction to the carbonyl group mainly with protein amines.

The interaction of phenyl-substituted aldehydes with lysine residues in proteins involves nucleophilic nitrogen attack to reactive carbonyl carbon leading to the formation of an aminol intermediate. The latter is dehydrated and converted into a Schiff base adduct [5,7,8].

The formation of such adducts appear to mediate some kind of toxicity by impairing the function of biological macromolecules.

Observed clinical signs after oral administration of some phenyl-substituted aliphatic aldehyde include nervous system symptoms of ataxia, sedation, piloerection and hunched posture [1,2]. Findings at necropsy showed acute dilation and acute hyperemia of hearth, clay yellow, grey-whitish and colouring of the periphery of the lobes of the liver, etc. [1].

CONCLUSION

After application of *in silico* methods (QSAR Toolbox software) for metabolic activation in the liver of rats (in vivo) to the OECD, Trifarotene has been found to generate thirty-three hepatic metabolites that were classified by the Toxic hazard classification by Cramer. Part of them were classified as Class I, being the least toxic, and the other part as Class III, being the most toxic.

The data obtained confirm that Trifarotene should be administered only topically, as after the analysis we found that it falls into class III.

The oral LD_{50} values in rats of metabolites № 16, 17 and 18 with phenyl-substituted aliphatic aldehyde structures are in the range of 1390 up to more than 5000 mg/kg. They are usually classified into structural class I which contains flavorings that have simple chemical structures and efficient modes of metabolism, which would suggest a low order of oral toxicity.

The phenyl-substituted saturated and unsaturated non-conjugated aliphatic aldehydes exhibit low acute oral toxicity, which is associated with their major metabolic pathway that includes:

- oxidation of phenyl-substituted aldehydes to the corresponding acids;

- detoxification of the resulting phenyl-substituted carboxylic acids through rapid excretion either free or in conjugated forms, mainly as glycine and glucuronic acid conjugates.

The acute oral toxicity of phenyl-substituted aliphatic aldehydes will depend on the ability to form Schiff base adducts with the nucleophilic sites in proteins. The amount of these toxic adducts should be influenced by:

- the available concentration of non-metabolized phenyl-substituted aldehyde;
- the reactivity of aldehyde as hard electrophilic substrate towards lysine amino groups in proteins.

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DESIGN AND IMPLIMENTATION OF A REAL-TIME SYSTEM FOR THE CLASSIFICATION OF PHARMACEUTICAL PRODUCTS CATEGORIES

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ABSTRACT

In this work, we propose an electronic based real-time system for the classification of pharmaceutical products categories. The developed system is based on the real-time processing of the product images performed with Raspberry-Pi3 and obtained using a Pi-camera. Moreover, the classification process is related to the recognition of each product name. Basically, there are four main stages in the recognition process: capture and acquisition of the product image, application of the edge detection, characters recognition and matching the obtained characters. Also, the overall algorithm of the recognition system has been implemented in Python language.

Keywords: real-time system, classification, recognition, pharmaceutical products.

THE DIMENSIONALITY OF INPATIENT SERVICES IN THE PRIVATE HOSPITAL SETTING

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ABSTRACT

The main objective of this study was to identify the underlying dimensions or core facets of inpatient services in the context of private hospital. Inpatient or hospitalization services require patients to stay longer in the hospital and involves extensive interactions with the physicians and nurses compared to outpatient services. Apart from that, given the different nature of the service provisions, studies focusing on inpatient experiences in private setting require a distinct set of quality measures that differ from those on publicly funded hospitals. Review of literature indicates that very little is currently known about the dimensionality of inpatient services in the context of private hospital. This study involving 254 ex-patients admitted for at least three days at private hospital in Malaysia employed both qualitative (interviews) and quantitative (questionnaire surveys) methods. The measures for hospitalization quality were developed based on various sources, including the CAHPS Adult Hospital Survey, Picker's eight domains of Person-Centered Care, MSQH and JCI accreditation standards. The SEM-PLS was used as the main method of data analysis. The indepth interviews with 14 respondents combined with a review of literature managed to generate a total of 47 items with regards to hospitalization service quality. Three subject matter experts were appointed to assess the content validity of the resulted items. A total of 15 items were removed, leaving 32 items for further analysis. The thematic analysis of the remaining 32 items produced five distinct dimensions of inpatient or hospitalization services labelled as "Medical Quality", "Service Quality", "Outcome Quality", "Servicescape" and "Right and Privacy".

Keywords: Inpatient services, medical quality, service quality, outcome quality, servicescape and, right and privacy.

THE USE OF CITRULLINE MALATE IN CHILDREN WITH AUTONOMIC NERVOUS SYSTEM DYSFUNCTIONS WITH BENIGN INTRACRANIAL HYPERTENSION

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ABSTRACT

Currently, the need to study and early diagnosis of autonomic nervous system dysfunction in children is predetermined by the further development of psychosomatic medicine in all countries of the world. It is shown that the origins of most psychosomatic diseases (vascular, ischemic, hypertensive and hypotonic diseases, bronchial asthma, etc.) they lie in childhood and the beginning of many of them is vegetative dysfunction.

Dysfunction of the autonomic nervous system is a condition determined by a violation of the autonomic regulation of the heart, internal organs, vessels, and endocrine glands associated with primary or secondary abnormalities in the structure and function of the central and peripheral nervous system.

From a clinical point of view, children with a history of perinatal pathology of the central nervous system suffer from dysfunction of the autonomic nervous system, with a subsequent residual phenomenon as a residual organic lesion of the central nervous system. At the heart of all these diseases is oxygen starvation of the tissue, with all its consequences (energy imbalance, energy deficiency, auto-intoxication of the body with catabolism products). For this process, which is a vicious circle, the term "metabolic death" is used. The accumulation of lactic acid and acidosis lead to glycolysis, and "paralysis" of energy processes. To date, a whole complex of drugs has been used to correct the manifestation of dysfunction of the autonomic nervous system, for example: with severe arterial hypotension in the picture of asthenia, it was recommended to take stimulant drugs such as cofetamine, mesocarb, sydnonymine hydrochloride, meridil.

Keywords: dysfunction, stimol, citrulline malate, asthenia.

In the case of vestibular disorders, drugs were used, reducing vestibular excitability: bellaspone, betahistine (betaserk), torekán. Calcium channel blockers (verapamil) were used for vasomotor disorders (Raynaud's phenomenon, vascular cephalgia). And also used, vasotonizing, neuroleptics, vitamin preparations, antidepressants, painkillers. The need for new, effective approaches to correction in the treatment of autonomic

nervous system dysfunction has led to the creation of a drug that acts on cellular metabolism, such as citrulline malate (stimol), which includes two points :

- 1) Malate (malic acid) is one of the acetyl groups undergoing catabolism in the citric acid cycle (Krebs cycle) due to the activity of a number of specific enzymes-dehydrogenases. As a result of a series of reactions occurring in the mitochondria, reducing equivalents are formed in the form of hydrogen, which enter the respiratory chain. During the functioning of this chain, oxidative phosphorylation occurs, i.e. adenosine triphosphate is synthesized- a high-energy intermediate, which is the main supplier of free energy for the implementation of energy-dependent processes. The citric acid cycle is a common metabolic pathway in the oxidation of all major foods.(1)
- 2) Citrulline is a stone base with an acidic function, which plays an important role in detoxification in the ornithine cycle of ammonia formed during the decomposition of nitrogen-containing compounds. It should be noted that this drug does not belong to the class of doping, is easily tolerated, and practically has no contraindications to use. A metabolic corrector that provides a high degree of utilization of lactate and ammonium in the body (citrulline is an amino acid involved in the urea metabolism cycle). Promotes normalization of metabolism and activation of nonspecific protective factors of the body. Citrulline is characterized by an almost complete absence of side effects, which made it possible to use the drug even in pregnant women with a violation of acid-base balance.

Citrulline is a general ionizing agent and adaptogen.

The purpose of the study; to study the possibility of therapeutic correction of citrulline malate dysfunction of the autonomic nervous system in intracranial hypertension in children.

Research material: The study was conducted on the basis of the city polyclinic No. 16 in Almaty. 40 sick children aged 10 to 15 years with a diagnosis of dysfunction of the autonomic nervous system against the background of benign intracranial hypertension were under observation. The following methods were used in the study:

1. Clinical and neurological method, including detailed collection of anamnestic data and neurological examination of the patient.
2. assessment of clinical manifestations of arterial hypotension was carried out with daily measurement of blood pressure in children presenting the following complaints: darkening in the eyes, dizziness, tinnitus, nausea, morning fatigue, a feeling of heaviness in the head, headaches, impaired concentration, fatigue, increased drowsiness, lethargy, uncontrollable yawning.

There were no signs of anemia in the general blood test and changes in the ENT organs in the studied group of children.

Against the background of etiopathogenetic therapy of the underlying disease to correct metabolic disorders in 20 patients, stimol 50% solution in a daily dose of 4 g (2-fold intake) was included in the complex treatment for 10 days. The control group of 20 people consisted of patients treated with traditional drugs..

The results are shown in tables N 1 and N 2

Dynamics of clinical manifestations before and after treatment stimol (# 1)

Symptoms	Before treatment	After treatment	Improvement of the condition (%)
Drowsiness during the day	20	7	65
Emotional instability	20	7	65
Headaches	20	7	65
General weakness, fatigue	20	7	65
Impaired concentration	20	4	80
Dizziness	20	4	80
Morning fatigue	20	0	100
Weather dependence	20	4	80
Darkening in the eyes	20	0	100

Dynamics of clinical manifestations of the control group before and after treatment with traditional drugs (№2)

Symptoms	Before treatment	After treatment	Improvement of the condition (%)
Drowsiness during the day	20	12	40
Emotional instability	20	12	40
Headaches	20	12	40
General weakness, fatigue	20	12	40
Impaired concentration	20	10	50
Dizziness	20	10	50
Morning fatigue	20	14	30
Weather dependence	20	10	50
Darkening in the eyes	20	12	40

RESEARCH RESULTS

The results of the study showed positive dynamics in the neurological status of children who were prescribed citrulline malate. In particular, such complaints as headaches, daytime drowsiness, emotional instability, general weakness and fatigue were stopped in 65% of patients; in 16 patients (80%), concentration of attention significantly improved. Complaints such as dizziness and weather dependence remained in 4 patients (20%), and morning fatigue and darkening in the eyes disappeared in all children of the study group. Whereas, in the control group, the above complaints persisted on average in 60% of patients to one degree or another.

CONCLUSIONS

1. The results obtained allow us to conclude that citrulline malate, by increasing the energy intensity of the cell and thereby increasing its synthesis of biological active substances in the dysfunction of the autonomic nervous system, reduces the hyperactivity of suprasegmental autonomic structures. This drug can replace the effect of other drugs used simultaneously, such as baralgin, piracetam or fezam, vitamins B, E, adenosine triphosphate, caffeine, mezon, eleutherococcus tincture, apilac, fetanol, calcium gluconate. The drug has no side effect.
2. Taking into account the above, citrulline malate can be recommended for wide use as the drug of choice in children with autonomic nervous system dysfunctions with benign intracranial hypertension

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DIABETIC NEUROPATHY IN DIABETES MELLITUS TYPE 2**Denisa VESELI (Bego)***PhD., Lecturer, Faculty of Medical Technical Sciences, University of Medicine, Tirana, Albania***ABSTRACT**

Diabetic neuropathy refers to various types of nerve damage associated with diabetes mellitus. Symptoms depend on the site of nerve damage and can include motor changes such as weakness, sensory symptoms such as numbness, tingling, pain or autonomic changes such as urinary symptoms. These changes are thought to result from microvascular injury involving small blood vessels that supply nerves (vasa nervorum). Relatively common conditions which may be associated with diabetic neuropathy include distal symmetric polyneuropathy, third, fourth or sixth cranial nerve palsy, mononeuropathy, mononeuropathy multiplex, diabetic amyotrophy and autonomic neuropathy. Diabetic neuropathy can affect any peripheral nerve including sensory neurons, motor neurons and the autonomic nervous system.

Methodologia: Evaluation of the relationship between demographic characteristics (gender, age, place of residence), time of onset of diabetes and complications that appear later with diabetic neuropathy in patients hospitalized in the endocrinology ward during the period 2019-2020. This study was conducted at the Mother Teresa University Hospital Center (QSUT) in Tirana. The data were obtained from the medical records of patients in the statistics department at QSUT. The population taken in the study are 45 patients who will be absolutely anonymous as the study does not require their identity. Among them 25 individuals are male and 20 female. The study found that most of those affected by neuropathy are residents of the city. The most affected age is the 50-59 age group. Over the years with the presence of DM also increases the chances of developing diabetic neuropathy. Care to keep glycemic values under control should be high, TA control should also stay within the norm values. They should have the best possible hygiene, especially in the lower extremities, legs, which are most at risk for injuries and the appearance of diabetic wounds where amputation of the limbs is achieved.

Recomandime: Diabetic neuropathy is one of the most common complications of diabetes mellitus. These conditions affect different parts of the nervous system and present with different clinical signs. Early recognition and proper management of neuropathy in patients with diabetes is important for a number of reasons:

1. Diabetic neuropathy is an exclusionary diagnosis. Non-diabetic neuropathy may be present in patients with diabetes and may be treated with specific measures.
2. A number of treatment options exist for symptomatic diabetic neuropathy.
3. Over 50% of peripheral diabetic neuropathies may be asymptomatic. If not recognized and if it avoids foot care then patients are at risk for limb injuries, in this case the feet.
4. Recognition and treatment of autonomic neuropathy can improve symptoms, reduce consequences, and improve quality of life.

Keywords: Diabet Mellitus, Diabet Mellitus type 2, Diabetic neuropathy, Diabetic polyneuropathy, Hyperglycemia, HTA, Cardiopathy, Retinopathy, Nephropathy, Diabetic ulcer, Insulin.

**PATIENT-CENTERED CARE IN THE MIDDLE EAST AND NORTH AFRICAN REGION: A
SYSTEMATIC MAPPING REVIEW**

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ABSTRACT

Background: Patient centered care (PCC) implementation has gained policy maker attention worldwide. In spite of the evidence showing the benefits and the challenges associated with practicing PCC in western countries there has been no comprehensive review of the literature on PCC practice in the Middle East and North African (MENA) region.

Objectives: Summarize the existing research on the practice of PCC in the MENA region and use this analysis to consider the key elements of a PCC definition based on MENA cultural contexts.

Methods: Five electronic databases were searched (EMBASE, Cochrane, Medline, CINAHL and Scopus) using the search terms: patient OR person OR client OR consumer AND *centered* OR *centred* AND care. The MENA countries included were Bahrain, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Palestine, Israel, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen, Algeria, Egypt, Libya, Morocco, Tunisia, Djibouti, Pakistan, Sudan, and Turkey. Results imported from databases were stored in the reference manager software (EndNote) and imported to Covidence where duplicates were removed, and the remaining papers were independently selected against the inclusion criteria by two authors. The following data were extracted for each paper: author, year, location (i.e., country), objectives, methodology, study population, and results as they related to patient centred care.

Result: The electronic search identified 3582 potentially relevant studies. Fifty-one articles met the inclusion criteria. Across all papers five themes were identified: 1) patient centered care principles; 2) patient and physician perceptions of PCC; 3) facilitators of PCC; 4) implementation and impact of PCC; and 5) barriers to PCC.

Conclusion: The preliminary findings suggest that the concept of PCC is evident and supported, but evidence shows that the implementation of PCC might be impacted due to the cultural contexts of the MENA region, highlighting that the region has a long way to go to successfully embed the ideal patient-centered approach to healthcare. The elements and impact of culture in the MENA region should be investigated in future research.

USE OF DEEP OSCILLATION AND THERAPEUTIC EXERCISES IN FUNCTIONAL RECOVERY OF PATIENTS WITH KNEE JOINT OSTEOARTHRITIS

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ABSTRACT

Purpose: To observe the therapeutic effects immediately after the complex rehabilitation, including Deep Oscillation and therapeutic exercises in patients with knee joint osteoarthritis.

Material and methods: The study included 57 patients at 65.6(11.3) mean age, with II-nd and III-rd radiological degree of the knee osteoarthritis. Patients received a ten-day course of treatment with Deep Oscillation and therapeutic exercises. Results were assessed before and immediately after therapy by manual muscle testing (MMT), measuring the circumference of the knee with centimeter, range of motion, pain (VAS) and WOMAC Osteoarthritis Index. Level of statistical significance ($p < 0.05$).

Results: Immediately after the rehabilitation statistically significant reduction of muscle weakness m. Quadriceps assessed by MMT test ($p < 0.05$), reduction in knee joint circumference ($p < 0.05$), increased range of knee flexion ($p < 0.05$), decrease pain level ($p < 0.05$) and WOMAC Index reduction ($p < 0.05$) were observed.

Conclusion: The results immediately after the treatment showed a significant reduction in pain and improvement in functional activity. The applied rehabilitation program can effectively reduce muscle weakness, swelling and to increase range of motion in patients with knee joint osteoarthritis. The therapeutic effects are probably due to the complex application of Deep Oscillation therapy in trophic and analgesic parameters and therapeutic exercises.

Keywords: Knee osteoarthritis, Deep Oscillation therapy®, therapeutic exercises, WOMAC Index, Pain (VAS).

THE EXPRESSION OF THE THERAPEUTIC EFFECT OF FULLERENE C₆₀ NANOPARTICLE AGAINST HEART TISSUE DAMAGE ON TNF- α AND COX-2 GENE EXPRESSIONS

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ABSTRACT

In this study, the effect of fullerene C₆₀ nanoparticle on some biochemical and molecular parameters against 7,12-dimethylbenz[a]anthracene (DMBA)-induced heart tissue damage in Wistar albino female rats was investigated. The animal experiments part of this study was carried out at the Firat University Experimental Animal Research Center (FUDAM) with the permission of the Firat University Animal Experiments Ethics Committee, dated 18.03.2021 and numbered 2021/05. In the study, 60 Wistar albino female rats (n = 60, 8 weeks old) were used and each group was arranged to include 15 rats. Groups: (i) Control Group: Group fed with standard diet; (ii) Fullerene C₆₀ Group: The group given Fullerene C₆₀ (1.7 mg/kg bw, oral gavage); (iii) DMBA Group: The group given DMBA (45 mg/kg bw, oral gavage); (iv) Fullerene C₆₀ + DMBA Group: The group given Fullerene C₆₀ (1.7 mg/kg bw, oral gavage) and DMBA (45 mg/kg bw, oral gavage). The rats were decapitated after 16 weeks and their heart tissues were examined. Expression levels of TNF- α and COX-2 proteins in heart tissue were determined by western blotting technique, lipid peroxidation malondialdehyde (MDA) analyzes, glutathione (GSH), catalase activity (CAT) and total protein levels were determined by spectrophotometer. Compared to the DMBA group, TNF- α and COX-2 protein expression levels and MDA levels decreased, while GSH, CAT and total protein levels increased in the Fullerene C₆₀ + DMBA group. According to these results, it was determined that fullerene C₆₀ nanoparticle has strong biological activity in the treatment of heart tissue damage.

Keywords: COX-2, DMBA, Fullerene C₆₀, TNF- α

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**DETERMINATION OF OXIDATIVE STRESS IN BITCHES WITH TRANSMISSIBLE
VENEREAL TUMOR**

**TRANSMISSIBLE VENERAL TÜMÖRLÜ KÖPEKLERDE OKSİDATİF STRES DURUMUNUN
BELİRLENMESİ**

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ABSTRACT

Transmissible venereal tumor (TVT) in dogs is most common in young, free-range dogs that are sexually active. This study was carried out to determine the changes in oxidative stress levels in the blood serum of healthy dogs and dogs with TVT. A total of 40 dogs were used in the study. According to genital organ examinations, healthy subjects constituted the control group (n=20), and those with venereal tumors constituted the TVT group (n=20). Serum was obtained by taking blood samples from the cephalic vein from dogs in both study groups. Total oxidant status (TOS), total antioxidant status (TAS) and oxidative stress index (OSI) were determined spectrophotometrically from serum samples. Obtained data were analyzed by Independent Sample T-test. Serum TOS and OSI levels were significantly higher in the TVT group than in the control group (p<0.001). Serum TAS level was significantly lower in the TVT group than in the control group (p<0.001). As a result, it was determined that oxidative stress was high in dogs with TVT. In this direction, it was concluded that oxidative stress can be reduced and more successful results can be obtained with supportive agents to be applied in addition to the treatment of dogs with TVT.

Keywords: Transmissible venereal tumor, oxidative state, bitches

ÖZET

Köpeklerde transmissible venereal tümör (TVT) sıklıkla seksüel olarak aktif olan genç yaştaki ve serbest dolaşan köpeklerde görülmektedir. Bu çalışma sağlıklı ve TVT'li köpeklerin kan serumundaki oksidatif stres düzeylerindeki değişikliklerin belirlenmesi amacıyla gerçekleştirildi. Çalışmada toplam 40 adet köpek kullanıldı. Genital organ muayenelerine göre sağlıklı olanlar kontrol grubunu (n=20), venereal tümörlü olanlar ise TVT grubunu (n=20) oluşturdu. Her iki çalışma gruplarındaki köpeklerden sefalik venden kan örnekleri alınarak serum elde edildi. Serum örneklerinden total oksidan durum (TOS), total antioksidan durum (TAS) ve oksidatif stres indeksi (OSİ) spektrofotometrik olarak belirlendi. Elde edilen veriler Independent Sample T-test analiz edildi. Serum TOS ve OSI düzeyleri TVT grubunda kontrol grubuna göre anlamlı derecede yüksekti (p<0.001). Serum TAS düzeyi TVT grubunda kontrol grubuna göre anlamlı derecede düşüktü (p<0.001). Sonuç olarak, TVT'li köpeklerde oksidatif stresin yüksek olduğu belirlenmiştir. Bu doğrultuda TVT'li köpeklerin tedavisine ek uygulanacak destekleyici ajanlarla oksidatif stresin düşürülüp daha başarılı sonuçlar alınabileceği kanısına varıldı.

Anahtar Kelimeler: Transmissible venereal tümör, oksidatif durum, bitches

ACİL SERVİSLERDE TRİYAJIN GEREKLİLİĞİ VE HEMŞİRELERİN ROLLERİ

THE IMPORTANCE OF TRIAGE IN EMERGENCY SERVICES AND THE ROLE OF THE NURSE

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ÖZET

Triyaj, yaralı ve hasta bireylerin sayısının çok bulunduğu ortamlarda sağlık ihtiyacı olan bireylerin belirlenmesi, erken müdahale edilmesi ve tedavi gereksinimi olmayan bireylerin de saptanarak zaman kazanma ve sağlık kaynaklarını verimli kullanmaya yönelik önceliklendirme işlemidir. Triyaj ilk olarak Fransa imparatoru Napolyon zamanında ortaya çıkmış bir kavramdır. Napolyon'un cerrahi şefi Dominique Jean Larrey, savaş sırasında yaralı ağır olan askerlere tıbbi kaynakların yetersizliği nedeniyle herhangi bir tıbbi müdahalede bulunmayıp, yaralı hafif olan askerlerin tedavilerini uygulayarak savaşa tekrar dönmeleri için triyaj uygulamıştır. Acil servislerin ulaşımının kolay olması, ücretsiz olması, bekleme süresinin kısalığı, uzman doktorların varlığı, hızlı tetkik ve tedavi imkânlarının olması ve nüfus artışı; acil olmayan hastaların da acil servisi tercih etmesine, başvuran hasta sayısının artmasına ve aşırı hasta yoğunluğuna sebep olmaktadır. Acil servislere başvuran hasta sayısı, şikâyetleri ve acil servislerin sirkülasyonu göz önüne alındığında acil triyajı önem arz etmektedir. Triyaj, acil servislerde hasta yoğunluğundan dolayı fark edilmesi güç, acil müdahale gerektiren hastaların belirlenip erken müdahale edilmesine olanak sağlar. Dünya üzerinde çeşitli triyaj sistemleri kullanılmaktadır. Bu triyaj sistemleri 3 seviyeli, 4 seviyeli ve 5 seviyeli olarak ülkelere göre farklılık göstermektedir. Ülkeler bu sistemleri kendi ihtiyaçlarına göre belirlemektedir. Acil servislerde triyaj uygulamalarının daha kolay hale gelebilmesi için sağlık kurumunun fiziksel donanım ve sağlık çalışanı bakımından yeterli olması gerekmektedir. Dünya genelinde triyaj uygulamasını yapan sağlık personeli genellikle hemşirelerdir. Acil servislerde hastaları ilk karşılayan ve triyajı başlatan sağlık çalışanı hemşireler olduğu için triyajın doğru bir şekilde uygulanması ve sürekliliğinin sağlanması adına hemşireler tarafından triyaj kavramının bilinmesi, benimsenmesi ve etkin uygulanması gereklidir. Acil servise gelen hastaları tanımlayabilmek ve başarılı triyaj uygulaması yapabilmek için triyaj uygulayan hemşirelerin bilgi ve deneyim kazanmaları önemlidir. Lisans eğitimleri, hizmet içi eğitimler ve sertifikasyon programları, yapılan triyajın daha başarılı olmasını sağlayacaktır. Bu çalışmada acil servislerde triyaj uygulamasına gereksinim duyulmasının nedenleri ve hemşirelerin triyaj uygulamasına yönelik rollerinin incelenmesi amaçlanmıştır.

Anahtar Kelimeler: acil servis, triyaj, hemşire, triyajın gerekliliği

ABSTRACT

Triage is the prioritization of individuals in need of health, early intervention, and identification of individuals who do not need treatment in environments where there are many sick and injured people, thus saving time and using health resources efficiently. Triage is a concept that first emerged during the time of the French emperor Napoleon. Napoleon's chief of surgery, Dominique Jean Larrey, did not intervene in the seriously injured soldiers due to the lack of medical resources during the war, and provided the lightly wounded soldiers with appropriate treatment and applied triage to return to the war. Easy access to emergency services, free of charge, short waiting times, presence of specialist doctors and rapid examination and treatment opportunities, population growth; This causes non-emergency patients to prefer the emergency service, increasing the number of patients and excessive patient density. Considering the number of patients admitted to the emergency

services, their complaints and the circulation of the emergency services, emergency triage is important. Triage allows for the identification of patients who are difficult to notice due to the intensity of the patients in the emergency departments and who require urgent intervention, and for early intervention. Various triage systems are used in the world. Some of these triage systems have 3 levels, some have 4 levels and some have 5 levels. Countries determine these systems according to their own needs. In order to facilitate triage practices in emergency units, the health institution should be sufficient in terms of health workers and physical equipment. Health personnel who perform triage around the world are usually nurses. In order to ensure the correct implementation and continuity of triage, the concept of triage should be known, adopted and applied effectively by the nurses who first meet the patients and initiate triage. It is important for nurses who perform triage to gain knowledge and experience in order to be able to diagnose patients who come to the emergency department and to perform successful triage practice. Undergraduate education, in-service training and certification programs will make triage more successful. In this study, it is aimed to examine the reasons for the need for triage in emergency services and the roles of nurses in triage practice.

Keywords: emergency department, triage, nurse, necessity of triage

GİRİŞ

Triyaj ilk olarak Fransa imparatoru Napolyon zamanında ortaya çıkmış bir kavramdır. Napolyon'un cerrahi şefi Dominique Jean Larrey, savaş sırasında yarası ağır olan askerlere tıbbi kaynakların yetersizliği nedeniyle herhangi bir tıbbi müdahalede bulunmayıp, yarası hafif olan askerlerin tedavilerini uygulayarak savaşa tekrar dönmeleri için triyaj uygulamıştır. (Durmaz ve Cebeci, 2021). Bazı hastalar hiçbir tedaviye cevap vermez. Bazı hastalar hiçbir tedavi almazsa bile yaşar. Bazı hastalar ise uygun tedaviyi almazsa hayatını kaybeder. Burada amaç tedavinin doğru hastaya uygulanıp sınırlı olan tıbbi kaynakları etkin ve verimli kullanmaktır.

Triyaj Fransızca'da "trier" fiilinden türemiştir ve "seçmek, ayıklamak" anlamına gelmektedir. Türkçe karşılığı "önceliklendirme" olan triyaj Acil Sağlık Hizmetleri Yönetmeliğinde "*çok sayıda hasta ve yaralının bulunduğu durumlarda, öncelikli tedavi ve naki edilmesi gerekenlerin tespiti amacıyla, olay yerinde ve ulaştırıldıkları sağlık kuruluşunda yapılan hızlı seçme ve kodlama işlemi*" şeklinde tanımlanmaktadır (Acil Sağlık Hizmetleri Yönetmeliği, 2000).

Eskiden triyaj günlük alanda triyaj ve afet triyajı olarak iki şekilde kullanılırken günümüzde hastane öncesi ve hastanede olmak üzere; sahada afet triyajı, sahada iletişime bağlı triyaj, acil serviste afet triyajı ve rutin acil servis triyajı olarak dört şekilde tanımlanmıştır. Günümüzde acil servislerde rutin acil servis triyajı kullanılmaktadır (Durmaz ve Cebeci, 2021; Tarhan ve Akın, 2016). Sivil olarak ilk triyaj uygulaması 1963 yılında Amerika Birleşik Devletleri (ABD) Yale Newhaven Hastanesi'nin acil servisinde uygulanmıştır ve ilk sivil triyaj sistemini 1964 yılında Weinermann ve arkadaşları yayınlamışlardır (Durmaz ve Cebeci, 2021).

Triyajın Amacı ve Gerekliliği

Triyaj, ekipman ve sağlık çalışanı yetersizliğinde hastanenin tüm servis ve polikliniklerinde uygulanabilir (Bal ve Gürkan, 2018). Acil servislere başvuran hasta sayısı, şikayetleri ve acil servislerin sirkülasyonu göz önüne alındığında acil triyajın önemi yadsınmaz.

Acil servis hizmetleri: Kronik hastalıkların akut atağı, aniden ortaya çıkan hastalık, kaza ve yaralanmalar, beklenmeyen zamanlarda oluşan sağlık problemlerinde, komplikasyon gelişmesi, hastalık, sakatlık veya ölümden korunması amacıyla hasta bireyin, görevli sağlık çalışanı tarafından acil serviste tıbbi ekipman desteği ile değerlendirilmesi, hastalık tanısının konulması, hayati tehlikesini ortadan kaldırmak amacıyla tıbbi girişimlerin uygulanması, ileri tanı ve tedavisi için diğer hizmetlere sevkine kadar yataklı sağlık kuruluşlarında sunulan acil sağlık hizmetleridir (Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkında Tebliğ, 2009).

Acil servisler, her türlü acil hasta ve yaralıların bakıldığı bir birimdir ve kesintisiz hizmet sunar. Bu nedenle acil servisler hastanelerin en önemli birimleridir (Köse, Köse, Öncü ve Tuğrul, 2011). Acil servislerin ulaşımının kolay olması, ücretsiz olması, bekleme süresinin kısalığı, uzman doktorların varlığı, hızlı tetkik ve tedavi imkanlarının olması ve nüfus artışı; acil olmayan hastaların da acil servisi tercih etmesine, başvuran

hasta sayısının artmasına ve aşırı hasta yoğunluğuna sebep olmaktadır (Köse ve ark., 2011; Şimşek Öner, 2018).

Van den Berg ve arkadaşlarının yaptıkları bir çalışmada birinci basamak sağlık hizmetlerine erişim sağlamakta güçlük çekilmesinin ve güvensizliğin acil servislerin kullanımını artırdığı sonucuna ulaşılmıştır (Van den Berg, Van Loenen ve Westert, 2016). Coster ve arkadaşlarının yaptıkları bir çalışmanın sonuçlarına göre acil servise erişim kolaylığının başvuru nedenleri arasında olduğu saptanmıştır (Coster, Turner, Bradbury ve Cantrell, 2017). Kraaijvanger ve arkadaşları acil servise kendiliğinden başvuran hastaların başvuru nedenlerini incelemiş hastaların %33'ünün ekonomik kaygılarla acil servise başvurduğu sonucuna ulaşmışlardır (Kraaijvanger, Van Leeuwen, Rijpsma ve Edwards, 2016). Kraaijvanger ve arkadaşları, yaptıkları başka bir çalışmada ise Hollanda acil servisine kendi kendine başvuran hastaların % 41,2 ile % 51,9'unun acil servise uygunsuz bir şekilde geldiğini tespit etmişlerdir (Kraaijvanger, Rijpsma, Van Leeuwen, Van Dijk ve Edwards, 2016). Köse ve arkadaşlarının acil servise başvuran hastalar üzerinde yaptığı bir çalışmada hastaların %64,4 ü yeşil kartlı olarak belirlenmiştir. Aynı çalışmada acil servise başvuran hastaların %88,4'ü ayaktan taburcu edilirken, %9,9'u acil gözlem sonrası taburcu edilmiştir (Köse ve ark., 2011). Çevik ve arkadaşlarının yaptıkları bir çalışmada ise acil servise başvuruda bulunan hastaların çoğunluğunu yaklaşık %38 oranla genç erişkinler (20-39 yaş) oluşturmaktadır. Aynı çalışmada acil servise başvuran hastaların önemli bir bölümünü (%24,34) acil olmayan hastalar oluşturmaktadır (Çevik ve Tekir, 2014). Şimşek Öner, yaptığı bir çalışmada 2013 yılında Türkiye genelinde acil servis başvurularının SGK medula veritabanı kayıtlarını incelemiş ve yapılan başvuruların yaklaşık yarısının acil olmadığı sonucuna ulaşmıştır (Şimşek Öner, 2018). Bu çalışmalar acil servislerin ücretsiz olmasının ve nüfus artışının servislere olan hasta müracaatlarının artmasına neden olduğunu ve acil servislerin uygunsuz kullanıldığını desteklemektedir.

Acil servislerdeki hasta yoğunluğu, hastaların tedavi olabilmek için uzun süre beklemelerine, gerçekten acil hasta ve önemli hastalığı olanlara sağlık hizmeti verilmesinde gecikmeye, acil servislerdeki hasta memnuniyetinin azalmasına, tedavilerin maliyetlerinin artmasına, acil sağlık hizmetlerinin kalitesinin düşmesine, ciddi güvenlik problemlerine ve acil servislerde çalışan personelin motivasyonunun ve veriminin düşmesine yol açmaktadır (Köse ve ark., 2011). Ayrıca sağlık hizmeti almak için hastanenin acil servislerine başvuran hasta ve hasta yakınları bir an önce tedavi olup sağlık kuruluşundan ayrılmak istemektedir. Tedavi olmak için hastanın bekleme süresinin uzaması, hastalığının diğer hastalara göre daha acil olduğunu düşünmesi gibi faktörler hasta ve hasta yakınlarının birinci derece muhatap olduğu sağlık çalışanlarına şiddet uygulama ihtimalini arttırmaktadır (Yıldırım ve Alpdoğan, 2014: 191).

Gereksinimi olan hastalara en kısa sürede acil sağlık hizmeti sağlamak ve en acil durumda olan hastaya öncelik göstermek, acil servislerde temel esastır (Çevik ve Tekir, 2014). Acil servislere başvuru anında hastaların hızlı değerlendirilip, şikayeti ve başvuru şekilleri dikkate alınarak aciliyet durumunun ve önceliğinin belirlenmesi, sınıflandırılması ve hastaların güvenli bir şekilde müdahalelerinin yapılması amacıyla triyaj uygulanmaktadır.

Acil servislerde triyaj uygulaması ile doğru yerde ve doğru zamanda tıbbi kaynakların verimli kullanımı sağlanır, hastaların bekleme ve hastanede kalma süreleri, morbidite ve mortalite azalmaktadır (Durmaz ve Cebeci, 2021). Önceliklerin belirlenmesi acil servislerdeki hasta yoğunluğunu azaltır ve iş akışının daha sistemli olmasını sağlar. Sistemin düzenli olması, acil servise başvuruda bulunan hastaların ve hasta yakınlarının da rahatlamasını sağlamaktadır (Tarhan ve Akın, 2016).

Triyaj Sistemleri

Triyaj sisteminin öncelikli amacı, hayatı tehlikede olan hastaların hızlı bir şekilde belirlenmesini sağlamaktır.

Etkin bir triyaj sisteminin uygulama kolaylığı, zaman etkinliği ve güvenilirlik özellikleri olmalıdır (Tarhan ve Akın, 2016).

Tüm dünyada acil servise gelen hastaları değerlendirmek, aciliyetini ve tedavi önceliklerini belirlemek için farklı triyaj sistemleri kullanılmaktadır. Bu triyaj sistemleri 3 seviyeli, 4 seviyeli ve 5 seviyeli olarak ülkelere göre farklılık göstermektedir (Şimşek Öner, 2018). 5 seviyeli sistemler 3 seviyeli ve 4 seviyeli sistemlere göre daha güvenilir, hastaları doğru acil birimlerine yönlendirmede daha duyarlıdır. Acil Hemşireler Birliği (ENA) ve Amerikan Acil Hekimler Birliği (ACEP) tarafından güvenilirlik ve geçerliliği daha fazla olduğu için 5 seviyeli triyaj sistemlerinin kullanılması önerilmektedir (Tarhan ve Akın, 2016). Triyaj sık kullanılmasına

rağmen triyaj sistemlerinde birlik olmaması hastane imkânlarına, yatak sayılarına, acil servis planı ve çalışanlarına, tıbbi donanımlara ve yoğunluğa bağlanmaktadır. Dünyadaki birçok ülke geçerliliği kanıtlanmış ve kullanılmakta olan triyaj sistemlerini kendi ülkelerinin nüfusu ve nüfusa uygunluğu açısından revize ederek uygulamaya geçirmiştir (Tarhan ve Akın, 2016).

Tablo 1: Triyaj Sistemleri (Kraaijvanger ve ark., 2016)

ACİL SERVİS TRİYAJ SİSTEMLERİ	
2 Seviyeli Triyaj Sistemi	Hasta Acil
	Hasta Acil Değil
3 Seviyeli Triyaj Sistemi	Hasta Çok Acil
	Hasta Acil
	Hasta Acil Değil
4 Seviyeli Triyaj Sistemi	Hastanın Hayati Tehlikesi Mevcut
	Hasta Çok Acil
	Hasta Acil
	Hasta Acil Değil
5 Seviyeli Triyaj Sistemi	Hastanın Hayati Tehlikesi Mevcut
	Hasta Çok Acil
	Hasta Acil
	Hasta Acil Değil
	Sevk

Yaygın kullanılan ve geçerlilik ve güvenilirliği kanıtlanmış 5 seviyeli triyaj sistemleri:

- **Aciliyet Şiddeti İndeksi (ESI):** 1990'larda Amerika'da geliştirilen 5 seviyeli triyaj sistemidir. 1. seviye en acil olup hayati önemi vardır. 5. seviyedeki hasta için tetkik ve tedavi gerekli değildir. Hastanın sadece öncelik sırası bellidir. Hekimin hastayı görmesi için beklenen süre belli değildir. Pediatrik hastalarda kullanılabilir.
- **Avustralya Triyaj Sistemi (ATS):** 1994'te Avustralya'da uygulanan ulusal triyaj ölçeği sonraları Avustralya Triyaj Ölçeği adını almıştır. 5 seviyeden oluşmaktadır. 1. seviyedeki hasta hayati önem taşır. 5. seviyedeki hasta acil değildir. Tüm seviyelerde tıbbi müdahaleye başlamak için gerekli süre belirtilmiştir.
- **Manchester Triyaj Sistemi (MTS):** 1997'de İngiltere ve Avrupa Birliği'nde kullanılmaya başlanmıştır. 5 seviyeden oluşmaktadır. Her bir seviyenin ismi, rengi ve tıbbi müdahale süresi vardır. Pediatrik güvenilirliği henüz bilinmemektedir.
- **Kanada Triyaj Sistemi (CTAS):** Avustralya Triyaj Sistemi'nden esinlenilerek yapılmıştır. 5 seviyeden oluşmaktadır. Pediatrik ölçeği geliştirilmiştir ve ölçeğin geçerlilik ve güvenilirlik oranı yüksektir (Durmaz ve Cebeci, 2021; Şimşek Öner, 2018).

Tablo 2: 5 Seviyeli Triyaj Sistemleri (Durmaz ve Cebeci, 2021)

January 14-16, 2022 / Tokyo – Japan

Triyaj Sistemi	Ülkeler	Seviyeler	Hastanın Bakım Süresi
Aciliyet Şiddeti İndeksi	ABD	ESI – 1	Süre Yok
	Avustralya	ESI – 2	
	Kanada	ESI – 3	
	Birleşik Krallık	ESI – 4	
		ESI – 5	
Avustralya Triyaj Sistemi	Avustralya	1- Resüsitasyon	Seviye 1- 0 dk
	Yeni Zelandada	2- Çok Acil	Seviye 2- 10 dk
		3- Acil	Seviye 3- 30 dk
		4- Az acil	Seviye 4- 60 dk
		5- Acil Olmayan	Seviye 5- 120 dk
Manchester Triyaj Sistemi	İngiltere	1- Hemen (Kırmızı)	Seviye 1- 0 dk
	İskoçya	2- Çok Acil (Turuncu)	Seviye 2- 10 dk
		3- Acil (Sarı)	Seviye 3- 60 dk
		4- Standart (Yeşil)	Seviye 4- 120 dk
		5- Acil Olmayan (Mavi)	Seviye 5- 240 dk
Kanada Triyaj Sistemi	Kanada	1- Resüsitasyon	Seviye 1- 0 dk
		2- Çok Acil	Seviye 2- 15 dk
		3- Acil	Seviye 3- 30 dk
		4- Az acil	Seviye 4- 60 dk
		5- Acil Olmayan	Seviye 5- 120 dk

Türkiye’de Kullanılan Triyaj Sistemi

1868 tarihinde “Osmanlı Yaralı ve Hasta Askerlere Yardım Cemiyeti”nin kurulmasıyla triyaj uygulaması resmîyet kazanmıştır. 1877’de toplanan Marko Paşa’nın başkanlık ettiği cemiyetin adını o dönemde padişah olan Abdülhamit Han “Hilâlî Ahmer Cemiyeti” olarak değiştirmiş, cumhuriyetin ilanından sonra bu cemiyet “Türkiye Cumhuriyeti Kızılay Cemiyeti” adını almıştır (Durmaz ve Cebeci, 2021).

1961’de yayımlanan 224 sayılı "Sağlık Hizmetlerinin Sosyalleştirilmesi Hakkında Kanun" ile tüm vatandaşların ulaşabileceği şekilde ülke genelindeki sağlık hizmetleri genişletilmiştir.

Türkiye’de triyaj kavramının uygulanması ile ilgili hükümler 11 Mayıs 2000 yılında yayımlanan Acil Sağlık Hizmetleri Yönetmeliği’nde; “Özel ve kamuya ait bütün hastanelerin acil birimleri, bütün acil başvurularını ayırım yapmaksızın kabul ederler. Başvuran her hasta için acil tıbbi değerlendirme, müdahale ve gerektiğinde stabilizasyon sağlanır.” “Acil servis, hastanın sosyal güvencesi olup olmadığına, bağlı bulunduğu sosyal güvenlik kuruluşunun nevine ve hastanın diğer özelliklerine bakmaksızın, stabilizasyon sağlanıncaya kadar bütün tıbbi hizmetleri sunar.” şeklinde yer almaktadır (Acil Sağlık Hizmetleri Yönetmeliği, 2000).

Sağlık Bakanlığı’nın 16 Ekim 2009 yılında Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkındaki Tebliği’nde;

“Acil servislerde etkin bir hizmet sunumu için renk kodlaması uygulanır. Triyaj işlemi başvuru sırasında yapılır. Triyaj uygulaması için muayene, tetkik, tedavi, tıbbi ve cerrahi girişimler bakımından öncelik sırasına göre kırmızı, sarı ve yeşil renkler kullanılır.”

“Dal hastaneleri ve bünyesinde I. Seviye acil servisi bulunan sağlık tesislerinde triyaj uygulaması yapılması zorunlu değildir. 112 acil ambulanslarıyla sağlık tesisine getirilen hastalara triyaj uygulaması yapılmaz. Ambulansla getirilen acil vakaların sağlık tesisine kabul işlemleri en kısa sürede tamamlanır.”

“Acil serviste ilk kayıt, güvenlik ve triyaj uygulaması için yeterli alan ayrılır. Triyaj uygulaması tabip veya acil tıp teknisyeni, hemşire, sağlık memuru (toplum sağlığı) ve benzeri nitelikteki sağlık personeli tarafından yapılır. Acil bakım ve triyaj uygulamasına ilişkin verilmesi gereken eğitimler, eğitimlerin müfredatı ve süresi ile eğitim verilecek merkezler Yükseköğretim Kurulu Başkanlığının ve ilgili diğer kurumlarında görüşü alınarak Bakanlıkça belirlenir.”

ifadeleriyle triyaj hakkında bilgilendirme yapılmıştır (Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkında Tebliği, 2009).

Sağlık Bakanlığı’nın resmi gazetede yayımladığı tebliğde kırmızı (çok acil), sarı (acil) ve yeşil (acil olmayan) olarak tanımlanan renk kodlamaları kullanılmaktadır ve 3 seviyeli triyaj sistemine uygunluk göstermektedir (Acil Triyaj Rehberi, 2015).

Triaj uygulaması aşağıdaki şekilde yapılır;

- “Kategori 1 (kırmızı): Bu kategorideki hastalar resüsitasyon odasına alınır ve hemen müdahale edilir.”
- “Kategori 2 (sarı): Bu kategorideki hastalar acil servis muayene odasına alınır ve en geç bir saat içerisinde müdahale edilir.”
- “Kategori 3 (yeşil): Bu kategoride hastalar acil servis muayene odasına alınır ve en geç iki saat içerisinde müdahale edilir.”
- “Kategori 4 (siyah): Bu kategorideki hastalar ölmüştür. Bu durumdaki hastalar ölüm kartı doldurularak hastanın ayak başparmağına bağlanır ve görevli personel tarafından morga indirilir.” (Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkında Tebliğ, 2009).

Tablo 3: Triyaj Uygulama Tablosu

“Yeşil triyaj kodu ayaktan başvuran, genel durumu itibariyle stabil olan ve ayaktan tedavisi sağlanabilecek basit sağlık sorunları bulunan hastaları belirtmektedir. Sarı triyaj kodu, hayatı tehdit etme olasılığı, uzuv kaybı riski ve önemli morbidite oranı olan durumlar ile orta ve uzamış dönem belirtileri olan ve ciddi potansiyeli taşıyan durumları ifade etmektedir. Kırmızı triyaj kodu ise hayatı tehdit eden, hızlı agresif yaklaşım, acil olarak eş zamanlı değerlendirme ve tedavi gerektiren durumları göstermektedir. Bu durumlarda hasta hiç bekletilmeden kırmızı alana alınır. Ayrıca hayatı tehdit etme olasılığı yüksek olan ve 10 dakika içerisinde değerlendirilip tedavi edilmesi gerekli durumlar da kırmızı ile kodlanmaktadır.” (Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkında Tebliğ, 2009).

Trijaj Sistemleri Bileşenleri

Herhangi bir triyaj sisteminin fonksiyonu birincil fonksiyon ve ikincil fonksiyon olarak iki türdür. Birincil fonksiyon; tanılama, hastanın başlıca şikayetini ve semptomlarını tanılama, kısa bir anamnez alma, hayati bulgularını ölçme ve fiziksel muayene yapma gibi uygulamaları içerir (Çevik ve Tekir, 2014).

İkincil Fonksiyon; kayıt tutmak, yönergelere uymak, telefonda öneride bulunmak, ambulansla hasta değerlendirmek, ambulans göndermek, ekipman depolamak ve ekipmanın devamlılığını sağlamak, hasta yoğunluğunu kontrol etmek, güvenlik ve danışmanlık sağlamak hizmetlerini kapsar (Çevik ve Tekir, 2014).

Trijaj uygulama alanı; genellikle acil servislerin giriş kısmına kurulur. Acile yönlendirme tek bir giriş ile yapılır. Ambulanlar ve hasta nakli yapan diğer araçlar için kolay manevra yapılabilecek bir ulaşım alanı alt yapısı oluşturulmalı, ihtiyacı olan hastalar için tekerlekli sandalye ve sedyeler triyaj alanında hazır bulundurulmalıdır. Triyaj alanının acil servis girişine çok yakın olması, polis, basın mensupları ve halktan

kişilerin çalışmalara müdahale etmesine neden olabileceği için dikkatli olunmalıdır (Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkında Tebliğ, 2009).

Bir triyaj kayıt sistemi oluşturmak kurum ve birimlerin etkin sağlık hizmeti sunmaları adına önem arz etmektedir. 1969 yılında, hasta değerlendirilmesi ve kayıt oluşturulması adına geliştirilmiş olan "SOAP Triage Model", triyaj kayıtlarında genel bir değerlendirme sunması açısından bir ilktir (Tarhan ve Akın, 2016).

SOAPIER Triyaj Modeli;

S = Subjektif Veriler: Hastaların şikayetleri

O = Objektif Veriler: Triyajı yapan personelin değerlendirilmesi

A = Verilerin Analiz Edilmesi

P = Planlama Yapma

I = Uygulama Ve Girişim

E = Değerlendirme: Hastanın şikayetlerinin tekrar değerlendirilmesi

R = Revizyon ve hastanın yeniden değerlendirilmesi: Uygulama veya girişimlerin yeniden değerlendirilmesi

Trijaj uygulamasını yapan sağlık çalışanları; kısa zamanda doğru kararı verebilen, iletişim kabiliyeti kuvvetli, etik ilkeleri önemseyen, hasta tanılama yeteneği gelişmiş, iyi bir görüşme yapabilen ve organizasyon yeteneği iyi olması gereken kişilerdir (Tarhan ve Akın, 2016).

Trijaj Değerlendirmesi

Birincil tanılama yaparken, triyajı uygulayan hemşire, hastanın yaşamını tehdit eden temel riskleri tanımlarken, hastaya uygun acil girişimleri başlatır ve hastanın tanısına uygun tedavi alanına transferini sağlar (Karaçay ve Sevinç, 2007).

A (Airway) : Hava yolu ve boyun güvenliğinin sağlanması: Konuşabiliyor mu?

B (Breathing) : Solunum: Solunumu sesli mi?

C (Circulation) : Dolaşım ve kanama kontrolü: Kapiller geri dolum 1-2 sn mi? Cilt rengi açık pembe mi? Radial nabız hissedilebiliyor mu?

D (Disability) : Kısa nörolojik muayene: Uyanık ve oryante mi?

E (Exposure) : Hastanın elbiselerinin çıkarılması

İkincil tanılamada; hastanın ismi, yaşı, hastaneye geliş şekli, temel şikayetleri, o anda var olan şikayetin öyküsü, özgeçmişi, allerji öyküsü, kullandığı ilaçlar, kadın hastalarda son adet tarihi, gebe olma ihtimali olup olmadığı, en son tetanoz aşısı olduğu tarih, en son ne zaman yemek yediği, yemeğin cinsi ve miktarı, pediatrik hastalarda boy ve kilo, ağrı değerlendirmesi, GKS değerlendirmesi, sigara, alkol, madde kullanımı değerlendirmesi yapılır (Karaçay ve Sevinç, 2007).

Trijaj görüşmelerinin hedefi tıbbi tanı koymak değil, doğru klinik kararı vermektir (Akgün, 2016).

Trijaj Uygulamasında Hemşirelerin Roller

Sağlık Bakanlığı'nın 16 Ekim 2009 yılında Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkındaki Tebliği'nde "*trijaj uygulamasını tabip veya acil tıp teknisyeni, hemşire, sağlık memuru (toplum sağlığı) ve benzeri nitelikteki sağlık personeli tarafından yapılacağı*" beyan edilmiştir (Yataklı Sağlık Tesislerinde Acil Servis Hizmetlerinin Uygulama Usul Ve Esasları Hakkında Tebliğ, 2009). Triyajı yapan sağlık personeli genellikle hastanenin personel durumu göz önüne alınarak hastane idaresi tarafından belirlenmektedir.

2010 yılında yayınlanan Hemşirelik Yönetmeliği'ne göre; hastaların acil servise kabulünü sağlamak, acil servis hemşiresinin yükümlülüklerinden biri olarak belirtilmiştir (Hemşirelik Yönetmeliği, 2010).

Küçüköğlü ve arkadaşlarının yaptıkları bir çalışmada araştırmaya alınan hastanelerin %53,2'sinde triyaj uygulanırken, triyajı uygulayan sağlık personelinin çoğunluğunun(%43,5) hemşireler olduğu saptanmıştır (Küçüköğlü, Köse, Aytekin ve Kılıç, 2017). Bu nedenle yapılan triyaj araştırmalarının birçoğunda hemşireler üzerine odaklanılmıştır.

Acil servis hemşiresi;

- Acil servislere başvuran hastaların kabulünü sağlamakla,
- Başvuran hastalar arasında sağlık gereksinimi olanların önceliğini belirlemekle,
- Hasta kaydı, sevki, resmi prosedürün ve evrak işlerinin takibini yapmakla,
- Hastaların vital bulgularını kontrol etmekle,
- Hastaların alerjisi olup olmadığı, tıbbi veya cerrahi işlem öyküsü, kullandığı ilaçları, ağrısının olup olmadığı, boyu, kilosunu, alkol ve sigara kullanıp kullanmadığı gibi parametreleri değerlendirmekle,
- Hastanın tanısına yönelik tetkiklere başlamakla (EKG, radyolojik grafipleri ve laboratuvar tetkikleri),
- Hastanın tüm kayıt işlemlerini ve gerekli yerlere bildirimini yapmakla,
- Hastayı değerlendirme sonunda en uygun tedavi ve bakımı alacağı bölüme yönlendirmekle yükümlüdür (Tarhan ve Akın, 2016).

Acil servislere hastaları ilk karşılayan ve triyajı uygulayan sağlık çalışanı hemşireler olduğu için triyajın başarılı bir şekilde uygulanması ve sürekliliğinin sağlanması adına hemşireler tarafından triyaj kavramının bilinmesi, benimsenmesi ve etkin uygulanması gereklidir (Bal ve Gürkan, 2018).

Trijaj uygulayan hemşirelerin; tanılama becerileri gelişmiş olmalı, iletişim yeteneği kuvvetli olmalıdır. Ayrıca triyaj hemşireleri; acil serviste en az altı ay çalışmış olmalı, triyaj ile ilgili iyi bir eğitim almış olmalı, kısa zamanda ve doğru karar verip hastaları uygun alanlara yönlendirebilmeli, etik ilkelere dikkat etmeli, geniş hastalık bilgisine sahip olmalı ve hastaların aciliyetini fark edebilmelidir (Küçüköğlü ve ark., 2017).

Acil servise gelen hastaları tanılayabilmek ve başarılı triyaj uygulaması yapabilmek için triyaj uygulayan hemşirelerin bilgi ve deneyim kazanmaları önemlidir (Tarhan ve Akın, 2016). Afaya ve arkadaşlarının acil serviste çalışan hemşirelerin triyaj algılarını ve bilgilerini değerlendirmeyi amaçlayarak yaptıkları bir çalışmada triyaj uygulayan hemşirelerin triyaj bilgileri ile ilgili ortalama yüzde puanının (%62,6) biraz üzerinde olduğu sonucuna ulaşılmıştır (Afaya, Azongo ve Yakong, 2017).

Küçüköğlü ve arkadaşlarının yaptıkları bir çalışmada, çalışmaya katılan hemşirelerin triyaj bilgilerinin yetersiz olmasının triyaj uygulamasını etkilediğini bildirmişlerdir (Küçüköğlü ve ark., 2017). Acil servislere hastaları hasta yoğunluğunun azaltılmasında triyaj hemşiresinin rolünü araştırmak için sistematik bir çalışma yapılmış; 1971-2011 yılları arasında yapılmış olan 14 çalışma incelenmiş ve inceleme neticesinde triyaj hemşirelerine triyaj uygulaması konusunda eğitim verildikten sonra hastaların bekleme sürelerinde anlamlı bir azalma olduğu (ort. 37 dk) tespit edilmiştir (Rahmati, Azmoon, Meibodi ve Zare, 2013). Yapılan çalışmalara bakıldığında hemşirelerin temel ve uygulamalı eğitimlerinde, hizmet içi eğitim ve sertifikasyon programlarında triyaj kavramına da yer verilmesi; triyaj uygulamasının daha başarılı olmasını sağlayacaktır.

SONUÇ VE ÖNERİLER

Acil servisler hastanelerin vitrinleri olduğundan, hastanelerin yapısını, işleyişlerini, yoğunluklarını ciddi oranda yansıtır (Köse ve ark., 2011). Acil servislere, hastaların aciliyet durumuna göre hizmet alması temel kuraldır (Şimşek Öner, 2018). Triyaj sisteminin amacı; hayati riski olan hastaları hızlı bir şekilde tanımlamak, mortaliteyi ve ileri yaralanmaları önlemek, hasta akışını rahatlatmak, acil tedavi alanındaki yoğunluğu azaltmak, hayati riski olmayan hastaların uygun tedavi almasını sağlamak, hasta ve ailelerinin yaşadıkları anksiyeteyi azaltmak, personelin etkinliğini sağlamak, ekip kavramının işlerliğini sağlamak olarak gösterilmektedir (Küçüköğlü ve ark., 2017; Aslan ve Pekcan, 2020; Karaçay, 2010).

Sağlık kurumunun fiziksel donanım ve sağlık çalışanı açısından yeterli olması acil servislerde triyaj uygulamalarının kolaylaşmasını sağlamaktadır (Akyolcu, 2007). Trijaj uygulayan personelin bilgi ve deneyimi triyaj kararının doğruluğunu etkilediği için sağlık kurumları, triyaj uygulayan sağlık çalışanlarının eğitimini ve triyaj uygulama becerilerinin gelişmesini önemsemeli, onları desteklemelidir (Küçüköğlü ve ark., 2017).

Acil servislere uygun olmayan hasta başvurularının, acil servislerde aşırı hasta yoğunluğuna ve sağlık harcamalarında artışa neden olduğu düşünülmektedir (Köse ve ark., 2011). Sağlık çalışanlarının acil servisteki hasta bakımı uygulamasını kolaylaştırmak, daha iyi kararlar alabilmesini sağlamak, otonomisini geliştirmek ve memnuniyetini artırmak adına triyaj uygulaması için protokoller geliştirilmelidir (Küçüköğlü ve ark., 2017).

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MORPHOLOGICAL AND MORPOMETRIC INVESTIGATION OF THE KNEE JOINT IN CATTLE WITH MAGNETIC RESONANCE (MR) IMAGES

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ABSTRACT

Magnetic resonance imaging (MR) is the most commonly used imaging method to reveal the anatomy of the knee joint in detail and to diagnose its pathologies. MR imaging; the most important advantages are that it is non-invasive, does not emit ionizing radiation, and provides a multiplanar image. The aim of this study is to examine in detail the anatomy of the knee joint in cattle using MR images. In our study, 15 cattle knee joints obtained from the slaughterhouses of Diyarbakır province were used. Images were obtained from the Philips Ingenia 3.0 T MR device with a cross-section of 1 mm. Anterior cruciate ligament, posterior cruciate ligament and collateral ligaments in the knee joint were examined. The cartilage structure of the femur, tibia and patella was visualized. In addition, bursae and fat pads in the knee joint were seen in detail. Morphometric measurements of all these structures were made. Since MR provides images with the principle of showing the motion of the hydrogen atom in the magnetic field, the meniscus was observed as dark (low signal) and triangular in shape, since it does not contain hydrogen atoms. The results of our study have revealed the anatomy of the knee joint in cattle in detail and will shed light on similar studies to be conducted in this area. It is important for our study to reveal the anatomy of the knee joint in cattle in detail, especially in terms of simulations to be made in knee joint prosthesis construction and orthopedic surgeries.

Keywords: cow, knee joint, manyetic resonance

ELECTROCHEMICAL CHARACTERIZATION AND PREPARATION OF AN ECONOMICAL AND EASY NANOHYBRID**Hilal İNCEBAY***Neveehir Hacı Bektas Veli University, Faculty of Arts and Sciences, Department of Molecular Biology and Genetics, Neveehir, Turkey.**ORCID: 0000-0001-8161-3957***ABSTRACT**

Electrochemical sensors are used in many different disciplines for quantitative and qualitative purposes. Recently, the incorporation of nanomaterials (carbon nanotubes, metal/metal oxide nanoparticles, peptide nanotubes, biocompatible polymers) into the sensor system has expanded their application areas. These sensor systems, which have become more sensitive and selective, have enabled the preparation of small, portable, or disposable measurement systems that provide fast, practical, reproducible and accurate analysis results, especially for the diagnosis, diagnosis and treatment of diseases. In addition, since the success of the analysis in electrochemical sensors is determined by the material selection of the working electrode, the production of new modifiers and the diversification of application areas have become important today. At this point, in order to change the electron transfer rates on the electrode surface, the electrode surfaces must be modified with layers and films. At the same time, since modification can be used to protect materials against corrosion or mechanical effects, new electrode surfaces can be designed, many electroanalytical problems can be solved, and new analytical applications and sensor studies can be developed. By modifying the electrode surfaces, the selectivity and sensitivity of the electrodes increase more. In order to benefit from these advantages of the modification, a new nanohybrid was obtained by combining natural rock bentonite and metal nanoparticles in this study. New surfaces were obtained by modifying the glassy carbon electrode surfaces with this nanohybrid. For the electrochemical characterization of these surfaces, cyclic voltammetry technique was applied in ferricyanide, ferrocene, ruthenium hexamine (III) chloride, and ferri/ferrocyanide probes. In order to determine the electron transfer properties of the modified surfaces, voltammograms were recorded by cyclic voltammetry technique at different scan rates. An electrochemical sensor was developed for the determination of drug active substances used in mental disorders in order to give an application area to the characterized surfaces.

Keywords: Electrochemical sensors, electrode modification, nanohybrids

INTRODUCTION

Electrochemical sensors are based on measuring the electroactive signal that occurs during the consumption and regeneration of electrochemical species during interaction. The ions formed as a result of reduction or oxidation of the electroactive analyte on the surface of the working electrode cause a potential difference between the reference electrode and the working electrode and generate a signal. This change, which occurs as a result of the redox reaction, depends on the type and concentration of the analyte (Hanrahan et al., 2004). Most electrochemical sensing methods use changes at potential and current. The basic features an electrochemical sensor should have are the same as most other sensor types. Selectivity, sensitivity, reproducibility, fast response time, low detection limit, wide measuring range, stability, lifetime, shrinkability, fast turnaround time and low cost are essential for an electrochemical sensor (Allothman et al., 2010; Liu et al., 2016). The success of the analysis in electrochemical sensors is determined by the material selection of the working electrode. Electrochemical sensors are used in many different disciplines for quantitative and qualitative purposes. Recently, the incorporation of nanomaterials (carbon nanotubes, graphene, peptide nanotubes, nanoparticles, biocompatible polymers) into the sensor system has expanded their application areas (Karimi-Maleh et al., 2020; Power et al., 2018). These sensor systems, which have become more sensitive and selective, have enabled the preparation of small, portable or disposable measurement systems that provide fast, practical, reproducible and accurate analysis results, especially for the diagnosis, diagnosis and treatment of

diseases. Electrochemical sensors have different application areas such as medicine, pharmacy, agriculture, food, forensic chemistry and environmental analysis (Shaw and Dennany, 2017).

Nanotechnology; thanks to the rapid developments in the world of science, it has taken its place among the branches of science that give birth to innovations. With the increasing use of nano-materials in our lives, studies on it have intensified. Nanoparticles have attracted attention due to their biocompatibility (Jafari et al., 2018). Among nanoparticles, gold nanoparticles are among the materials that give good results (Halkare et al., 2019), (Ben Messaoud et al., 2017). The unique electronic and material properties of these particles allow good communication between redox proteins and nanoparticles. Other nanomaterials such as nickel oxide, titanium oxide, tungsten oxide, iron oxide, manganese oxide and zirconium oxide have also been used successfully in enzyme and protein immobilization (Pachaiappan et al., 2021; Richard and Venkataraman, 2021; Shrivastav et al., 2021). In studies with nanoparticles, new metal oxide nanoparticles; high biocompatibility, high adsorption ability and they do not harm the biological activity of redox proteins (Nikolova and Chavali, 2020). Compared with other materials, nanoparticles have found many applications thanks to their physical and chemical, mechanical, magnetic, optical and electrical properties. Thanks to the nanotechnology developed by these applications, promising great prospects are presented in the fields of industry, agriculture, medicine, public health, household appliances and the environment (Oluwasanu et al., 2019; Sahoo et al., 2021).

Voltammetric techniques can be considered as active techniques because, unlike passive techniques such as potentiometry, the applied potential force causes a change in the concentration of electroactive species by electrochemical oxidation or reduction on the electrode surface. Voltammetry; it is used in many applications such as examining the oxidation and reduction processes occurring in various environments, investigating the adsorption processes on the surface and elucidating the electron transfer mechanisms occurring on the electrode surfaces, molecular oxygen determination and determination of pharmaceutically important species (Zhou et al., 2021). Working electrodes with a surface area of less than a few mm^2 (microelectrodes) are used in voltammetric studies, and even electrodes with a surface area of a few micrometers or less are used. The anode is the electrode where the oxidation reactions take place and the cathode is the electrode where the reduction reactions take place. Hg, C, Ag, Pt, Au and many metals can be used as cathode material. A more limited number of materials such as Pt, C, Au or various metal oxides are used as the anode material. By voltammetry, precise amounts of metals and their species, S^{2-} , CN^- , Cl^- , F^- anions, inorganic compounds such as IO_3^- , NO_2^- , SCN^- , $\text{S}_2\text{O}_3^{2-}$ and SO_2 ; organic compounds such as aromatics, peroxides, ethers, nitroaromatics, amines, heterocyclic amines, phenols, aliphatic halogens, quinones, carboxylic acids, dienes, acetylene are determined (Lu et al., 2018). Voltammetry is used as a very common and effective method in the investigation of oxidation, reduction and adsorption phenomena in inorganic, physical chemistry, biochemistry, hydrolysis, solubility, complex formation, stoichiometric and kinetic investigations of chemical reactions, investigation of the mechanisms of electrode reactions and studies on drug active substances.

In this study, it was aimed to obtain a new nanohybrid by combining natural rock bentonite and metal nanoparticles and using it as a modifier. It has been shown that the nanohybrid obtained by the combination of the functional groups in the structure of bentonite with metal nanoparticles is a promising candidate for usability in an application area.

MATERIALS AND METHODS

Gamry Interface 1000B Potentiostat/Galvanostat/ZRA device and Bionalytical System (BAS) C3 cell system were used for electrochemical processes. For the three-electrode cell system, platinum wire (Pt) was used as the counter electrode, a modified glassy carbon electrode was used as the working electrode. Ag/AgCl/KCl(saturated) was used as the reference electrode in the aqueous medium studies and Ag/AgNO₃ was used as the reference electrode in the non-aqueous environment studies. Thermo scientific Orion 4 Star branded device was used for pH measurements.

Modification of electrode surfaces: a nanohybrid suspension was obtained by doping Ho₂O₃ (holmium oxide) nanoparticles to the bentonite (B: Si₈Al₄O₄(OH)_{4n}H₂O) structure. A nanohybrid/GCE surface was obtained by immobilizing 5.0 μL of this suspension onto the bare glassy carbon electrode (GCE) surface. For the

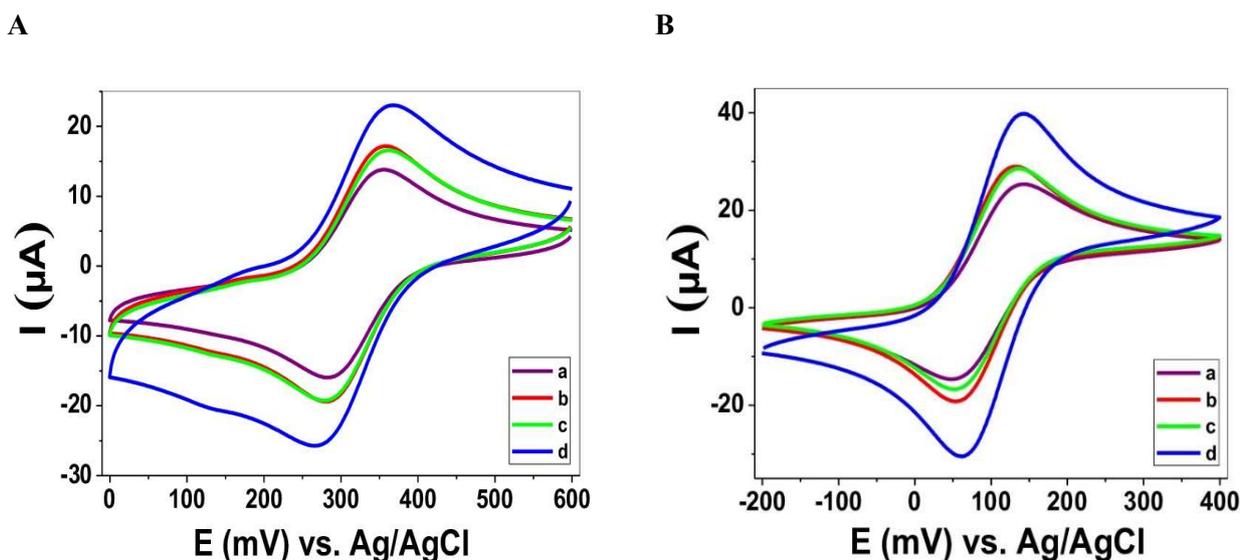
electrochemical behavior tests of the surfaces, cyclic voltammetry (CV) technique was applied to these surfaces at ferricyanide, ferrocene, ferri/ferrocyanide and ruthenium hexamine (III) chloride probes.

RESULTS and DISCUSSIONS

Electrochemical Characterization of Nanohybrid

In surface tests performed in the presence of redox probes, the CV technique is an effective method that reveals whether there is electron transfer between the surface and the electrolyte. For this reason, the electrochemical behavior of bare GCE and modified GCE surfaces was investigated separately in ferricyanide, ferrocene, ferri/ferrocyanide and ruthenium hexamine (III) chloride probes respectively using CV technique. The electrochemical behavior of the modified GCE surfaces was compared with the electrochemical behavior of the bare GCE surface. In Figure 1A, voltammograms of the bare/GCE and modified surfaces are given in the ferricyanide probe at a potential range of 0.0/0.6 V, at a scan rate of 100 mV/s are given. When the voltammograms in the ferricyanide probe are examined, it is observed that the peak current of the nanohybrid/GCE surface is larger than the other surfaces. This can be explained by the large surface area of the metal nanoparticles and the increase in conductivity by allowing them to increase the catalytic activity on the electrode surface. The best voltammetric peak current response of the nanohybrid/GCE shows that the nanohybrid combination was brought together under suitable conditions.

In Figure 1B, voltammograms of bare GCE and modified GCE surfaces in a ferrocene probe at a scanning speed of 100 mV/s in the potential range of -0.2/0.4V are given. When the voltammograms of the surfaces in the ferrocene probe are examined, it is seen that the nanohybrid/GCE surface exhibits the best electrocatalytic activity and exhibits the highest peak current. This showed excellent biocompatibility on the surface thanks to the good adhesion of the functional groups in the bentonite structure on the electrode surface and allowed electron transfer in the ferrocene probe, thanks to the protection of the modified form of the surface by preventing the fragmentation that may occur on the surface. In other words, it was observed that the nanohybrid structure used as the modifier species did not make the electrode surface electroinactive. For this reason, it was concluded that the voltammetric responses obtained in the reactions of the ferrocene probe allow electron transfer on bare GCE and modified GCE surfaces without creating a blockage that prevents electron transfer.



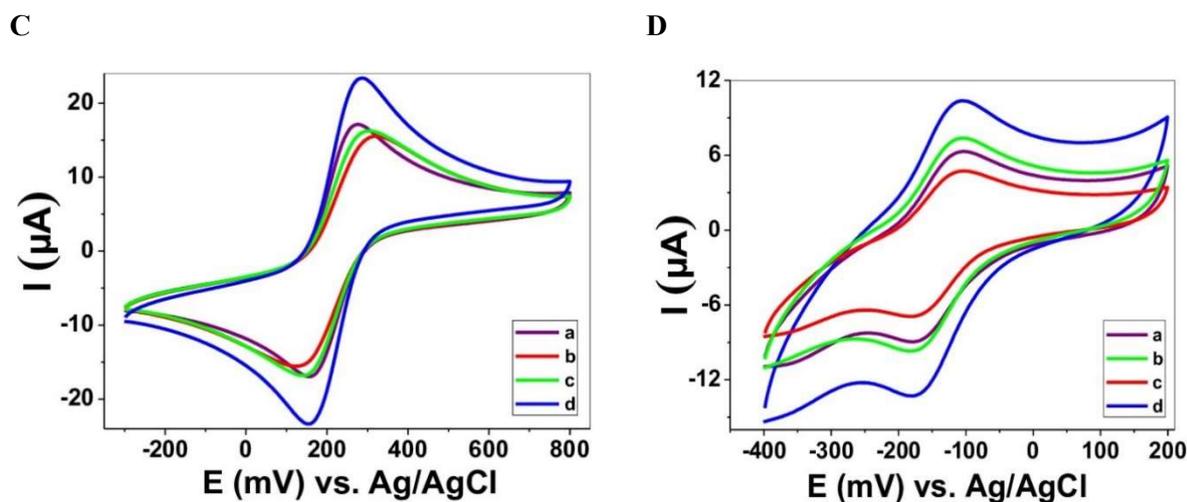


Figure 1. Voltammograms of a) bare GCE, b) bentonite/GCE, c) metalnanoparticles/GCE d) nonohibrit/GCE in A) Ferricyanide and B) Ferrocene C) ferri/ferrocyanide and D) ruthenium hexamine (III) chloride probe.

The voltammograms of the bare GCE and modified surfaces taken in the ferri/ferrocyanide probe at a scan rate of 100 mV/s in the -0.3/0.8 V potential range is given in Figure 1C. Reduction and oxidation peaks were observed at the bare GCE and modified GCE electrode surfaces. The reason for this is that while the Fe^{2+} ions in the solution are first oxidized to Fe^{3+} ions, then the opposite happens and Fe^{3+} ions are reduced to Fe^{2+} ions. In addition, when the voltammetric responses obtained in the ferri/ferrocyanide probe were examined, it was observed that the bare GCE and modified surfaces exhibited similar peak current responses and slight shifts in the peak potentials, but the nanohybrid/GCE surface exhibited the best voltammetric response. This observed result can be attributed to the excellent surface compatibility of bentonite by doping with metal nanoparticles. In this way, the nanohybrid/GCE catalyzed the electron transfer on the surface more in the ferri/ferrocyanide probe.

The voltammogram of bare/GCE and modified surfaces taken in the ruthenium hexamine (III) probe at a scan rate of 100 mV/s in the -0.5/0.2 V potential range is given in Figure 1D. When the voltammograms of the ruthenium hexamine (III) probe are examined, it is seen that both bare GCE and modified GCE surfaces are sensitive to ruthenium for reduction and oxidation reactions. However, the nanohybrid/GCE surface exhibited a better-defined peak current compared to the other surfaces. This high sensitivity of the nanohybrid/GCE surface against the ruthenium hexamine (III) probe is thought to be due to the fact that bentonite is a compatible material at the interface of an electrochemical sensor, and that it can significantly increase the sensing ability and sensitivity of the electrode surface, which is desired to be modified thanks to its integration with metal-based nanostructures.

Applicability Of The Proposed Electrode

For analytical applications of the nanohybrid/GCE surface, its sensitivity to drug active ingredients used in the treatment of mental illnesses was investigated by cyclic voltammetry. It has been observed that the proposed nanohybrid modified electrode performs well with high sensitivity and selectivity.

CONCLUSION

For the electrochemical characterization of bare and modified surfaces, it has been observed that ferricyanide, ferrocene, ruthenium hexamine (III) chloride and ferri/ferrocyanide probes allow electron transfer for reduction/oxidation reactions without forming a blockade preventing electron transfer at the proposed surfaces. However, a higher voltammetric behavior of the nanocomposite/GCE surface was observed in all redox probes than the bare GCE and other modified surfaces. This can be attributed to the fact that the nanohybrid

combination is doped at appropriate rates and that the electrocatalytic effect is increased due to the synergistic effect created with this combination.

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ADÖLESANLARDA İNTERNET BAĞIMLILIĞI VE FİZİKSEL AKTİVİTE DÜZEYİ ARASINDAKİ İLİŞKİ

THE RELATIONSHIP BETWEEN INTERNET ADDICTION AND PHYSICAL ACTIVITY LEVEL IN ADOLESCENTS

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ÖZET

Gelişen teknoloji ile birlikte akıllı telefon, tablet, bilgisayar ve internet çocukluk çağından itibaren hepimizin vazgeçilmezi olmuştur. Özellikle son dönemde internetin yaygın kullanılması ile birlikte hızlı bir bilgi akışı sağlanmaktadır. İnternet bağımlılığı, internetin aşırı kullanılması isteğine engel olunamaması, internete bağlı olmadan geçirilen zamanın önemini yitirmesi, yoksun kaldığında aşırı sinirlilik ve saldırganlık olması ile birlikte kişinin tüm sosyal hayatının giderek bozulması olarak tanımlanmaktadır.

Küçük yaşlardan itibaren internet kullanımının yaygınlaşması ile birlikte daha hareketsiz bir yaşam tercih edilmiştir. Hareketsizlik ve fiziksel aktiviteden uzak bir yaşam çocukların bedensel gelişimini olumsuz etkilemektedir. Çocukların düzenli fiziksel aktivite katılımı ile beden ve ruh sağlığı gelişimi de olumlu etkilenmektedir. Düzenli fiziksel aktivitenin tüm faydaları bilinmesine rağmen dünya genelinde 13-18 yaş arası çocuk ve ergenlerin yaklaşık %80'inin fiziksel aktiviteye katılmadığı bilinmektedir.

Birçok çalışmada teknoloji ve internet bağımlılığının adölesanlarda fiziksel aktivite katılımını azalttığı gözlenmiştir. Bu hareketsiz yaşamın benimsenmesi ile adölesan dönemde başta obezite olmak üzere pek çok fiziksel ve ruhsal rahatsızlığın arttığı gözlenmiştir. Bu çalışma internet bağımlılığına dikkat çekerek, adölesanlarda düzenli fiziksel aktivite katılımının bedensel ve ruhsal gelişim için önemini vurgulamaktadır. Bu derleme adölesanlarda internet bağımlılığı ve fiziksel aktivite düzeyi konusunda detaylı bilgi vermek üzere hazırlanmıştır.

Anahtar Kelimeler: İnternet Bağımlılığı, Fiziksel Aktivite Seviyesi, Adölesan

ABSTRACT

Along with the developing technology, smartphones, tablets, computers and internet have been indispensable for all of us since childhood. Especially in the last period, with the widespread use of the internet, a rapid flow of information is provided. Internet addiction is defined as the gradual deterioration of a person's entire social life, together with the inability to prevent excessive use of the internet, the loss of importance of the time spent without being connected to the internet, excessive irritability and aggression when deprived.

With the widespread use of the internet from an early age, a more sedentary life has been preferred. Inactivity and a life away from physical activity negatively affect the physical development of children. With the participation of children in regular physical activity, the development of physical and mental health is also positively affected. Although all the benefits of regular physical activity are known, it is known that approximately 80% of children and adolescents aged 13-18 worldwide do not participate in physical activity.

In many studies, it has been observed that technology and internet addiction reduce physical activity participation in adolescents. With the adoption of this sedentary life, it has been observed that many physical and mental disorders, especially obesity, increase in adolescence. This study draws attention to internet addiction and emphasizes the importance of regular physical activity participation for physical and mental

development in adolescents. This review is designed to give detailed information on the relationship between internet addiction and physical activity level of adolescents.

Keywords: Internet Addiction, Physical Activity Level, Adolescent

GİRİŞ

Gelişen teknoloji ile birlikte akıllı telefon, tablet, bilgisayar ve internet çocukluk çağından itibaren hepimizin vazgeçilmezi olmuştur. İnternet adölesan dönemden itibaren hayatımızda en fazla kullanılan teknolojik ürün olarak yer edinmiştir. Alışveriş, araştırma, video izleme, oyun oynama ve daha birçok farklı alanda internet kullanılmaktadır (Taş, Eker ve Anlı, 2014).

İnternet kullanımının bu denli arttığı günümüzde yeni bir bağımlılık şekli olarak internet bağımlılığı tanımı karşımıza çıkmaktadır. İnternet bağımlılığı, internetin aşırı kullanılması isteğinin önüne geçilememesi, internete bağlı olmadan geçirilen zamanın önemini yitirmesi, yoksun kalındığında aşırı sinirlilik hali ve saldırganlık olması ve kişinin iş, sosyal ve ailevi hayatının giderek bozulmasıdır (Young, 2004). İnternet bağımlılığı her yaşta görülebilen bir bağımlılık türü olsa da günümüzde en çok adölesan dönemdeki çocukları etkilemektedir (Fariz ve Sarıcı Bulut, 2019). İnternet teknolojilerindeki gelişme ile birlikte bireylerin günlük yaşamlarında önemli değişimler meydana gelmiştir. Günlük yaşamda işleri kolaylaştıran pek çok uygulama kullanılır hale gelmiştir. İnternetin birey yaşamını bu denli kolay hale getirmesi internet bağımlılığını da artırmaktadır (Şavlı ve Tekin, 2019).

İnternet kullanımının yaygınlaşması ile birlikte yaşam alışkanlıkları değişti ve küçük yaşlardan itibaren daha hareketsiz bir yaşam tarzı tercih edilmeye başlandı. Fiziksel aktiviteden uzak yaşam ve sedanter davranışlar çocukların bedensel ve ruhsal gelişimini olumsuz etkilemektedir.

Bu gözden geçirme yazısında sıklığı gittikçe artan internet bağımlılığının adölesan dönemde fiziksel aktivite düzeyine etkilerini inceleyen çalışmaları bir araya getirerek güncel bilgilerin literatür ışığında derlenmesi ve tartışılması amaçlanmıştır.

ADÖLESAN DÖNEMDE İNTERNET BAĞIMLILIĞI

Son yıllarda teknoloji alanındaki hızlı gelişim iş hayatı, toplumsal hayat ve kişiler arası ilişkilerde de ciddi değişimlere neden olmuştur. Bilgisayar ve internet teknolojilerinde ki bu hızlı gelişim bireylerin ekran karşısında geçirdiği süreyi de artırmaktadır (Aslan Üçkardeş, 2010).

Bugün gelinen son noktada internet adı verilen ağa dahil olmayan hemen hemen hiçbir ülke kalmamıştır. İnternet yalnızca bilim kuruluşlarının kullandığı bir sistem değil, eğitim, iletişim, sağlık, medya, alışveriş gibi pek çok farklı alanda kullanılabilen bir kitle aracı olmuştur (Güçdemir, 2003). Tüm dünyada yaklaşık üç milyardan fazla insanın internet kullandığı bilinmektedir. Türkiye’de internet kullanıcısı sayısı 46 milyonu aşmış olup özellikle gençler arasında kullanımı hızla artmaya devam etmektedir. İnternetin yaygın kullanımının artması internet bağımlılığı gibi yeni sorunları beraberinde getirmiştir (Kutlu, Savcı, Demir ve Aysan, 2016).

İnternet bağımlılığı ilk defa 1996 yılında Amerikan Psikoloji Derneğinde yayınlanan bir çalışmada konu olmuştur. Bu çalışmanın ardından internet bağımlılığını konu alan pek çok çalışma literatüre girmiştir (Söyler ve Yıldırım Kaptanoğlu, 2018). Young (2004), internet bağımlılığını internetin aşırı kullanılması, bu kullanma isteğinin engellenememesi, internet başında geçirilen zamanın önemli görülmesi, eksik kullanıldığında aşırı sinirlilik hali ve saldırganlık oluşması ve kişinin iş, sosyal ve aile hayatının bozulması şeklinde tanımlamıştır. İnternet bağımlılığı en yaygın olarak sosyal açıdan savunmasız gruplarda (ergenler ve genç yetişkinler) görülmektedir. İnternete mobil erişimin ve kullanılabilirliğin hızlı bir şekilde artması ergenlerde internet kullanımı ve bağımlılık oranını da artırmaktadır (Tershchenko ve Kasparov, 2019).

İnternet bağımlılığı olan çoğu bireyde depresyon tanısı da eşlik etmektedir. Depresif kişilerde gözlenen düşük benlik saygısı, reddedilmeye hassasiyet, onaylanma ihtiyacı ve düşük motivasyon gibi özellikler kişileri

internetin interaktif işlemlerine daha bağımlı hale getirebileceği düşünülmektedir. Yine obsesif kompulsif bozukluk tanısının da internet bağımlılığı tanısına sıklıkla eşlik ettiği bildirilmiştir (Aslan Üçkardeş, 2010).

Günümüzde internet kullanımının gerekliliği kaçınılmaz olup ergenlik döneminde sosyal onay alması ve akran kabulü ön plana çıktığı için internet kullanımına yönelim de daha fazla olmaktadır (Ceyhan, 2008). İnternet kullanıcı sayısı tüm dünyada hızla artarken kullanıcıların demografik özellikleri de hızla değişmektedir. Kullanıcılar pek çok uygulama üzerinde gerçek kimliklerini gizleyebilmektedir. Bu nedenle, düşük öz güvenli, sosyal ortamlarda kendi kimliğini yansıtamayan bireyler internet ortamında sanal bir kimlik oluşturabilmektedir. Bu durum bireylere gerçeklerden kaçma fırsatı sunmaktadır (Ng ve Wiemer-Hastings, 2005). Adölesan dönemde birey kendini bir gruba ya da topluluğa ait hissedemediğinde bu ihtiyaçlarını sanal ortamda gidermeye çalışmaktadır. Gerçek yaşamı ihmal edip, psikolojik ihtiyaçlarını sanal dünyada giderme çabası interneti sağlıksız kullanmasına neden olmaktadır (Sever, 2021).

Adölesan dönemin özelliği olan farklı ortamlara girebilme, sosyal statü edinme, ikili ilişki kurma ve kendini beğendirme çabasında olan bireyler bu nedenlerden dolayı interneti daha fazla kullanmaktadır. 19 yaş üzerindeki öğrencilerin davranışlarını kontrol edebilme yeteneği daha gelişmiş olup internet kullanımı daha bilinçli olmaktadır (Kılavuz ve Karacabey, 2020).

Bireyin internetteki yeni bir teknolojiyi kullanması uygulamadan aldığı haz ile doğru orantılıdır. Bireyin yeni bir uygulamayı kullandığında aldığı yanıtın olumlu olması uygulamayı kullanmaya devam etmesini pekiştirir. Birey başlangıçtaki hazzı alabilmek için uygulamayı hep daha fazla kullanmak üzere koşullanır. Bu koşullanma benzer bir uygulama bulana kadar devam etmektedir (Davis, 2001).

Uzun süre bilgisayar önünde kalma, yeme alışkanlıklarının bozulması, fiziksel aktivite katılımında azalma ve obezitede artış ile doğrudan ilişkilidir. Ekran karşısında fazla zaman geçirme çocukların oyun oynama, spor yapma gibi etkinliklere daha az zaman ayırmasına neden olmaktadır. Bu durum obezite, hiperlipidemi, hipertansiyon gibi problemlere zemin hazırlamaktadır (Shields ve Behrman, 2000).

İNTERNET BAĞIMLILIĞININ FİZİKSEL AKTİVİTE DÜZEYİNE ETKİSİ

Fiziksel aktivite günlük yaşamda kas ve eklemlerimizi kullanarak enerji harcadığımız, farklı yoğunluklarda nabzımızı ve soluk sayımızı artıran hareketlerdir. Vücut gelişiminin ve büyümenin sıhhatli olması, olumsuz alışkanlıklardan uzaklaşma, toplumsallaşma, hastalıklarla mücadele, nitelikli hayat sürdürmede düzenli fiziksel aktivitenin önemli rol oynadığı düşünülmektedir (Baltacı, 2008, s.7,8). Fiziksel aktivite, her yaşta sağlığa yararlıdır. Hareket çocuğun fiziksel, zihinsel ve duygusal gelişiminin önemli bir parçasıdır (Kerkez, 2012). Egzersiz ve spor terimleri sıklıkla fiziksel aktivite ile birlikte kullanılsa da fiziksel aktivite bu terimleri de kapsayan daha geniş bir kavramdır. Gün içinde vücut tarafından gerçekleştirilen harekete dayalı tüm eylemler fiziksel aktivite tanımına girmektedir. Fiziksel aktivite düzeyi yaş, cinsiyet, sosyal konum, yapılan iş, maddi durum, iklim ve coğrafya gibi pek faktörden etkilenmektedir (Alagöz, 2019).

Fiziksel efor mental yorgunlukla baş etmenin en iyi yollarından biridir. Fiziksel aktivite zihnin işleyişini düzenler, kaygıyı azaltır ve ruh halini iyileştirir. Covid-19 pandemisi mental sağlığı olumsuz etkileyen oldukça yeni bir stres faktörüdür (Zalewska, Galczyk, Sobolewski ve Kalinowska 2021).

Adölesan dönem, sağlıklı bir yaşam için gerekli olan düzenli fiziksel aktivite, kaliteli uyku gibi alışkanlıkların edinildiği dönemdir (Park, 2014). Düzenli fiziksel aktivite ile zihinsel ve fiziksel olarak daha sağlıklı bir yaşam sürdürülebilir. Adölesanlarda düzenli fiziksel aktivite ile fiziksel uygunluk parametrelerinde, motor becerilerde, zihinsel fonksiyonlarda, özgüven ve disiplinde gelişim sağlanır. Hem çocukların hem de toplumun sağlığı için düzenli fiziksel aktiviteye katılım erken yaşta desteklenmelidir. Yeterli fiziksel aktivite katılımı birçok kronik hastalık için koruyucu rol oynamaktadır (Kerkez, 2012).

Günlük yaşamda hayatımıza dahil olan pek çok teknolojik gelişme (asansör, yürüyen merdiven, iş yerinde kullanılan cihazlar vb.) fiziksel aktivite katılımımızı dolayısıyla enerji tüketimimizi azaltmıştır. Fiziksel aktivite düzenli olarak yapıldığında vücut metabolizmasının düzenlenmesine, kardiyovasküler hastalıkları ve obeziteyi azaltmaya ve ruhsal sağlığın korunmasına katkı sağlar (Karaca, Ergen ve Koruç, 2000).

Çocukluk çağından itibaren düzenli fiziksel aktivite katılımı kas kitlesini artırır, kemik yapısını güçlendirir. Kişinin öz güvenini geliştirerek depresyon ve anksiyete gelişimini engeller. Fiziksel ve psiko-sosyal gelişimi olumlu etkiler. İleri yaşlarda görmeye alıştığımız pek çok kronik hastalık, hareketsiz yaşamın benimsenmesinden dolayı günümüzde çocukluk döneminden itibaren ortaya çıkmaya başlamıştır. Bu nedenle çocukluk çağından itibaren hareketin artırılması ve hareketsiz geçen sürenin azaltılması oldukça önemlidir (Türkiye Fiziksel Aktivite Rehberi, 2014).

Alagöz (2019), ortaöğretim öğrencilerinin internet bağımlılığı ve fiziksel aktivite düzeyini araştırdığı çalışmada boş vakitlerini internette geçiren çocukların fiziksel aktivite düzeyinin anlamlı derecede düşük, sporla ilgilenen çocukların ise anlamlı derecede yüksek olduğunu bildirmiştir. Yine oyun bağımlılığı boş vakitlerini internette geçiren çocuklarda önemli derecede yüksek bulunmuştur. Aşırı internet kullanımı bireylerin sosyal hayattan uzaklaşmasına neden olmaktadır. Lise öğrencilerinin spor yapma durumlarının internet bağımlılık düzeyine etkisini inceleyen bir çalışmaya 220 lisanslı spor yapan ve 210 lisanslı olarak spor yapmayan toplam 430 öğrenci katılmıştır. Çalışma sonucunda lisanslı spor yapan grubun internet bağımlılık düzeyi spor yapmayan gruptan istatistiksel olarak anlamlı düzeyde daha düşük bulunmuştur. Cinsiyet faktörüne göre yapılan karşılaştırmada her iki grupta da erkeklerin internet bağımlılık düzeyi daha yüksek bulunmuştur (Ayca ve Üzüm, 2020).

Tahran'da 465 lise öğrenci ile yapılan bir çalışmada kız ve erkek öğrencilerde fiziksel aktivite düzeyi, sedanter davranışlar ve uyku kalitesi kıyaslanmıştır. Okul ve tatil dönemlerinde farklı aktivitelere harcanan haftalık ortalama süre değişkenlik göstermiştir. Öğrencilerin spor faaliyetlerine tatil zamanında daha az vakit harcadığı gözlenmiştir. Hem kızlarda hem de erkeklerde, öğrencilerin sedanter aktivitelere (TV izleme, internet, dijital oyunlar) ayırdıkları ortalama süre spor aktivitelerine ayrılan zamandan çok daha fazla olduğu bildirilmiştir (Jalali Farahani, Amiri, Chin, 2016)

9-14 yaş arası ortaokul öğrencilerinde dijital oyun bağımlılığının fiziksel aktivite düzeyi ve uyku alışkanlıklarına etkilerini inceleyen bir çalışmaya 100 öğrenci katılmıştır. Çalışmaya katılan öğrencilerin %67'sinin dijital oyun oynama alışkanlığının olduğu ve bunların %6'sının günde 3 saatten fazla dijital oyun oynadığı belirlenmiştir. Günde 3 saat ve üzeri dijital oyun oynama alışkanlığı olan öğrencilerin bağımlılık seviyeleri yüksek çıkmıştır. Bu çalışmada dijital oyun bağımlılığı ile fiziksel aktivite seviyeleri ve uyku alışkanlıkları arasında anlamlı bir ilişki olmadığı tespit edilmiştir (Marufoğlu ve Kutlutürk, 2021). Çeşitli nedenlerle fiziksel aktivite düzeyinin düşmesi obezite için ciddi bir risk faktörü oluşturmaktadır. Ergenlerde internet bağımlılığının obeziteye etkisini inceleyen bir çalışmada beden kitle indeksi daha yüksek olan bireylerde internet bağımlılığı oranının da daha yüksek olduğu görülmüştür. Normal kilolu olan bireylerin internet bağımlılığı seviyesinin daha düşük olduğu tespit edilmiştir (Yıldırım, 2016). Kore'de 13-15 yaş arası 583 lise öğrencisinin katıldığı bir araştırmada öğrencilerin internet bağımlılığı ile yaşam tarzı ve beslenme alışkanlıkları incelenmiştir. Çalışmada riskli internet kullanımı oranı erkek öğrencilerde daha yüksek bulunmuştur. Yine bu çalışmada yüksek riskli internet kullanıcılarının daha az iştahlı olduğu çoğunlukla öğün atlayarak düşük kalorili beslendiği, uyku saatlerinin düzensiz olduğu, alkol ve tütün kullanımına yatkınlığının daha yüksek olduğu tespit edilmiştir (Kim ve ark., 2010)

SONUÇ

Teknolojik gelişmeler ve internet sayesinde bilgi akışı çok hızlı gerçekleşmektedir. Çocukların gelişen teknolojik olanaklar ve internette yararlanması için elimizden gelen çabayı gösterirken aynı zamanda onları daha kontrollü bir kullanımla olası zararlardan korumakta oldukça önemlidir. Çocukların teknoloji ve internet bağımlılığını önlemek için öncelikle bağımlılığa sebep olan etmenleri dikkatlice tespit etmek ve incelemek gereklidir. Özellikle adolesan dönemde bireyin sosyal ve psikolojik ihtiyaçları aile ve okul tarafından göz ardı edilmemelidir.

Düzenli fiziksel aktivitenin küçük yaşlardan itibaren sağlığı geliştirip koruduğu pek çok çalışmanın sonucunda özellikle belirtilmiştir. Dünya Sağlık Örgütü'nün tavsiyeleri doğrultusunda tüm dünya ülkelerinde koruyucu sağlık hizmeti olarak fiziksel aktivite rehberleri düzenlenmektedir. Yetersiz fiziksel aktivite ve hareketsiz yaşam ile birlikte obezite ve diyabet gibi bulaşıcı olmayan kronik hastalıkların erken yaşlarda ortaya çıktığı ve giderek arttığı bildirilmektedir. Son yıllarda yapılan çalışmalarda teknoloji ve internet bağımlılığının adolesan

dönemde fiziksel aktivite düzeyini olumsuz etkileyen en önemli nedenlerden biri olduğu belirtilmiştir. Fakat bireyin sosyal çevresi, ailenin eğitim düzeyi, ekonomik olanaklar vb. birçok faktörde fiziksel aktivite düzeyini etkilemektedir.

İnternet bağımlılığının, çevresel etmenler ve aile tutumu ile birlikte fiziksel aktivite düzeyini olumsuz etkileyip hareketsiz bir yaşam tarzının benimsenmesine neden olduğu literatürde mevcuttur. Teknoloji, internet ve dijital oyun bağımlılığının önüne geçip düzenli fiziksel aktiviteyi teşvik etmek ve hareketsiz yaşam tarzı alışkanlıklarını azaltmak için bu alanda yeni çalışmalar yapılması gerekmektedir.

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KORO EĞİTİMİNDE AMACA YÖNELİK İŞLEVSEL ISINMA EGZERSİZİ ÖRNEKLERİ

EXAMPLES of GOAL-ORIENTED FUNCTIONAL WARM-UP EXERCISES IN CHOIR EDUCATION

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ÖZET

Dünya literatüründe “warm up” diye nitelendirilen ve dilimize “ısınma” olarak adapte edilmiş egzersizler bütününe kapsayan kavram, bütünsel bir yaklaşımla koroyu, eser çalışmadan önce hem zihinsel ve ruhsal, hem fiziksel olarak hazır hale getirmek, hem de solunum, artikülasyon, entonasyon ve homojenlik gibi başlıklar altında vokal kaliteyi sağlamak ve artırmak için yapılan ön hazırlıklar anlamına gelmektedir. Bir sporcu için müsabaka öncesi ısınma ne kadar önemliyse, koro üyelerinin de provalarda eser seslendirmeden önce ısınması aynı öneme sahiptir. Bu egzersizlerin belli bir program, amaç ve kapsamda ele alınması gerekmektedir. Isınma egzersizlerinin her birinin birer işlevi vardır ve hedeflenen davranışlara göre çeşitlilik göstermektedir; korodan daha koyu renkli bir tını elde etmek için yapılan egzersizle, daha parlak ve açık bir renk elde etmek için yapılan egzersiz farklıdır. Çalışılan koronun özellikleri de büyük önem taşımaktadır; çocuk korosuna yönelik ısınma egzersizleriyle profesyonel koroya yönelik ısınma egzersizleri birbirinden farklıdır. Koronun temel ses özellikleri, ses sınırları, yaş grubu, kaç kişiden oluştuğu, koro psikolojisi ve koro motivasyonu gibi birçok farklı değişken de ısınma programı hazırlamada dikkate alınmaktadır. Bu çalışmanın amacı, uluslararası koro literatüründe kullanılan, amaca yönelik çeşitli işlevsel vokal ısınma egzersizlerinden örnekler vermektir. Nitel araştırma yöntemlerinden doküman taraması modeliyle gerçekleştirilen araştırma, lisans düzeyinde mesleki müzik eğitimi veren kurumlardaki çoksesli koro dersi almakta olan öğrencilere yönelik olup; amaçları bakımından farklı yapılandırılmış korolara yönelik olarak yapılacak çalışmalar için kaynak oluşturması planlanmaktadır.

Anahtar Kelimeler: Koro, ısınma, ısınma egzersizleri

ABSTRACT

From an integrated approach, the concept which is described in the world literature as “warm-up”, has been adapted into our language as “ısınma” and includes overall exercises, indicates preliminary preparations aimed at making a choir intellectually, mentally and physically ready prior to studying a piece and providing and increasing vocal quality under topics such as respiration, articulation, intonation and homogeneity. Warming up prior to vocalizing a piece in rehearsals is as crucial for choir members as warming up prior to a competition for a sportsman. It is necessary to handle these exercises in a specific program, goal and content. Each warm-up exercise has a function and these functions vary according to intended behaviors. An exercise aimed at obtaining a darker tone from the choir is different from an exercise aimed at obtaining a brighter and lighter tone. Qualities of the choir worked are also crucial. Warm-up exercises aimed at a children’s choir are different from warm-up exercises aimed at a professional choir. Many different variables such as the choir’s basic vocal properties, vocal limits, age group, number of people, choir psychology and choir motivation should also be taken into consideration when preparing a warm-up program. The purpose of this study was to give examples from a variety of goal-oriented functional vocal warm-up exercises used in the international choir literature. The study which was conducted using the document screening model which is among qualitative research methods was aimed at students taking the polyphonic choir class in institutions providing occupational music training at the level of bachelor degree. It is planned to be a resource for further studies aimed at choirs that are structured differently in terms of their goals.

Keywords: Choir, warm-up, warm-up exercises

DYNAMICS OF DECOMPOSITION IN SOILS OF DRY STEPPES OF AZERBAIJAN**Turkan Hasanova ALLAHVERDI***Azerbaijan National Academy of Sciences, Institute of Soil Science and Agrochemistry, Baku, Azerbaijan
ORCID ID: 0000-0002-5040-2599***Rena Mirze-zade ISLAM***Azerbaijan National Academy of Sciences, Institute of Soil Science and Agrochemistry, Baku, Azerbaijan***ABSTRACT**

The cultivation of agrocenosis increases the humus content in comparison with virgin soils, which contributes to an increase in the total number of microorganisms. Soil humus is not only important for fertility, it is also a product of the complex activities of environmental factors. The dry climate of Goychay region of Azerbaijan Republic appear a number of microhabitats that are inhabited by microorganisms. Soils formed in dry step zones of arid ecosystems have very unique flora and fauna. Actinobacterias and Firmucutes perform a number of important functions, including the decomposition of all types of organic matter such as cellulose, polysaccharides, protein fats, organic acids, humus (resistant material), the dynamics of the decomposition of chitin in 29 °C and 50 °C. Soil fungies and bacterias are important for immobilizing, or retaining, nutrients in the soil. Farmers and young scientists could use biodiagnostic indicators for attracting raw materials to agriculture.

Keywords: humification, agrocenosis, microbiotes, microorganisms

INTRODUCTION

According to the research of S.N. Vinogradskiy (1952) soil microflora can be divided into metabolically active organisms that assimilate inorganic, low-molecular-weight organic substances and rapidly ferment high-molecular organic compounds - proteins, cellulose, pectin, chitin and metabolically inactive organisms capable of destruction and synthesis of humic substances. [Hasanova T.A. 2021]

Azerbaijan possesses 9 of 11 world climatic zones, which are characterized by the development of unique and endemic soil types. The soils of Goychay region develop in arid ecosystem conditions, therefore a comparative analysis of the soil formation of gray-brown, meadow serozem and serozem soils under specific plants formation is carried out. [Mirzazade R.I. 2015]

Since stress allows only the tolerant forms to grow, the microorganisms not only dominate such habitat but also grow sufficiently to impart special visible features to the habitat. Fungi are microscopic cells that usually grow as long threads or strands called hyphae, which push their way between soil particles, roots, and rocks. [Hasanova T.A. 2015]

Many of fungies can span in length from a few cells to many yards. A few fungi, such as yeast, are single cells. Decomposers convert dead organic material into fungal biomass, carbon dioxide (CO₂), and small molecules, such as organic acids. These fungi generally use complex substrates, such as the cellulose and lignin, in wood, and are essential in decomposing the carbon ring structures in some pollutants. In addition, many of the secondary metabolites of fungi are organic acids, so they help increase the accumulation of humic-acid rich organic matter that is resistant to degradation and may stay in the soil for hundreds of years.

The Goychay River has a well-developed river network. The results of the study showed that the irrigation water of the Goychay River transports significant amounts of water-soluble humus, nutrients and other products to the fields, which also significantly affects the fertility, nutrient content and diagnostic characteristics of irrigated lands. The results of the analysis of seasonal studies of the content of nutrients in dependent particles of irrigation water show that a significant amount of nutrients is introduced to the fields

by dependent water particles. This has a positive effect on the fertility of irrigated lands and an increase in their productivity. [Hasanova T.A., Hasanov A.B.]

MATERIALS AND METHODS

Soil samples taken from the soil layers were analyzed in the laboratory in accordance with the general rules adopted in soil science, and their genesis, physical and chemical properties were determined. Meanwhile, samples of plants and invertebrates collected from the territory in different seasons were studied in the laboratory using modern methods. In the Bergey's Manual of determinative bacteriology all actinobacteris are included under the order Actinomycetales.

RESULTS

The differences between control and experimental variants were especially clear starting from the 7th day of the experiment by comparing the average values of the control and experimental variants. The dynamics of the decomposition of chitin differed in different subtypes of gray-brown soils. The study of the microbial complexes of gray-gray brown soils by sowing on medium chitin revealed the dominations of the microbial complex. The actinomycetes that decompose cellulose include representatives of the genera *Streptomyces*, *Streptosporangium*, *Micromonospora*, and fungi - representatives of the genera *Fusarium*, *Dematium*, *Chaetomium*, *Trichoderma*, *Alternaria*, *Verticillium*, *Rhizopus*, *Aspergillus*, *Mucor*, *Penicillium*, *Botrytis*, *Rhizocium*, *Mycelia*

When considering the dynamics of the biomass of pure cultures of chitinolytics, a similar picture is noted: all the studied strains isolated from gray-brown soils, rather actively accumulated biomass when growing on chitin. Compared to the control, the biomass of all groups of microorganisms (both bacteria, and actinomycetes, and fungi) increased. The amount of chitin in the soil, completely decomposed during sampling from the 0-50 cm soil layer in different seasons of the year, compare 1 g of pure control soil and chitin soil. The process of complete decomposition in 29 °C of mycelial forms in the soil is 0.038 mg/g soil and in 50 °C their mass 0.020 mg/g soil. Unicellular forms in 29 °C are 0.004 mg/g soil and in 50 °C their mass 0.025 mg/g soil. During the complete decomposition of unicellular and mycelial forms, a temperature of 29 °C and 50 °C is required. The results are shown below in Figure 1.

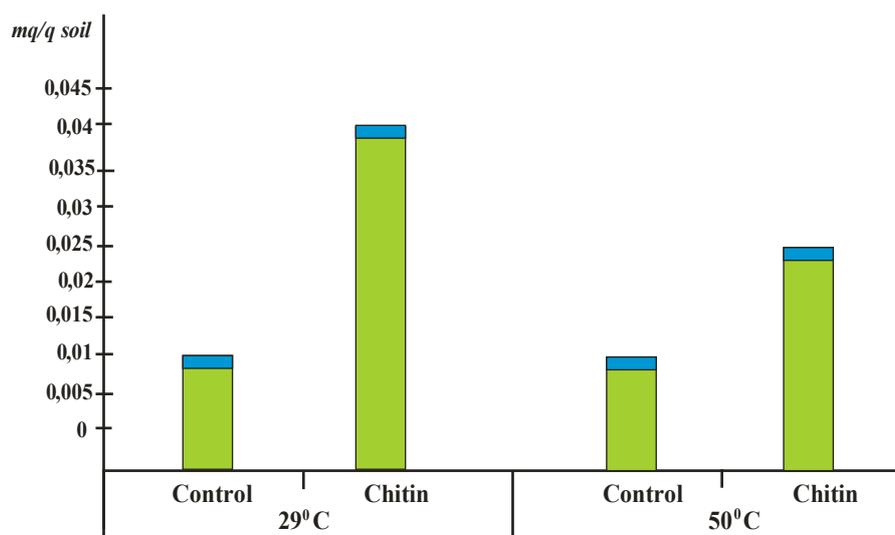


Figure 1. The dynamics of the decomposition of chitin in 29 °C and 50 °C
■ - tək hüceyrəli formalar
■ - mitselili formalar

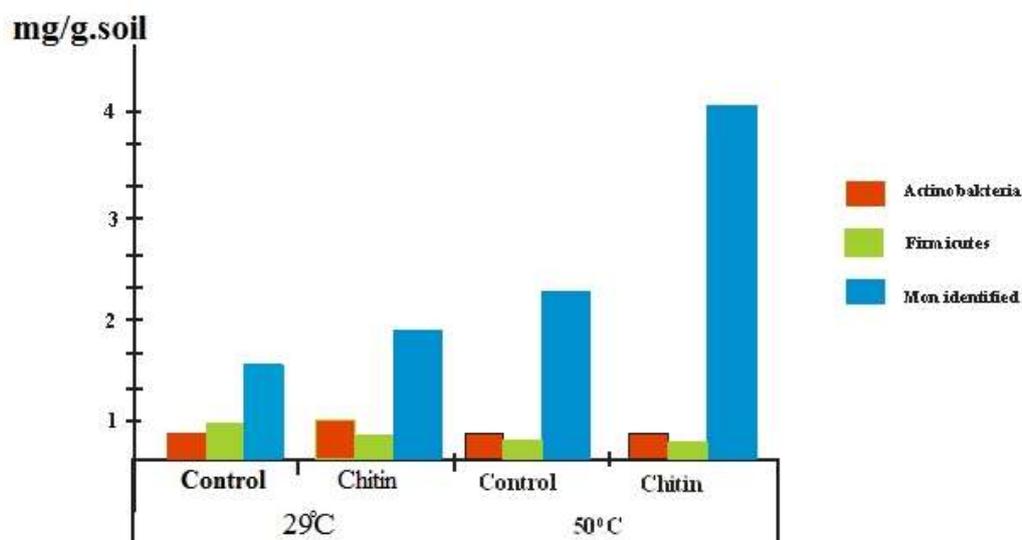


Figure 2. The mass of actinobacterias, firmicutes, non identified bacterias

In diagram [Figure 2] at 29°C and 50°C, the mass of actinobacterias, firmicutes, non identified bacterias was studied at a depth of 0-50 cm of soil layer in different seasons of the year, compare mg/g soil of pure control and chitin. The process of complete decomposition in 29°C of Actinobacterias in the soil is 1.05 mg/g soil and in 50°C their mass 0.8 mg/g soil. Firmicutes bacterias in 29°C are 0.05 mg/g soil and in 50°C their mass 0.04 mg/g soil. Non identified bacterias in 29°C are 2 mg/g and in 50°C their mass 4 mg/g soil.

DISCUSSIONS

The comprehensive studies carried out in various biocenosis of gray-brown soils have revealed a close relationship between natural and cultivated cenosis. Between these biotopes, the relationship of humus formation not only with physic-chemical properties, but also with the activity of invertebrates, enzymatic activity, microorganisms that carry out the biotic transformation of organic residues into soil humus. The results of authors microbiological analyzes indicate significant and serious differences in microbial biotopes of natural cenosis exposed to pollution and anthropogenic impact. Actinomycetes and fungi in relatively poor soils can slowly break down cellulose under aerobic conditions. Actinobacteria, which share the characteristics of both bacteria and fungi, are widely distributed in both terrestrial and aquatic ecosystems, mainly in soil, where they play an essential role in recycling refractory biomaterials by decomposing complex mixtures of polymers in dead plants and animals and fungal materials. Actinobacterias are aerobic, spore forming gram-positive bacteria, belonging to the order actinomycetales characterized with substrate and aerial mycelium growth.

CONCLUSION

The results showed that the identified microscopic fungi are involved in the formation of a rich flora, adapting to river water. Based on the results obtained, it was determined that the qualitative composition of irrigation water is suitable for obtaining optimal indicators in biotope soils and is suitable for irrigation. The results of microbiological analysis showed that the results of agro-ameliorative activities, such as splashing, irrigation water, crop rotation, soil quality and useful microbiota increased. Farmers and young scientists could use biodiagnostic indicators for attracting raw materials to agriculture.

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**NATIONAL ANATOLIAN WATER BUFFALO BREEDING PROJECT CARRIED OUT IN
TURKEY AND ITS APPLICATION PRINCIPLES**

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ABSTRACT

The existence of water buffalo in Turkey dates back to 3000 BC. Turkey has approximately 194000 Anatolian water buffaloes (AWB) in 2021 and also one of the two most important buffalo breeding countries in Europe. AWB has meat and milk yield, but it is primarily raised for milk yield in Turkey. AWB breeding is especially widespread in the Marmara, Black Sea, Central Anatolia, Eastern and Southeastern Anatolia regions. Breeding systems are generally family type enterprises. However, investments from the private sector have increased in recent years. In order to boost the number of buffaloes, which tended to decrease until 2011, to increase the income of buffalo breeders and to produce breeding buffalo bulls, the Ministry of Agriculture and Forestry launched the Breeding Project of National Anatolian Buffalo in Breeder Conditions with the participation of the University and the Buffalo Breeders' Associations. The project, which was first started with 11246 buffaloes in 8 provinces in 2011, was expanded in line with the demands from the breeders and project partners with the widespread effect. Currently, the project, with sub-projects implemented in 18 different provinces, covers 2881 breeders and approximately 28000 AWB. Each sub-project has a project leader and at least one project technical staff (PTS). Breeders are determined by the project leaders. Yield records are kept by the PTS. In order to improve the meat yield, live weights at birth, 6 and 12 months are taken into consideration and to increase milk yield are used lactation milk yield which measured at least 5 controls once a month during a lactation period. In some sub-projects, the composition of milk is also determined. All growth and milk yield measurements are recorded in the database named 'Manda Yıldızı' developed for the project. This database is used for selection processes made by the project leader to increase yields in the enterprises. The aim of this study is to show and share the application principles of the project in farm conditions made for increasing the buffalo production and products of Turkey.

Keywords: Anatolian Buffalo, Breeding Project, Turkey

ACKNOWLEDGEMENTS

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**TRİPTOFAN UYGULAMALARININ TUZ STRESİ KOŞULLARINDAKİ ÇİLEK FİDELERİNİN
BAZI BİYOKİMYASAL ÖZELLİKLERİ ÜZERİNE ETKİSİ**

THE EFFECT OF TRYPTOPHAN APPLICATIONS ON SOME BIOCHEMICAL PROPERTIES OF
STRAWBERRY SEEDLINGS UNDER SALT STRESS CONDITIONS

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ÖZET

Çalışmada farklı dozlarda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin bazı biyokimyasal özelliklerine yaptığı etki incelenmiştir. Araştırma Yozgat Bozok Üniversitesine ait ısıtmasız serada, Albion çilek çeşidi kullanılarak torf perlit karışımı doldurulan 2 litrelik saksılarda yürütülmüştür.

İki farklı tuz konsantrasyonunda (30 ve 60 mM) 5 farklı triptofan dozu (0, 5, 10, 25 ve 50 µM) denenmiştir. Deneme sonunda triptofanın bazı biyokimyasal özellikleri üzerine etkilerini belirlemek için alınan yaprak örneklerinde klorofil a, klorofil b, toplam klorofil, karotenoid, prolin ve malondialdehit (MDA) analizleri yapılmıştır.

Yapılan analizler sonucunda tuz koşullarında yetiştirilen çilek fidelerinde triptofan uygulamalarının klorofil a ve toplam klorofil içerikleri üzerine önemli etkileri olduğu görülmüştür. En yüksek klorofil içeriği 5 µM triptofan uygulamalarında elde edilmiştir. MDA içerikleri incelendiğinde triptofan uygulamalarının stres koşullarını hafiflettiği tespit edilmiştir. Sonuç olarak yapılan çalışma ile triptofanın 5 µM dozu tuz stresi koşullarında etkili olduğu bulunmuştur.

Anahtar Kelimeler: çilek, tuz stresi, triptofan, prolin, malondialdehit

ABSTRACT

In the study, the effect of tryptophan applications at different doses on some biochemical properties of strawberry seedlings under salt stress was investigated. There search was carried out in the unheated greenhouse of Yozgat Bozok University, in 2-liter pots filled with peat perlite mixture using Albion strawberry variety.

Five different tryptophan doses (0, 5, 10, 25 and 50 µM) were tried at two different salt concentrations (30 and 60 mM). At the end of the experiment, to determine the effects of tryptophan on some biochemical properties, chlorophyll a, chlorophyll b, total chlorophyll, carotenoid, proline, and malondialdehyde (MDA) analysis were performed on leaf samples.

As a result of the analysis, it was seen that tryptophan applications had significant effects on chlorophyll a and total chlorophyll content in strawberry seedlings grown in salt conditions. The highest chlorophyll content was obtained in 5 µM tryptophan applications. When MDA contents were examined, it was determined that tryptophan applications alleviated stress conditions. As a result, 5 µM doses of tryptophan were found to be effective under salt stress conditions.

Keywords: strawberry, salt stress, tryptophan, proline, malondialdehyde

GİRİŞ

Üzümü meyveler içerisinde yer alan çilek, birçok farklı iklim ve toprak koşullarına adaptasyonu oldukça iyi olan ve bu grup içerisinde yetiştiriciliği en fazla yapılan türdür. Dünya çilek üretimi incelendiğinde ülkemiz, 2020 yılında 546.525 ton üretim miktarı ile Çin, ABD, Mısır ve Meksika'dan sonra 5. sırada yer almaktadır (FAO, 2020). Çilek, geniş ekolojilere adaptasyonu, yetiştiriciliğinin çok zor olmaması, gıda sanayisinde yoğun olarak kullanılması ve insan sağlığına yaptığı olumlu katkılar nedeniyle yetiştiriciliği ve ekonomik önemi gün geçtikçe artan bir meyve türüdür (Yılmaz, 2009). Çilek meyvesinin ticari değeri göz önünde bulundurulunca, artan talebi karşılayabilmek için yetiştiriciliğinde karşılaşılan sorunlarla mücadele etmek de büyük önem kazanmaktadır. Özellikle, geniş ekolojilerde çilek yetiştiriciliği yapılmasına rağmen, bitkinin gelişimi, verimi ve kalitesini etkileyen birçok faktör bulunmaktadır. Bunlardan en önemlileri olan abiyotik stres faktörleri, bitkiler üzerinde olumsuz fizyolojik ve biyokimyasal etkilere neden olmaktadır (Taiz ve ark., 2019).

Dünya üzerindeki sulanan tarım alanlarının üçte biri tuz stresinden etkilendiği bilinmektedir. Fazla sulama ve yetersiz drenajın neden olduğu toprak tuzluluğu, dünyada birçok bölgede tarımı olumsuz etkilemektedir (Taiz ve ark., 2019). Çilek bitkisi toprak tuzluluğuna karşı en hassas türler arasında yer alan ve 2 mmhos/cm'den daha fazla iletkenliğe sahip ya da 960 ppm'den daha fazla suda çözünebilir tuz içeren topraklarda zarar görmeye başlayan bir türdür (Yılmaz, 2009). Tuz stresine maruz kalan çilek bitkisinde yaprak alanı, gövde sayısı ve kök gelişiminin azalması gibi bazı vejetatif büyüme kriterlerinin etkilenmesiyle verim düşmeye başlamaktadır (Üzal ve Yıldız, 2014). Tuz stresine karşı salisilik asit (Tohma, 2007), jasmonik asit (Üzal, 2009), mikoriza (Bağ, 2019), poliamin (Yavuzlar, 2021) ve triptofan (Mosa ve ark., 2021) gibi uygulamalar yapılmış ve bu uygulamaların bitkilerin gelişimine ve biyokimyasal içeriklerine önemli katkılar sağladığı bildirilmiştir. Yaptığımız literatür taramalarında çilek bitkisinde tuz stresine karşı triptofan uygulanan çalışmaya rastlanılmamıştır.

Triptofan (TRP), β -3-indolyalanine olarak da bilinen oldukça büyük, bitkilerde, hayvanlarda ve insanlarda önemli etkileri olan bir amino asittir. Bitkiler, TRP'nı başlangıçta 3-fosfoshikimik asit ve ardından korismik asit ve antranilik asitten sentezlerler (Meister, 1965). Bitkilerde TRP, İndol Asetik Asit (IAA), melatonin (MEL) ve serotonin (SER) hormonunun öncül maddesidir (Yakupoglu ve ark., 2018). IAA hormonu, hücre zarının esnekliğini, ozmotik basıncı ve hücre zarlarının geçirgenliğini artırarak hücre büyümesini teşvik eden büyümeyi düzenleyicilerdir. MEL ise yaprağın ve sürgünlerin büyümesini ve yaprak yaşlanmasını düzenler. Ayrıca soğuk, kuraklık, tuzluluk gibi stres koşullarına bitkilerin tolerans seviyelerini ve antosiyanın miktarını artırdığı bilinmektedir (Arnao, 2014). TRP, yetişkinlerde azot dengesini sağlayan bebeklerde ise büyüme gibi birçok işlevi olan esansiyel bir amino asittir. Niasin, MEL ve SER yapımında görev alır. TRP ve ürettiği moleküller vücutta uyku döngüsü, ruh hali ve davranış gibi birçok işlevi etkiler. Beyindeki pek çok fonksiyonu doğrudan etkiler. Eksikliği, duygusal ve bilişsel bozukluklara, niasin eksikliğine bağlı gelişebilen pellagram hastalığına yol açabilir. Esansiyel bir amino asit olduğu için vücut tarafından sentezlenmeyen TRP besin yoluyla alınması gerekir (Anonymous, 2022).

Çilek yetiştiriciliğinde triptofan uygulamasının büyüme ve meyve kalitesi üzerine etkilerini incelemiş ve triptofanın büyümeyi destekleyebileceği ve meyve kalitesini iyileştirebileceği bildirilmiştir (Xiaohong ve ark., 2004). Bununla birlikte çilek yetiştiriciliğinde tuz stresine karşı triptofan uygulaması çalışmalarının olmamasına rağmen triptofanın, tuz stresi koşullarına karşı etkili olabileceği birçok çalışma mevcuttur.

Tuz stresi altında triptofan uygulamaları ile yapılan çalışmada, bazı serin iklim sebzelerinin (soğan, pırasa, siyah havuç, turp) maksimum çimlenme yüzdesi, çimlenme indeksi, %50 çimlenmeyi tamamlama süresi ve ortalama çimlenme süresi değerleri ölçülmüş ve triptofan uygulamalarının, tüm türlerde ve değerlendirilen tüm özellikler üzerinde önemli etkilere neden olduğu bildirilmiştir (Hancı, 2019). Biber ile ilgili yapılan başka bir çalışmada, ekim öncesi tohumların triptofan ile muamele edilmesinin, tuzluluk stresi koşulları altında biber tohumlarının çimlenme ve çıkış performansını artırabileceği ifade edilmiştir (Gerekli, 2015; Korkmaz ve ark., 2020). Marul bitkisi ile ilgili yapılan araştırmada, triptofanın, şiddetli stres koşulları altında marul bitkilerinin yaprak sayısı, tuzluluk nekrozu, taze yaprak ağırlığı, taze kök ağırlığı ve toplam yüzey alanı üzerinde olumlu etkiye sahip olduğu ifade edilmiştir (Hancı ve Tuncer, 2020).

Kırmızı biberde yapılan bir çalışmada tuz stresine bağlı olarak verimde, bitki biyomasında, kök uzunluğunda ve bitki boyundaki meydana gelen azalmalar triptofan uygulamaları ile hafifletildiği tespit edilmiştir (Jamil ve

ark., 2018). Yine tuz stresi koşullarında yetiştirilen soğanlarda yapılan triptofan uygulamaları ile yaş ve kuru ağırlıklardaki azalmalar, soğan baş çapındaki küçülmeler gibi olumsuzlukları azaltmıştır (Hussein ve ark., 2014). Tuz stresi altındaki elma bahçelerinde yapılan triptofan uygulamalarının kimyasal gübre etkinliğini arttırdığı ve yaprak element içeriğine olumlu etki yaptığı tespit edilmiştir (Mosa ve ark., 2021).

Bu çalışmada farklı triptofan uygulamalarının (0, 5, 10, 25 ve 50 μ M) farklı tuz dozlarına maruz bırakılan (30 ve 60 mM) çilek fidelerinde bazı biyokimyasal özellikleri üzerine (klorofil a, klorofil b, toplam klorofil, karotenoid, prolin ve malondialdehit) yaptığı etki belirlenmeye çalışılmıştır.

MATERYAL VE METOT

Bu çalışma Yozgat Bozok Üniversitesi'ne ait deneme alanındaki ısıtmasız serada 2019 yılında yürütülmüştür. Çalışmamızda soğuk ve yüksek rakımlı bölgelerde başarılı bir şekilde yetiştiriciliği yapılan "Albion" çilek çeşidine ait frigo fideler kullanılmıştır (Balcı ve ark., 2017).

Fideler, 1:1 oranında torf:perlit içeren 2 litrelik saksılara 20.09.2019 tarihinde dikilmiştir. Denemede tuz stresi için 0, 30 ve 60 mM NaCl dozları ve tuz stresine karşı etkinliğini belirlemek amacıyla triptofan (TRP)'nın farklı dozları (0, 5, 10, 25, 50 μ M) topraktan uygulanmıştır.

Çalışmada, triptofanın çilek fidelerinde bazı biyokimyasal özellikleri üzerine etkilerini belirlemek üzere deneme sonunda sökülen bitkilerden yaprak örnekleri alınmıştır. Alınan yapraklarda klorofil a, klorofil b, toplam klorofil (Witham ve ark., 1971), karotenoid (Kirk ve Allen, 1965), prolin (Bates ve ark., 1973) ve MDA (Zhang ve ark., 2007) analizleri yapılmıştır.

Deneme tesadüf parselleri faktöriyel deneme desenine göre üç tekerrürlü (her tekerrürde 10 bitki), iki uygulamalı (triptofan ve tuz uygulaması) olarak kurulmuştur. Araştırma süresince elde edilen tüm verilerin istatistikî analizleri SPSS 20.0 paket programında değerlendirilmiştir. İstatistiksel analiz sonucunda farklılık gösteren ortalamalar arasındaki farklılığın belirlenmesinde aynı paket programı kullanılarak Duncan çoklu karşılaştırma testi uygulanmıştır. Sonuçların, istatistiksel değerlendirilmesinde farklar arasındaki önemlilik düzeyi 0.05 olarak belirlenmiştir.

SONUÇ

Denememizde tuz stresine maruz bırakılan çilek fidelerine farklı dozlarda triptofan uygulamalarının bazı biyokimyasal içeriklerine etkileri incelenmiştir. Elde edilen veriler Çizelge 1'de verilmiştir.

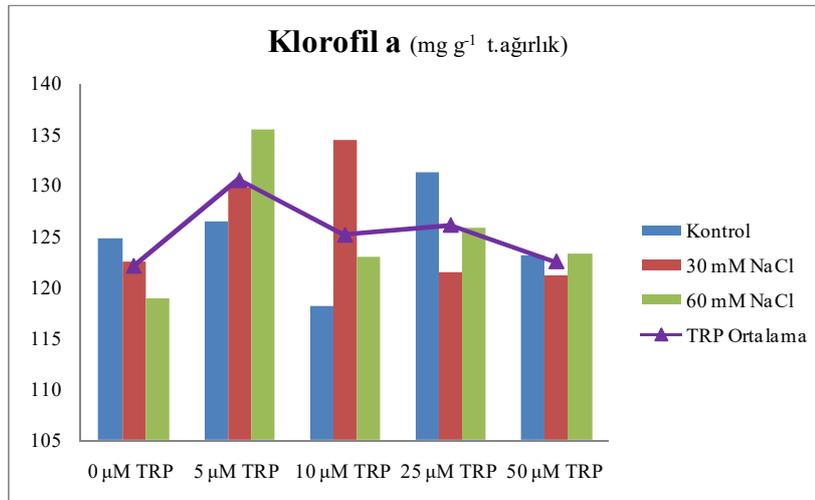
Çizelge 1. Farklı dozda triptofan uygulamalarının farklı tuz stresi altındaki çilek fidelerinin bazı biyokimyasal özellikleri üzerine etkisi

Özellikler	Uygulamalar	0 TRP	5 µM TRP	10 µM TRP	25 µM TRP	50 µM TRP	ORT.
Klorofil a	Kontrol	124.73	126.43	118.16	131.18	123.17	124.73 öd
	30 mM NaCl	122.55	129.73	134.35	121.46	121.09	125.84
	60 mM NaCl	118.90	135.53	122.90	125.76	123.28	125.27
	Ort.	122.06 b	130.56 a	125.14 b	126.13 ab	122.52 b	
Klorofil b	Kontrol	68.19	113.63	94.29	66.95	51.60	78.93 ab
	30 mM NaCl	75.13	58.37	63.38	74.80	70.27	68.39 b
	60 mM NaCl	84.40	88.76	92.24	81.21	103.25	89.97 a
	Ort.	75.91 öd	86.92	83.30	74.32	75.04	
Toplam Klorofil	Kontrol	192.92	240.07	212.45	198.13	174.77	203.67 b
	30 mM NaCl	197.68	188.09	197.73	196.26	191.36	194.23 b
	60 mM NaCl	203.30	224.29	215.13	206.97	226.53	215.24 a
	Ort.	197.97 b	217.48 a	208.44 ab	200.45 b	197.56 b	
Karotenoid	Kontrol	7.75	9.32	8.84	8.34	7.30	8.31 öd
	30 mM NaCl	8.48	7.90	8.86	9.06	8.19	8.50
	60 mM NaCl	8.12	8.50	7.99	8.82	8.65	8.41
	Ort.	8.12 öd	8.57	8.56	8.74	8.05	
Prolin	Kontrol	0.20	0.06	0.26	0.22	0.20	0.19 b
	30 mM NaCl	0.22	0.10	0.08	0.12	0.09	0.12 b
	60 mM NaCl	0.58	0.79	0.53	0.85	0.65	0.68 a
	Ort.	0.33 öd	0.32	0.29	0.40	0.31	
MDA	Kontrol	2.98	1.95	2.36	2.14	1.79	2.55 c
	30 mM NaCl	3.66	2.66	2.41	3.21	2.78	2.81 b
	60 mM NaCl	4.50	2.31	3.84	3.23	2.79	3.17 a
	Ort.	3.71 a	2.31 b	2.87 b	2.86 b	2.45 b	

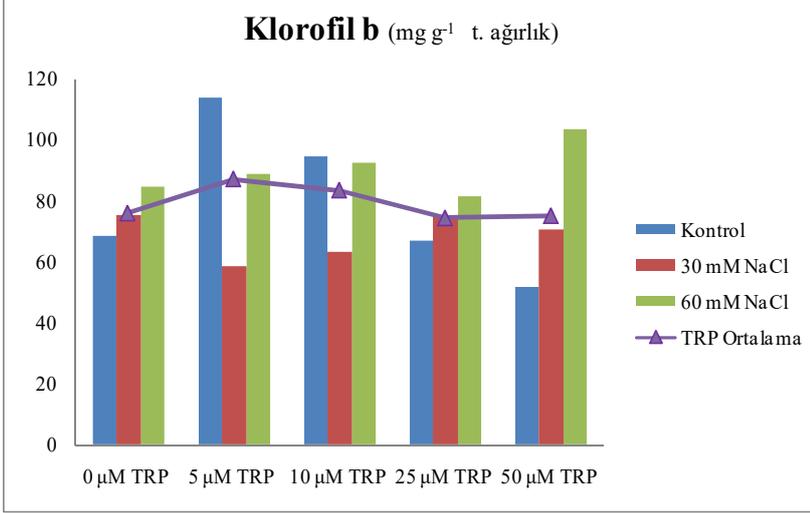
*Aynı sütunda farklı harflerle ifade edilen ortalamalar arasında %5 düzeyinde farklılık vardır

Tuz stresi koşullarındaki çilek fidelerinin klorofil a miktarına bakıldığında, tuz dozları ortalamaları arasındaki fark istatistiki olarak önemli olmaz iken triptofan dozları ortalamaları önemli bulunmuştur.

Kontrol grubu bitkiler incelendiğinde tuz dozları ortalamaları arasındaki fark önemsiz olmasına rağmen, tuz stresi klorofil a miktarını bir miktar azaltmıştır. Triptofan uygulamaları, klorofil a içeriğini arttırmış ve 5 µM TRP (130.56 mg g⁻¹ t. ağırlık) dozu diğer dozlardan daha iyi sonuç vermiştir (Çizelge 1, Şekil 1).

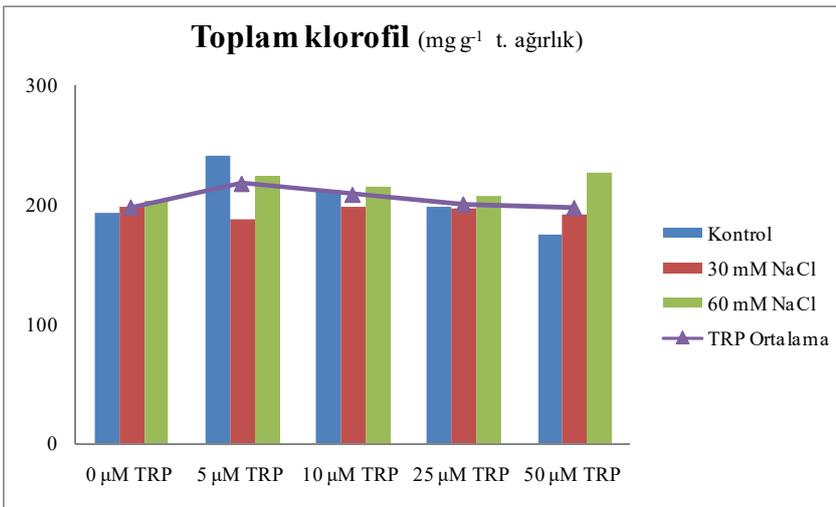
**Şekil 1.** Farklı dozda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin klorofil a miktarı üzerine etkisi

Klorofil b miktarı incelendiğinde, tuz dozları ortalamaları arasındaki fark istatistiki olarak önemli olurken triptofan dozları ortalamaları arasındaki fark ise önemsiz olmuştur (Çizelge 1). Kontrol grubu bitkiler incelendiğinde tuz stresine bağlı olarak klorofil b miktarı arttırmıştır. Triptofan dozları ortalamaları arasındaki fark önemsiz olmasına rağmen, sayısal olarak triptofan uygulaması klorofil b miktarını arttırdığı belirlenmiştir (Şekil 2).



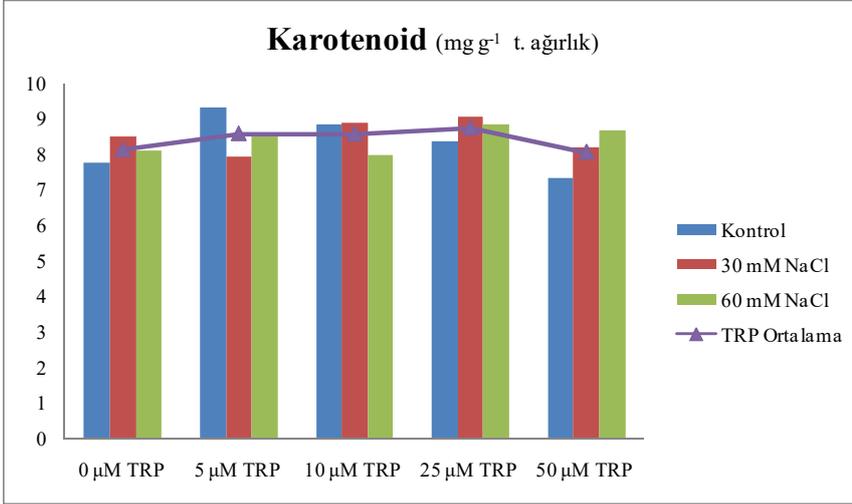
Şekil 2. Farklı dozda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin klorofil b miktarı üzerine etkisi

Toplam klorofil miktarı incelendiğinde hem tuz dozları ortalamaları arasındaki fark hem de triptofan dozları ortalamaları arasındaki fark istatistiki olarak önemli bulunmuştur. Denememiz boyunca toplam klorofil miktarı 217.48–197.56 mg g⁻¹ t. ağırlık aralığında belirlenmiştir (Çizelge 1). Kontrol grubu bitkiler incelendiğinde tuz dozları arttıkça toplam klorofil miktarı bir miktar artmıştır. Triptofan uygulamaları toplam klorofil miktarını arttırmıştır ve en iyi sonucu 5 μM TRP dozu vermiştir (Şekil 3).



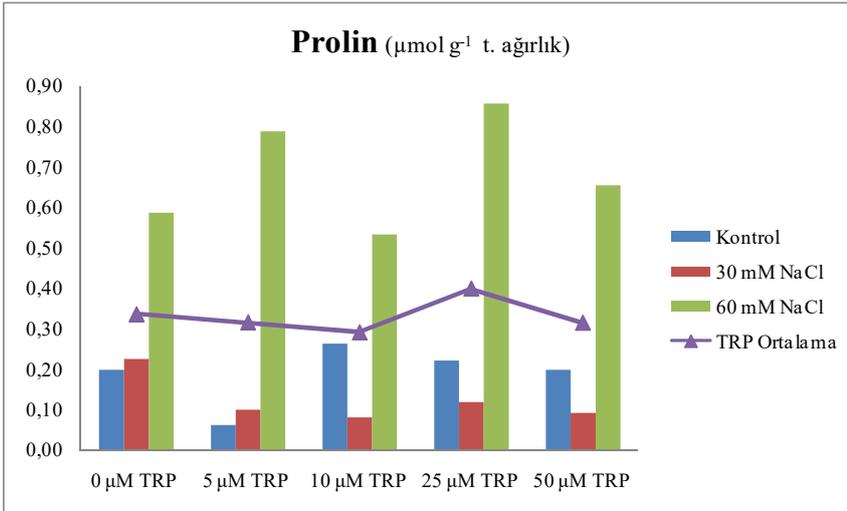
Şekil 3. Farklı dozda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin toplam klorofil miktarı üzerine etkisi

Yapılan çalışmada karotenoid miktarı incelendiğinde tuz dozları ortalamaları arasındaki fark ve triptofan dozları ortalamaları arasındaki fark istatistiki olarak önemli bulunmamıştır. Karotenoid miktarı 7.30-9.32 mg g⁻¹ arasında değiştiği tespit edilmiştir (Çizelge 1). Triptofan dozları arasında istatistiki bir fark bulunmamasına rağmen bu uygulamaların karotenoid miktarını sayısal olarak artırdığı tespit edilmiştir (Şekil 4).



Şekil 4. Farklı dozda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin karotenoid miktarı üzerine etkisi

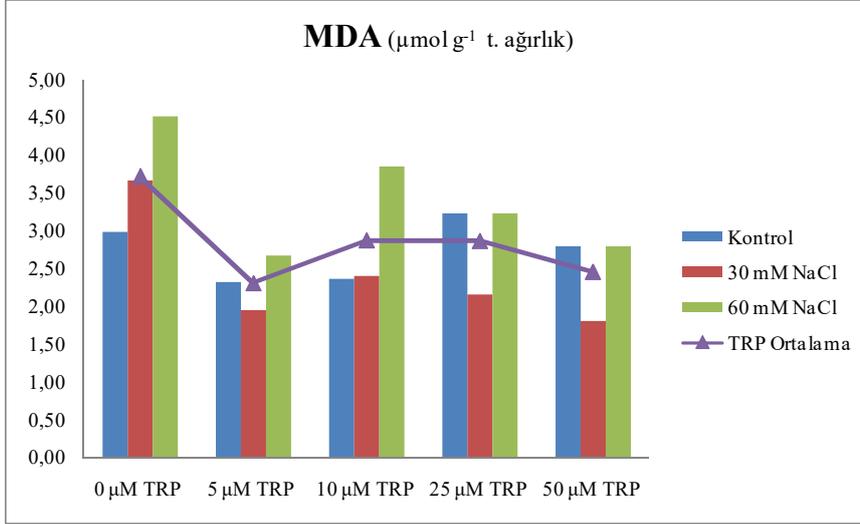
Tuz stresi koşulları altındaki çilek fidelerinin yapraklarındaki prolin miktarı incelendiğinde, tuz dozları ortalamaları arasındaki fark istatistiki olarak önemli, triptofan dozları ortalamaları arasındaki fark ise önemsiz olduğu belirlenmiştir (Çizelge 1). Kontrol grubu bitkiler incelendiğinde tuz dozları arttıkça prolin miktarı da artmıştır. Triptofan dozları ortalamaları arasındaki fark önemsiz olmasına rağmen, triptofan uygulamalarının stres koşullarını hafiflettiği ve prolin miktarını bir miktar artırdığı belirlenmiştir (Şekil 5).



Şekil 5. Farklı dozda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin prolin miktarı üzerine etkisi

MDA miktarı incelendiğinde hem tuz hem de triptofan dozları ortalamaları arasındaki fark istatistiki olarak önemli bulunmuştur (Çizelge 1). Kontrol grubu bitkiler incelendiğinde tuz dozları arttıkça MDA miktarı da

artmıştır. Triptofan uygulamaları MDA miktarını azaltmıştır ve en iyi sonucun 5 μM TRP doz uygulaması olduğu belirlenmiştir (Şekil 6).



Şekil 6. Farklı dozda triptofan uygulamalarının tuz stresi altındaki çilek fidelerinin MDA miktarı üzerine etkisi

TARTIŞMA

Tuz stresi farklı değişkenler üzerine etkili olmakla birlikte fotosentez üzerine olumsuz etki yaptığı yapılan çalışmalarla ortaya konulmuştur. Tuz stresi, yaprakların hücrelerinde CO₂ basıncını düşürerek, stomaların geçirgenliğini ve klorofil kapsamını azaltmaktadır ve dolayısıyla fotosentezin azalmasına neden olmaktadır (Abdullah ve Ahmad, 1990; Kacar ve ark., 2013).

Toplam klorofil miktarı fotosentez etkinliğini gösteren önemli bir belirteçtir. Tuz dozları incelendiğinde en yüksek içerik 215.24 mg g⁻¹ t. ağırlık ile 60 mM tuz konsantrasyonunda tespit edilmiştir. Stres koşulları altında klorofil miktarının artabileceği bu artışı stresin şiddetinin ve azalan yaprak alanının bir göstergesi olduğu bildirilmektedir. Stres koşulları altındaki bitkiler azalan yaprak yüzey alanından su kaybını en aza indirmek için terleme alanını azaltır, bunun sonucunda yapraklardaki toplam klorofil miktarı ve yaprak alanı başına klorofil içeriği artar (Gholamin ve Khayatnezhad, 2011; Aydoğner Çoban ve ark., 2020). Denememizde triptofan uygulamaları ortalamaları 197.56-217.48 mg g⁻¹ t. ağırlık aralığında belirlenmiştir. Yapılan çalışmalarda tuz stresi altında yetiştirilen bitkilere dışsal triptofan uygulamalarının bizim çalışmamızda olduğu gibi toplam klorofil içeriğini artırdığı rapor edilmiştir (Hussein ve ark., 2014; Kahveci ve ark., 2021).

Karotenoid içeriği incelendiğinde, tuz konsantrasyonu ve triptofan uygulamaları arasındaki fark istatistiki olarak önemsiz bulunmuştur. Denememizde karotenoid miktarı triptofan ortalamaları 8.05-8.74 mg g⁻¹ t. ağırlık aralığında bulunmuştur. Kahveci ve ark., (2021) fesleğen ile yaptıkları çalışmada triptofan uygulamalarının tuz stresi koşullarında karotenoid miktarı üzerine etkisinin önemsiz olduğunu bildirmişlerdir.

Prolin oksidatif stres koşulları ortaya çıktığında hücre turgorunu koruyan ve iyi bilinen ozmoprotektanlardır (Weinberg ve ark., 1982). Yapılan bir çalışmada, tuz stresi arttıkça çilekte prolin miktarının da arttığı bildirilmiştir (Keutgen ve Pawelzik, 2008). Çalışmamızda tuz konsantrasyonu uygulamaları arasındaki fark istatistiki olarak önemli bulunmuş ve tuz miktarı arttıkça prolin miktarı da artmıştır. En yüksek prolin içeriği (0.68 $\mu\text{mol g}^{-1}$) 60 mM tuz uygulanan bitkilerde görülmüştür. Triptofan uygulamaları arasındaki fark ise istatistiki olarak önemli bulunmamakla beraber triptofan uygulamalarının orta düzey stres koşullarında prolin miktarını azalttığı, yüksek düzey stres koşullarında ise prolin miktarını artırdığı görülmüştür. Mısırdaki yapılan bir çalışmada çalışmamıza benzer şekilde triptofan uygulamasının tuz stresi koşullarını hafiflettiği rapor edilmiştir (Yasmin ve ark., 2017).

Genel olarak, MDA üretimi, lipid peroksidasyonunun ve dolayısıyla hücre zarı hasarının bir göstergesi olarak kabul edilir. Çilekte, tuzluluk stresinde MDA içeriğinin yüksek düzeylerde olduğu ifade edilmiştir (Keutgen ve Pawelzik, 2008). Araştırmamızda triptofan dozlarının MDA içerikleri ortalamaları 3.71-2,31 $\mu\text{mol g}^{-1}$ arasında değiştiği görülmüştür. Tuz dozları arttıkça MDA miktarlarının da arttığı belirlenmiştir. Biberde yapılan triptofan uygulamaları ile MDA içeriğinin azaldığı bildirilmiştir (Korkmaz ve ark., 2020). Bizim çalışmamızda da benzer şekilde triptofan uygulaması ile çilek fidelerindeki MDA içeriği önemli düzeyde azalmıştır, fakat triptofan uygulamaları (5, 10, 25, 50 μM TRP) arasındaki önem düzeyi benzer bulunmuştur.

ÖNERİ

Sonuç olarak yapılan çalışma ile triptofanın tuz stresi koşullarında çilek bitkisinin bazı biyokimyasal parametrelerine olumlu etki yaptığı ve tuza toleransı arttırdığı belirlenmiştir. Elde ettiğimiz veriler incelendiğinde 5 μM triptofan dozunun, tuz stresi koşullarında etkili olduğu bulunmuştur. Ancak çilek üzerine yapılan triptofan çalışmaları çok az sayıdadır. Bu nedenle daha etkin doz çalışmaları ve daha kapsamlı arazi çalışmaları yapılmasının ileriki çalışmalara katkı sağlayacağı düşünülmektedir.

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FORMULATION AND PRODUCTION OF EMULSION PAINT USING ENYIGBA CLAY AS EXTENDERS AND FILLER

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ABSTRACT

The aim of this project work is to formulate and produce emulsion paint from local source, which can compete comfortably with the global raw materials for paint production. The major raw material was clay from Enigba. Enigba is a small town in Abakaliki, close to the boundary between it and Ikwo local government, in Ebonyi state, Nigeria. Other ingredients used were: Water, Titanium (iv) Oxide, Calcium Carbonate, Kaoline, Combizel, P.V.A or Acrylic, Ammonia, Deformer, Genippor, and Formalin.

The clay in Enyigba was carefully dug out and physically cleaned. It was then grinded and soaked in water for three days for softening. This was followed by calcinations for four hours at 750°C. the calcined clay was sieved to 0.02µm particle size and further cleaned up with tetraoxo sulphate (iv) acid, H₂SO₄. The prepared paint sample was characterized using standard methods as follows: specific gravity (AS TMD 153-84): Refractive index (AS TMD 281-12): Oil Absorption (AS TMD 281-12): PH (AS TMD 1208-90): and chemical composition determined via energy dispersive X-ray fluorescence spectrometer (EDXRF). The Emulsion paint sample produced was subjected to quality control tests based on the standard organization of Nigeria, SON (SON 2007) and was certified correct of the following properties: Colour, Hiding Power, Viscosity, Density, Cracking, Drying Time, And PH Test. By this research, it becomes obvious that Enyigba in has a raw material (clay) capable of producing world class emulsion paint with specific gravity, PH and oil absorption of 2.46, 6.67 and 34.30g/g respectively.

Keywords: Paint, Enyigba, Clay, Extender, Drying time, Calcination, Sieve, Emulsion, Solvent, Binder

INTRODUCTION

Problem Of Study

Several surveys carried out recently showed that almost all the paint manufacturers in Nigeria buy their raw materials for paint production outside the country. This makes the paint expensive and unaffordable by the common people.

However, we therefore embarked on the formulation and production of emulsion paint using local clay in Enyigba, Ebonyi state that can give the same result with that of the foreign raw materials.

Importance Of Study

The success of this work will enhance and encourage the development of the paint industry in Nigeria to produce good quality emulsion paint using locally sourced raw material, which will stand the test of time and eliminate the importation of raw materials.

BACKGROUND OF STUDY

Classes Of Paint

Paint can be classified based on the type of solvent used. Which are Water based paints (emulsion) and oil based paint (gloss).

Another classification could also be based on the substrate part of application (exterior paints, interior paint, automotive paints, and marine paints).

The basic classifications are:

Gloss Paint (Oil Based Paint): These are paints that may be classified according to whether the drying mechanism is predominantly solvent evaporation, oxidation or some chemical reaction. Gloss paints which dry by solvent evaporation, rely on a fairly hard resin as the vehicle. It is applied to interior wood and metal-skirting boards, radiators, wood paneling etc. Gloss paint is available in water based or oil-based versions. Three kinds of Gloss paint are traditional gloss paint, satinwood paint and modern Eggshell paint.

Emulsion Paints (Water Based Paints): It is a water based paint with resin added to make it hardwearing. It is normally wall paint or exclusively for interior walls and ceilings. Emulsion paint is made from water, resin, pigments, and a tiny amount of additives or preservatives. There different types of emulsion paint, which include; Flat matt emulsion, Soft Sheen Emulsion and Silk Emulsion paint.

Latex Paint: The term latex denotes a suspension of polymer particles in water. Emulsion paints consist basically of a combination of pigment and latex, hence it is called latex paint.

White Wash: This may be made by mixing unslaked lime with water and allowing it to stand for a few days before use, or starting with calcium hydroxide in the first place. The applied coating converts to calcium carbonate. Certain additions, like glue, have been used for their cheapness.

Cement Paint: This is used to a limited extent to masonry. It is supplied as a powder containing Portland cement and white or alkali-resistant coloured pigments. It is mixed for application.

Traffic Paints: High pigment volume, the use of fast-drying vehicles such as low oil content resin combinations or oil. Free synthetic resins, and low-binding solvents such as petroleum fractions with distillation ranges from 100 to 1500c are three factors responsible for the fast-drying characterizes of the road-stripping paints. Resin solutions like chlorinated rubber or styrene – butadiene may be used. Some aromatic hydrocarbon solvent has to be included in these vehicles to maintain solubility.

Marine Paints

Antifouling paints that are used in ship bottoms are formulated with copper and mercury compounds as positions for marine growth, using binders which are not too permanent so that gradual breakdown of the film and release of position can take place (as tributyltin compounds are used as the toxic materials). A typical formulation calls for zinc oxide ferric oxide, magnesium silicate, cuprous oxide, mercuric oxide, rosin, oil, coal tar, and solvent.

The most commonly used type of paint is the emulsion paint which constitute the solvent which is usually water, the pigment which impacts color to mixture, titanium (ii) oxide which is most popular pigment used in production, the extender-pigment which acts to reduce cost of pigment and increase durability of the mixture and lastly the additives like preservatives, defoamer added to improve other properties of the paint [Norris, 1986].

However, in recent years, the crucial effect of the extender pigment on the rheological properties of paint has been noted and also reduces the cost of paint production which positively affects the general economics of paint production.

Different research shows that different compounds have been used as extender-pigment in the production of emulsion paint and as such have different effects on the properties of the paint. Some of these compounds are as following: barium sulfate in its natural crystalline form of barite, magnesium silicate known as talc and

asbestine, ordinary silicon (ii) oxide is also used but the most commonly used extender-pigment is Calcium carbonate [Igwebike and Clementina, 2015].

Components Of Paint:

There are five main components of paint such presented in fig 1;

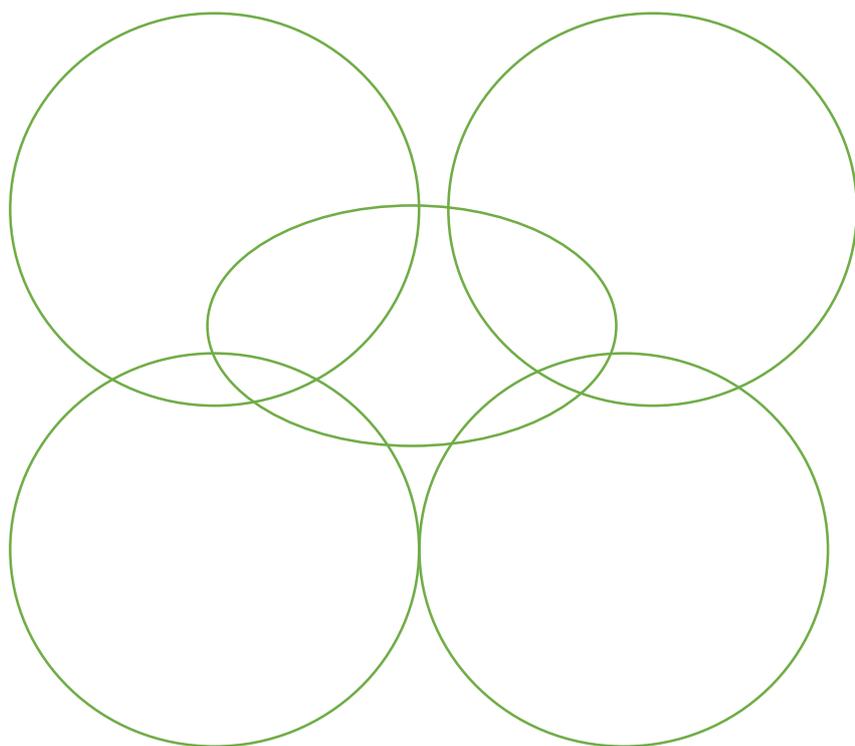


Figure1: Components of paint

Pigments And Extender

Pigments for the formulation of paint are of submicron particles which most possess certain features such as opacifying strength (also called hiding power), brightness, resistance to chemical attack, good thermal suitability and resistance to UV degradation. Some pigments from mineral sources gives opacity and brightness because of their ability to scatter light. The degree to which they do this depends on the structure they form and their intrinsic index of refraction. [Imerys P, 2013]. They can be found in paste or oxide. When colours are found in paste, it means they are in condensed liquid form (like your pomade) but when we say they are in oxide, it means they are in dust form (like your powder).

Pigments like titanium dioxide have high refractive index and very strong absorption in the UV region, While Calcined Kaolin has a very similar property with titanium dioxide and hence can substitute titanium dioxide as a pigment. [Imerys, 2013]. Pigment as one of the most important components of paint usually have a particle size of about 0.5 to 5µm in a standard paints but most times have a lower value in size as 0.01µm for some organic pigment. (Clark, 2013).

Classification of pigments: there are three main group of classification for pigments:

Inorganic pigment e.g. Titanium dioxide, red and yellow iron oxides, mixed metal oxide and chrome oxide or organic pigment e.g. Black, Yellow, Green, Orange, Violet, Magenta.

Extender pigments.

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Type	Advantages	Disadvantages	Colour
Clay	Helps to prevent settling and increases bulk density of paint.	Usually has coarse particle and low hiding power	White
Mica		Poor adherent to surface and rapid settling Leading to inhomogeneity in aqueous paint.	Transparent
Barytes	Wear resistant		Colourless, white, light, shades of blue, yellow, grey, and brown
Calcium carbonate	Helps flatten the gloss of semi-gloss and low sheen paints. Usually a very cheap pigment.	Does not contribute much in film integrity and its chemistry makes it subject to acid attack. High ionic content that adversely affects paint stability.	White
Talc	Assist titanium dioxide dispersion and improves sanding	It leads to high viscosity	Pale green, white, grey and colourless
Silica	Good flattening agent and wear resistant. It gives extra hardness to paint.	High viscosity and less adherent to Surface	White

Anti-corrosive and special function pigments.

Inorganic pigments have mineral origin and are mostly metal oxides. These metal oxides are naturally found such as red and yellow oxides. However, they can be synthesized to get the main colour. However, on the other hand, organic pigments are not naturally occurring but are made from petroleum by-products. They are brightly coloured as used for clean colours red, yellow, bright green and blue, purple and magenta.

Extender pigment is an integral part of all coating formulations and significantly contributes in various coating properties such as flow characteristics, gloss, resistance, abrasion and setting tendency. [woodridge 1991]. Since they don't impact opacity to the coating and are partially transparent in the oil medium, there are different from true pigments. Most of the extender used is such as talc, whiting and barites used in the production of paint are expensive due to their mineral origin and requires long processing which result to significant loss of minerals. [Isaac 2020].

Extender pigment is usually natural occurring minerals such as clay, mica talc and limestone. They are mostly used to reduce the high cost of paint. They are usually gotten by mining.

Anti-corrosive pigments are important area to study as steel requires the greatest protection against corrosion and the need to develop pigments to inhibit the corrosion of steel being considered for many years. Some of the anti-corrosive pigment which has been into use are red lead, Pb_3O_4 . When combined with linseed oil, red lead is set to be the standard anti-corrosive primer for iron and steel (Resene, 2013). There are special purpose pigments like copper which can be used in anti-fouling paints for ships. Other special pigments are the non-leafing aluminium flake pigments and the special effect, iridescent, pearl effect pigments used in automotive finishes (Resene, 2013).

Nevertheless, titanium dioxide is regarded as the most important of all the various pigments. This result to increasing demand of for titanium dioxide and its price has consequently been on the rise. In 2011, the price of titanium dioxide rose to 35% and is expected to increase at an average annual rate of about 7% for the near future (Huntsman, 2013). The above reason has made the search for an alternative pigments an important one. One of such alternative is calcined kaolin with its physical and chemical properties compare favorably with that of the titanium dioxide. Some common extender pigments are highlighted in table 1 including their advantages and disadvantages.

Solvent

It is used to mix all the chemicals together i.e. it is used to dissolve or disperse different components used in paint formulation (e.g. pigment and resin). The type of liquid (solvent) used depends upon the other components of the given paint. Oil-based paints for example can use kerosene or fuel as the primary liquid while emulsion paints on the other hand; tend to use water as their liquid. Examples are Ketones, aromatics,

aliphatics, alcohols, glycol ethers, glycol ether esters, glycols, glycol esters, chlorinated products, terpenes, etc.

Binder

It helps to hold all the pigments together. It also helps the product to adhere to the surface it is being painted too without much stress. A good example is PVA, which stands for Poly Vinyl Acrylic.

Clay

Clay is a common name for a number of fine grained earthy materials that are plastic and tenacious when moist, and permanently hard when fired or baked [Isaac 2020]. Generally, clays are hydrated silicates of aluminum made of the composition of Al_2O_3 , $2SiO_2$, $2H_2O$ and which mostly contain impurities like potassium, sodium, calcium, magnesium or iron in small quantities. They are one of the major minerals that are abundant on the earth's crust which are characterized by sheet silicate structures of composite layers stacked along the c – axis [Grim, 1968].

Local clays are known to be layered silicates and their mineral platelet structure has the thickness of about one nanometer, however, its dimensions in lengths and width can be measured in hundreds of nanometer (200-400nm) range after purification.[Patel, 2006]. These clays are naturally abundant, renewable and very cost effective and easy to process. For instance, according to the Nigeria ministry of solid minerals development, Nigeria has very large and economic deposit of kaolinite clay minerals with a reserve of about 3 billion tones in many locations. [Edomwony et al 2013].

MATERIALS AND METHOD

Materials

The following materials were used in this study.

The solvent, binder, pigments, and additives used in this study were obtained from paint factory, Alex-Ekwueme Federal University Ndufu Alike (AE-FUNAI) in Ebonyi State Nigeria.

The Enyigba clay used in this project study was hand dug from the clay deposit at Abakaliliki local government Area, Ebonyi state, Nigeria.

Raw Materials For Emulsion Paint Formulation

The raw materials used in paint formulation are grouped into five:

Extender

Pigment

Solvents

Binder

Additives

Preparation Of Clay Extender

The Enyigba clay sample, was dug out from the clay deposit site, and impurities removed physically. Then the clay was grinded and soaked in water for 3 days to softening it. Calcination at $750^{\circ}C$ for 4hrs followed. The calcined Clay was sieved to $0.02\mu m$ particle size and further cleaned up with H_2SO_4 to further removal of impurities.

Preparation Of Emulsion Paint Sample

A series of emulsion paints were prepared using the Enyigba clay, and calcium carbonate combined with kaolin. The calcium carbonate and kaolin were used as a reference extenders. The specific formulation used in the preparation is show in Table 3 below.

Table 3. Formulation of Enyigba Clay emulsion paint (ECEP).

S/N	MATERIALS	MASS OF SAMPLE A (KG) (ECEP)	MASS OF SAMPLE B	MASS OF SAMPLE C (KG) (C&KEP)
1	Clay	0.8	0.4	–
2	Calcium	–	–	0.5
3	Kaolin	–	–	0.3
4	Water	1	0.5	0.5
5	Genippor	0.1	0.05	0.1
6	PVA(Acrylic)	0.2	0.01	0.2
7	Combizel	0.01	0.005	0.01
8	Titanium oxide	–	0.05	0.05
9	Ammonia	0.01	0.005	0.01
10	Formalin	0.01	0.005	0.01
11	Deformer	0.01	0.005	0.01
Total		2.14	1.12	1.69

Note: ECEP means Enyigba clay emulsion paint and C&KEP means calcium carbonate and kaolin emulsion paint.

Procedure For Production of Emulsion Paint

The following procedures were dully followed to produce Enyigba clay emulsion paint (ECEP) and the reference paint produced with calcium carbonate and kaolin (C&KEP).

The materials used were properly measured and weighed out in kilogram, with the aid of weighing balance.

Firstly, we measured 1kg and 0.5kg of water and poured into two different containers (the reactor tank).

Then we poured the measured clay(0.8kg) into the container having 1kg of water, likewise the kaolin(0.3kg) and calcium carbonate(0.5kg) mixed together were also poured in a separate container having 0.5kg of water and mixing started immediately. After about 5mins of mixing with a stirrer, and stilling on a continuous mixing process we introduced Genippor into the reactors. This Genippor now softens and makes the clay, calcium carbonate and kaolin to dissolve more in the water by reducing its surface tension.

However, the measured quantity of PVA (0.2kg) was poured into each of the two reactors and mixing continued for another 4mins. This helped to bind the whole materials together as the mixing process continued.

Furthermore, we poured in the measured thickener (Combizel 0.01kg) into a very negligible amount of water, and mixed properly before pouring it into each of the reactor tanks. This was to dissolve properly the combizel which serves as the catalyst before going into the tanks, thus to increase homogeneity of the mixture. All these were done in continues stirring process.

Hence, we poured in the measured quantity of ammonia (0.01kg) and formalin (0.01kg) as the mixing continued. At this stage, we divided the ECEP sample into two and added 0.05kg of titanium dioxide while the same quantity of titanium (0.05kg) was pour to the C&KEP sample which served as pigment or colorants. The mixture was stirred thoroughly for another 10minutes to obtain a homogenous emulsion. The samples paints produced were kept for analysis and testing.

PREVIOUS STUDY

S/N	AUTHOR/ YEAR	TOPIC	MATERIALS/ METHOD	AIM	RESULTS
1	Umunakwe, et al 2020	Properties evaluation of interior decorative emulsion paints produced using local extenders obtained from Akure, Ondo state, Nigeria	The calcined soils were obtained from Ijobo, Ebule and FUTA North Gate all in Akure, Ondo state, Nigeria.	To use locally sourced clay from Akure in Ondo State to produce emulsion paint.	The result should that the calcined local extender materials obtained from Ijapo, FUTA North Gate and Ibule areas of Akure, Ondo State, Nigeria met the required standard, passed the quality assessments tests and will compete effectively with the other commercial products in the market. The viscosity(in Pa.s) for the local extenders from the 3 different areas are 10.5, 9.5, and 11.5 respectively
2	A.O. Afolabi et al 2019	Sustainable locally sourced materials for small-scale paint production	The method used was an experimental Approach, a milk-based and clay-based paint were prepared in the laboratory. Clay, Edible starch, Local pigment Dry milk and Lime were obtained from chemical village in Ojota, Lagos state.	To produce a paint product Using sustainable locally sourced materials in a small-scale production.	The materials used in the production of the sustainable paint products are environmentally friendly and the final product did not have any hazardous effect. A quality paint that is comparable with the ones made of imported raw materials. The off-white based paint is 52mins, and the lamb black milk paint is 30mins, while the standard is 25 – 30 mins. The Opacity test was two coat finish for the two based paints.
3	Isaac O. Igwe, et al 2020	Formulation of Anti-Corrosive Alkyd Paints Based on Umuahia Clay Extender	Clay sample was collected from Ubakala in Umuahia, Abia state and used as an extender, Alkyd resin (a medium soyabean oil alkyd resin), metallic driers (Cobalt and lead naphthanates), solvent and regents(toluene (JHD), chloroform (JDH), methanol, xylene (BDH), sulphuric acid, hydrochloric acid (M&B), acetic acid (BDH), sodium hydroxide, ammonia, Titanium dioxide (M&B), linseed oil, and stearic acid.)The methods used are: Preparation,	To formulate alkyd paint Umuahia With clay that is anti-corrosive.	Umuahia clay which was stable to heat and chemicals consisted mostly of the inert oxides of silica, alumina, and titanium dioxide was utilized successfully to Formulate alkyd paints having anti-corrosive property. The pH value of the clay is 6.50 which indicates it's moderately acidic. The specific gravity is 2.10 and the reference pigment (TiO ₂) is 4.20kg/l. The refractive index usin Abbe's refractometer is 1.63. The chemical composition of the clay includes; SiO ₂ (60.90wt. %),

			Characterization of clay extender and preparation of Alkyd paint sample.		Al ₂ O ₃ (24.63 wt.%), Al ₂ O ₃ (3.50 wt.%), K ₂ O (0.82wt%), and Fe ₂ O ₃ (2.58 wt.%)
4	Okafor Chris et al, 2020	Study on Pigment-Extender Effect of Some Nigerian Clays and Calcium Carbonate in Emulsion Paint	Aningele clay was obtained from Umudike Asaba Delta State and Nwangele clay was obtained from Owerre Ezukala in Anambra State.	To investigate the pigment-extender effect of Aningene clay, Nwangene clay and the effect of calcium tiioxocarbonate on emulsion paint.	The Aningene clay and Nwangene clay and calcium carbonate have been successful incorporated into emulsion paint and Compared through the Quality control test. Also, the calcined clay gave a better result than the uncalcined clay. The calcined Aningene clay was found to contain 43.04% of SiO ₂ , 23.92% of Al ₂ O ₃ , 6.08% of Fe ₂ O ₃ ; this explains its reddish-brown appearance, and less than 5% of other constituents. While calcined Nwangene clay contained 66.20% of SiO ₂ , 27.50% of Al ₂ O ₃ , and less than 5% of the other constituents. The high proportion of silica and aluminium oxide in the clays is indicative of the kaolinite nature of the clays and the basis for the type of clay to be used for the production.
5	Igwe, I. O Et al, 2016	Performance evaluation of Aro-Ndizuogu local clay in Alkyd paint production	The clay sample was gotten from Aro-Ndiuzogu in Imo State. Lead and cobalt Nephthanate was used as driers while xylene was used as the solvent.	To investigate the potentials of Aro-Ndizugu clay in gloss paint production.	The local clay obtained from Aro-Ndizuogu, Imo State, Nigeria, has been used successfully to Prepare alkyd paint with improved performance characteristics. The TiO ₂ formulated paint sample has the highest specific viscosity value with the specific gravity of the local clay formulated paints In the range 1.30- 1.40 Pa.s. Paint sample containing 20 % local clay having the highest viscosity.

RESULTS AND DISCUSSION

Composition Analysis of Enyigba Clay

The results of chemical composition of Enyigba clay was determined using energy dispersive X-ray fluorescence spectrometer (EDXRF) as represented in table 4 below.

Table 2 composition of Enyigba clay

Chemical composition	Composition, Weight %
SiO ₂	62.81
Al ₂ O ₃	27.03
TiO ₂	1.82
Fe ₂ O ₃	2.81
MgO	0.08
CaO	0.17
Na ₂ O	0.60
K ₂ O	0.34
MnO	0.08
PbO	1.28
ZnO	0.10
ZrO ₂	1.06
Bi ₂ O ₃	1.58

These results showed the appreciable presence of silica (SiO₂) and alumina (Al₂O₃) in the clay, followed by titanium dioxide (TiO₂) and iron (III) oxide (Fe₂O₃), with other constituents present in smaller quantities.

However, it is evident that Eniyigba clay contains less than 65% of silica as recommended by world health organization, (WHO 2005) for clays to be used for paint production. Paint containing more than 65% of silica can cause fibrosis, silicosis and lung Cancer (WHO, 2005).

The high proportion of silica and aluminium oxide in the clay is indicative of the kaolinite nature of the clay and the basis for the type of clay to be used for the production of clay emulsion paint. The oxide contents (SiO₂ and Al₂O₃) of this clay which is 62.81% and 27.03% respectively were consistent with other Nigerian clays that are used to produce paint. Some of these clays include; Aningene clay 43.05%, 23.92% and Nwangene clay 66.2%, 27.50% [Okafor chris et al, 2020]. Ibere clay 52.06%, 27.87% and Oboro clay 60.21%, 19.05% [Mark, U., 2010]. Mayo-Belwa clay 59.8%, 7.08% [Haruna, M.K, 2014]. Omankwo Afikpo clay 87.13%, 6.70%; Okposi clay 53.04%, 19.70% [Igwe I. O, 2010].

Comparism Between Enyigba Clay And Standard Raw Material Given By Standard Organisation Of Nigeria (Son 2007).

Table 3:

S/N0	Property	Sample A (ECEP) without TiO ₂	Sample B ECEP with TiO ₂	Sample C (C&KEP)	Standard from SON
1	PH	8.1	7.9	8.0	7.0-8.5
2	Viscosity using I.C.I rotor thinner viscometer	6.2 (poises)	6.4	6.4 (poises)	6.0 (poises) (using I.C.I Rotothinner viscometer minimum.
3	Opacity	High opacity observed at first coating and was able to cover very well	High opacity observed at first coating and was able to cover very well	High opacity observed after second coating	Good opacity and shall be able to cover well at not more than two coats with a minimum spreading rate of 10 m ² /litre.
4	Brushability	Very easy to brush. Brisuh marks not broadly pronounced	Esay to apply.	Easy of application of brush. Brush marks observed	Easy application of the successive coats by brushing. Brush marks produced during brushing application shall not be more pronounced than those of the first coat.
5	Drying properties	18 hrs	20hrs	21 hrs	Maximum 24 hours
i.	Surface drying	20 hrs	20hrs	20 hrs	20 hrs
ii.	Hard drying	1 hr 33mins	1 hr 45mins	1 hr 50mins	Maximum 2 hours
6	Specific gravity (kg/l)	1.13	1.01	1.12	1.33-1.39
7	Resistant to external exposure				
7i	Intense sun shines	No cracking and colour change was observed	No cracking and the same colour retained	No cracking and colour change was observed	No film defect such as cracking blistering, flaking colour fading and dirt retention
7ii	Water (rainfall)	High wash ability resistance observed	Resistance to wash ability	High wash ability resistance observed	

Chemical Composition:

X-ray fluorescence (XRF) analysis of Enyigba clay shows an appreciable presence of silicon oxide (SiO₂) (62.81wt.%) in the clay, followed by aluminium oxide (Al₂O₃) (23.07 wt.%), and titanium oxide (TiO₂) (1.82wt.%) in that order. The quantities of potassium oxide (K₂O) and iron(iii)oxide(Fe₂O₃) are 0.34, and 2.18 wt.% respectively, with other oxides present in minute quantities. However, it is evident that Eniyigba clay contains less than 65% of silica as recommended by world health organization, (WHO 2005) for clays to be used for paint production. Paint containing more than 65% of silica can cause fibrosis, silicosis and lung Cancer (WHO, 2005).

According to Raheem and Olowu [2013], a large presence of SiO₂ and Al₂O₃ in an extender indicates the kaolinite nature of the extender pigment and which will form the basis for its utilization in paint making.

PH test and result:

The pH for the three samples was 8.1, 7.9 and 8.0 respectively.

Viscosity

Viscosity of the emulsion paint samples.

Table 4: The viscosity results of paint samples produced.

S/N	Paint Sample	Clay content(wt%)	Viscosity in pascal-seconds (Pa.s) (1Pa.s = 10P)
1	Sample A	80	1.13
2	Sample B	40	0.93
3	Sample C	0	0.94

Density

This is determined using a weight per gallon cup. 50ml of paint was filled in the cup and used in the same way as a specific gravity bottle. The paint density was calculated for the three paint samples and was gotten as in table 5 below:

Table 5: The densities of paint samples produced.

S/N	Paint Sample	clay content (wt%)	Density (ρ) (kg/l)
1	Sample A	80	1.15
2	Sample B	40	1.01
3	Sample C	0	1.12

Chalking Test on Paint Sample

The chalking tests carried out on the formulated paint samples indicated that none of the paint samples showed any sign of chalking. A good paint should not chalk. The three paint samples showed good quality in terms of chalking. This is due to the choice of PVA as binder, which helps the paint to stick to the wall for a very long time.

Colour

The colour of the three paint samples varies due to different materials used in the production. The colour of sample A (ECEP) was Beige colour while the colour of sample C was found to be pure white due to the addition of TiO_2 as pigment.

However, the Beige colour of the sample A was due to the clay content which served as pigment with such fine colour. But when we divided the sample A into two and added TiO_2 as pigment to obtain sample B, the colour was found to be Brown colour.

Generally, it was observed that Enyigba clay can not only serve as extender and filler but can also serve as pigment as shown in our work.

Drying Time:

The paint samples were applied with brush on a panel surface and allowed to dry under normal condition. The time it took for each sample to dry very well was monitored and recorded for each samples.

Table 6: surface drying time

S/N	Paint Sample	clay content wt%	surface dryness time	hard drying time.
1	Sample A	80	18hrs	105min
2	Sample B	40	20hrs	110min
3	Sample C	0	20hrs	93min

CONCLUSION

Enyigba clay obtained from Abakaliki Local Government Area of Ebonyi State; Nigeria, has been used successfully to formulate emulsion paints with improved qualities.

The results from chemical composition analysis showed the appreciable presence of silica (SiO_2) and alumina (Al_2O_3) in the clay, followed by titanium dioxide (TiO_2) and iron (III) oxide (Fe_2O_3), with other constituents present in smaller quantities. And it is evident that Eniyigba clay contains less than 65% of silica as recommended by world health organization, (WHO 2005) for clay to be used for paint production.

However, the quality control test carried out on the paints indicated good properties associated with the paints such as, good opacity, moderate drying time, moderate pH, high viscosity and high density compared to the reference sample. The overall analysis carried out showed that the Enyigba clay served as extender, filler and at same time a pigment since it gave us a very unique beige colour; therefore replacing TiO_2 in a very high capacity.

More so, the cost evaluation carried out showed that Enyigba clay is almost free which is an added advantage on the use of Enyigba clay rather than expensive imported raw materials and high cost of production. Its more available and nearer to the users and most importantly, it is will motivate and encourage the local processors of the raw materials in the country which will at the same time improve the level of industrial and technological development in Nigeria.

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MODELING THE IMPACT OF LAND USE AND MANAGEMENT OPTIONS ON RUNOFF AND SEDIMENT LOSS IN THE ETHIOPIAN HIGHLANDS

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ABSTRACT

Land degradation by soil erosion is a serious challenge in the Ethiopian highlands. Land capability-based alternative land use and management options are needed to tackle this challenge in the region. This study, therefore, evaluated the impacts of five alternative land use and management options in reducing runoff and sediment loss in the drought-prone sub-humid highlands of Ethiopia by integrating observed plot- and watershed-scale data with the Soil and Water Assessment Tool. Land capability classification was used to produce five alternative land use options for the watershed. We modified flow- and sediment-sensitive model parameters based on runoff and soil loss findings from the six best-performing plot-scale land management practices (*i.e.*, *bund+grass*, *polyacrylamide lime*, *row planting*, and *reduced tillage on cropland*; *exclosure+trench on grassland and bushland*; and *improved forage grass on cropland and grassland*) to simulate watershed-scale runoff and sediment loss under the different options. The results revealed that alternative land use options could reduce runoff and sediment loss by about 21–30% (from 740 to 517 mm) and 32–83% (from 101 to 18 t/ha), respectively, compared to the baseline data. The simulations of best alternative land management options also decreased runoff by 10–41% and sediment loss by 40–89%. Runoff and sediment loss reductions were estimated to be as high as 72% (from 740 to 210 mm) and 95% (from 101 to 5 t/ha), respectively, when land use and land management options are combined. These results indicate that implementing suitable land use and management practices has the potential to rehabilitate degraded watersheds in the sub-humid Ethiopian highlands and similar environments elsewhere. Moreover, the best options will help to achieve one of the UN's Sustainable Development Goals by reducing land degradation in the region.

However, additional research should also be conducted on other impacts of land use and management practices as well as on socioeconomic issues related to these alternative options.

Keywords: Soil erosion; Land capability; Land use plan; Upper Blue Nile basin; SWAT

DETERMINATION OF AMINO ACID COMPOSITION, COLOR AND TEXTURE PROFILE OF FRESH AND PROCESSED SEA CUCUMBER (*HOLOTHURIA TUBULOSA*)

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ABSTRACT

This research evaluated amino acid composition, color profile, and texture properties of fresh and processed sea cucumber *Holothuria tubulosa*. Sampling was carried out with a hand on the coast of Muğla, the Aegean Sea, from 1 meter deep. Firstly, the internal organs of the sea cucumbers were removed, and obtained fillets were boiled at 100 °C in saltwater (34‰) for 30 minutes. In the following, fillets were sun-dried for seven days until the meat texture hardened. Finally, processed and fresh sea cucumber samples were analyzed. Homogenized fillets were digested with 6N HCl at 100 °C for 24 hours in the amino acid analysis. The obtained filtrates were analyzed in an HPLC system equipped with a diode array detector in the 262 and 338 nm. Color and texture analyses were carried out in non-homogenized fillets. Color measurements were performed by Konika Minolta colorimeter, and data were evaluated according to the CIELAB color scale. Texture analyses were performed with TA.XT texture analyzer with TPA probe having five kgf load cell and meat tissue's hardness, adhesiveness, flexibility, cohesiveness, gumminess, chewiness, resilience were evaluated. According to the results, while total amino acid content was detected as 11.457±0.84 g/100g in the fresh samples, 19.758±0.96 g/100g was detected in the processed samples. The most abundant amino acids were detected as tyrosine (1.905±0.55-3.613±0.87 g/100g), aspartate+asparagine (1.584±0.34-2.787±0.57 g/100g), threonine (1.284±0.48-2.401±0.62 g/100g), glycine (1.168±0.33-2.249±0.47 g/100g) and glutamate+glutamine (1.050±0.25-2.011±0.41 g/100g) in both fresh and the processed samples. Color profile was 45.04 L*, 1.32 a*, 9.30 b* in the inner surface of the fillets, while 27.69 L*, 1.54 a*, 1.10 b* in the external skin. Finally, according to the texture analysis, hardness and chewiness were found highest in the processed sea cucumber fillets; adhesiveness, flexibility, cohesiveness, gumminess and resilience were found highest in fresh samples (P≤0.05).

Keywords: Chemical composition, seafood, Aegean Sea, integrative medicine.

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RELATIONSHIP BETWEEN RELIGION AND MENTAL HEALTH AMONG WORKING WOMEN AND HOUSEHOLD WOMEN

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ABSTRACT

Being women is always a tough responsibility, whether it is for working women or household women. They have to trade-off between work domain and family domain, in perspective sector and the area chosen. The dynamics of the work environment have exerted enormous pressure on working women as they need to cope with virtually two full time jobs-one at work place and other one at home. Review of this study is to reveal the psychological health of women, how religion plays a significant role and how it impacts the coping strategy of women. Three types of scales were used. The Centrality of Religiosity Scale (CRS) of Huber and Huber (2012) measure the importance of religious aspects in one's life. This scale is used to observe the consequence of religion and its beliefs among household and working women. Further, Rotter's Locus of Control scale by Rotter (1966) was used to find the magnitude of controlling techniques in women. At last, Coping Scale which is given by Hanby, Grych and Banyard (2013) was applied for measuring the Coping ability and capacity across working women and household women. The findings of the current study reveal that Household women are more Religious, on the other hand Working women have high magnitude of locus of control. At last, both group of women have same level of immensity of coping strategies.

Keywords: Household women, Mental health, Religion, Working women.

THE EFFECT OF UTILIZING SHEA BUTTER MIXTURE ON PHYSICAL AND ORGANOLEPTIC PROPERTIES IN CHOCOLATE MANUFACTURING**Shaymaa S. LAFTA***Department of Food Science, Collage of Agricultural engineering science, University of Baghdad, Baghdad, Iraq***Fered SAADOON. A***Department of Quality control, General Company for Grain Processing, Ministry of trade, Baghdad – Iraq.***Luma KHAIRY. H***Department of Food Science, Collage of Agricultural engineering science, University of Baghdad, Baghdad, Iraq***ABSTRACT**

In this study was prepared to conduct the physical and organoleptic properties of chocolate products which made from M1 (25% shea butter + 75% cocoa butter) (Choc M1) sample and chocolate product made from CB (0% shea butter + 100% cocoa butter) (Choc CB) sample. Our analysis on color, viscosity, thermal behavior, texture properties and sensory evaluation of the two chocolates samples were carried out from observing the color on the parameter, it was found that there was a significant difference between samples of chocolate made from M1 (Choc M1) (22.26) and CB (Choc CB) (23.82) in lightness (L^*) and no significant differences between values in redness (a^*) and yellowness (b^*). The results showed that Choc CB and Choc M1 sample had significant differences between viscosity values as (2.80 ± 0.06 , 2.68 ± 0.04 and 2.41 ± 0.06) mpa.s in Choc CB and (4.53 ± 0.15 , 3.73 ± 0.31 , and 3.14 ± 0.51) mpa.s in Choc M1, but the viscosity behavior of Choc M1 followed a similar trend to that of Choc CB in decreased the viscosity with the increasing temperature at 45, 55 and 60°C, respectively. Choc M1 sample resulted in similar thermal behavior (melting and crystallization curve) with the Choc CB sample. Finally, the chocolate products were evaluated by hedonic test, no significant differences ($p > 0.05$) between Choc CB and Choc M1 in color, bitterness, taste, flavor and overall acceptability between panelist. Therefore, the consumer had difficulties to determine any difference between two types of chocolate products. Through the results, it was found that it is possible to be utilized shea butter as a cocoa butter replacer which allows the mixing with cocoa butter in small proportion in processing of chocolate manufacturing.

INTRODUCTION

Dark Chocolate is defined as the product that got from cocoa and sugar containing at least 35 percent of the total dry cocoa solid content, including at least 18 percent cocoa butter and at least 14 percent dry non-fat cocoa solids. There are three main types of chocolates: dark, milk and white chocolate with significant differences between them (Awad *et al.*, 2006; Afoakwa *et al.*, 2008b; Beckett, 2010). The dark chocolate variety consists mainly of cocoa liquor, sugar and cocoa butter. Fat crystallization is a complex process affected by processing conditions that determine the physical properties of chocolates. The behavior of chocolate melting has been studied using differential scanning calorimetry measurement (DSC) (Hartel, 2001), and it has been observed that the control of the process of crystallization is very important for the texture, properties of melting and other quality properties.

Cocoa butter, the only continuous fat phase in dark chocolate, consists of a mixture of 40-50 different words dominated by 2-oleyl glycerides of palmitic and fatty acids, mainly 1-palmitoyl-2-oleoyl-3-stearoylglycerol (POS) 35%, 1,3-distearoyl-2-oleoylglycerol (SOS) 23% and 1,3-disaturated-2-oleoylglycerol, 1,3-dipalmitoyl-2-oleoylglycerol (POP) 15% (Lipp and Anklam, 1998). These triacylglycerols occur as a monohydrate containing monounsaturated fatty acids, with saturated fatty acids at positions 1 and 3, which dominate the crystallization, polymorphism and phase transitions, thus providing dark chocolate with unusual textures and other sensory properties. The last years, the cocoa butter price has been increasing continue due

to few countries cultivated, suppliers of cocoa butter can be unstable (Hassan *et al.*, 1995; Moreton, 1988). Therefore, the studies found the other fats in alternative of cocoa butter, but are available and cheap price. The potential of natural or processed lipids to be utilized as cocoa butter alternative can be decided using its synthetic data (composition of fatty acids and triglycerides) or its thermal properties (Lipp & Ankleam, 1998). However, similarities those fats with CB are also an important aspect that should be implemented to measure the fat to be utilized as an alternative to cocoa butter. Last studies have shown that the extraction of fat from shea butter seeds can be a substitute for the use of shea seeds. It has already been aforementioned that the fats can be used in candles, soap and the fuel industry (Morton, 1987).

shea butter has a high-value shea nut fat used as an edible oil, antimicrobial and moisturizer in the food, pharmaceutical and cosmetic industries, respectively. The annual worldwide export of shea nut from Africa was 350,000 MT of kernels with a market value of approximately 120 \$ million to producing countries. The multifunctional properties of the shea butter depend on its compositional properties: the peroxide value, moisture content, free fatty acid level and the insoluble impurities. Standard extraction technologies: the traditional, mechanized, enzymatic and chemical methods were used for shea butter extraction. The current extraction technologies which rely on different extraction parameters for shea butter extraction to yield the desired qualities and efficiencies of butter. Application of hydrolysing enzymes during enzyme extraction, however eliminates the laborious, tedious and labour- intensive extraction processes creating alternative, selective and mild extraction conditions. The current review gives an overview of the efficiencies, qualities and a perspective into the shea butter industry. (Abdulai *et al.*, 2015). In this study, two types of dark chocolate made from CB and SHB have been produced mixed with CB in a specific proportion to study its color, viscosity, thermal behavior, texture properties and sensory evaluation. This information will be a good input for an evaluation of the compatibility of shea butter with cocoa butter to produce dark chocolate. Shea butter was used due to it exhibited good consistency, the high antioxidant activity and can be considered as the optimum result for flavor development.

MATERIALS AND METHODS

Materials

CB was bought from The Cocoa Research Institute, Jember, East Java, Indonesia. while, raw shea butter was obtained from shea butter canning factories in Sungai Petani, Kedah, Malaysia.

Preparation of SHB and cocoa butter mixtures

The mixtures of shea butter (SHB) and cocoa butter (CB) were prepared following proportions as mentioned in Table 1. The mixing process was carried out by adding predetermined proportions (w/w) of cocoa butter and shea butter, and then melted in oven (60°C for 15-20 minutes). Melted mixtures were then homogenized using vortex (mixed for five minutes at room temperature before transferred to bottles). SHB and CB mixtures were then transferred into inert-screw-cap bottles.

Table 1 List of proportions of the shea butter and cocoa butter

Mixtures of CB & SHB	CB% ^a	SHB% ^b
Mixture 1 (CB)	100	0
Mixture 2 (M1)	75	25

^a CB% = proportion of cocoa butter, ^b SHB% = proportion of shea butter

Preparation of chocolate products

Dark chocolate products were prepared by the standard procedure of Cook and Meursing (1982). Two types of dark chocolate were produced made from CB (Choc CB) including (100% CB + 0% SHB) and dark chocolate made from M1 (Choc M1) including (75% CB+25% SHB), respectively. The following ingredients were used for the chocolate industry: cocoa powder (40%), sugar (50%), cocoa butter (10%) and lecithin (0.4%). Two chocolate products were put in refrigerator for further testing.

Characterization of the chocolate products made from CB and M1

Color measurement

CIE L* a* b* analysis of the samples was carried out using a Minolta colorimeter (CM3500d, Osaka, Japan). After calibration against the scale of white and black glass standards, the following calibration program provided by the software. The analysis result was presented in L* value for lightness, a* value for redness (+), greenness (-) and b* value for yellowness (+) and blueness (-) (Maskan, 2001).

Viscosity measurement

The viscosity was measured by use Viscometer Model (SV-10 Japan). A 45 ml of Choc CB and Choc M1 samples were transferred to Viscometer vial for viscosity measurement. The samples were analyzed in triplicate at 45, 55, 60°C, respectively.

Thermal behavior analysis

The characteristic temperature of the polymorphic transition of dark chocolate made from CB and M1 was determined based on the method presented in Solís-Fuentes *et al* (2010). DSC Q200 equipped with an RC90 refrigeration system (TA Instrument, New Castle, DE, USA), which was previously calibrated with indium (melting point 156.6 °C), was utilized in this analysis. Approximately 9.0 ± 0.50 mg of the sample was weighed and hermetically sealed. An empty sealed capsule was used as reference. The temperature programs in the calorimeter were as follows:

1. Isothermal heating at 90 °C for 10 min.
2. Cooling at 10 °C/min from 90 °C to -60 °C. Heating at 10 °C/min from -80 °C to 90 °C.

Triplicate measurements were performed for each sample. Thermal analysis, post-processing analysis, and enthalpy calculations were conducted using TA Universal Analysis 2000 (TA Instrument, New Castle, DE, USA).

Sensory evaluation

Sensory traits were prepared from dark chocolate samples, such as color, flavor, bitterness, taste and general acceptance evaluated using a 2-point hedonic scale (1 = not very liked, 7 = moderate, = 2 very liked) by those with experience in the field of Food) Larmond, 1977.

Statistical analysis

Each sample was carried out in triplicate and the data was expressed as the means of measurements \pm S.D. All the data were analyzed using SPSS (Statistical Package for Social Science) software version 20 (IBM Corporation, Armonk, New York 10504-1722 United State). By compare means analysis with confidence level of $\alpha = 0.05$.

RESULTS AND DISCUSSION

Color measurement

The results showed, the color measurement of the dark chocolate made from CB (Choc CB) and M1 (Choc M1) are expressed by the degrees of lightness (L*), redness (a*) and yellowness (b*). Figure 1 displays that measurement of the Choc CB and Choc M1 sample. Observing the L* parameter, it was found that slight

differences in Choc M1 (22.26) and Choc CB (23.82) samples due to a slight difference in whiteness and lightness were observed between CB and M1 samples. The increasing a proportion of the shea butter in the mixture will reduce the degree of the whiteness and lightness, therefore lead to the degradation of the color pigment (Oliviero, 2008; Vissotto *et al.*, 2010). So that, no significant differences ($p > 0.05$) in lightness between Choc CB and Choc M1 values. In general, the results reported that dark chocolate made from M1 (Choc M1) was similar in lightness (L^* value) to that chocolate made from CB (Choc CB). According to Glicerina *et al.* (2015), the human eye detects colour according to how the light is reflected from the surface, thus the sizes of both the non-fat solid and crystalline fat particles affect the color of dark chocolate. Especially in a densely packed medium, light scattering factors are inversely related with particle diameters, for our samples, having finer particles and a large specific surface area, tended to scatter more light appearing. Moreover, the reason of lightening between these samples was the denaturation of protein during roasting of shea seed and cocoa bean which allow a concentrated amount of oil particles surrounded in a protein matrix.

Concerning a^* color parameter, dark chocolate made from M1 (Choc M1) simple differ a^* values in comparison to dark chocolate made from CB (Choc CB). But, Choc M1 (1.75) resulted little increased amount of redness in comparison to Choc CB (1.35) because of the increasing a^* value of the Choc M1 sample was associated with a decrease in the L^* value of that sample, respectively. On the other hand, the reason of redness (a^* value) in Choc M1 and Choc CB was the formation of brown pigments through the non-enzymatic browning reaction when roasting cocoa bean and shea butter.

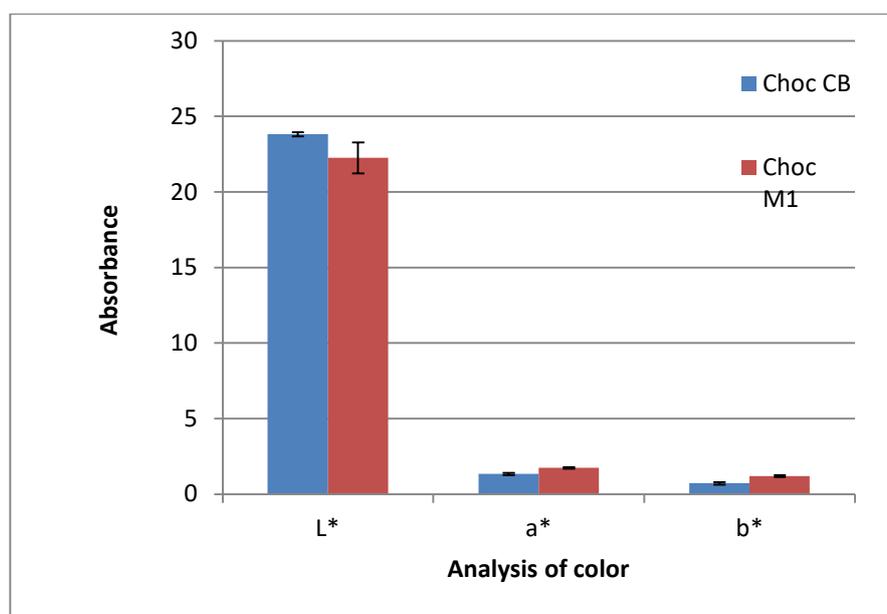


Figure 1. The changes in L^* , a^* and b^* values of the chocolate products made from CB and M1

A similar trend was observed as in dark chocolate made from the M1 (Choc M1) and dark chocolate made from CB (Choc CB) for the changes of b^* value. The results noted that the b^* value showed the yellowness of Choc CB and Choc M1 in a range of (0.73 ± 0.09 and 1.21 ± 0.07), respectively. The yellowing of the cocoa butter was reduced during the roasting process of cocoa bean because of the degradation of pigments that responsible of yellow color.

Viscosity measurement

In order to get good quality products that it is important to control the viscosity of dark chocolate and related cocoa products. Accurate viscosity data and affected by a heat-process are also important for the trade of chocolate masses with well-defined texture properties (Servais *et al.*, 2003). A comparison in viscosity of dark chocolate products made from the CB (Choc CB) and M1 (Choc M1) at different temperature is shown in

Figure 2. The results of our measurement revealed that the Choc M1 sample little effect on viscosity values of dark chocolate. A low viscosity was observed in the sample of Choc CB (2.80 ± 0.06 , 2.68 ± 0.04 and 2.41 ± 0.06) mpa.s and Choc M1 (4.53 ± 0.15 , 3.73 ± 0.31 , and 3.14 ± 0.51) mpa.s with increasing the temperatures at 45, 55 and 60°C, respectively. Although, the high viscosity values were observed in dark chocolate made from M1 (Choc M1), the viscosity behavior of Choc M1 followed a similar trend to that of dark chocolate made from CB (Choc CB) in decreasing the viscosity with the increasing temperature due to the Choc M1 was crystallized in a β form structure similar to Choc CB, that given their small size and high surface area of the chocolate. This is a result of the presence of a large proportion of triglycerides in CB sample such as SOS, POP and POS responsible for the β crystal formation (Toro-Vazquez *et al.*, 2004).

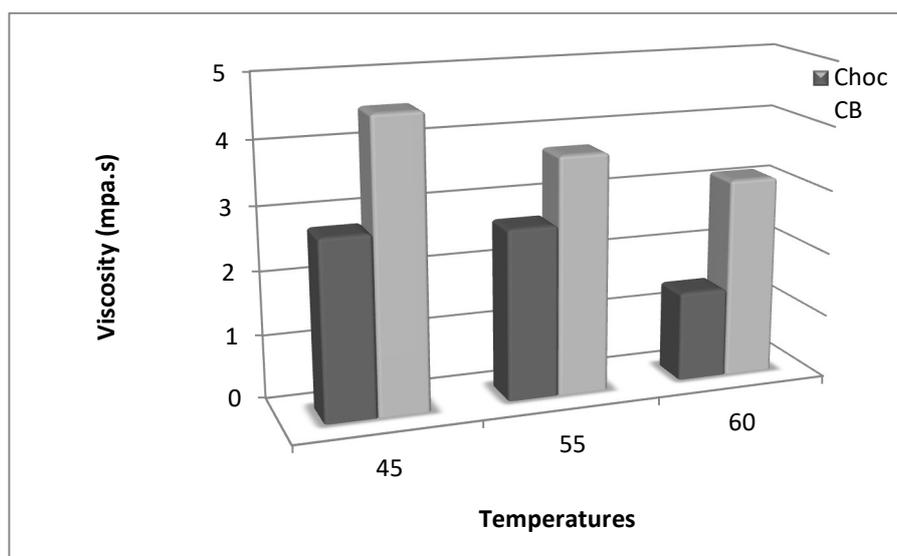


Figure 2. Changes in viscosity of chocolate product made from the CB and M1 at different temperature

The chocolate makers are very interested in the spatial distribution of the cocoa butter molecules. So, they seek to produce a β crystal structure, which melts on the tongue at temperatures between 33 and 37 °C. Without this crystal structure the chocolate tastes waxy or is too soft at room temperature ($\sim 25^\circ\text{C}$). Therefore, the viscosity of the chocolate is a particularly important parameter, especially during production (Fernandes *et al.*, 2013).

Crystallization behavior

The behavior of crystallization of fat and lipids have two basic conclusions in the industry, the first was the process of finished products made from lipid crystals, such as chocolate, margarine and whipping cream; the second is the separation fats and lipids from nature resources (Sato, 2001). During the manufacture of chocolate, the fineness and high smoothness of the product is obtained from the composition and crystallization of cocoa butter plays a distinctive and important role. The crystalline state and the solid fat ratio are important in determining the melting properties of finished products during chocolate processing (Afoakwa *et al.*, 2008b). The DSC analysis result of the crystallization curves of dark chocolate made from CB (Choc CB) and M1 (Choc M1) is shown in Figure 3. The Choc M1 sample exhibited a similar crystallization pattern to Choc CB sample, with a single curve that have one peak maxima height at a temperature of 12.43°C relative to that of Choc CB at a temperature of 12.03°C , indicating that there was a slight difference in polymorphic behavior. The different combinations of triglycerides in CB can easily pack, generating crystals which modify and reorganize themselves to create the well-known six polymorphic phases in CB (Beckett, 2009).

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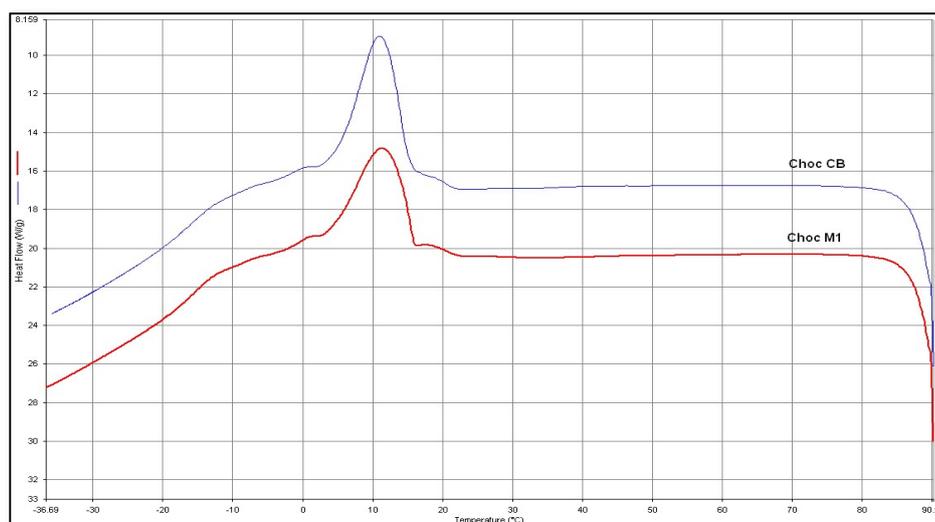


Figure 3. The DSC crystallization curves of chocolate products made from CB (Choc CB) and M1 (Choc M1)

Beckett (2000) reported that properly tempered chocolate shows the formation of β form, the most desirable polymorphic form which gives the appropriate dark chocolate product snap, contraction, gloss and shelf-life characteristics. Therefore, the differences in temper regime produced changes in crystalline and melting characteristics. These indicated that differences in crystallization behavior in dark chocolates during tempering affect the degree of crystalline of their derived products. Afoakwa et al. (2009) found that under-tempered (bloomed) chocolates showed the greatest peak width, followed by the over-tempered samples having a slightly wider crystal formation than the optimally-tempered products with the resulting variation in their melting behavior. Accordingly, the arrangement and distribution of crystalline (total and specific characteristics of crystalline material) in chocolate play a significant role in final dark chocolate quality. The number of crystals and range of sizes, shapes, and polymorphic stability, besides arrangements in network structures dictates mechanical and rheological characteristics. Knowledge and control of crystalline during chocolate manufacture can be important for optimizing processing conditions (Hartel, 2001).

Sensory evaluation

Hedonic scale is widely utilized in both consumer type work and laboratory studies due to its usefulness in term of discrimination among samples on a group basis (Lawless and Heymann, 2010). Sensory evaluation of the dark chocolate made from CB (Choc CB) and M1 (Choc M1) samples showed no significant difference between the samples (Table 2). In this study, the bitterness and taste attributes of the two dark chocolate were very slightly varied, but no significant differences ($p > 0.05$) between the dark chocolate samples. While, the color attribute of Choc CB was identical to that observed of Choc M1, and also no significant differences ($p > 0.05$) between samples. With regard, the overall acceptance and flavor attributes showed that the Choc M1 sample slightly higher as compared to those of the Choc CB sample. Flavor is the most significant organoleptic properties of chocolates. The consumer would not eat it if the product did not taste good enough. Human beings use all five senses to perceive flavor (Reed, 2010). The proper flavor development mainly depends on the roasting process of cocoa beans and shea seeds, which their fat is the main raw ingredient of dark chocolate and provide the flavor compound for each sample. Finally, the Choc M1 had slightly higher in overall acceptable than Choc CB due to taste and texture of the shea butter.

Table 2. Sensory evaluation of the chocolate product made from CB (Choc CB) and M1 (Choc M1) samples

Attributes	Choc CB	Choc M1
Color	5.90 ± 0.48 ^a	5.88 ± 0.13 ^a
Flavor	5.44 ± 0.15 ^a	5.86 ± 0.32 ^a
Bitterness	4.93 ± 0.37 ^a	5.01 ± 0.34 ^a
Taste	5.22 ± 0.35 ^a	5.00 ± 0.52 ^a
Overall acceptance	5.69 ± 0.37 ^a	5.80 ± 0.27 ^a

*Mean±standard deviation. No significant differences ($p>0.05$) between the dark chocolate

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LEGAL FRAMEWORK FOR ISSUING, TRADING VIRTUAL CURRENCY, AND PREVENTING VIRTUAL CURRENCY CRIME IN VIETNAM

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ABSTRACT

Around 2013, the virtual currency became popular in Vietnam and grew strongly. With the development of digital technology, accepting virtual currencies is an inevitable trend. The critical issue still lies in the supervision and management of virtual currency. Vietnam has no legal regulations governing the issuance, trading, and exchange of virtual currencies, and there is no official unit to manage the issuance and grading of coins. The lack of a legal framework for the issuance and virtual currencies has caused difficulties for both users and regulators. At the same time, criminals take advantage of virtual money to cover up crimes, launder money, evade taxes, and evade detection and handling by authorities. Information technology has become an area where objects exploit and commit crimes. In order to contribute to promoting economic development in general, the interests of organizations and individuals participating in purchasing, selling, and exchanging virtual currencies in particular, the Article aims to recognize virtual currencies, examine and review the current legal system on, crime situation, and handle crimes related to virtual currency in Vietnam in the latter year. The Article will discover the legal framework's difficulties, obstacles, and inadequacies on virtual currencies. The Article proposes some recommendations to improve the legal framework for virtual currency in Vietnam. The report suggests recognizing virtual currency as a legal commodity to enhance the control ability of the competent authority.

Keywords: virtual currency, cryptocurrency, digital currency

INTRODUCTION

According to cryptocurrency market research firm CryptoCompare, at the end of November 2017, up to 80% of Bitcoin transactions originated in Asia, of which the four largest markets are China, Japan, Korea, and Vietnam. Besides, the number of computers "mining" Bitcoin imported to Vietnam has also increased relatively high in recent years. According to the General Department of Customs, from 2017 to now, 15,600 virtual currency mining machines have been imported into Vietnam.

Vietnam has also had virtual currency attacks. According to the latest statistics from security firm Kaspersky on small and medium-sized businesses (SMBs) in Southeast Asia, in the first quarter of 2020, more than 1 million cryptocurrency mining attacks were carried out, currently aimed at enterprise devices. The figure is up 12% from the 949,592 crypto-mining attacks prevented during the same period last year.

The situation of virtual currency transactions and violations of laws related to virtual currencies is complicated, with different characteristics and sizes. Studies in recent years have shown that the current legal framework on virtual currencies has many loopholes, making it difficult to monitor and handle violations related to virtual currency. It is essential to assess the legal system's challenges, problems, and inadequacies for issuing and using virtual currencies and dealing with virtual currencies violations.

MATERIALS AND METHODS

This article is based on: (1) Analyze documents, reports, data, transactions, violations, and crimes on virtual currency provided by Vietnamese state agencies and research agencies such as the State Bank of Vietnam,

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Securities Commission, Government Office, Ministry of Information and Communications, Ministry of Justice, Ministry of Industry and Trade, General Department of Taxation. (2) Legal reports, research papers in relevant journals, and the Internet.

The author has reviewed documents and consulted personally with experts, prosecutors, and lawyers to learn about the contents related to the virtual currency crime situation, the obstacles in solving the problem related to virtual currency.

RESULTS

Virtual currency has become popular in Vietnam today and has advantages and disadvantages.

In Vietnam, about 1 million people own and participate in crypto-asset transactions with a daily transaction amount of about 200-300 billion dong; Bank transactions are the primary method for these funds. Vietnamese investors' major virtual currency exchanges traded, bought, sold, invested, and stored are Binance, Okex, Houbi, Bittrex, Remitano, Santienao, Kenniex. Besides, investors also trade through spontaneous groups on social networks. Vietnam is also the fourth country in profits from cryptocurrencies, just behind China, Japan, and South Korea. In addition to buying, selling, and trading cryptocurrencies, many organizations and individuals have set up computer systems and servers to "mine" cryptocurrencies in Vietnam. This "mining" of cryptocurrencies wastes much energy, generates profits but does not declare, and pays no corporate or personal income tax.

Cryptocurrency exchanges offer the following advantages: (1) The principle of neutrality helps to conduct transactions regardless of the number and type of business. Virtual currency can work on any electronic device capable of accessing the Internet. (2) Second, there is no intermediary in the transaction. With the advent of virtual currencies, the role of credit institutions in financial payments came to an abrupt end. This issue will create the following advantages: (i) Minimize transaction fees as well as foreign exchange fees, (ii) freedom in transactions, (iii) Fast cross-border payments Fast, complete anywhere at any time with no limit on the maximum amount that each person can send or receive per transaction. (3) A high degree of privacy, also known as anonymity (more precisely, semi-anonymity). Although the digital currency, represented by Bitcoin, is not entirely anonymous, its users have a higher level of protection and privacy than other remittance services. This problem will reduce the risk of information theft.

However, in Vietnam, virtual currency creates many consequences. (1) The risk of money laundering and terrorist financing from crypto-asset transactions is due to the anonymous nature of these transactions. (2) Difficult for management. Taking advantage of the anonymity of virtual currencies, most organizations and individuals operating in this field often do not register to establish businesses in Vietnam. Non-traditional operating methods make it difficult to detect and investigate violations. (3) The risk of fraud. Fraudulent acts can be listed as follows: (i) Performing ICO but without cryptocurrencies, as advertised, without blockchain wallet, unable to convert to "virtual currency." (ii) The scam raises capital by investing in cryptocurrency exchanges and pays interest to depositors with very high returns. When the system mobilizes a certain amount of money, the subjects will flee or use excuses to delay paying customers to appropriate illegal assets.

The legal framework in Vietnam regarding the issuance and use of virtual currencies is minimal.

In Vietnam, there are only a few documents that have the nature of announcements and recommendations of state agencies, specifically:

Documents of the State Bank of Vietnam:

On February 27, 2014, the State Bank of Vietnam issued a press release on virtual currency for the first time. The content of the Notice focuses on several fundamental issues as follows: (1) confirmed that Bitcoin is a form of digital currency (virtual money), not issued by the Government or a financial institution, but created and operated based on a system of computers connected to the Internet. (2) confirmed that the appearance of Bitcoin has caused many harms and risks for users. Crimes such as money laundering, drug trafficking, tax evasion, illegal payments can use Bitcoin as a tool. Bitcoin users face the risk of being hacked, stolen, changed data, financial bubble. No government agency regulates Bitcoin transactions, so Bitcoin holders are at their

own risk. (3) the use of Bitcoin (and other similar virtual currencies) as a means of payment is not recognized and protected by law. Credit institutions cannot use Bitcoin (and other similar virtual currencies) as a currency or means of payment when providing services to customers. (4) Owning, buying, selling, and using bitcoin (and other similar virtual currencies) as an asset carries many risks for people and is not protected by law.

On October 28, 2017, the State Bank of Vietnam sent Official Letter No. 5747/NHNN-PC of the State Bank of Vietnam to the government office to reply on the issue of virtual currency: "Virtual currency in general and Bitcoin, Litecoin, in particular, is not a currency and is not a legal means of payment according to the provisions of Vietnamese law. Issuing, supplying and using virtual currency in general and Bitcoin, Litecoin in particular (unlawful means of payment) as currency or means of payment is prohibited. Decree 96/2014/ND-CP of the Government on sanctioning administrative violations in currency and banking and the 2015 Penal Code (amended and supplemented) stipulates sanctions for handling administrative violations. In addition, about investing in virtual currency, the State Bank of Vietnam has warned many times that this investment has enormous risks for investors."

Decisions and Directives of the Prime Minister:

On April 11, 2018, the Prime Minister issued Directive No. 10/CT-TTG on strengthening the management of activities related to Bitcoin and other similar virtual currencies. The Directive mentioned the risks and consequences of activities related to virtual currencies, such as risks to participants, the risk of using virtual currency for criminal activities, investing, virtual trade-in currency, raising capital through the issuance of virtual currency (ICO). In particular, the operation of using virtual money to raise capital is increasingly complicated, affecting the stability of the financial market, social order, and safety.

Directive of the Governor of the State Bank of Vietnam:

On April 13, 2018, the State Bank of Vietnam Governor issued Directive No. 02/CT-NHNN on measures to strengthen control of transactions and activities related to virtual currencies. (1) Requires credit institutions, payment intermediary service providers not to provide payment services, conduct card transactions, grant credit via card, assist handling, payment, money transfer, clearing and settlement, currency conversion, payment transaction execution, cross-border money transfer related to virtual currency transactions for customers. (2) The issuance and use of Bitcoin and other similar virtual currencies as a means of payment are prohibited.

Notice of the State Securities Commission:

On its website, on January 29, 2018, the State Securities Commission advised investors to be careful when investing in virtual currencies to limit possible financial risks. On July 20, 2018, the State Securities Commission continued to issue Official Letter No. 4486/UBCK-GSĐC requesting public companies, securities companies, fund management companies, and Securities Investment Funds to comply with regulations on prevention anti-money laundering, not to conduct illegal virtual currency issuance, trading and brokerage activities.

Notice of the Ministry of Finance:

The Ministry of Finance also warned about the risks, dangers, and consequences of participating in illegal buying, selling, trading, investing, and trading virtual assets and virtual currencies. According to the Ministry of Finance, only the Ho Chi Minh City Stock Exchange and the Hanoi Stock Exchange can organize a stock trading market in Vietnam. According to securities law, virtual currency is not a type of security.

Notice from the Ministry of Industry and Trade:

In the view of the Ministry of Industry and Trade, "Bitcoin does not meet the basic characteristics of goods or services. Therefore, Bitcoin is not a good or service."

Administrative handling and criminal handling for violations related to virtual currency according to the provisions of Vietnamese law are not precise.

According to Clause 6, Article 26 of Decree 88/2019/ND-CP on administrative sanctions in currency and banking activities, issuing, supplying, and using payment means is illegal and will be administratively fined from VND 50 million to VND 100 million.

In addition, from January 1, 2018, Article 174 of the Penal Code ("Cheat to appropriate property") or Article 206 ("Violation of regulations on banking and other related activities") banking activities) can be applied to criminally handle those who perform the act of issuing, providing, using a payment means causing damage to other people. Specifically, those who perform the act of "issuing, providing, using illegal payment instruments; forging payment documents or payment means; using payment documents or fake payment instruments; causing damage to others from 100 million VND to less than 300 million VND, shall be subject to a fine of between VND 50 million and VND 300 million or a prison term of between six months and three years. A person can be imprisoned for up to 20 years if causing 3 billion VND or more damage.

On the other hand, users of transactions related to virtual money for money laundering may also be held criminally responsible for "money laundering" specified in Article 324 of the 2015 Penal Code, as amended and supplemented in 2017. The Law on Prevention and Combat of Money Laundering in 2012 stipulates measures to prevent, detect, stop and handle organizations and individuals that commit money laundering; responsibilities of agencies, organizations, and individuals in the prevention and combat of money laundering; international cooperation on prevention and fighting of money laundering. Accordingly, money laundering is understood as an act of an organization or individual to legalize the origin of the property resulting from a crime, which includes: (i) Acts specified in the Penal Code; (ii) Assist organizations and individuals involved in crimes to evade legal responsibility by legalizing the origin of property obtained from crime; (iii) Therefore, individuals and organizations that conduct transactions related to virtual currencies for money laundering are regulated by this law, even if Vietnam has not yet recognized and protected virtual currencies.

DISCUSSION**Vietnamese law has not defined virtual currency.**

Clause 1, Article 105 of the 2015 Civil Code stipulates: "Property is the thing, money, valuable papers, and property rights." The Civil Code 2015 does not define what a "thing" is. According to the provisions of Articles 112 to 114 of the Civil Code 2015, "things" are divided into Main objects and auxiliary objects, divisible and indivisible objects, consumable and non-consumable objects, and objects of the same type. Even so, this division is still not enough to determine whether a virtual currency is a "thing." Clause 2, Article 105 of the 2015 Civil Code also classifies assets: Property includes immovable property and movable property, which can also be existing property or property formed in the future. Clause 1, Article 107 of the 2015 Civil Code deals with real estate, and Article 108 of the 2015 Civil Code deals with properties formed in the future. According to the way specified in the laws mentioned above, virtual currency is neither immovable property nor assets formed in the future. Meanwhile, it is still not clear whether "virtual currency" is an object in the form of movable property.

+ In terms of money, virtual currency is not a legal currency in Vietnam, according to the analysis in Section 6.2 below.

+ Virtual currency is also not a valuable paper. According to Clause 1, Article 3, Circular 04/2016/TT-NHNN, "Valuable papers are proof of debt repayment obligation between the issuer and the holder o in a given period, certain term, interest payment, and other conditions." Therefore, virtual currencies cannot be considered valuable papers.

+ The 2015 Civil Code defines property rights as follows: "Property rights are rights valued in money, including property rights to objects of intellectual property rights, land use rights, and other rights. Other assets." One can use fiat currency to value virtual currency; therefore, the virtual currency can also be an object of property rights.

However, it is not appropriate to conclude that virtual currency is a property right because the request is always the lawful conduct of the right holder, recognized and protected by the law. Property rights are intangible assets, so in theory, if there is an act of infringing on property rights, the method of "claiming property" or "suing physical rights" cannot be applied as in the case of property rights. Only other methods can be used, such as suing for conduct termination or lawsuits for damages. However, virtual currency is an algorithm (a sequence of numbers) based on Blockchain technology. Therefore, the author believes that, according to the provisions of the Civil Code 2015, virtual currency is not currently a type of property.

The absence of any provisions of the civil law affirming that virtual currency is a type of property leads to the subsequent consequences of civil relations such as ownership, inheritance, contract, or compensation for damage related to virtual currency. The virtual currency also almost falls into the "gap," without a mechanism to correctly solve it. For example, can the owner get it back when an object hacks an e-wallet and steals the owner's virtual currency? What civil liability applies when the parties buying and selling virtual currency do not fulfill the obligation to deliver the property? When someone asks for the division of an inheritance that is virtual money, will it be divided? How will the virtual money in a person's e-wallet be split if the relevant people do not have or do not provide a password or "key" to log into this person's account? Alternatively, when a person breaks someone else's e-wallet making login impossible, how will compensation be determined.

From the perspective of goods, according to the provisions of the Commercial Law 2005, the virtual currency will be a commodity if the virtual currency is subject to civil rights and can be bought and sold. The 2005 Commercial Law does not define "services," stipulates in Clause 9 of Article 3, service is understood as a type of "work" that one party provides to the other. Compared to these regulations, virtual currency is not a service.

According to the provisions of the Investment Law 2014, business activities related to virtual currency are not considered prohibited business lines.

There is no legal basis for collecting taxes on cryptocurrency transactions.

Law on Value-Added Tax in 2008 (amended and supplemented through 2013, 2014, 2016), Law on Personal Income Tax 2007 (amended and supplemented in 2012, 2014), Law on Corporate Income Tax in 2008 (amended and supplemented in 2013, 2014) regulate taxable and non-taxable income. Such listings lead to an underestimation of all taxable income. On the other hand, as mentioned above, the view on whether to consider virtual currencies as goods or services is still unclear. Therefore, it is tough to tax the earned income related to virtual currency.

Vietnamese law makes it challenging to handle criminal acts related to virtual currency.

According to provisions of Clause 1, Article 4 of the Law on Prevention and Combat of Money Laundering 2012, money laundering is understood as an act of an organization or individual to legalize the origin of the proceeds of crime, including actions specified in the Penal Code. Point a Clause 1, Article 324 of the 2015 Penal Code (amended and supplemented in 2017) stipulates that an offense of money laundering can be: "Directly or indirectly participating in finance transactions, banking transactions, or other transactions to conceal the illegal origin of the money or property obtained through their commission of a crime, or obtained through another person's commission of a crime to their knowledge." However, the motive of this crime must be to conceal the illegal origin of money and property that he commits. Meanwhile, Vietnam has not recognized virtual currency as money or property in Vietnam; it is still difficult to determine whether it is a money-laundering crime.

Regarding the crime of sponsoring terrorism, according to the provisions of Clause 1, Article 300 of the Penal Code 2015 (amended and supplemented in 2017), any person who raises or provides money or property in any shape or form to a terrorist or terrorist organization shall face a penalty of 05 - 10 years' imprisonment. Terrorist financing can take many different forms. The Penal Code only cares about the purpose of acts to mobilize and support money and properties for terrorist organizations and individuals, not limited to terrorist financing form. Funding subject to this act must also be money or property. The above regulation again shows that virtual currency's birth and existence has confused in determining many legal consequences of acts related to virtual currency, including the identification of financial crimes.

CONCLUSION

First, the law needs to provide a specific definition of virtual currency.

Second, the law needs to recognize virtual currency as a new type of asset. Article 105 of the 2015 Civil Code needs to amend the concept of property in the direction of adding “other types of property prescribed by law.”

Third, the law should not recognize virtual currency as a means of payment.

Fourth, the law should stipulate that virtual currency is a particular property type and has conditional circulation. Virtual currency is very anonymous. Thus, the legal mechanism for virtual money cannot be similar to that of ordinary assets. Still, it is necessary to consider virtual money as a particular type of asset, with conditional circulation. Specifically, organizations operating in the field of virtual currency exchange and business need to register their operations with the relevant authorities, such as (i) registration of establishment of a brokerage and trading virtual currency business; (ii) store information about transaction history; (iii) comply with accounting principles for assets in the enterprise; (iv) comply with regulations on tax obligations related to virtual currency ownership and trading; (v) comply with the provisions of the law on prevention and combat of money laundering.

Fifth, the law should have provisions on tax collection for transactions related to virtual currency. When the law recognizes virtual currency as an asset, it becomes a commodity according to the provisions of the Commercial Law. It then becomes subject to tax according to the requirements of tax law.

Sixth, the law needs to allow and control the issuing of virtual currency to the public (ICO). If the law recognizes virtual currency as an asset, the virtual currency can also be a security under the Securities Law. The Securities Law will regulate ICO activities. The law should allow the establishment and control of virtual currency exchanges, independent and separate from regular stock exchanges.

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E-LEARNING AND ITS IMPACT ON IMPROVING THE QUALITY OF THE EDUCATIONAL PROCESS: ANALYTICAL STUDY IN TEACHING ISLAMIC EDUCATION

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ABSTRACT

The research focused on the problem of how to make the pupil keep pace with his scientific career despite his inability to go to school, and take the curricula directly from the teacher, In light of the conditions of the crisis, the Corona pandemic, the transformations and developments in the feild of life and what the country is going through, Does e-learning have a role in overcoming this crisis. Especially there are materials that need focus and attention on the part of the pupil to be in continuous contact with the material, discussion and interaction with the teacher, It has become necessary to keep pace with these developments, especially in the field of education, which is the basis for the advancement and development of the nation.

Where the questionnaire form was used as a process to analyze the impact of e-learning in improving the quality of the educational process (QOTEP), and distributed it to a sample of pupils, especially in the teaching of Islamic education material for pupils of Najaf Schools in Iraq. to know their opinions and work on analyzing it and conclusions extraction from it, Where e-learning contributes to working to confront and solve these problems, e-learning affects the improvement of the quality of the educational process.

Keywords: E-Learning, Quality OF Educational Process

1. INTRODUCTION

The modern world has witnessed many changes in information transmission technologies due to rapid technological advances. With the advent of computers, the Internet and mobile communications has increased the volume of information in the public domain, It becomes easier to access the necessary information and takes less time to solve problems, All we need is to turn on the computer and run the browser. And all the necessary information will be at our disposal on the screen.

Searching for information depends to a large extent on providing access to the Internet.

People are becoming more ability to the movement and better performance in multitasking almost everywhere around the world.

In order to solve problems efficiently, a person needs some knowledge in this field. In light of the Corona pandemic and the fear of the spread of this virus, most educational and non-educational institutions have been closed, and this crisis may be prolonged. Given that education is the basis for the progress of any country. It is necessary to employ this technology to introduce the teaching curricula to the pupils while they are in their homes. One of these methods is e-learning. Under the advanced technologies of information processing and means of communication, an unprecedented opportunity in Iraq to use electronic content in teaching. Where technological progress and the current state of education led to the emergence of e-learning in Iraq. Where this research deals with the concept of e-learning, the quality of the education process, how to apply it and the results derived from it, in addition to discussing that and identifying conclusions and recommendations (Istikomah & Ayuwanti, 2017).

2. LITERATURE REVIEW

2.1. E-Learning

E-learning gives us access 24 hours a day, 365 days a year, where e-learning is a powerful and effective alternative (Goyal, 2012). While (Lahti, et.al., 2014) stated that e-learning is not superior to the traditional method of learning, but it can be used as an alternative method in education, and e-learning should be used with a good understanding of learners' needs. (Etmad, et.al., 2021) defines e-learning as a modern teaching method that uses a progressive communication mechanism from computers, networks, multimedia, graphics, electronic libraries, as well as Internet portals. Where e-learning mainly depends on computers, modern devices and networks to provide knowledge and skills. E-learning is characterized by flexibility and positive adaptation to events to achieve the desired goals and become a reality and an urgent need. Accordingly, all universities and schools must improve their teaching staff for transferable integration into new teaching methods. And there are a lot of features associated with the adoption of e-learning technology, such as the following:

First. Providing interactive educational content with explanations, exercises, interaction and follow-up, partially or comprehensively.

Secondly. Providing an integrated educational system that uses technologies to strengthen and expand the educational process.

Third. Introducing a new way of giving and explaining lectures based on modern computer, web and multimedia technologies.

2.2. Quality Of The Educational Process

The (QOTEP) is the only solution to dealing with and solving pupils' problems. Elimination of school failures, and the process of teacher-pupil interaction in order to produce a high-quality product. It explains that there are several ways to improve the quality of education for pupils, and one of these methods is effective education, so that there is interaction and discussion between the teacher and the pupil, and freedom of discussion without coercion, so that the teacher creates an atmosphere during teaching that makes the pupil feel comfortable. The teacher helps them in the process of teaching and understanding the material, especially that Islamic education needs a lot of explanation and discussion to clarify all religious matters, ambiguity and confusion at times.

This is also what (Chalaris et.al., 2014) indicated that the (QOTEP) and the identification of means through which these means can be verified and improved for provide quality of education for pupils. The quality of education is one of the main responsibilities of any educational institution, The quality of education is one of the main responsibilities of any educational institution, not only ascertain the production requirements of high knowledge, But it is also necessary to provide effective education so that the pupils can reach their educational goals without any difficulty or problem.

3. RESEARCH METHODOLOGY

3.1. Research Questions and Hypothesis

The main questions of this research describe to measure the extent to which e-learning can improve the quality of the educational process, . For this reason, the current research aims to answer the following research hypothesis:

Is there a statistically significant correlation between e-learning and improving the (QOTEP)?

Is there a statistically significant impact between e-learning and improving the (QOTEP)?

3.2. Design questionnaire and sample

This research was done in 2021 in Al-Najaf Al-Ashraf, Iraq, in the Institution of Education for Intermediate Pupils, where e-learning was introduced for schools as an alternative to face-to-face education. The sample of this research was 32 pupils

They were examined by analysis quantitative data using Analytics of descriptive statistics. The data were analyzed by the SPSS statistical program to calculate descriptive statistics and tables.

The sample set was provided with a questionnaire adapted from (Fell & Baydak, 2015; Sandybayev, 2020; Salamat, et.al., 2018) and contained ten questions on five different scales (strongly disagree: 1 point, disagree: 2 points, neutral: 3 points, agree : 4 points, strongly agree: 5 points) for each question.

The questionnaire mainly assessed pupils' desire to use and operate e-learning

In order to measure e-learning for some specific groups. The table represents the questionnaire used. In addition, to research whether e-learning motivates pupils towards education.

3.3. Model Of Research

The research model shows the research variables represented by e-learning as an independent variable and the (QOTEP) as a dependent variable, which can be illustrated through the following figure:

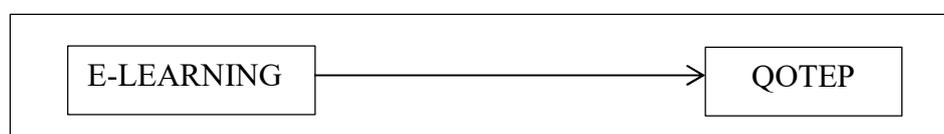


Figure 1. Modal Of Research

4. RESULTS AND DISCUSSION

Depending on the results of the table 1, related to the first hypothesis H1, the results showed a strong correlation between e-learning and improving the (QOTEP), corralation = 70% by answering the ten questions as in the table 4 .

Table 1. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.709 ^a	.503	.487	.85712

a. Predictors: (Constant), e-learning

As for the second hypothesis H2, it was found that there is an effect of e-learning on the QOTEP at a significant degree of 0.1%, table 2 and table 3, wherein Test Statisti > Critrial Value, for F test and T Test.

Table 2. ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	23.076	1	23.076	31.410	.000 ^b
	Residual	22.774	31	.735		
	Total	45.850	32			

a. Dependent Variable: QOTEP

b. Predictors: (Constant), e-learning

Table 3. Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients		Sig.
	B	Std. Error	Beta	t	
e-learning	1.260	.225	.709	5.605	.000

a. Dependent Variable: QOTEP

Through the above, H1 & H2 are accepted.

Table 4. Survey Questionnaire and STDEV and Average

Code	Question	STDEV.S	AVERAGE
Q1	Own a computer , tablet , or mobile phone	0.889757	4.333333
Q2	I can access the Internet	0.918043	4.30303
Q3	I am skilled in the use of a computer or tablet used for study	1.102683	3.818182
Q4	E-learning tools enhance my learning	1.252271	3.545455
Q5	E-learning motivates me to study at home without the help of others	1.317136	3.121212
Q6	I think my grade in Islamic education will improve by using e-learning	1.309927	3.181818
Q7	The use of e-learning in the Islamic education lesson is more interesting than the traditional method	1.317136	3.121212
Q8	I find teaching Islamic education easier when using e-learning	1.424222	3.181818
Q9	E-learning is an opportunity to improve the interaction with the teacher	1.54846	2.909091
Q10	I would like to learn Islamic education through the use of e-learning	1.317136	3.121212

5. CONCLUSION AND RECOMMENDATION

We conclude through the research that there is a strong correlation between e-learning and QOTEP. E-learning has an impact on improving the QOTEP. Where e-learning is a good alternative in the continuation of the pupil in education and raising his scientific level in the current situation, Where it motivates the student to teach and research better and not depend on the teacher only. Where e-learning increases the pupil's skills and motivates him to study without helping others only by accessing the Internet. It also works to organize the pupil's time well. However, we note from the sample answers that there is a not strong interaction between the pupil and the teacher.

Therefore, we advise the necessity of making a strong interaction between the teacher and the pupil to motivate him more and not make him feel bored. Rather, motivate him more and give him an opportunity for free discussion and scientific interventions. In order for him to have an incentive to raise his scientific level and improve HIS.

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THE IMPORTANCE OF THE DECISION – MAKING CRITERIA IN DECISION MAKING PROCESS

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ABSTRACT

The main aim of this research is to determine what are the most relevant factors that influence the decision-making process. Decision making can be studied as an individual or as a collective process. In the first case, the emphasis of the study is on the criteria used by individuals when making choices and decisions. In the latter case, the emphasis of the study is on the processes by which majority is built or by which approval is obtained. The individual can be subject to various influencing factors when deciding how to vote or resolve a particular issue. What will affect the individual the most, in this case is difficult to determine and specify. Officials often make statements explaining their decisions made in Congress or other official institutions. They do this through social networks, in political speeches, at press conferences, in separate court opinions, memoirs and elsewhere. Namely, the academic literature states that there are few criteria that influence the political choice and those are: values (personal, organizational, professional, political, ideological); party affiliation; constituency interests, public opinion; adherence or invocation of authorities or precedents and decision rules. The author gives an overview to this most relevant decision factors and tries to determine which one is the most relevant in the decision-making process for the politicians and other government officials.

Keywords: decision making, criteria, decision making process

THE SUCCESSIVE APPROXIMATION METHOD FOR SOLVING FREDHOLM INTEGRAL EQUATION USING MAPLE

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ABSTRACT

Scientists began to research natural phenomena, whether physical or biological, when the many sciences grew complicated due to their interactions and developed significantly. Biochemical, biological, or integral engineering equations of many kinds played a dual role in explaining these events and finding diverse solutions to them. Whether analytic or numerical, different mathematical disciplines, such as partial and differential equations, functional analysis, Theory of operators, transformers, and special functions, all use integral equations. As a result, there is no science derived from the several sciences unless integrative equations play a significant role. As a result, numerous academics were able to deduce various methods for solving integrative equations connected to the nucleus of the integrative equation unconnected and other types of integrative equations. We present an acceptable approach for the numerical solution of For Fredholm Integral Differential Equations using the successive approximation Method (SAM) in this research. The proposed methodology is utilized to solve first and second-degree linearity and the nonlinear system of Fredholm integral equations. It is a very effective numerical method. In addition, avoid arithmetic simplification and extended integration. Compare the exact solution as well. Approximate solutions were developed, and inaccurate answers converged to accurate, straightforward solutions. The results reveal that the proposed algorithm for solving Fredholm's integral equations is more specific, efficient, and faster than the Analytical approach.

Keywords: Successive Approximation Method; Fredholm Integral Equations, Maple18.

INTRODUCTION

The current research intends to the successive approximation method for solving Fredholm integral equation of the second kind using Maple18. Different types of analytical methods and numerical methods were used to Solve the problem [1]-[37]. The main objective of this work is to use the successive approximations method in solving the nonlinear Fredholm integral equation of the second kind using Maple. The paper is arranged as follows: In section 2, the successive approximations method. In section 3, Numerical examples are also considered to show the ability of the proposed method, and the conclusion is drawn in section 4.

The Successive Approximations Method

The Fredholm integral equation of the second kind

$$u(x) = f(x) + \lambda \int_a^b K(x, t) u(t) dt, \quad (1)$$

Where $u(x)$ Is the unknown function to be determined, $K(x, t)$ Is the kernel, $F(u(t))$ is a nonlinear function of $u(t)$, and λ is a parameter.

$$u_0(x) = \text{any selective real valued function,}$$

$$u_{n+1}(x) = f(x) + \lambda \int_a^b K(x, t) u_n(t) dt, \quad n \geq 0. \quad (2)$$

The question of convergence of $u_n(x)$ is justified by noting the following theorem.

Theorem.1see [16] If $f(x)$ in (1) is continuous for the interval $a \leq x \leq b$ and the kernel $K(x,t)$ is also continuous in the triangle $a \leq x \leq b, a \leq t \leq b$ the sequence of successive approximations $u_n(x), n \geq 0$ converges to the solution $u(x)$ of the integral equation under discussion.

NUMERICAL EXAMPLES

In this section, we solve some examples, and we can compare the numerical results with the exact solution.

Example1. Consider Fredholm integral equation of the second kind

$$u(x) = x + \sec^2 x - \int_0^{\frac{\pi}{4}} xu(t) dt$$

with the exact solution $u(x) = \sec^2 x$.

Table.1 Numerical results and exact solution of Fredholm integral equation for example 1.

x	$Exact1 = \sec^2 x$	u	$Error = Exact1 - u $
0.10000	1.0100670	1.0097880	0.0002791
0.20000	1.0410914	1.0405332	0.0005582
0.30000	1.0956889	1.0948516	0.0008373
0.40000	1.1787541	1.1776377	0.0011164
0.50000	1.2984464	1.2970509	0.0013955
0.60000	1.4680432	1.4663686	0.0016746
0.70000	1.7094497	1.7074961	0.0019536
0.80000	2.0601556	2.0579228	0.0022327
0.90000	2.5879987	2.5854869	0.0025118
1.00000	3.4255188	3.422727	0.0027909

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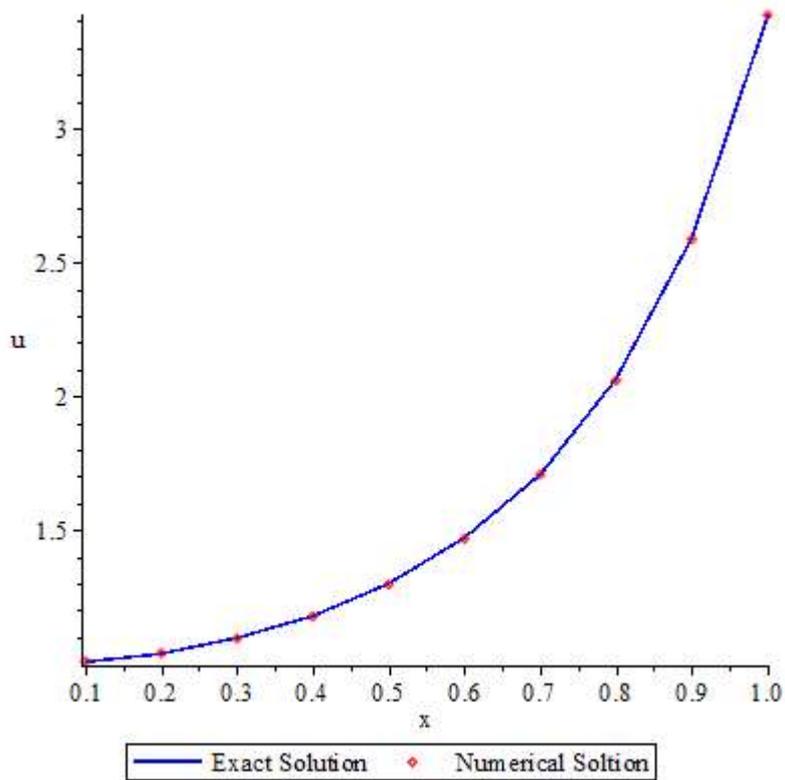


Fig. 1 the exact and approximate solutions result Of Fredholm integral equation for example 1.

Example2. Consider Fredholm integral equation of the second kind

$$u(x) = \sin x + \sin x \int_0^{\frac{\pi}{2}} \cos t u(t) dt ,$$

with the exact solution $u(x) = 2 \sin x$.

Table.2 Numerical results and exact solution of Fredholm integral equation for example 2.

x	$Exact1 = 2 \sin x$	u	$Error = Exact1 - u $
0.10000	0.1996668	0.1965470	0.0031198
0.20000	0.3973387	0.3911302	0.0062084
0.30000	0.5910404	0.5818054	0.0092350
0.40000	0.7788367	0.7666674	0.0121693
0.50000	0.9588511	0.9438690	0.0149820
0.60000	1.1292849	1.1116399	0.0176451
0.70000	1.2884354	1.2683036	0.0201318
0.80000	1.4347122	1.4122948	0.0224174
0.90000	1.5666538	1.5421749	0.0244790
1.00000	1.6829420	1.6566460	0.0262960

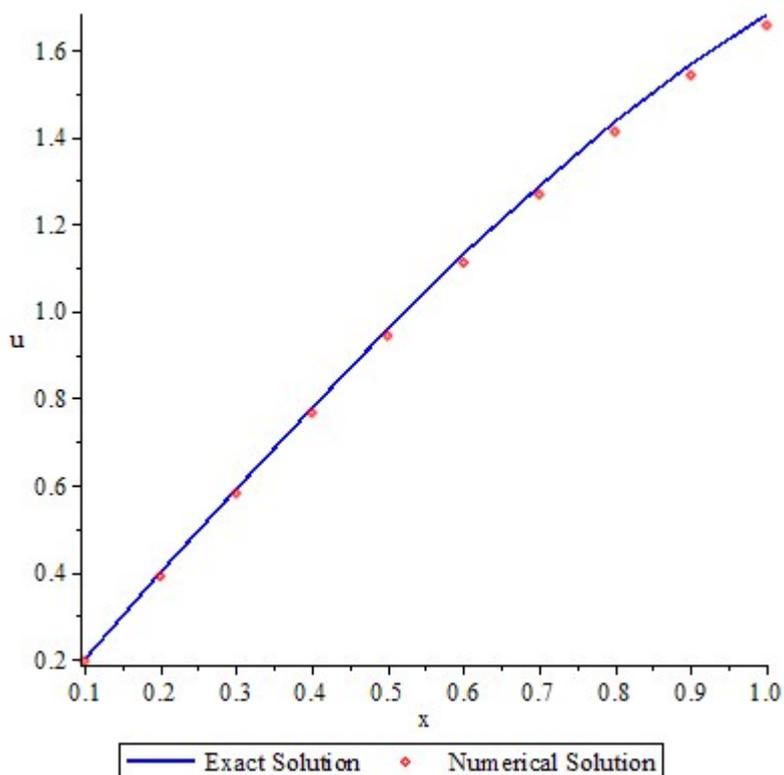


Fig. 2the exact and approximate solutions result Of Fredholm integral equation for example.

Example3. Consider the nonlinear Fredholm integral equation of the second kind

$$u(x) = x + \lambda \int_{-1}^1 xtu(t) dt ,$$

with the exact solution $u(x) = \frac{3x}{3-2\lambda}$.

Table.3 Numerical results and exact solution of Fredholm integral equation for example 3.

x	$Exact1$ $= \frac{3x}{3-2\lambda}$	u	$Error$ $= Exact1 - u $
0.10000	0.1500000	0.1499314	0.0000686
0.20000	0.3000000	0.2998628	0.0001372
0.30000	0.4500000	0.4497942	0.0002058
0.40000	0.6000000	0.5997257	0.0002743
0.50000	0.7500000	0.7496571	0.0003429
0.60000	0.9000000	0.8995885	0.0004115
0.70000	1.0500000	1.0495199	0.0004801
0.80000	1.2000000	1.1994513	0.0005487
0.90000	1.3500000	1.3493827	0.0006173
1.00000	1.5000000	1.4993141	0.0006859

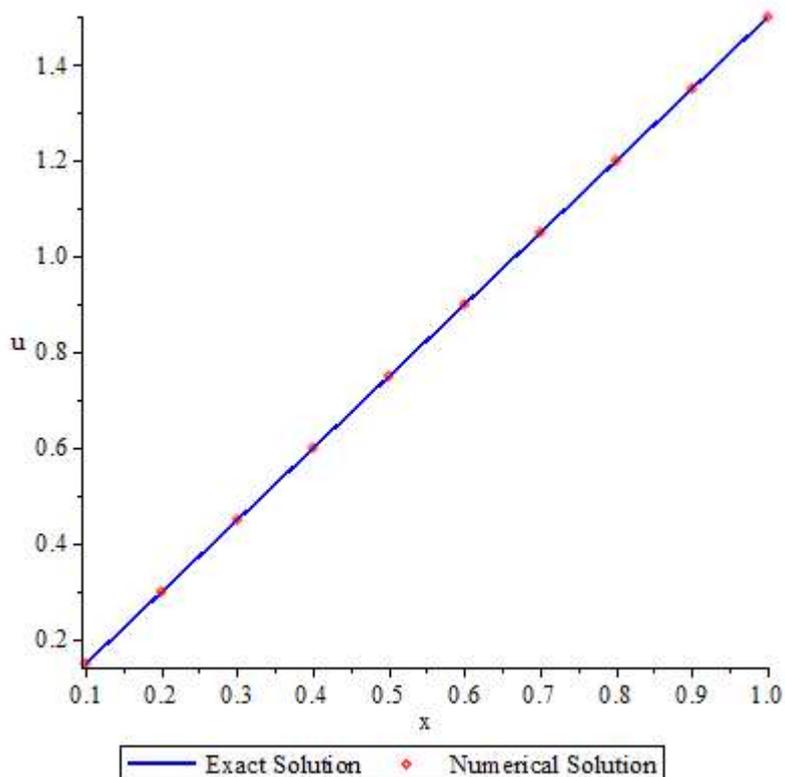


Fig. 3 the exact and approximate solutions result Of nonlinear Fredholm integral equation for example 3.

CONCLUSION

In the paper, a successive approximations method is presented for solving the r Fredholm integral equation of the second kind using Maple18. The benefit of our method lies in the fact , for some nonlinear problems, our method is still convergent as illustrated by figures and tables showing match the right accuracy, that show that the exact solution with the approximate solution is largely identical and noticeable .Accuracy and application are displayed through some examples. Numerical results show that the accuracy of the solutions obtained is good.

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SUPERVISION IN A PEDAGOGICAL ENVIRONMENT: AN INNOVATIVE WAY TO SUPPORT PROFESSIONAL AND PERSONAL DEVELOPMENT OF PEDAGOGUES

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ABSTRACT

Supervision is wide-known method to horizontally support humanitarian experts, especially social workers, psychologists, health-care workers, therapists and number of others humanitarians professionals. It has been actively and in detail developed since the end of the XX century, but it is still an almost unrecognizable approach to the pedagogical world (unstructured, unregulated) and as such fails to offer adequate support to the pedagogue by analogy with other humanitarian professionals.

The present study develops a concise characteristics of supervisory practices from the humanitarian world and based on it opens opportunities to run innovative way to support pedagogues through supervision; offers regulation of the supervision in a pedagogical environment; envelops supervision with the positive education and throughout all these expands supervision as a tool of the educational management.

Keywords: supervision, educational management, support, development, pedagogical professionals

I: INTRODUCTION

Human resource supervision generally dates back to the second half of the XX century. Initially it is developed in the economical sector, incl. production processes, banking and so on. Gradually, thanks to its beneficial impact on both process management and the quality of the workforce, supervision entered the medical industry and health care and in the late XX century - the social sphere. Since the medical and the social spheres are major components of the humanitarian sphere, it is logical to assume, that supervision would be perceived positively in the humanities as a whole. Given the huge section that the pedagogical world occupies in the humanitarian sector, it is appropriate to focus on the opportunities that supervision offers to the pedagogical specialists.

Scientists and research authors define supervision in different ways - as a process, as a tool, as a criterion for quality management. Judith Kaufman and Thomas Schwartz characterize supervision's goal to achieve effectiveness of developing and shaping a professional identityⁱ (Kaufman, J., Schwartz, Th., 2008). Due to F.J. Reh, supervision is a form of planned assistance to the professional in the work as well as a tool for monitoring the quality and efficiency of effortsⁱⁱ (Reh, F.J., 2020). Alfred Kadushin and Daniel Harness develop a wide range of understanding for supervision in humanitarian world, especially focusing on social workⁱⁱⁱ – a process of discussing problems and conflicts in professional interaction, designed according to certain rules; supporting the expert to learn from own experience, to develop own skills and to improve the quality of own work; a method by which a professional receives help in understanding the situation where works, own role and behavior in it (Kadushin, A., Harness, D., 2014). Carlton Munson says supervision is a tool to ensure a good emotional climate in the team^{iv} (Munson, C., 2001).

Based on own researches and practices, it could also be added that supervision is:

- Rational dialogue through which the reconstruction of the experience from practice, trainings and previous counseling is carried out;
- Reflection on a case study;
- Methodologically structured reflection on professional activity, both on a cognitive and emotional level;
- Supporting and developing process;

- Part of the educational process that recognizes the importance of learning by practice;
- A process of reflection on professional's behavior succored by another person, in order to improve the practice;
- A way for supervised experts to receive professional support, guidance and a developing flair;
- Combination of elements of specialized counseling and psychotherapy to create conditions for awareness of their own behavior in the profession and related feelings, as well as to take concrete action.

None of these characteristics is in conflict with the possible supervision in pedagogical environment. On the contrary, supervision for pedagogical experts is stepping on achieved since end of XX century till nowadays and accounting strengths of humanitarian experience, it has the opportunity to present a contemporary and innovative way to horizontally support key professionals for the society – as pedagogues are.

II: WHAT DOES SUPERVISION LOOK LIKE IN THE HUMANITARIAN WORLD?

Historically, supervision is effectively proven process worldwide, used as an indispensable element in social, medical, psychological and other services. It starts by transferring good practices from economical area by successful analogue to managerial processes targeting human resources development and advancement. Widening its implementation among the specific humanitarian world, supervision process is enriched with sensitiveness to personal attendance of the professional in the work process, to the satisfaction, perception of success and progress. In the contemporary practice, supervision is recognized as ongoing support for the human resources, ensured by the humanitarian management, however targeting horizontal gratification of the workforce. It is, generally, help by an expert who's experienced enough to understand other professional's situation and to reflect with a different point of view by strengthening own resources and situation abilities in a short period of time.

Methodologically, the supervisor creates an attitude in which the supervised feels comfortable enough to discuss own shortcomings and mistakes. The process inspires calmness and confidence through personal and professional experience, based on which the supervisor manages to lead professionals through the work obstacles that require supervision in the humanitarian field. Some of the main milestones of such operation are:

- Supporting the professional/team in understanding the targets of the case and the goals for process effectiveness;
- Conducting a focused dialogue to illuminate supervisee's specifics;
- Supporting the programming of working hours and work commitments;
- Encouraging coordination between professionals;
- Promoting conditions for rotation of work commitments (and points of view), incl. mutual exchange of experience and learning from the experience of a colleague;
- Providing real-time feedback on the challenge that requires supervision - on the effectiveness of the moves taken, the relationships built and the decisions made;
- Sharing new targets and goals;
- Identifying the boundaries of the challenge that requires supervision;
- Naming problems in the workplace (including related to time-consuming processes, resource-intensive, etc.);
- Supporting the provision of management approval;
- Developing supervisee's knowledge, understanding and ability to apply theories so that own actions rest on a wider information base;
- Effective recording of supervision - both by the supervisor and the supervisee (accurate recording allows to effectively evaluate the session at the next stage);

- Avoiding the temptation to offer ready-made solutions to work dilemmas immediately.

As a key approach, Carlton Munson is emphasizing the principle "everyone supervised is unique and this must be taken into account" (Munson, C., 2001).

Practically, supervisor is the person in front of whom professional has the opportunity to express feelings in a protected environment; who is able to think in togetherness in a way to improve supervisee's work. The supervisor is an expert with a similar practice and usually comes from the same professional field, but has a different view of the scope of activity of the supervisee.

Systematically viewed, an example from practice in Bulgaria shows that social service providers for children are assured by national regulations with at least 12 supervisions (team and/or individual) per year. As stipulated in the Regulation on the criteria and standards for social services for children (2003), Standard 13 point 4 "the members of the staff working with the children are provided with monthly supervision, and a report is drawn up for the results"; Standard 15 point 10 "the social-services-providing staff is covered with supervision by well-trained and qualified specialists with experience in the field ..."; Standard 22 point 1 "the service provider periodically evaluates the professional and personal qualities of the staff, provides training, support, supervision and monitoring in the process of work"^v.

Many other examples could also be given by other countries worldwide, since supervising in humanitarian area is well developed in the last 3-4 decades.

III: WHAT (MAY) SUPERVISION LOOK LIKE IN A PEDAGOGICAL ENVIRONMENT?

Challenges in front of the contemporary pedagogical environment are divers and almost vast. Terry Heick defines 15 challenges for the modern teacher wrapping 9 general areas with priority on personalization, classroom management, lesson planning, students relations, privacy, invisible technologies, etc^{vi}. (Heick, T., 2015). Jason Lodge, Gregor Kennedy, Lori Lockyer, Amael Arguel and Mariya Pachman provide integrative review on difficulties and confusions in learning process and put an accent on educational environment as a whole^{vii} (Lodge, J. et al, 2018). Despite its importance, understanding, identifying and responding to difficulties and the resulting emotions in learning can be problematic. Without the affordances of synchronous face-to-face human interaction, emotions like confusion are difficult to detect. Humans are uniquely tuned to respond to the emotional reactions of other humans^{viii} (Damasio, A., 1994).

Brenda Alvares, Tim Walker, Cindy Long and Amanda Litvinov turn attention to the challenges in the school organization highlighting the special participation of the administrators, drivers, councilors, paraeducators, etc. and, like Mariya Packman's studies, put an accent on the importance of the team spirit and coordination, educational environment in its various faces and the balance between the resources available and processes ongoing^{ix} (Alvarez, B. et al, 2018).

If additional researches are studied, plenty of challenges will be detailed for each and every contact point of the elements in the educational system. However, the essence is that all these points are focal for supervisions in the pedagogical environment and vary among the concrete expert, team, city, community, financing situation, managerial style, etc. That is why, wrapping in systematic approach the thematical scope of pedagogical challenges is essential for organizing and providing supervision. Such approach could be spread in 4 groups:

1. Challenges of behavior – like aggression, stubborn, crimes, etc.
2. Challenges of emotions – like fear, anger, depression, etc.
3. Challenges of social communications – like family issues, interpersonal relations, peers, etc.
4. Challenges of addictions – like electronic devices addictions, addictions to people, addictions to web-communications, hierarchical issues, etc.

As pedagogues' reactions are human reactions and so, unique ones, it is logical to highlight that a particular pedagogical challenge could be a behavioral one for one expert and emotional one to another. So, systematical

approach mainly helps the supervisor to be oriented in the grounds of the session, trying to clarify as possible in advance the scope of the supervision, so to be adequately prepared for ensuring its efficiency and good quality. Together with that, challenges may conditionally transfer in different periods of time and eventually become social issue after being behavioral, for example.

It should also be assumed that as a pedagogical innovation, supervision is not well recognized yet, so requesting it may not be specified well by the pedagogue or it may not be even respected as a necessity. On this basis, supervisor should be as active as needed to manage the session in advance and on-going in a way to even educate the pedagogue how to use supervision as a modern horizontal-support tool.

In 2020 analyses on pedagogical supervisions held in 2019 for 381 Bulgarian pedagogues are implemented. Due to the data, 21 % of the supervisions are part of the scope "emotions", 34.1 % "social communications", 7 % "addictions" and 37.8 % "behavioral challenges" (see Fig. 1) - shares, formed by the declared interest of the supervised persons^x (Kaneva, O., 2021).

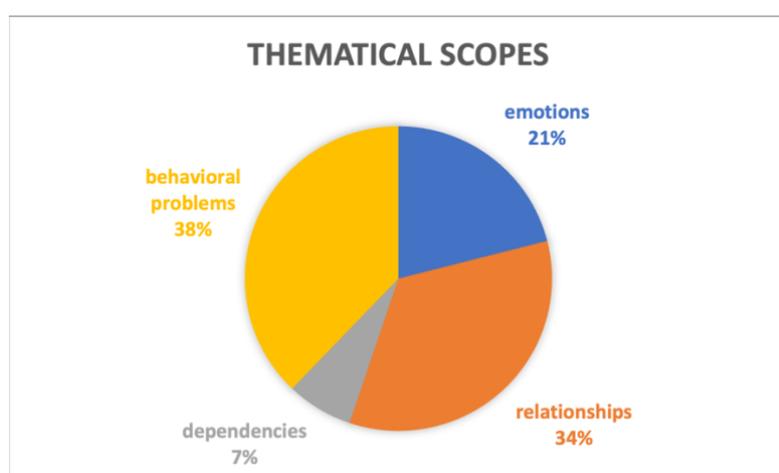


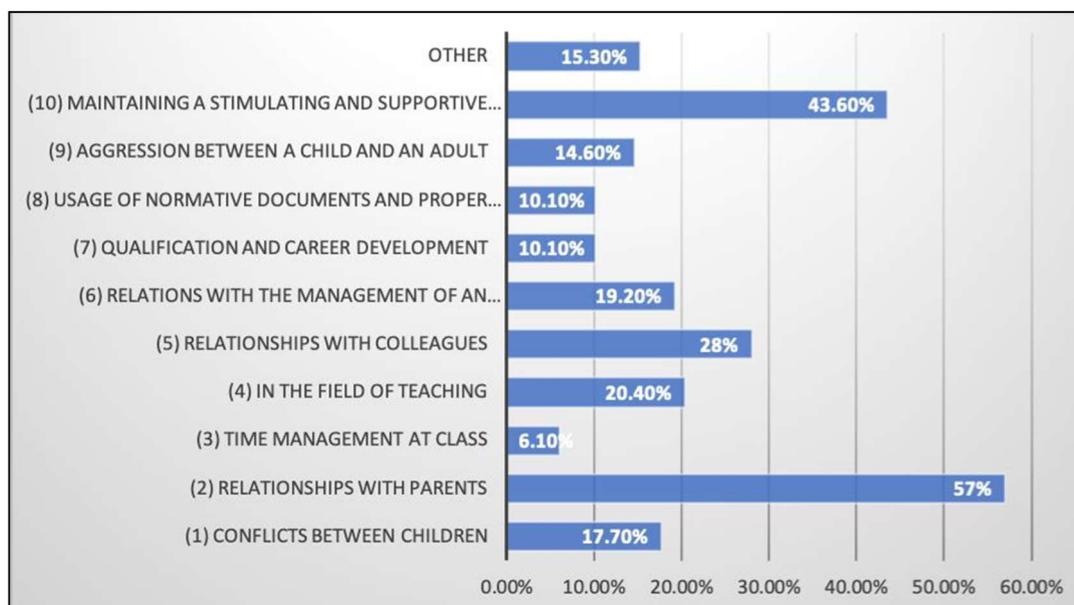
Fig. 1

Going deeper to the pedagogical environment, thematic scope should be detailed better according the challenges that experts meet. Stepping on empirical data of the same Bulgarian analyses, pedagogues demonstrate some typicality in facing challenges, like:

1. Every fifth pedagogue has difficulties in dealing with **conflicts between children** (17.7 %);
2. **Relationships with parents** is a serious challenge for the pedagogical specialist (57 %);
3. **Maintaining a stimulating and supportive educational environment and positive discipline** is a challenge for every second teacher (43.6 %);
4. **Time management at class** challenges just a few of the educators (6.1 %);
5. Every third pedagogue is caused by disharmonious **relations with colleagues** (28 %);
6. Every second in **relationships with the management of an educational organization/institution** (19.2 %);
7. Every fifth faces challenges **in the field of teaching** (20.4 %);
8. **Qualification and career development** concerns every tenth (10.1 %);
9. As well as the **implementation of normative documents and proper keeping of school documentation** (10.1 %);

10. **Aggression between a child and an adult** is an issue in 14.6 % of the supervisions;

11. **Other** concerns like working with groups in which there are children at risk and/or children with special educational needs, etc. (Fig. 2)



So, in proposing a basic structure for pedagogical supervisions, typicalities demonstrated should be taken under attention both sides – for better orientation of the supervisor and the supervisee.

In addition, by analogue of the successful practices in the other humanitarian spheres, an individual and a team supervision should be available for each and every pedagogue, since necessities and challenges are reflected differently in a group and individually.

And since the modern education and living, in general, insists for high-quality and short-term reactions, wider opportunities for personal development, higher motivation and active participation, supervision is needed to reflect the pedagogue's contemplation on work: (1) It provides opportunities to highlight ethical complication; (2) It studies the professional interventions on particular cases; (3) It supports better understanding of own abilities, strengths and weaknesses; (4) It upgrades the pedagogue with clear assessment of own teaching; (5) It ventilates the pressure and stress of school dynamics, (6) etc.

Supervision in the production industry is definitely an instrument of the management and owners of the company. In the humanitarian world, however, supervision is a tool for supporting the professional, ensured by the employer, in favor to the employee. The supervisor should mandatory recognize the difference in these positions and despite the hierarchical connections and economical dependances, supervisor is successful when ensures effective support to the professional. And this is relevant to the pedagogical environment as well.

IV: SUPERVISION AS AN OPPORTUNITY TO SUPPORT THE TEACHING STAFF

The collective spirit, team dynamics, support and development of abilities for group interaction in pedagogical environment are crucial for the educational system, management and participants at all. So, it is relevant to look for particular group contact points in horizontal supporting tools that supervision presents.

Explicitly, teamwork skills and dynamics are demonstrated as verbal and nonverbal. Pravin Chopade, David Edwards, Saad Khan, Alejandro Andrade and Scott Pu work on collaborative problem solving constructs, defined as a combination of 21st century skills and behaviors, which are progressively more important in

today's multifaceted and interconnected world^{xi} (Chopade, P. et al, 2020). Due to the authors, collective problem solving is a core competency in the workforce. It also could be considered as educational standard as well as assessment program item. This clearly indicates a growing awareness of the impact of collaboration on educational outcomes and therefore it should definitely be an element of pedagogical support system, including supervision.

Although collaboration is hard to assess, however it's recognizable as a critical skillset nowadays, so it should be presumed as a key ground for constructing pedagogical supervision in process. Supervision may be requested by a team member due to feeling of tension in the collective – as prevention of suspected conflict or as opportunity to solve already existing team pressure; also as an option to gain additional skills and knowledge about using team resources for managing with the team dynamics successfully. Supervision may not be requested, however needed to clarify administrative issues, cooperation with partners or stakeholders, communication with parents and other relatives, balancing hierarchical relations in the team and community as well as better supporting personal development of the trainees, not just teachers. All these are issues of collective character which cannot be fully wrapped with individual approach only. Together with that, the strength of the collective interaction could also help the pedagogue to deal with professional challenge in individual way without contra-versioning the team spirit. Therefore it is significant to provide opportunities for group supervising sessions in each thematical scope regularly.

V: SUPERVISION IN SUPPORT TO PEDAGOGUE

Positive effect of the strengths on good life, happiness, search of sense and meaning, pleasure and enjoyment, relationships, tackling challenges and strengthening resilience^{xii} has been already proven by the modern science in 21st century (Stamatov, R., 2020). Strengths of the character open distinct paths to great virtues^{xiii} (Peterson, C., Seligman, M., 2004) and create the basements of human existence, identity and behavior^{xiv} (Niemiec, R., 2014). A distinctive feature of the strengths of the character is the fact they are universally recognized and valued, with a moral orientation, which guarantees use dedicated to making the world a better place to live^{xv} (Park, N., Peterson, C., 2009). Therefore, the personal development of the pedagogue is of significant meaning for the educational environment, its management, effectiveness and efficiency.

The supervised may be the one realizing the necessity of supervision and clearly states and seeks for it. However, this may also be a professional who's management judged the need of targeted support at work. Supervision may be requested in a moment of hesitance on professional's case position. It is also applicable when self-vision on the next professional steps is not clear for the pedagogue. And may support discovering the reasons for joy and happiness in professional and personal life process. Or could be the illuminant of strengthening the influence of the natural environment in pedagogue's position. Supervision is also the support of identifying needed in addition people and workforce in a particular challenge, as well as precisizing time-schedule and formal activities. Possible problems in development could be found in advance, so barriered efficiently on time and abilities to count and understand clearly the progress could be developed better.

Based on all these, supervision is identifying pedagogue's strengths and targets their investment in managing the challenges of the professional.

VI: POTENTIALS AND OPPORTUNITIES FOR SUPERVISION REGULATION IN PEDAGOGICAL ENVIRONMENT

It is relevant to announce that usage of the same word "supervision" hides different concepts and humanitarian understandings worldwide. In Portuguese educational reform supervision is involved as middle management position among teachers^{xvi} (Coimbra, M. et al, 2020). It is pedagogical innovation for Bulgaria, however good social practice is already gathered in the country and works as basement of educational supervising approach where supervision is horizontal support for the pedagogue. British system recognizes supervision as activities of staff of training institutions in relation to students on initial teaching training and in USA the connotations embrace the activities of para-pedagogical corps of people in a superordinate relationship with practicing

teachers in schools, as well as those activities cognate to British conceptions (Stones, E., 1984^{xvii}). Understanding as peer-to-peer review among teachers is also found in Portugal, Georgia, etc.

All these concepts are spinning around the needs of the educational system and management in general. However, stepping on contemporary researches about strengths, as demonstrated above, personality of the professional is the key answer for success, so support at horizontal level with vertical guarantees seems like most appropriate for modern pedagogical environment. An example with Bulgarian social systems has already demonstrated that professionals are ensured minimum monthly with supervision support. It is legislatively regulated at national level and it is monitored and controlled both by authorities and social management. Respecting the dynamics in pedagogical environment, educational semesters should be the guideline for enveloping the supervising support. Every pedagogue should be guaranteed on semestrial base that at least one individual and one group supervisions are provided for support. Highlighting the importance of both group and individual interactions, no doubts are left for the need of both approaches in horizontal support.

The theory is not giving answers about the maximum number of supervisions that professional may have per year. It should be an appraisal of the particular professional, collective and organization embracing the educational relationships. However, the duration of the supervision might be set, based on empirical experience and in connection with the aim to structure the supervising session properly. Stepping on the need to envelop understanding about the particular challenge, discovering the strengths, history of own activities and their reflections to the situation and to the supervised professional, building paths and guidelines for activities in the near future and beyond, and in the same way keeping strict and tight approach in the session, it is relevant to define that individual supervision shouldn't take more than 1 hour and the group session shouldn't be longer than 2 hours. Otherwise interaction won't be well arranged and so it won't be effective enough as a supportive tool to the pedagogue.

Based on cases from the field, theory and practice (Kaneva, O., 2021), shaping the understanding about supervisor shows that this should be an outstanding person, invited by the educational organization to support professionals' work in need of support. The supervisor should be "a colleague" to the supervised professionals in a mean to have the experience of standing in similar shoes, although not being part of the particular cases. Personal potency and rich background of the supervisor are coral for the quality of the interaction during the session. This all reflects on the curriculum for preparing supervisors – a topic out of present research' scope, since shifting from pedagogical support to curriculum may leave the focus now out of place within the school organization.

Administration of the supervision process is needed not only to regulate the financial relations between the sides but also to ensure proper tracking of the challenges and their solving. It is also needed to focus the professional in the time after supervision was held, since the structured steps during it may embrace longer period and a chance for distraction that slows the effect of session appears. In addition, regulatory documents concerning supervision should allow tracking quality performance, mostly in the content. Based on the regulatory framework, including ethical standards and other regulations, the administrative coverage should also outline the profile of those who proposed supervision.

Supervision is applicable only in a professional ground and environment.

VII: CHALLENGES TO SUPERVISION IN PEDAGOGICAL ENVIRONMENT.

Challenges to supervision in pedagogical area should be connected directly to the challenges of the environment itself. Managerially they could be ones, systematically – others, on behalf of the State – thirds, by the view of the students – forth, and so on, and so on. As it was already stated, supervision is valuable precisely because of the opportunity to support the pedagogue at her/his level, without challenging the authority, belittle the efforts or weaken the professional positions – no matter the case or challenges she/he is involved.

In this regard, all challenges that may be started as identification (since it's an endless process), are subordinated to the needs of the pedagogue:

(1)Legislative

- a. Legislative frame at certain operative level should guarantee the pedagogue access to horizontal support during each semester;
- b. The guaranteed by legislation supervisions should be part of pedagogue's qualification file;
- c. some teachers continue to associate supervision with evaluative and bureaucratic procedures, which affects interpersonal relationships between supervisors and teachers – a circumstance to be clarified legislatively.

(2)financial

- a. The guaranteed by legislation supervisions should be covered financially with the school budget for each and every particular pedagogical expert in the team;
- b. Supervision should not be depended by subjective managerial issues typically influencing the financial complications.

(3)lack of supervisors

- a. a curriculum for supervisors should be developed at university level;
- b. supervisors' data base should be kept at highest national level, most probably in the ministry of education, since this authority is responsible for the qualification levels of the pedagogues in the school system in general.

(4)bad school management

- a. managerial system without respect to team's necessities and dynamics;
- b. confusion between supervision and teacher performance evaluation due to continuous understanding of supervision as evaluative.

(5)awareness of professional (and personal) burnout

- a. lack of understanding about burnout;
- b. self-underestimation of own needs and progress.

(6)self-management of personal development and professional realization

- a. inadequate carrier appreciation;
- b. low lifestyle targets;
- c. deficient balance between personal and professional dynamics;
- d. poor sensitiveness about happiness and strengths.

(7)school autonomy

- a. activities, based on democratic management practices, collaborative and thoughtful work - considered essential for the reinforcement of continuous teacher training;
- b. evolution of the school dynamics as educational community, based on sensitive collective understanding and progress at individual professional level.

(8)accumulation of good practices

- a. positive support style to staff is not always recognizable and welcomed by the institutions, so accumulation of good practices is needed to change the trend;
- b. incertitude about own needs and targets could be well oriented by good examples and influence of the practice.

(9)others

VIII: OPINIONS, SUGGESTIONS AND CONCLUSIONS ABOUT SUPERVISION AS EDUCATIONAL MANAGERIAL TOOL

Empirically and academically analyzed, could be round-off that: (1) the supervisor's profile for pedagogical specialists is still unshaped; (2) the university curricula for supervisor's training should be developed; (3) thematical areas in which the supervision can effectively cover the support of the pedagogical specialist are established, however not sustained enough yet; (4) the basic structure of individual and group supervision is set; (5) the support to supervisors should be standardize; (6) monitoring processes should be applied regularly, maintaining high quality supervision; (7) good practices should be gathered and so on.

The practical implementation of supervisions for teachers in Bulgaria in 2019 demonstrated that legal framework, especially in its reading as an element of the career support and growth of the pedagogue, should be refined. It also exhibits options for economical cover of the supervision process, however exhibited the gratification and contentedness of the pedagogies - 99 % satisfaction of the supervised pedagogues. Based on this good example, in 2021 a transfer and upgrade of supervising practices is continued in Austria and in Greece^{xviii}.

Educational management should ensure wide ground for knowledge, habits, skills to socialize better and achieve higher life standards. Human's welfare was never as essential as being expected by the school system in 21st century. So, managerial approach should guarantee systematic understanding and reflection on each educational element and contact point. As supervision. Such supportive instrument improves (not limited to):

- (1) ventilation of workflow pressure;
- (2) enriching the positive attitude to profession;
- (3) balancing the relationships in the collective, mastery of conflicts and aggressive behavior;
- (4) stabilizing connections with the parents and community partners;
- (5) maintaining a stimulating and supportive environment and positive discipline;
- (6) improving time-management and teaching process;
- (7) carrier and qualification development;
- (8) administrative competences and proper keeping of school documentation;
- (9) confidence (systematical and personal).

It is obvious, supervision answers the necessities of contemporary pedagogue experts in professional (and not only) environment. It also allows the professional to grow up not only for self-development, but with priority for the community and for the educational system. That is how supervision should be understood as a modern, flexible, dynamic, effective and efficient managerial tool through which active development, welfare and higher standards are achieved.

Together with that, supervision ensures ground for positive education, for democratic management in school, for burnout prevention, upgrading skills, specifying expertise, discovering new points of view, enriching the varieties of pedagogical specialists, widening horizons, personal and systematical grow.

And all these findings put pedagogical environment in a particular new challenge to manage with the insufficiently explored field that warrants studies aimed at finding a balance in the introduction and implementation of process supervision in educational environment – not as innovation anymore, but as sustainable supportive tool for pedagogues.

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INTENTIONALITY AND THE QUR'AN

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ABSTRACT

This paper investigates the philosophical term of 'intentionality' with respect to the Qur'an, the sacred text of Muslim. The focus is on the idea of *Shia* theologians particularly Allamih Tabatabai, the prominent commentator and philosopher of the twentieth century Iran. The issue of intentionality has been a contentious topic throughout the history of hermeneutics and scholars from various philosophical schools and religions have presented contradictory statements about it. Overall, in the issue of intentionality there are three main axes; author, text and reader (interpreter), and depending on which one is in priority, our hermeneutical orientation will be determined. In other words, they play the central role in the debate of intentionality. However, the issue of intentionality has evolved into a dilemma and scholars from various schools have posed different ideas. It is evident that there are lots of differences between *Shia* theologians and other scholars about the aim of interpretation. Since sacred texts such as the Qur'an have specific purposes so some kinds of interpretive methods cannot be applied to them. In fact, those kinds of hermeneutical methods, which neglect the author and his intention, are not appropriate for the interpretation of the Quran. Apparently, there are rudimentary differences between Islamic hermeneutics and Christian-West forms of hermeneutics, in particular philosophical hermeneutics. Gadamer as a distinguished member of philosophical hermeneutics has brought up specific idea in the realms of understanding and interpretation. In this paper, the differences between *Shia* and philosophical hermeneutics (generally from Gadamer's perspective) including the issue of intentionality, reader's prejudices and presuppositions and the validity of interpretation will be explored. This article is based on text analysis and tries to answer to one question, how author's (God) intention behind the Quranic texts could be understood?

Keywords: The Qur'an, Allamih Tabatabai, Intentionality, Hermeneutics

INTRODUCTION

The issue of intentionality has been a contentious topic throughout the history of hermeneutics and scholars from various philosophical schools and religions have presented contradictory statements about it. It could be said that before Heidegger, despite some philosophical and theological dissension, scholars shared common hermeneutical principles. Generally, they had objectivist attitude and believed in determined meaning of a text. According to them, it was possible to value our interpretation and distinguish between the true and false interpretation. While in 20th century subjectivism and relativism became the preponderant view amongst scholars. However, there are still scholars who emphasise the objectivist theory of interpretation like Hirsch and Emilio Betti.

Overall, in the issue of intentionality there are three main axes; author, text and reader (interpreter), and depending on which one is in priority, our hermeneutical orientation will be determined. In other words, they play the central role in the debate of intentionality. Mainly, objectivist scholars focus on the author's intention. From their perspective, the aim of interpretation is to discover the author's determined meaning. However, during the past few decades there has been an all-out assault on this opinion and the advocates of author irrelevant theory tried to shift the focus of discussion from author to the text. This attitude led to the theory of semantic autonomy, which leaves no room to author as the determiner of the text. From this standpoint, since the text has been composed of meaningful words, thus its author has nothing to do with the meaning and he just organized the words and constructed the text. Therefore, the aim of interpretation is to find out what the text says, not what its author intended. It seems that the advocate of philosophical hermeneutics more than other scholars have emphasis on the theory of semantic autonomy.

Above attitude has been rejected by scholars like Hirsch. According to him the meaning of the text is intentional issue. It means that the text always presents someone's intention. He declares, "Whenever meaning is connected to words, a person is making the connection" (Hirsch 1967, p. 4). Furthermore according to him readers should consider the ethical dimension of reading as well. He declared "when we simply use an author's words for our own purposes without respecting his intention, we transgress what Charles Stevenson in another context called 'the ethics of language' just as we transgress ethical norms when we use another person merely for our own ends" (Hirsch 1976, p. 90).

Deliberately or not, the idea of semantic autonomy, that omits the role of author in the process of understanding and gives his place to readers, results in some theoretical confusions that some of them will be mentioned below.

- A) There will be multiplicity of meanings and none of them has superiority to others.
- B) No one has this authority to judge the validity of interpretation. In this regard Hirsch said "to banish the original author as the determiner of meaning was to reject the only compelling normative principle that could lend validity to an interpretation". He adds "if a theorist wants to save the ideal of validity, he has to save the author as well" (Hirsch 1967, p. 5).

As was already mentioned, hermeneutics has three main axes, author, text and reader and with respect to these key elements, various philosophical and religious debates emerged over a time, particularly about the issue of intentionality in sacred texts. Along with other scholars, *Shia* theologians developed their own opinion. In fact they simultaneously consider all three factors, author, text and the reader. According to them, in the process of interpretation the important point is the aim of interpretation and depending on this each of those key factors could become the kingpin of interpretation. As a result, several questions arise like, what does the term 'interpretation' mean? Or what is the essence of interpretation in the eyes of *Shia* theologians? One can respond to these questions by saying that, interpretation at least can be defined in two ways.

- A) 'Interpretation' means to explain a text in order to discover its author's intention and in this process an expounder is required to decipher the author's determined meaning. According to this perspective, a text is like a bridge, which can help a reader to reach the author's intention. To this end, it is necessary that the reader be acquainted well with the context of the text, social and historical situation, author presuppositions and pre-understandings, etc. In this regard, Schleiermacher states "the meaning of each word in a passage must be determined by the context in which it occurs" (Thiselton 1992, p. 226). It is obvious that in this kind of interpretation, author is the central element and the interpreter has to find out the determined meaning beyond the external appearance of the text. In other words, the aim of interpretation is to perceive the author's intention. However, some scholars like Schleiermacher believes that "the interpreter can grasp the meaning of the text better, or more fully, even than its author" (Thiselton 1992, p. 225). Dilthey also believes that, "the final goal of the hermeneutics procedure is to understand author better than he understood himself" (Dilthey 1986, p. 104).
- A) 'Interpretation' also means to explain a text in order to find what a text means to us. In this kind of interpretation, there is no room for author and his intention but instead this is the text, which plays the central role. In this process, an expounder focuses on the text to find the meaning. Thus, it is possible that he discovers meanings that the author has not intended them. In this regard, Ricoeur asserts: "writing renders the text autonomous with respect to the intention of the author. What the text signifies no longer coincides with what the author meant" (Ricoeur 1981, p. 139).

In fact, ‘Interpretation’ can be used in both (A&B) meanings. Both explanations can be true and authentic. This is the aim of interpretation, which designates which kind of interpretation is appropriate. Indeed what kind of interpretation is appropriate for the interpretation of the sacred texts particularly the Quran?

UNDERSTANDING AND INTERPRETATION OF THE QUR’AN

Since sacred texts such as the Quran have specific purposes so some kinds of interpretive methods cannot be applied to them. The Quran is the word of God, which conveys his message to human beings, and since in Islamic thought being faithful means to affirm God’s commands and to surrender to him completely, so commentators should try to find out the author’s (God) intention. In other words, God has certain intention in his word that should be revealed by interpreters. Therefore, from the Muslim theologian’s perspective understanding the author’s intention is the main purpose of Quranic interpretations. In other words the final and the real meaning of a text is its author intention. Thus, those kinds of hermeneutical methods, which neglect the author and his intention, are not appropriate for the interpretation of the Quran. Vaezi, believes that, the commentator of the Quran should see beyond the text and find its message. In other words, the text is like the bridge, which helps a reader to reach the author’s determined meaning. Therefore, in the process of interpretation, the expounder should not focus only on the words and the text but also he should regard them as a bridge and see what is behind them (Vaezi 2006, p. 56).

In several verses the Quran emphasizes that all of the sacred texts are the word of God and that the prophets were the recipients of that word and they had the duty to convey God’s message to people. It also stresses that the aim of the sacred texts is to guide people, thus, the specific intention of God within these texts should be disclosed by the interpreters. For example, the Quran says:

“Thou receivest the Quran from One All-wise, All-knowing.” (27:6).

“Then We gave Moses the Book, complete for him who does good, and distinguishing every thing, and as a guidance and a mercy; haply they would believe in the encounter with their Lord” (6:154).

“And We sent, following in their footsteps, Jesus son of Mary, confirming the Torah before him; and We gave to him the Gospel, wherein is guidance and light, and confirming the Torah before it, as a guidance and an admonition unto the god fearing” (5:46).

One should bear in mind that understanding and interpretation are two key concepts in various hermeneutical forms. They have different functions although; they can have considerable influence on each other. Neglecting their differences is the cause of number of misunderstanding, mistakes and sophistries. However this issue has been slurred in some hermeneutical schools. Eric Hirsch in his hermeneutics distinguished between interpretation and understanding. He states, “understanding, interpretation, judgment and criticism are distinct functions with distinct requirements and aims” (Hirsch 1967, p. 133).

Allamih Sayyid Muhammad Hussain Tabatabai (1904-1981) a prominent Shia theologian and philosopher of twentieth century Iran, in his interpretive method distinguished between these two concepts as well. It seems he holds the idea that understanding is prior to interpretation. In his viewpoint, the Quran’s message belongs to humanity and every single person who knows Arabic language can understand it. In this respect he states, “The Quran has been sent down in plain Arabic; and no Arab (or Arabic-knowing non-Arab) can experience any difficulty in understanding it”. However, people’s understandings are not equal. Some conceive the literal meaning whereas the others see beyond the external meaning. to Tabatabai, the Quran has external and internal meanings, which are in vertical relationship with each other. Pious, loyal and intellect man can reach the meaning of the Quran which is in higher level and more close to reality than the ordinary people (Tabatabai 1985, pp.14-16). In other words, there is a mutual relationship between the Quran’s meanings and the people’s understandings. Since the Quran’s meaning are in different levels, people’s understanding are in different levels too.

It should be noted that additionally to philological presuppositions which are essential for understanding the Quran, there are other elements which are required in order to construe its meaning such as Arabic language, Islamic history, Prophet and Imam's sayings and etc. Overall, the remarkable point is that the Quran should be understood in its own term and reader should be well informed of the context of the Quran. It means historical, social aspects of a text as well as its language. But he should bear in mind that the context does not include the opinions of companions and their disciples "because, first, there is too much confusion and contradiction in them; and second, they are not vested with any authority in Islam" (Tabatabai 1985, p. 20).

It is deemed that Allamih shares common ideas with scholars like Hirsch who strongly believes that the "verbal meaning has to be construed in its own terms if it is to be construed at all" (Hirsch 1967, p. 135). Allamih holds likewise that the Quran should be interpreted within the Quranic framework. From his perspective the exegete has to "explain the verse with the help of other relevant verses, meditating on them together - and meditation has been forcefully urged upon by the Quran itself -.... No doubt this is the only correct method of exegesis" (Tabatabai 1985, p.16). However, this attitude is obviously in contrast with some contemporary hermeneutical schools like philosophical hermeneutics or historicism. For instance, according to a sceptical historicist "we can only understand a text in our own terms" (Hirsch 1967, p. 135).

Taking above into consideration, it comes to conclusion that in the first step the interpreter is duty-bound to understand the Quran in its own term and then in the second step he is required to interpret it properly. Indeed, what is the proper interpretation? Allamih Tabatabai describes 'interpretation' as "explaining the meaning of the Quranic verse, clarifying its importance and finding out its significance" (Tabatabai 1985, p. 7). In his view, through the process of interpretation a commentator is expected to disclose God's intention (message). To this end, it seems that the best method is to interpret the Quran by the Quran as he did in his commentary; 'Al-Mizan fi Tafsir al-Qur'an'.

However, since the interpretation of the Quran is the explanation of our understanding, it is possible that through the process of interpretation commentator observes new meaning. Or in other words, he could reach to another profound understanding. i.e., since the Quran contain the universal message, its interpretation should have consistency with current circumstances as well. Therefore, there is a strong demand for reinterpretation of the Quran during the history. By this I mean that each generation faces new social and political situations, and they need to find the answer of their questions in the Quran. One should bear in mind that, reinterpreting the Quran does not mean that, the Quran contains several contradictory meanings or, different interpretations are in the same levels and all of them are authentic. But instead, the possibility of Quranic reinterpretation refers to its universality. In *Shia* theologians' point of view, various interpretations of Quran derive from following reasons:

- A. Different interpretive methods. Muslim theologians approach the Quran within different perspectives (mystical, philosophical, etc).
- B. Different interpretations arise from different presuppositions and pre-understandings. Muslim scholars from diverse Islamic schools believe that the interpretation should be based on specific presuppositions and pre-understandings and each of them has his own idea about this issue. This theoretical dissension leads to various sorts of interpretations.
- C. Third reason refers to commentator's contemplation. The more profound and accurate he reads the Quran, the higher level of meaning and reality he would achieve and the more comprehensive interpretation he would set forth. Hence, it is possible that the commentator who contemplates the Quranic meaning and scrutinises its verses, discovers a new meaning, which had been hidden from other expounders.
- D. The fourth and pivot reason for various sorts of interpretations refers to reader's questions. Two persons can understand the Quran equally but interpret it in different ways. It seems that reader's questions and situation have effect on his interpretation. Indeed, a diversity of interpretations is not just, because of different understanding of literal meaning but it is grounded in questions, which have occupied expounder's mind. These questions can originate from the development of science or social and political situation. For

instance, a commentator who is familiar with political issues can probe the Quranic verses in order to find out which kind of democracy has been recommended by the Quran.

It does not mean that the commentators who lived in the previous decades were not able to find the answers of above questions but because each generation has their own circumstances, thus they try to expound the Quran in a way to find the solution of their contemporary problems. It comes to conclusion that there is a mutual relationship between current issues and the interpretation of the Quran in a specific era. In other words, the variety of Quranic interpretations to a large extent originates from social requirements. However, this question must be asked how we can recognize the true interpretation from the false one or what the criterion for the validity of the Quran's interpretation is.

VALIDITY OF INTERPRETATION

Although it is ideal to find out the real meaning (God's intention) of the Quran, this certainty cannot be achieved in all of the Quran's verses. Because this text has different parts, some of them are clear and a commentator can claim that he understood them, while other parts are more complicated and full of metaphorical and allegorical phrases so he cannot be sure that he has perceived the final meaning of them. Nevertheless it does not mean that the exegesis in those parts is not valid. Vaezi emphasizes that we can assess the validity of the commentaries. According to him, we can find the valid interpretation but it does not mean that this interpretation necessarily is the true one (Vaezi 2006, p. 57). There are certain criteria, which help us to judge the validity of interpretation such as:

- a) The Quran itself. Since the Quran has self-consistency thus there is no contradictory between its verses. Consequently, its interpretation should have consistency with the entire Quran.
- b) Intellectual principles. From *Shia* standpoint, interpretation of some verses without considering wisdom is impossible. For instance there are few verses in the Quran, which imply personification of God, like "...God's hand is over their hands" (48:10). Whereas according to intellectual arguments the idea of personification is not acceptable. The role of wisdom in the Quran's interpretation has been one of the disputable issues among Muslim scholars. Some groups like *Asharryah* denied the role of wisdom in understanding the Quran and strongly emphasized the literal and superficial meaning while and *Mu'tazila* and *Shia* have had emphasis on the influence of wisdom in the process of understanding and interpretation (Tabatabai 1985, pp. 16-17). According to them there should not be any contradiction between wisdom and religious doctrines. The Quran itself in several verses directly or indirectly invites people to think about the Quranic verse like "And such are the Parables We set forth for mankind, but only those understand them who have knowledge" (29:43).
- c) The third criterion, which helps us to assess the validity of interpretation, is prophet sayings (*Hadith*). In other words, our commentary of the Quran should have consistency with *Hadith* as well. The Quran itself introduces Prophet Mohammad as the best interpreter; it states, "...and We have sent down to thee the Remembrance that thou mayest make clear to mankind what was sent down to them" (16: 44).

Therefore from the vantage point of *Shia* theologians, we have criteria, which distinguish between valid and false interpretation. However, except for the Prophet Mohammad and his family (*ahlul bayt*), there is no ideal reader who can have a comprehensive understanding of the Quran. No one can be certain about the correctness of his own interpretation. A reader has this responsibility to exclude his own prejudices and not to impose them on the text in order to find the author's intention. However, no one can claim that he has established the author's (God) intention in his commentary. As Hirsch submitted "the interpreter's goal is simply this-to show that a given reading is more probable than others. In hermeneutics, verification is a process of establishing relative probabilities" (Hirsch 1967, p. 236).

With respect to the above view, I think, one should distinguish between the valid and true interpretation. In other words, the validity is more general than truth. By this I mean although one exegesis can be valid at a particular time, it could be invalid in the next era whereas the true meaning of the text will never change. Although finding the ultimate correctness is a final goal of interpretation, one can never be sure that he has achieved it. But it does not imply that we cannot reach the most probable interpretation.

Differences with philosophical hermeneutics

Apparently, there are rudimentary differences between Islamic hermeneutics and Christian-West forms of hermeneutics, in particular philosophical hermeneutics. Gadamer as a distinguished member of philosophical hermeneutics has brought up specific idea in the realms of understanding and interpretation. In this section, the differences between *Shia* and philosophical hermeneutics (generally from Gadamer's perspective) including the issue of intentionality, reader's prejudices and presuppositions and the validity of interpretation will be explored.¹

Intentionality:

From a philosophical hermeneutics' standpoint, the process of understanding has two pivotal elements: reader (interpreter) and text. It would be better to say that, understanding is a negotiation between the text and its reader and an agreement between them in this hermeneutical dialogue leads to an understanding. In other words, "coming to such an agreement means establishing a common framework or 'horizon' and Gadamer thus takes understanding to be a process of the 'fusion of horizon'" (Malpas 2003). Hence, there is no room for the author or his intention in this process. As Gadamer expressed, "The artist who creates something is not the appointed interpreter of it. As an interpreter he has no automatic authority over the person who is simply receiving his work. In so far as he reflects on his own work, he is his own reader. The meaning that he, as reader, gives his own work does not set the standard. The only standard of interpretation is the sense of his creation, what it 'means'" (Gadamer, Weinsheimer et al. 2004, p.193).

In contrast with *Shia*, which has strong belief in the authorial intention as the central point of their hermeneutics, Gadamer did not pay attention to author's intention rather he has an emphasis on the dialogue between the text and its reader. In his view, author and his determined meaning have nothing to do with our understanding. As was claimed by him "the sense of a text in general reaches far beyond what its author originally intended. The task of understanding is concerned above all the meaning of the text itself" (Gadamer, Weinsheimer et al. 2004, p. 372). Following Gadamer's way of thought, neither the author's meaning nor the original reader's understanding can limit the horizon of a text's meaning. In this respect he declared "The horizon of understanding cannot be limited either by what the writer originally had in mind or by the horizon of the person to whom the text was originally addressed" (Gadamer, Weinsheimer et al. 2004, p. 395).

Therefore, in Gadamer's perspective, there is an endless conversation between the text and reader, thus understanding is an ongoing process which will be never completed. Gadamer "rejects the idea that there is any final determinacy to understanding". According to him, there is no method or technique that can guide us toward the final truth. It would be better to say, that Gadamer's conception of understanding is not reducible to method or technique. Indeed, he believes that, understanding is an ongoing process that has no final ending (Malpas 2003). While according to *Shia*, there is a final and determined meaning for the Quran although this meaning has different levels.

Reader's prejudices and presuppositions:

From a *Shia* theologians' perspective, the reader (interpreter) can and should avoid presuppositions and prejudices because Prophet Mohammad said "whoever interprets the Quran according to his own opinion has made a place for himself in the fire" (Tabatabai 1982, p. 61). Thus, from their perspective prejudices can have negative influences on the exegesis of a text; yet, according to relativist hermeneutics "to try to escape from one's own concepts in interpretation is not only impossible but manifestly absurd. To interpret means precisely

¹ The differences between Islamic (*Shia*) hermeneutics and philosophical hermeneutics are not confined to above issues but it would take too long to discuss all of them in a section of this length.

to bring one's own preconceptions into play so that the text's meaning can really be made to speak for us" (Gadamer, Weinsheimer et al. 2004, p. 397). Accordingly Heidegger in his book 'Being and Time' said, "Whenever something is interpreted as something, the interpretation will be found essentially upon fore-having, fore-sight, and fore-conception. An interpretation is never a presuppositionless apprehending of something presented to us" (Heidegger 1962, p. 191-192).

Validity of interpretation:

According to philosophical hermeneutics, we cannot judge our understanding. Indeed, 'understanding' is an agreement between the text and reader and there is no criterion to evaluate understanding. Gadamer notes that "understanding is not, in fact, understanding better...it is enough to say that we understand in a different way, if we understand at all" (Gadamer, Weinsheimer et al. 2004, p. 296). While in *Shia* scholars' view, people can understand the Quran on different levels i.e. some interpretations are more profound and close to the reality (author's intention) while the others are in the lower levels and further from the truth. Moreover, there is a group of interpretations, which are said to be absolutely wrong, because they are based on false prejudices and pre-understandings that have no consistency with the spirit of the Quran. Therefore, from *Shia's* opinion, we can have both wrong and right understandings and as was already mentioned one is able to assess the validity of interpretations. However, relativist hermeneutics, this is not acceptable and we cannot speak about correct interpretations.

CONCLUSION

In this paper the Quranic hermeneutical principles have been explored (from *Shia* theologians' perspective, precisely from Allamih Tabatabai's viewpoint). The Quran as a sacred text makes certain textual claims that should be recognized by hermeneutics. *Shia* strongly believes in the authorial intention as the central point of their hermeneutics. In fact, the scriptures like the Quran have sensitive situation and interpreter should approach them with extreme caution. At least he is expected to consider two fundamental factors; first, they are the sacred text with particular characteristics and purposes. Thus we cannot easily ignore the authorial intention of these divine texts. Therefore, by considering the aim of revelation i.e. the salvation of human beings, definitely God intended specific meaning in these scriptures. The remarkable point here is that, these divine books can guide humanity toward salvation, just when they are understood and interpreted truly, otherwise, they could be so misleading and dangerous. Secondly we, as human beings need to conceive the scriptures' message truly in order to orient our life toward salvation. To put it more simply, there is mutual relationship between God's intention in the sacred texts and human beings' need; he sent these scriptures to guide humanity and we need to discover his intention to be saved. Hence, this is the reader's (interpreter) responsibility to understand and interpret the Quran and find out its determined meaning behind the text.

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RECREATION FUNCTION OF THE TV NEWS DISCOURSE

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ABSTRACT

Modern TV news discourse focuses not only on representing phenomena and events of reality but also creates opportunities for the audience's recreation. Recreation function produced by different semantic codes is becoming an integral feature of news discourse, a tool for managing moods and public opinion. This study examines the thematic diversity of recreation, which is presented in the form of a finite list of thematic dominants capable of organizing the information space of discourse around themselves. Thematic dominants of recreation are actively involved in the structural organization of the information text; implement a wide range of recreational functions and are represented by various language means. The study of these components of recreation determines the scientific novelty of the research. The major findings are as follows: 1) revealed macrostructural components, which are most often filled with thematic dominants of recreation; 2) it is shown that thematic dominants are unevenly located on the bipolar scale of *positive - negative recreation*; *extreme*, *average* and *threshold* degrees of discourse recreation have been established; 3) revealed the dominant language tools for the formation of recreation: imitation of the discourse of fine arts, music, cinema, as well as magic / mystical discourse.

Keywords: TV discourse, news discourse, recreation, language means, concepts.

INTRODUCTION

Until recently, recreation was used by specialists in medicine, tourism, architecture. It was associated mostly with entertainment and regeneration of physical strength. In modern society, recreation reflects the manners, way of life and characteristic of a particular historical situation. According to J. Baudrillard, happiness and entertainment is the equivalent of the traditional coercion to work and production. ... It is "fun-morality" or an imperative to have fun, make yourself excited and enjoy [Baudrillard, 2006].

Recreation represents the following forms: 1) *rest* as a process of restoring the psychophysiological balance of the human body, rehabilitation of physical and mental strength; 2) *entertainment* as a way of spending time; 3) *play* as a way to change impressions, imitation of "acute", including dangerous situations [Fedotova, 2014].

Modern television is one of the most popular ways of recreation. As a source of recovery, a means of compensating for stress, modeling pleasure, distraction from the problems of everyday life, television fully performs a recreational function. This one of the most important functions of television discourse can be reduced to a set of functions: hedonistic, entertaining, leisure, escapist, creating a certain emotional and psychological tone, relaxation, stress relief, psychological relief [Shiryayeva, 2014].

In an effort to meet the consumer needs of the media audience interested mostly in leisure and entertainment, the creators of information content try to find a balance between serious, difficult to perceive information and information aimed at organizing conditions for rest, relaxation and entertainment. As a result, implementation of recreational functions in TV space is transformed. It goes far beyond talk shows, pop concerts, entertainment series, sports competitions and intellectual competitions.

Information is presented in the focus of the brightest, exciting and impressive moments of both positive and negative nature. This is facilitated by the variety of topics that perform a recreational function. The information content incorporates the themes that represent of Recreation thematic dominants. *The aim* of the study was to examine the structure and diversity of the recreation thematic space and thematic dominants functions.

MATERIALS AND METHODS

The work used traditional general scientific methods, such as description and classification of linguistic material, generalization and observation, target sampling, quantitative analysis, as well as linguistic methods: discursive, descriptive-analytical, contextual and semantic text analysis. 400 texts-representatives of the news television discourse, diverse in thematic focus and genre representation, were selected as the material of the study.

RESULTS

Analysis of news discourse allows us to talk about the saturation of recreational topics that broadcast information aimed at providing conditions for rest, relaxation, distraction from everyday problems and entertainment of the addressee. It is shown that thematic dominants are unevenly located on the bipolar scale of positive - negative recreativity. The extreme, average and threshold degrees of recreativity are established, the themes defining them are described.

DISCUSSION

First and foremost we define which events are considered to be recreational. These are events that are emotionally charged, often unusual, non-standard everyday media constructs [Kellner, 2009] that are related to rivalry / struggle, dramatic or tragic; funny or amusing; explicate the personal lives of others; or composed of facts that represent everyday reality as a chain of bright, impressive moments. Thus the list of recreation thematic dominants is as follows: 1. *Curious, funny and amazing events*; 2. *Unusual, non-standard things/behavior of people or animals*; 3. *Experiment*; 4. *Holidays*; 5. *Leisure*; 6. *Stories of rescue*; 7. *Life of the country / city*; 8. *Personal life and space*; 9. *Crimes, incidents*; 10. *Disasters*.

The prevalence in news of various kinds of information that serves entertainment, relaxation of the viewer, is observed in materials on socio-political and social issues. Informing about a serious problem is interrupted by entertaining information, which will be attributed to the thematic dominant *Curious events*. Omitting this component would not reduce the informativeness and certainty of the message. However, it enhances the humorous effect of the message, designed to entertain the viewer, to cause a smile. An important function of such recreational infusions is also to *attract attention and help memorize meaningful information* or ideas (in the given fragment - poisoning from low-quality alcohol).

Recreation dominants often play a *decorative function*, illustrating the event, giving it entertainment and theatricality. However, such insert narratives are an important text-forming element, helping the author to unfold the narrative / plot, introducing incredible, funny events into his canvas.

The infusions of recreational information into the news discourse, being selective from the point of view of the author of the text, acquire a steady character within this type of discourse, thus revealing the regularities of its thematic organization. Recreational thematic dominants in news discourse are located on the bipolar scale of *positive - negative recreation*.

Themes located in the zone of *positive recreation* are aimed primarily at creating conditions for recreation, entertainment, interesting leisure activities with some information about what is happening in the country / world. The presentation of the event / fact is organized according to game, entertainment scenarios (wrestling, carnival, travel, fun / holiday, etc.), accompanied by humor; detailed detailing, vividly and colorfully describing the location, positive emotions of the participants; allows the addressee to penetrate into the inner world of the heroes. This makes it possible to present an often rather ordinary event not only with dry facts, but also to place it in an emotional shell that produces impression and pleasure.

News discourse uses a recreational resource, taking into account the interests and requests of different categories of viewers: interested in rest, entertainment and relaxation; as well as in high-profile scandals with exposure; eerie pictures of misfortunes, sufferings, catastrophes, etc. The core of thematic dominants in the

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zone of negative recreation: *Crime; Protests; Disasters; Stories of rescue* are events related to the negative side of life: death, suffering, crime, cruelty, violence.

Another finding was that thematic dominants are unevenly located on the scale of positive - negative recreation. Thus *extreme, average and threshold* degrees of recreation have been established.

In the zone of *extreme positive recreation* are events of reduced social, social significance for the media consumer of a particular society, such as the birth of a panda, a party in honor of the birthday of a monkey, etc. The purpose of the dominant *Curious, funny, amazing events* in this area is to produce surprise, entertainment. The texts are aimed at organizing the pastime of the addressee without deep content, are designed to give pleasure, entertain or surprise.

As the social, social, and economic significance of the presentation of the event in television moves to the *moderate zone of positive recreation*. Texts with the themes *Leisure, Life of the country / city (subtopics socio-political sphere, transport, housing), Experiment, Personal life and space, Holidays* are constructed by alternating actual and recreational blocks.

At the *threshold level of positive recreation* there are texts, the compositional models of which are presented: 1) inserting themes *Curiosity, Personal Life and Space of the Other, Amazing Facts, Experiment, City Life* in one of the blocks of the macrostructure; 2) superstructure of one of the macrostructural blocks only with audio-visual components aimed at modeling pleasure, relaxation, entertainment.

Death, destruction, catastrophes become the object of thematic dominants of the *extreme zone of negative recreation*. Specific for the representation of such texts is the high degree of detail of the characteristics, circumstances of the event in all macrostructural blocks of the information text with the dominance of the emotional component.

As the scale of negative recreation progresses from extreme to *moderate*, textual representations of information discourse reduce the emotional degree and construct additional meanings or functions, perform a variety of recreational functions (entertainment, emotional saturation), and additional non-recreational functions. A significant group of such information messages is designed to implement the educational function, to influence the minds of people by condemning or ridiculing unwanted behavior.

We have also revealed the dominant language tools for the formation of recreation: *imitation of the discourse of fine arts, music, cinema, as well as magic / mystical discourse*. The discourse of art, representing the conceptual dominance of artistic and figurative forms of world development, has an impact on the textual representations of information discourse due to the specifics of the basic concepts of *performance, game, stage, cinema, music*.

The influence of theatrical discourse can be traced in the news texts devoted to the most relevant events of social significance, from the life of the city, the sphere of transport.

In the news is implemented the idea of spying on the creation of a thing, action. Thus the conceptual sphere "Art" is actively realized by concept "Theater". Its most striking representatives in the news discourse are the tokens of the lexical-thematic group "Objects that close the stage from the auditorium": *behind the scenes, behind the scenes, the curtain*. Their use is due to the reference to a parallel world / sphere hidden (behind the scenes) from the eyes of most people. Thus, the report on the readiness of the capital's retail outlets for the New Year's sale is enlivened by "peeping" on how and from what materials the Christmas tree is assembled, toys and garlands are made, and the working conditions of specialists involved in these processes.

Codes of musical and art discourse are mainly used to create vivid images and express aesthetic appreciation. At the same time, an important function of the concepts of the source sphere "Art" is the function of the dissemination of certain values, meaningful for a particular time. Thus, the described objects created by man (city, flower beds, parks); the events of reality are identified with an exciting, fascinating spectacle, a holiday.

The dominant (predominant) representatives of the concept "Fine Arts" in the news discourse are units of the lexical-thematic group "Materials / Tools": *canvas, paints, watercolor, easel* and "Products of the material embodiment of art": *panels, paintings, sculpture (from trees)*.

The city in most cases is represented by combinations of representatives of the concept "Fine Arts" with explicators of various modes of perception. Among them, the lexical-semantic group of "visual words" prevails - lexemes with the semantics of "color" and "brightness": *red, yellow, white, purple*. The verbal reflection of visual perception is actively supported by the video sequence (frames of flower decorations, picturesque landscapes of green areas), musical accompaniment (light, pleasant music), which enhance the recreational function of the media text.

The vocabulary of *magic* is characterized by a wide representation in the news discourse. In this case, focus is on children's perception through the unusual form, magical actions and vivid fantastic images. Objects of reality are endowed with supernatural properties, capabilities, which makes it possible to highlight the spectacular component of the object. Common linguo-stylistic means of mystical discourse / discourse of magic are: the concept of "Magic", a means of expressiveness of speech that transfers human qualities to inanimate objects - personification. The conceptual field of "magic" is formed by the lexical-thematic group "Actions and processes", as well as the vocabulary of magic: *fairy tale, magic (magical), magic*. Vocabulary marking magical actions and processes: *transform, transform, revive, teleport* allows the author of the message to assess reality, to present a certain reality that develops according to special laws. So, in the news specialists are constantly improving, i.e. transforming various objects of reality into the best, which residents can be proud of. As a result, the viewer is immersed in the world of a carefree, almost fabulous existence, where, in the process, objects transform, turn and come to life.

CONCLUSION

The thematic dominants of recreation are aimed at shifting the focus of describing reality for the implementation of recreational functions (the formation of mental effects - distraction, experience; entertainment, escapism, interesting leisure, etc.). The dominant concepts of recreation, due to the brightness and emotional potential of the images they create, construct an event, object or phenomenon that is significant for a certain moment.

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OVERVIEW OF THE PRESS WITH THE PROBLEM OF WRONGFUL CONVICTIONS

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SUMMARY

Of all countries in the world, wrongful convictions are considered "loopholes" of the justice system, so the problem of wrongful convictions has been approached by many scholars around the world from different sciences including the field of media journalism. This article uses a documentary research method to review the world's research on journalism with the problem of wrongful convictions. The results of the documentary study show that the research has focused on three main groups of issues: The study of method, way to reflect and the message of the press on the issue of wrongful conviction; Research on social responsibility, skills, professionalism and professional ethics; Research on the public and public opinion on the issue of wrongful convictions. The results of this study provided an overview of the press with the problem of wrongful convictions, from which the analysis indicates the issues that need to be further studied to enhance the role of the media in limiting wrongful convictions.

Keywords: Overview; wrongful conviction; press; media

I. INTRODUCTION

Early on, the judicial systems of several countries around the world discovered a large connection between the media (press) and the problem of wrongful convictions. In the 1960s, for example, the U.S. Supreme Court ruled that pretrial publicity seriously harmed a defendant's right to a fair trial. So that, the American Bar Association (ABA) has provided a list of the types of information that would be detrimental if disseminated by lawyers or published by the media. This was created in the hope that the media in the United States would restrict the adverse information and strengthen the legal right of the accused to a fair trial. The Judicial Council of Canada (CJC) has also released documents relating to pre-trial publicity and prejudiced information that could affect someone's right to a fair trial. [Canadian Judicial Council, 2010].

Therefore, the study of journalism with the issue of wrongful conviction has been carried out in many different aspects to highlight the relationship, impact and influence of the press on the issue of wrongful convictions, in which, the two main areas of research on this topic are: criminal justice, journalism and media.

II. RESEARCH METHODOLOGY

To carry out this study, we use the method of Document analysis to overview the research works in countries around the world on journalism with the problem of wrongful conviction.

To search for material for this study, we take the most advantage of digital resources on the Internet using the keywords: Press with the problem of wrongful conviction; wrongful conviction; media with wrongful convictions to find databases, search engines and websites such as EBSCO, Google Scholar, Science Direct; books.google.com.vn.

On the basis of the collected documents, we conducted an overview according to 3 main groups of content about the press with the problem of wrongful convictions: Research on the method and way of reporting and message of the press; Research on social responsibility, skills, professionalism and professional ethics; Research on public and public opinion with the problem of wrongful convictions.

III. RESEARCH RESULTS

3.1. Research on the method and way to report and message of the press

Warden's research indicates that in the past, the printed reports coincided with the beliefs of the police and prosecutors, meaning that the contents of the information in the newspapers matched the facts published by the investigating authorities. In other words, the media does not question the suspicions surrounding the investigative agency's convictions. It was only recently (2002) that a "revolution" was considered to have taken place in the media about criminal justice processes. This change led to reports in which "the media has seriously questioned the fundamental reliability of the criminal justice system [Warden 2002, p.804]. Therefore, there has been much research on the impact of the press on the issue of wrongful convictions.

Lisa Bell's research (2015) is based on the social constructors' approach to social issues (Surrette 2007; Loseke 2011) and uses thematic analysis and content analysis of 280 articles published in three Canadian newspapers to determine media trends about wrongful convictions and its effects on the public. The results indicated that the media often reported sensational cases after the case was reviewed and questioned the legal system. Although individuals wrongfully convicted are identified as the main victims, the media largely ignores the role of systemic discrimination in convicting innocent people and argues that the criminal justice system is correcting itself.

From the wrongful convictions of Amanda Knox and Raffaele Sollecito – convicted of murder and their attempts at vindication, Bruce Fisher (2011) attributes one of the reasons for their wrongful conviction is that Amanda was mistreated by the media. The author uses content analysis to analyze articles about Amanda Knox and Raffaele Sollecito and points out that the media has seized on this story and the article headlines criticized Amanda endlessly. These headlines were seen around the world, long before any evidence was gathered. The media had created a completely negative description of Amanda Knox. There was a series of lies leaked on the media shortly after Meredith's death. These lies were revealed with the sole purpose of destroying Amanda Knox's credibility. The prosecution succeeded in using the media to kill Amanda's personality. She was charged in public court long before the real trial began.

Research on media coverage through three typical U.S. cases: Florida's Groveland Four; Kirk Bloodsworth's conviction for the rape and murder of a 9-year-old girl near Baltimore (1985); and Walter McMillian's conviction for the murder of Monroeville (1986), Ala. salesman David J. Krajicek (2014) pointed to the possibility of media errors in reporting the case. Using case studies and analyzing the media message of the three cases, the author pointed out that in each case, the defendants were sentenced to death on the media before that case went to real trial. The fact that the press constructed stories "for the purposes of the press" has put pressure on prosecutors to resolve the case. According to the author's findings, journalists are eager to engage in a "tunnel vision" that leads to one-sided convictions. The study also showed that the effect of crowd journalism and tunnel vision has made journalists a tool of prosecutors, and this is the cause that has contributed to the "wrongful conviction".

Katherine Rozad (2015) uses the grounded theory (Charmaz 2006), author of 1,495 papers related to three cases of Canadians wrongfully convicted: Guy Paul Morin, Robert Baltovich and James Driskell, from the time the victims were murdered or disappeared until the three men were pardoned. Analyzing the content of the messages of the articles in the survey, the author affirmed: Writing about wrongful cases, the press has created stories: The author said that the media has two opposing roles: the first role is the media contributing to creating circumstances related to wrongful convictions; The second role is proven to benefit innocent people through investigating cases of affirming suspicion and supporting the proof of innocence for wrongfully accused victims.

Media Framing of Wrongful Convictions, author Eza Bella Zakirova (2018) focuses on how the media framed the factors that contributed to this wrongful conviction using Loseke's social building framework (which is useful for deconstructing the diagnostic framework, the motivation and prognosis of the problem - that is, how media consumers assess the causes, solutions and reasons for taking action to solve the given social problem) to analyze the content of articles on the wrongful conviction topic and draw conclusions: Through framing,

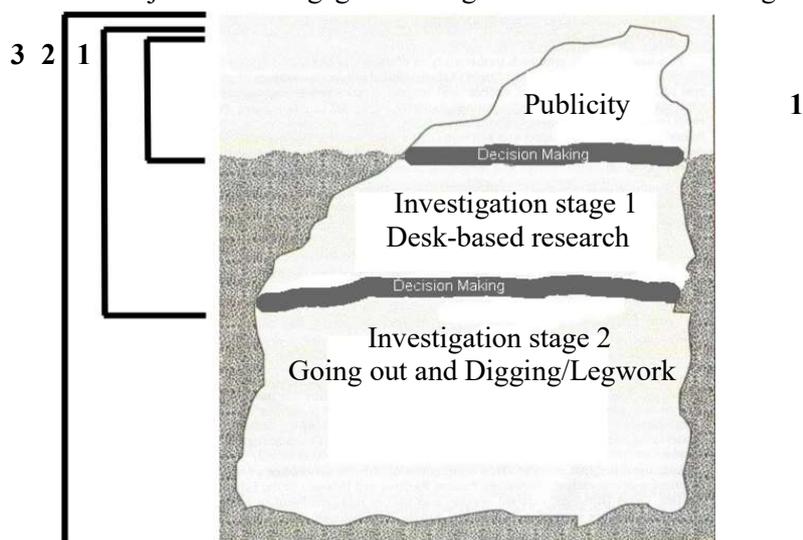
the media can change public perceptions of the social issue of wrongful conviction by emphasizing a number of aspects. Wrongful convictions are a major issue that hinders the effectiveness and legality of the criminal justice system. The topic has become the focus of media attention. Among the issues raised are factors that contribute to false convictions, such as false confessions, false or misleading forensic evidence, official misconduct, mistaken witness identification, and perjury or false accusations. According to the author, through framing, the media can change public perceptions of social issues of wrongful convictions by emphasizing some aspects in a different way. The study analyzed New York Times articles to determine whether the media's release of factors that contributed to wrongful convictions was commensurate with official data collected by the National Registry of Exonerations, a project built by the University of California and the University of Michigan provides detailed information on every known amnesty in the United States since 1989.

3.2. Study of social responsibility, skills, profession and professional ethics

According to Walker & Starmer: "It seems that only journalists can investigate suspected facts that have been rejected by the court and can reinforce them enough to firstly convince a segment of the mass readership, and then the court to accept them" (Walker & Starmer, 1999). In other words, the investigative journalist not only has a reporting role but also points to the "hidden corners" of an iceberg that seem to have been decided by a balance of power and fairness – the "court." Therefore, the study of the problem of wrongful convictions has been analyzed by some scholars around the world from the perspective of the role, responsibility and professional skills, professional ethics of journalists.

Sam Poyser's 2012 study in "Watchdogs of the Wrongly Convicted: the Role of the Media in Revealing Miscarriages of Justice" used a triangular research strategy that includes interviews, questionnaires, and narrative analysis to look at the role of the media in wrongful convictions in England and Wales (from 1960 to 2012) and determine how the level of media involvement in such cases has changed over time. According to the results of the interview with 27 journalists and 23 people who have participated in wrongful cases, the authors said that the motivation of journalists when participating in wrongful incidents are divided into three categories, in which the motivation is mainly from: i) the characteristics/ characteristics of the journalist himself, ii) awareness of the reliability/reliability of others who have been involved in a case, and iii) promise an interesting story. In particular, the concept of public obligation and social conscience are very important factors in determining the journalist's participation in articles on the issue of wrongful convictions (especially the category of investigative journalism). The study also shows how journalists engage in wrongful convictions, as shown by the following three-stage model:

Table 1.3: Model of how journalists engage in wrongful convictions according to Sam Poyser, 2012



In particular, publicity is only one aspect of the journalist's work when participating in the wrongful case. Investigation Stage One: Desk-Based Research accounts for a large part of their involvement in cases, (hence it is a larger part of an iceberg), the results partly determining whether they have decided to leave their desks and go out and investigate further. Investigation Stage Two: Going Out and Digging/Legwork demonstrates the deepest level of journalistic involvement in justice cases. The press's involvement in wrongfully cases can consume manpower and time, especially complex, difficult investigations that take months a year to complete. So the study points to 18 personal traits of journalists identify as important for succeeding in investigating the flaws of justice: a stable layout, integrity, determination and motivation, energy, commitment and endurance, persistence, high organization, meticulousness, accuracy, confidence, risk-taking, persuasion, empathy...

3.3. Study of public and public opinion on wrongful conviction

Group of authors including Marvin Zalman, Matthew J. Larson, and Brad Smith (2012) used the method of analyzing the material to review the research on the wrongful conviction in all aspects; using a public survey method (including residents of Michigan) using a random household phone number form provided by a survey company (of the 6,914 numbers contacted in this survey, 3,755 were verified numbers, forming a response rate sample; the average age of the sample was 50.4 years old, and the majority of the numbers were verified, forming a response rate form; the average age of the sample was 50.4 years old, and the majority of the numbers respondents (66.8%) were female) to assess citizens' attitudes towards wrongful convictions. The study found that significant differences in beliefs, noted by race, education level and marital status, were among non-whites, those with high school or less education, and unmarried people who tended to believe that wrongful convictions occurred more frequently. In general, citizens believe that police, forensic experts, prosecutors, judges, juries are trustworthy. In fact, there are no more than 16% of citizens reporting that the agents of the system are often or very unreliable/incompetent – demonstrating general trust in the evidence they make and the decisions they make. Overall, respondents were most skeptical of defense attorneys and trusted the most in forensic experts.

Wrongful Conviction and Criminal Justice Reform: Making Justice: The Creation of Justice by Marvin Zalman, Julia Carrano addresses the role of the media and public opinion in "Reforming the pedophile speculation." The authors assert that without the media challenging wrongful convictions and errors as well as misconduct by police, prosecutors and judges, the innocent reform movement will not exist. The mainstream media, a resistance force when it comes to criminal justice issues, begins to develop, initially slowly, then quickly, into a revolutionary force, winning an immediate victory in overturning wrongful convictions, Correcting systemic flaws that led to wrongful convictions, and abolishing the death penalty.

In order to improve society's response to the "social issue" of wrongful convictions, the press must first provide accurate information so that public perceptions of wrongful convictions are as clear as possible. This phenomenon was studied by Clow, et al. (2011), who found that those who were exonerated had a positive view of the media. Research shows that most newly pardoned people feel a positive, welcoming attitude in society and they believe it's actually because of the media, which has a lot to do with describing how they are declared innocent, especially when state officials apologize to those exonerated for making an unfortunate mistake.

The press and the media have a strong role in the criminal justice system through its influence on public opinion. Much of the information the public receives regarding crime and the criminal justice system is through newspaper reports, television articles and, more recently, social media. The study's methodology selection is an earlier analysis of three men wrongfully convicted of murder in Canada - Guy Paul Morin, Robert Baltovich and James Driskell - along with numerous media studies that played a role in creating public prejudice against the accused and how the media and social media reported about wrongful conviction cases. Lauren Chancellor (2019) reviewed and analyzed media biases on the issue of wrongful convictions against the public and the jury. An overview study has shown that jurors are increasingly able access to additional information about the cases on trial, whether through deliberate searches or being "inadvertently disclosed" while online or engaging in their social media, as a result, the jury is continuing to be influenced by the reporting of crimes in the press and on social media.

IV. CONCLUSION

The research works in the world have studied the problem of wrongful conviction and journalism (media) in many different aspects: from the perspective of press messages, the public, ethics, journalist profession. From the results of that study, there are two opposite roles of the press with the problem of wrongful conviction:

Firstly, the press has contributed to reducing the rate of wrongful convictions by its influence on society, and "creates indirect pressure on state legislatures". At the same time, the media also has a great role to play in correcting errors in the legal system that contribute to reducing errors.

Secondly, the press and the media also have its downsides when there are some studies show that the press, the media also inadvertently increases the rate of wrongful convictions. The authors mainly use document research methods, content analysis methods, case studies methods in their studies. The theories used are quite diverse, but mainly grounded theory, "tunnel vision" to show the advantages and disadvantages of the media press on the problem of wrongful conviction.

However, the research have not clarified the state of the press's reflection on this topic based on specific survey data in the types of journalism, so it has not been comprehensively and deeply evaluated the role of the press when reporting about wrongful conviction cases. Currently, the number of studies on journalism with the problem of wrongful conviction from the theory of the media is limited. Therefore, later research can extend the approach from **Agenda Setting** theory, **Framing** theory or **Uses and gratifications** theory to expanded research results and provide objective, comprehensive assessments of journalism with the problem of wrongful conviction as well as solutions to improve the effectiveness of the press and media in combating and preventing wrongful convictions in countries around the world.

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THE FUNCTIONAL POSITION OF ART MANAGEMENT UNIT IN ART MUSEUMS

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ABSTRACT

Art management is a concept which is discussed frequently in the recent years. Although, it has curatorial features in terms of meaning, it is quite comprehensive and in relation with different disciplines. If the meaning and function of the concept of art management is considered at a certain scale; the artist can think of art manager as the organizer and center of synchronization between the art and the art audience. Therefore, an art manager; can be considered as the person who accomplishes the interventions that enable the interactive relevance between art, artist and art interest to evolve in favor of units such as galleries, art dealers and art museums. However, there are certain aspects that require much more detail than is thought in the background of the editing that is attributed to the art director. Following the art market with an understanding focusing on the new art market agenda and technological developments, exhibition initiatives where the interest is kept alive in a sustainable way by thinking about the future, aesthetics, image, finance and communication issues that art faces in the process of meeting the visitor are within the body of the art manager. In this paper, by conducting a comprehensive literature review, how the art management unit is positioned within the art museums, and the multiple dynamics and variables that the art manager manages in the process of self-realization of art museums are emphasized.

Keywords: Art direction, art director, curator, art museums, museum

INTRODUCTION

Interactions in terms of habits, tendencies and preferences that are affected from the global interactions change the expectations of a huge population accordingly. The change in this scope is due to technological developments. Technological and digital developments enabled the creation of multiple digital platforms and as a result, organs such as social media, e-books, e-magazines deliver or impose similar trends to a high number of people in specific periods. In such an environment, where the number of users reach billions, the endeavors, activities, information exchange and agenda of the world population started changing rapidly and also towards similar ones. The attitude of the population of this new world, which access the new developments almost concurrently, is also alike. Recent technological developments, which are the most important factors causing this impact, resulted in a rapid shift of the wishes and expectations of the people. For example, a traditional exhibition method that has been used in an art museum started shifting towards a method that highlights visitor interactions with the digitalization of the exhibition method. The innovative perspective brought by the technological developments started directing the pursuit of visitors. As the global interactions take place in a more accelerated manner, it is now easier to follow and realized the ideal order that is envisioned.

With this new order, art museums are obliged to take the pulse of the world that is becoming globalized under certain topics. New aesthetic concepts, the changing sense of beauty, new dimensions of communication, discovery of new artists, advertising and marketing policies that include the latest generations, future-oriented management design that does not disrupt the permanence of tradition are the basic functions of the art management unit that require persistent focus. If this chain of functions that are different from each other but are endeavored being coordinated in harmony, such as administrative and aesthetic functions, are implemented

in sync, the marketing strategies of the museum would have a higher impact on the visitors. For this reason, art management unit plays an active role as part of the marketing strategy of the museum and is active in ensuring that an art museum is always up-to-date. This is because the art management unit, in which mostly new research and approaches are targeted as a means of study, is closely related to the changing marketing strategies. As art museums build a marketing strategy in their own language for this purpose, the moves of the art management unit constitute an important factor that shape such strategy.

ARTIST/ ART / AUDIENCE / MUSEUM

In art museums where the balance between the artist, art and the audience is ensured under the supervision of art management, correct consolidation of these factors is highly significant for the character, vision, image, and as a result the marketing strategies of the museum. This is due to the coinciding of the functions of the museum and the art management. A tangible and one of the most effective tools of an art museum is exhibition. The stronger the exhibition is, the longer lasting the impact that art museum has on the market. However, for such an influence to take place, the right art management unit should be in action. Marketing is very fluid and transparent; thus, it can be integrated to almost anything the museum puts into practice. Another element, in which we can see the marketing strategy as part of art management is the selection of the artist whose art is to be displayed in the museum by the art manager in terms of the impact on and reactions of the market.

The image and the level of profile of the artist, their recognition in the art market determine the level of visitors' interest to the exhibition in the art museum, whereas the response of the visitors to the art affects the return to the relevant museum. The examples of these were observed both in Turkey and around the world. The interest shown to a Picasso or Salvador Dali exhibition helped museums that are not strong in marketing move to the forefront, like a sudden volcanic eruption. However, the real issue here is for such successful artist selections to have continuity. Of course, works of artists that are globally famous may be exhibited with certain financial and corporate connections. However, how long can this last? This is the point, where the art manager needs to keep its network of artists exhaustive and evaluate the works of art that are suitable to their sense of aesthetics taking into consideration the tendencies of museums in order to keep the marketing strategy and the interest of the audience fresh.

Within the framework of the museum's vision, when exhibitions that correspond to the current tendencies of the visitor profiles are offered with a visitor-oriented approach and by taking the pulse of the art market, the interest could be kept alive and the requirement for star artists could be less. For this purpose, characteristics that affect the visitors' interest such as the artist of the works considered for exhibition, the subject and movement of such works could be adapted to the exhibition significantly. The evaluation of the arts and the work of art at the intersection of the visitor profiles and the identity of the museum is the task of the art management unit that has a direct impact on the marketing strategy of the museum.

CONTINUITY

While building the image of an art museum, the context of the museum itself is also taken into consideration. Particularly globally famous empire museums or contemporary art museums have their own context. These include mostly selections that are related to the visitors such as accustomed methods of exhibition, selection of locations within the museum and the means of communication with the visitors. The art manager's attempt to follow-up and implement current developments could help the museum in terms of marketing and image to an extent. In addition to this, continuity of decisions is also very important. A block-busting exhibition or performance art organized by the art management unit of a museum could help the museum strengthen its position as a center of attraction and the marketing endeavors to be successful. However, if such effective moves are in continuum, start of the branding process that is the result of successful marketing strategies could be in the horizon.

In art museums, timeliness and continuity should be taken into consideration not only in terms of exhibition but also in values that emphasize the identity and prospective codes of the museum such as social media, visual communication, aesthetic attitude, etc. Right curatorial decisions taken by an art museum in succession bring

about interest of artists and visitors. Contemporary art museum such as MoMA (Museum of Modern Art) and Tate Modern are two of the most successful examples in timeliness. Such contemporary art museums feed on the current trends by hosting the works of certain artists at certain periods. Such art museums that are successful in building an image and ensuring continuity also highlight the important role of art management in the creation of a marketing strategy. Thus, if art management's role in choosing the right balance of artist, art and visitor is combined with the right points of contact, the visitors will appreciate this correct combination.

AESTHETIC ATTITUDE

An art manager that keeps up with the universal aesthetic visions and trends may change the curatorial flows of an art museum to the benefit of the museum. The sense of beauty and aesthetics change over time and new senses of beauty and aesthetics dominate different eras. From the physical characteristics of people to the physical belongings such as cars and houses are affected from and reshaped based on the change in aesthetical approach based on current trends. This is why our current aesthetical judgment is different from the many judgments made in the past. This also applies to museums. The art manager would need to be equipped with certain capabilities in order to give a satisfactory response to the visits that take place with a previously considered aesthetic expectation.

An art manager should be able to comprehend the new approaches and trends on aesthetical developments in industry, fashion and design. Aesthetic performances inspired from various fields are the performances that have successfully passed the preference filters of that era's world. Such personal aesthetic performances could be implemented by the art manager as part of exhibition methods. There are aspects to aesthetic attitude that transcend the stage of exhibition. This is caused by the aesthetic attitude's nature of being taken into consideration at almost every situation: From museum exhibition catalogues to advertising, from social media to museum brochures. Exhibition in the visual context and all kinds of curatorial interventions under art management endeavors to keep up with the aesthetic attitude of the targeted axis. Successful implementation of the aesthetic attitude that would attract the visitors' attention requires knowledge in the current aesthetic visions around the world.

INVISIBLE STRENGTH: MANAGEMENT / VISIBLE STRENGTH: COMMUNICATION

When the definition of the term 'art manager' is taken into consideration, this person is regarded as the individual that organizes and coordinates the interaction between art, artist and the audience in favor of the museum or the gallery. However, behind this there is a structure that does not prominent but yet holds a key position, consisting of matters such as marketing, finance, etc. The financial structure in the background, which allows the images of the museums of art galleries to be realized as designed, in terms of visual elements such as exhibition, determines the resources and limits of an art museum to access an artist or a work of art. It also determines the need for qualified personnel that would allow the exhibition to be offered as requested with the resources at hand. Like the characteristics required in an art manager, such characters are also intertwined. In a museum with a failure to manage financial matters, it is difficult to make the progress that is in line with the mission of the museum.

Contrary to the administration, which is the invisible strength of a museum that is not reflected to external parties, communication arguments at the visitor base, which allow access to the audience, are the most prominent factors of the marketing function of art management. The art manager, who guides the sensory communication in museums, particularly visual communication, creates the ideal environment to allow the exhibition work of art to be highlighted perfectly with the communication tools in the museum starting with the mapping in the museum brochure. The communication function of art management is the tool that gives a strong position to the museum in the art market. Today, in an era where communication and information are most prominent, it is possible to reach and explain to the audience of all generations the mission and vision of a museum with the methods of communication utilized by the art manager on behalf of the museum. However, with a team that speaks the same language as and shares the vision of the art manager may create the environment for a museum to communicate with a language of its own marketing and image.

COLLABORATIONS

Another function art management fulfills for museums is highlighting both the artists and the museums by establishing collaborations with artists. Discovery of new artists is one of the best cards a museum may have for ensuring the continuity of temporary exhibitions. If art managers keep the young artists, who are successful but yet unknown and are not able to reach their audience in their radar, followers of such artists could also be attracted to the relevant museum. Today, many artists express themselves through art with the power of social media. However, these artists can only reach a limited audience. If an art manager contacts the artists of the works, they believe would attract the attention of the visitors and offer these as exhibitions, the museum visitor profile could be enriched with other individuals that are not part of the regular visitor profile of the museum. In order to keep the interest to the museum alive, such new collaborations should always be at the agenda of the museum.

When university museums make these collaborations, especially with the students of the faculty of fine arts, in a qualified manner, future young artists' awareness would expand and exhibitions' inheritance to art museums could be encouraged. Collaboration function, which is important in order to discover new artists and enrich the current exhibitions that ensure continuity, depends on the perspective and independence of the art manager. However, for museums and galleries it is also a marketing strategy under art management with an important interaction promise. Art management is positioned in a manner that adopts such innovative and creative approaches and is open to collaborations. Common exhibitions made in collaboration with young artists are risk-free endeavors for an art manager as they would be offered under the aesthetic view suitable to the pulse of the audience and subject of the art. Collaborations with successful amateur artists could also keep the impressions of visits active by allowing the museums to meet the audience at an emotional level.

PLANS AND ANALYSIS

Art museums have their own management policies that are specific to their operations. The route of the museums is determined periodically, on a monthly or yearly basis, and the visitors are included in the route. Within the planning processes for an art museum, the average visitor age, time frames and interest to museum activities are constantly monitored and the returns are taken into consideration. The structuring of the museum based on its own visitor circulation ensures a higher level of satisfaction in its current visitors, while creating a potential that would attract new visitors by taking regular and consistent steps.

It may be required for collection management to be considered under conditions that are both visitor oriented and allow the collection value to be transmitted to the audience as a whole in order for the exhibitions activities to be realized optimally in the long-term plans of art museums. This is because alternating exhibitions in art museums with rich collections may have a direct impact on the interest of the visitors. Again, in art museums with high number of collections, it may be possible to manage the interest of the visitors to the exhibitions in a multifaceted manner without sharp diversions when the works of art that are more prominent than others are divided among exhibitions hierarchically and in a balanced manner. In other words, dynamics of a museum that change on a monthly or yearly basis are under the direct control of the art manager. Art managers take into consideration the plans and strategies for exhibitions over time and plans that would allow the exhibition to reach its visitors optimally in the long term, with the accurate reports that are drawn up based on the analyses of the period, in addition to the approaches that are only associated with exhibition.

CONCLUSION

Although art management is a concept that consists of curatorial matters, it has more and deeper functions that branch out to various areas in addition to curatorial functions. In a square that puts the art, artist, location and audience at the center, if the best results are desired for the institution, it plays an administrative role in addition to the actions that are taken only around the artist and the visitors. The role of the art manager, who is the individual that implements the decisions taken by the financial and administrative management with practices to the benefit of the museum, is actually related to everything art related within the institution, as it can be understood from the title. Art manager's interventions can be seen in the details that represent the institution

such as the selection of the prints on the products to be sold at an art museum, the graphic design selections of an exhibition organization, the symbols used in a brochure to represent the institution, etc. When discussed within the framework of art museums, art directors are organizers that ensure that an organization that is in constant motion to evolve towards the most efficient version of itself. This organizing role encompasses arguments that would allow the visitor, the art and the artist to meet at the ideal location under ideal conditions such as following up with the current trends in the area, being future-oriented, professional relationships, administrative attitude, image and prestige.

When the profile of an art director is analyzed, it can be seen that each function requires a professional in such an interdisciplinary matter, however, generally for practicality one individual having all qualities is sought for this position. In order for the art manager to create an environment that will allow them to realize themselves for such a difficult position in such an administrative chain, it is required to address the matter of education and the individuals trained for this role. The expectation for one individual to have multiple qualifications in an institution makes the art manager profile a profile that is rarely observed. The qualifications an art manager should have create a certain professional outline as mentioned in various sources in the literature and as observed in practice. The education to be provided to a professional profile such as art managers, who are associated with multiple fields, is not only important for art galleries and art museums, but also for the country in which such institutions operate. If we are to focus on art museums, which are the institutions art managers are most active today, we could say that museums are the tourism displays of a country and also locations that contribute to the country image by branding culture and art policies. Thus, the image built by art managers for a museum also has an impact on the impression that country makes. If the planning of investment to be made to art management departments in order to train art managers is included in the governmental structure, this could help create an environment where better returns can be obtained both in terms of art and culture policies and in terms of training art managers.

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RİYAZİ BƏRABƏRSİZLİKLƏR
MATHEMATICAL INEQUALITIES

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XÜLASƏ

Bərabərsizlik, tərəflərin bir -birinə bərabər olmadığı riyazi bir ifadə deməkdir. Bərabərsizlik hər iki dəyəri müqayisə edir və bir dəyərin tənliyin digər tərəfindəki dəyərdən kiçik, böyük və ya bərabər olduğunu göstərir. Bərabərsizliklər rəqəmləri müqayisə etmək və müəyyən bir dəyişənin şərtlərinə cavab verən dəyərlər aralığı və ya aralıqlarını təyin etmək üçün istifadə olunur.

Riyazi bərabərsizliklər həm riyaziyyatın həm də əlaqəli sahələrin öyrənilməsi üçün vacibdir. Bu tezisdə riyaziyyatın müxtəlif sahələrində və digər əlaqəli sahələrdə riyazi bərabərsizliklərə baxılmışdır. Riyazi bərabərsizliklər mövzusu geniş bir mövzudur, lakin bu tezisdə sözügedən bərabərsizliklərin kompleks analiz, həndəsə və matris nəzəriyyəsi ilə əlaqəli olanlar müzakirə olunur.

Yaxın zamanda sübut edilmiş triqonometrik və hiperbolik bərabərsizliklər araşdırılır. Bura Katsuranın sinus və tangens funksiyalarının yeddi bərabərsizliyinin xətti və Pricenin bərabərsizliyi daxildir. Eləcədə, bu məqalədə sonsuz qiymətlərdən alınan və hiperbolik bərabərsizliklər müzakirə olunur.

Daha sonra üçbucağın əlaqəli tərəfləri daxil olmaqla, konik kəsiklər və onların tangens xətlərinin həndəsi bərabərsizliklərini qururuq. Arifmetik-həndəsi orta və Erdos-Mordell bərabərsizliklərinin sübutlarını da hazırlayırıq.

Univalent funksiyalarla bağlı xeyli miqdarda bərabərsizliklər aşkar edilmişdir, əlbəttə ki, bu sahədə daha çox iş görmək mümkündür və bu matris bərabərsizlikləri üçün də eynidir.

İşin sonunda məşhur Bieberbax Fərziyyəsi, Sahə teoremi və Koebenin dördü bir teoremi daxil olmaqla, univalent funksiyaların bərabərsizliklərini araşdırırıq. Determinantları müəyyən etmək üçün Hadamarın Bərabərsizliyi ilə sonlandırırıq.

Açar Sözlər: bərabərsizlik, həndəsə, matris, teorem, sübut, determinant, tangens, sinus, xətt

ABSTRACT

Inequality provides a mathematical expression in which the values are not equal to each other. The inequality compares both values and indicates whether one value is less than, greater than, or equal to the value on the other side of the equation. Inequalities are used to compare numbers and to define intervals or ranges of values that meet the conditions of a particular variable.

Mathematical inequalities are important for the study of both mathematics and related fields. This thesis deals with mathematical inequalities in various fields of mathematics and other related fields. The topic of mathematical inequalities is a broad one, because of this we discuss inequalities related to the complex analysis of these inequalities, geometry and matrix theory. Proven trigonometric and hyperbolic inequalities are being investigated. The thesis includes the line of seven inequalities of Katsura's sine and tangent functions and Price's inequality. This article also discusses hyperbolic inequalities from infinite values.

Then we establish the geometric inequalities of the conic sectors and their tangent lines, including the connected sides of the triangle. We also prepare proofs for arithmetic-geometric mean and Erdos-Mordell's inequalities.

A large number of inequalities have been discovered in relation to univalent functions, of course more work can be done in this field, and the same is true for matrix.

In conclusion, we investigate the inequalities of univalent functions, including the famous Bieberbach's Conjecture, Theorem about Area, and Coebe's Quarter Theorem.

Keywords: inequality, geometry, matrix, proof, theory, determinant, tangent, sine, line

GİRİŞ

Riyazi bərabərsizliklər həm riyaziyyatın həm də əlaqəli sahələrin öyrənilməsi üçün vacibdir. Amerikan Riyaziyyat Cəmiyyətinin məlumat bazasında 23000-dən çox bərabərsizlik və onların tətbiqi istinadı vardır. Konsepsiya sadə olsa da, riyaziyyatda ən məşhur və əhəmiyyətli nəticələrdən bəziləri məhz bərabərsizliklərdir.

Bugün nəinki tanınmış, həm də olduqca aktual olan bir çox klassik bərabərsizlik var. Tanınmış bərabərsizliklərə Şur bərabərsizliyi, Kauçi-Şvarts bərabərsizliyi, Jordan bərabərsizliyinin adını çəkmək olar. Riyazi bərabərsizliklər mövzusu geniş bir mövzudur, lakin bu tezisdə sözügedən bərabərsizliklərin kompleks analiz, həndəsə və matris nəzəriyyəsi ilə əlaqəli olanlar müzakirə olunur. I fəsildə triqonometrik və hiperbolik bərabərsizliklərdən bəhs edilir. İşdə məşhur üçbucaq bərabərsizliyinin sübutundan başlayırıq və sonra Katsura nəticəsinə baxırıq. Fəslin sonunda bəzi sonsuz nəticə alan triqonometrik və hiperbolik bərabərsizliklərə baxırıq.

II fəsildə arifmetik- həndəsi ortaların bərabərsizliyinin iki sübutuna baxırıq. Burada üçbucaqların tərəflərini, bucaqlarını və sahələrini əhatə edən bir çox bərabərsizlik var. Onlardan bir çoxu məşhur riyaziyyatçılar Karlitz (700-dən çox iş nəşr etmişdir) və Srivastava (1000-dən çox iş nəşr etmişdir) tərəfindən daxil olunmuşdur. Onlardan çoxu çox tanınmışdır, lakin bu məqalədə yeni sübutlar gətirəcəyik.

III fəsildə isə diqqətimizi univalent funksiyalar və matrislərə yönəldirik. Univalent funksiyalardan danışdıqda Bieberbax fərziyyəsini mütləq qeyd etmək lazımdır. Nəzərə alsaq ki, f funksiyası $f(0) = 0$ və $f'(0) = 1$ xassələri ilə vahid diskində analitik və univalentdir, buradan bilirik ki, f artan güc seriyasına malikdir: $f(z) = z + a_2 z^2 + a_3 z^3 + \dots$. Bieberbax dəqiq olaraq inanırdı ki, n -in istənilən qiymətində $|a_n| \leq n$. 6-8 il sübut oluna bilməyən bu fərziyyə, həmçinin univalent funksiyaların xassələri böyük bir araşdırmaya səbəb oldu. Daha sonra biz Sahə teoremi, Kobun dördü bir teoremini, Bieberbaxın $n=2$ və Bieberbaxın fərziyyəsini real rəqəmlərlə sübutunu müzakirə edəcəyik.

Hal-hazırda riyazi bərabərsizliklərə aid bir çox kitab, məqalə və jurnallar mövcuddur, lakin bəzilərinin adlarını xüsusi qeyd etmək lazımdır ki bunlar, triqonometrik bərabərsizliklər haqqında Andreescu və Feng, həndəsi bərabərsizliklər haqqında daha çoxbilmək üçün [Kaz61] və daha bir çox maraqlı və faydalı məlumatlar üçün Mitrović kitabına baxa bilərsiniz.

Məqalənin əsas mövzusu yuxarıda da qeyd olunduğu kimi riyazi bərabərsizliklərdir, bu bərabərsizliklərdən ən aktual olanları seçib, detallı şəkildə araşdırmağa çalışacağıq.

İlk olaraq bəzi triqonometrik bərabərsizlikləri araşdıracağıq. Bu bərabərsizliklərə sinus və tangens əhatə edən bərabərsizliklər, kompleks hiperbolik funksiyalar və Praysın bərabərsizliyi aiddir.

Sinus və tangens funksiyaları əhatə edən bərabərsizliklər. Burada hesab mətnlərində təqdim olunanlarla əlaqəli bir bərabərsizlik zənciri əldə edəcəyik. Bu zəncir, iti bucağın radian ölçüsünün sinus və tangensin arifmetik ortalamasından daha az olduğunu göstərir. 2011-ci ildə Katsura bəyanatın yeni bir sübutunu təqdim etməklə yanaşı, bir neçə bərabərsizliyi də əhatə etdi.

$$0 < \theta < \pi/2 \text{ olarsa}$$

$$\theta = \frac{\sin\theta + \tan\theta}{2}$$

Sübut. İlk öncə bəzi tanınmış triqonometrik eyniliklərdən bəhs edirik.

$$\cos 2\theta = \cos^2\theta - \sin^2\theta$$

$$\cos 2\theta = 2\cos^2\theta - 1$$

$$\sin 2\theta = 2\sin\theta\cos\theta$$

İlk olaraq bunu qeyd edirik

$$\begin{aligned}
 & \sin\theta \tan\theta - \left[2 \tan\left(\frac{\theta}{2}\right)\right]^2 \\
 &= \frac{\sin^2\theta}{\cos\theta} - \frac{4\sin^2(\theta/2)}{\cos^2(\theta/2)} \\
 &= \frac{\sin^2\theta}{\cos^2(\theta/2) - \sin^2(\theta/2)} - \frac{4\sin^2(\theta/2)}{\cos^2(\theta/2)} \\
 &= \frac{4\sin^2(\theta/2)\cos^2(\theta/2)}{\cos^2(\theta/2) - \sin^2(\theta/2)} - \frac{4\sin^2(\theta/2)}{\cos^2(\theta/2)} \\
 &= \frac{4\sin^2(\theta/2)\{\cos^4(\theta/2) - [\cos^2(\theta/2) - \sin^2(\theta/2)]\}}{\cos^2(\theta/2)[\cos^2(\theta/2) - \sin^2(\theta/2)]}
 \end{aligned}$$

Ifadələri sadələşdirək

$$\begin{aligned}
 & \cos^4\left(\frac{\theta}{2}\right) - \left[\cos^2\left(\frac{\theta}{2}\right) - \sin^2\left(\frac{\theta}{2}\right)\right] \\
 &= \cos^4\left(\frac{\theta}{2}\right) - \cos\theta \\
 &= \cos^4\left(\frac{\theta}{2}\right) - \left(2\cos^2\left(\frac{\theta}{2}\right) - 1\right) \\
 &= \left(\cos^2\left(\frac{\theta}{2}\right) - 1\right)^2 > 0
 \end{aligned}$$

Bərabərsizlik 0-dan böyük olduğu üçün

$$\cos^2\left(\frac{\theta}{2}\right) - \sin^2\left(\frac{\theta}{2}\right) = \cos\theta > 0$$

$0 < \theta < \frac{\pi}{2}$ müsbətdir. Buradan,

$$\sin\theta \tan\theta - \left[2 \tan\left(\frac{\theta}{2}\right)\right]^2 > 0 \text{ və beləliklə, } 2 \tan\frac{\theta}{2} < \sqrt{\sin\theta \tan\theta}.$$

Arifmetik-həndəsi orta. Arifmetik-Geometrik Orta Bərabərlik, hər hansı bir mənfi olmayan həqiqi ədədlər qrupu n üçün olduğunu bildirir a_1, a_2, \dots, a_n ,

$$\frac{a_1 + a_2 + \dots + a_n}{n} \geq \sqrt[n]{a_1 \cdot a_2 \cdot \dots \cdot a_n}$$

$a_1 = a_2 = \dots = a_n$ olarsa $\sin\theta$ və $\tan\theta$ müsbət nəticələr verib aşağıdakı bərabərsizliyi alırıq

$$\frac{\sin\theta + \tan\theta}{2} > \sqrt{\sin\theta \tan\theta}$$

$$2 \sin\left(\frac{\theta}{2}\right) < \theta < 2 \tan\left(\frac{\theta}{2}\right) < \sqrt{\sin\theta \tan\theta} < \frac{\sin\theta + \tan\theta}{2}$$

$$\theta < \frac{\sin\theta + \tan\theta}{2}.$$

Praysın bərabərsizliyi. a, b və θ müsbət və bərabər olmayan rəqəmlərdir, eləcə də $n \geq 1$

$$\frac{a^{2n} + b^{2n} - 2a^n b^n \cos(n\theta)}{a^2 + b^2 - 2ab \cos \theta} \leq \left(\frac{a^n - b^n}{a - b} \right)^2$$

Kompleks hiperbolik bərabərsizliklər. Jordan və Kober bərabərsizlikləri, hər biri riyazi işlərdə çoxsaylı tətbiqləri olan iki tanınmış trigonometrik nəticədir.

Jordan bərabərsizliyi:

$$\frac{2}{\pi} \leq \frac{\sin x}{x} \leq 1, 0 < x \leq \frac{\pi}{2}$$

Koberin bərabərsizliyi:

$$\cos x \geq 1 - \frac{2x}{\pi}, 0 \leq x \leq \frac{\pi}{2}$$

Erdos Mordel Bərabərsizliyi. Növbəti bərabərsizliyimiz 1935-ci ildə Erdos tərəfindən başlandı, 1937-ci ildə Mordell tərəfindən sübut olunan həndəsi bərabərsizlikdir. Tutaq ki, P ΔABC üçbucağı daxilində bir nöqtədir. $R_1, R_2,$ və R_3 P nöqtəsindən zirvələrə qədər olan məsafədir və r_1, r_2 və r_3 P nöqtəsindən tərəflərə qədər olan məsafədir. O zaman,

$$R_1 + R_2 + R_3 \geq 2(r_1 + r_2 + r_3)$$

bərabərlik ilə və yalnız üçbucağın bərabər tərəfli olması və P -nin mərkəz olmasıdır

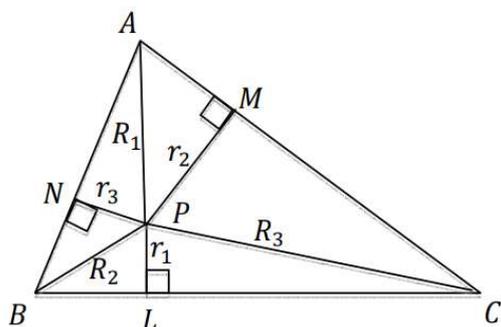


Fig. 1. ΔABC daxilindəki P nöqtəsi ilə

ΔABC üçbucağı hər tərəfi $2x$ olan bərabərtərəfli üçbucaqdır. Hündürlüyü isə $x\sqrt{3}$. P mərkəz nöqtəsidir. Verilmiş üçbucaq bərabər tərəfli olduğu üçün P nöqtəsindən üçbucağın zəmininəkimi olan məsafə hündürlüyün $1/3$ bərabərdir. Beləliklə, $r_1 = r_2 = r_3 = (x\sqrt{3})/3$. Sadə triqonometriyaya əsasən $R_1 = R_2 = R_3 = 2x\sqrt{3}/3$

Univalent funksiyalar. İndi univalent funksiyaların öyrənilməsində və Bieberbach Fərziyyəsinin sübutuna yönəlmiş araşdırmada bəzi nəticələri araşdıracağıq. İlk olaraq Sahə teoreminə baxacağıq.

$$g(z) = \frac{1}{z} + b_0 + b_1 z + b_2 z^2 + \dots$$

$$A_p = \frac{1}{2i} \oint_c z dz$$

$$\oint_c (Ldx + Mdy) = \iint_p \left(\frac{\delta M}{\delta x} - \frac{\delta L}{\delta y} \right) dx dy$$

$$Z = x + iy$$

$$\begin{aligned}
\frac{1}{2i} \oint_C \bar{z} dz &= \frac{1}{2i} \oint_C (x - iy)(dx + idy) \\
&= \frac{1}{2i} \oint_C [(xdx + ydy) + i(xdy - ydx)] \\
&= \frac{1}{2i} \oint_C (xdx + ydy) + \frac{1}{2} \oint_C (xdy - ydx) \\
&= \frac{1}{2i} \iint_P (0 - 0) dx dy + \frac{1}{2} \iint_P (1 + 1) dx dy \\
&= \frac{1}{2} \iint_P 2 dx dy \\
&= \iint_P dx dy \\
&= A_P,
\end{aligned}$$

Son fəsildə kompleks və matris bərabərsizlikləri müzakirə olunacaq. Bura univalent funksiyalardan yaranan bərabərsizliklər və çox məşhur Bieberbach Fərziyyəsinin öyrənilməsi, habelə Jacques Hadamardın determinantları əhatə edən matris bərabərsizliklərindən biri daxil olacaq.

Bieberbax Fərziyyəsi. The American Mathematical Monthly jurnalında bir məqalədə J. Korevaar, Bieberbach Fərziyyəsinin tarixini təsvir edir. Bieberbax teoremi ehtimal edir ki,

$f(z) \in S$ olarsa,

$$|a_2| \leq 2,$$

$f(z) \in S$

$$f(z) = z + a_2 z^2 + a_3 z^3 + \dots$$

$h(z) = \sqrt{f(z^2)}$ götürsək. $h(z)$ analitik funksiyaların birləşməsidir, eyni zamanda vahid diskidir. $h(z)$ univalent olduğunu görmək üçün ilk öncə onun tək funksiya olduğunu göstərmək lazımdır.

$$\begin{aligned}
h(z) &= \sqrt{z^2 + a_2 z^4 + a_3 z^6 + \dots} \\
&= \sqrt{z^2(1 + a_2 z^2 + a_3 z^4 + \dots)} \\
&= z \sqrt{1 + a_2 z^2 + a_3 z^4 + \dots}.
\end{aligned}$$

İndi binom teoremi: n tam ədəd olmazsa

$$(1 + x)^n = 1 + nx + \frac{n(n-1)}{2!} x^2 + \frac{n(n-1)(n-2)}{3!} x^3 + \dots$$

belə, yuxarıdakı ifadə ilə bunu birləşdirək

$$\begin{aligned}
 h(z) &= \left[1 + \frac{1}{2}(a_2z^2 + a_3z^4 + \dots) + \frac{\frac{1}{2}(\frac{1}{2}-1)}{2!}(a_2z^2 + a_3z^4 + \dots)^2 \right. \\
 &\quad \left. + \frac{\frac{1}{2}(\frac{1}{2}-1)(\frac{1}{2}-2)}{3!}(a_2z^2 + a_3z^4 + \dots)^3 + \dots \right] \\
 &= z \left[1 + \frac{1}{2}(a_2z^2 + a_3z^4 + \dots) + \frac{1}{8}(a_2z^2 + a_3z^4 + \dots)^2 \right. \\
 &\quad \left. + \frac{1}{16}(a_2z^2 + a_3z^4 + \dots)^3 + \dots \right] \\
 &= z \left[1 + \left(\frac{a_2}{2}\right)z^3 + \left(\frac{a_3}{2} - \frac{a_2^2}{8}\right)z^4 + \dots \right] \\
 &= \left[z + \left(\frac{a_2}{2}\right)z^3 + \left(\frac{a_3}{2} - \frac{a_2^2}{8}\right)z^5 + \dots \right]
 \end{aligned}$$

Yuxarıdakı nəticədən görürük ki $h(z)$ tək funksiyadır. Burdan isə göstərə bilərik ki, $h(z)$ univaletdir. Tutaq ki, $h(z_1)=h(z_2)$ bu zaman

$$\sqrt{f(z_1^2)} = \sqrt{f(z_2^2)}$$

$$\text{beləliklə } f(z_1^2) = f(z_2^2)$$

f S -ə daxil olduğundan bəri, f univalentdir. Buna görə də

$$(z_1^2) = (z_2^2)$$

bu da nəzərdə tutur ki,

$$z_1 = -z_2 \text{ və ya } z_1 = z_2$$

Tutaq ki, $z_1 = -z_2$, bu zaman $h(z_1) = h(-z_2)$

h tək funksiya olduğu üçün $h(-z_2) = -h(z_2)$

Lakin biz ehtimal etdik ki, $h(z_1) = h(z_2)$, bu zaman $-h(-z_2) = h(z_2)$

D daxilindəki hər bir z üçün hansı ki $h(z) = 0$. Bu belə deyil. Buradan, $z_1 \neq -z_2$, $z_1 = z_2$, beləliklə, $h(z)$ birin birə funksiyadır.

$h(0) = 0$ və $h'(0) = 1$ götürsək, $h(z)$ vahid diskində analitik və univalent funksiyadır. h S -ə daxildir. Lemma teoremini tətbiq edərək aşağıdakını alırıq

$$\left| (0)^2 - \frac{a_2}{2} \right| \leq 1$$

beləliklə, $|a_2| \leq 2$. Bu teoremin tətbiqi üçün Kobun $\frac{1}{4}$ teoreminə baxırıq.

Bu tezisə bir neçə riyazi bərabərsizliyi araşdırdıq. Məsələn, Katsuura iti bucağın sinusu və tangensinin zəncir bərabərsizliyi təqdim etsə də davamı bilinmir. Eləcə də, Katsuura və Obaid'in aşağıdakı nəticəsini sübut etdik: Əgər z modulu birə bərabər olmayan kompleks rəqəmdir və n müsbət tam ədəddir, o zaman

$$\left| \frac{z^n - 1}{z - 1} \right| \leq \frac{|z|^n - 1}{|z| - 1}$$

Sıfır olmayan m dəyərləri üçün aşağıdakıların doğru olub olmadığını müəyyən etmək üçün əlavə araşdırma etdik:

$$\left| \frac{z^n - z^m}{z - 1} \right| \leq \frac{|z|^n - |z|^m}{|z| - 1}$$

Praysın Bərabərsizliyini ümumiləşdirən bir çox bərabərsizlik hələ də araşdırılmaqdadır. Eynilə, univalent funksiyalarla bağlı xeyli miqdarda bərabərsizliklər aşkar edilsə də, əlbəttə ki, bu sahədə daha çox iş görmək mümkündür və eyni şey matris bərabərsizlikləri üçün də keçərlidir.

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AZERBAIJAN'S SYSTEM OF SPECIAL NAMES – HYDRONYMS

AZERBAIJAN'S SYSTEM OF SPECIAL NAMES – HYDRONYMS

AZƏRBAYCANIN XÜSUSİ ADLAR SİSTEMİ-HİDRONİMLƏR

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ÖZET

Azerbaycan halkı milli zihniyet, gelenek, düşünce tarzı ve diğer hususlarda diğer milletlerden farklıdır. Bu farklılıklardan biri de reklam konusudur. İnsan toplumunun oluşumundan bu yana insanların bildikleri ve gördükleri aynı türdeki nesnelere isimlendirilerek aralarında ayırım yapmaya çalıştıkları ve bunun sonucunda farklı reklam türlerinin ortaya çıktığı bilinmektedir. Bu yön, insanların, coğrafi nesnelere ve diğer içerik ve kavramların isimlendirilmesinde kendini göstermiştir.

Bu yazımızda ülkemiz topraklarında var olan, tarihi ve kültürel önemi olan hidronimlerden bahsedeceğiz. Azerbaycan'ın coğrafi olarak çok elverişli bir bölgede, Kafkasya'da bulunduğu bilinmektedir. Kafkasya bölgesi doğal kaynaklar, stratejik yönler, yeraltı ve yüzey kaynakları ve iklim açısından zengindir. Bu zenginliklerden biri de ülkemizin su kütleleri, denizleri, gölleri, nehirleri, şifalı kaynakları vb. Su olmadan hayatın olmadığı bilinen bir gerçektir. Atalarımızın yaşamak ve yerleşmek için bu bölgeyi seçmeleri muhtemelen tesadüf değildir. Ülkemiz topraklarındaki mevcut su kütleleri, nüfusun su kaynaklarını kapsamakta ve aynı zamanda bu suların elde edilen ürünler, nüfusun gıda rasyonunu oluşturmaktadır. Bu ürünlerden hazırlanan yemek çeşitleri insanların yemek kültürünü ve ekonomik hayatını şekillendirmektedir. Bu nedenle, hidronimlerin incelenmesi konusu gündemdedir. Ancak asıl amacımız su kütlelerinin ekonomik verimliliğinden değil, isimlendirilmesinden bahsetmek.

Azerbaycan'da yaklaşık 500 irili ufaklı göl bulunmaktadır. Ancak bunların hepsi insanlar için erişilebilir değildir. İnsanların bazılarını yaklaştırmak ve güzelliklerinin tadını çıkarmak kolay olsa da, bazıları değildir. Bu göllerden biri de ünlü Kuğu Gölü'dür. Ülkemiz topraklarında bulunan birçok göl ismi zoonimlerden yola çıkılarak oluşturulmuştur. Bunlar arasında Ayı Gölü, Gazelle Gölü, Geyik Gölü, Ördek Gölü vb. gösterilebilir. Kuğu Gölü, Bakü'nün Garadagh ilçesine bağlı Lokbatan yerleşiminde yer almaktadır. Devlet belgelerinde tescil edildi ve korunması ve geliştirilmesi hakkında karar verildi.

Abşeron yarımadasındaki 9 gölün (Hocahasan önündeki göl, Boyukshor, Binagadi yerleşim spor kompleksi, Red, Puta (Lokbatan), Gu, Zabrat, Bulbula, Zykhdölleri) Bakü ve çevresinin siyasi gelişimi verilmiştir.

Anahtar Kelimeler: hidronimler, göl adları, etimoloji, coğrafi adlar ...

SUMMARY

The people of Azerbaijan differ from other nations in their national mentality, traditions, way of thinking and other aspects. One of such differences is the issue of advertising. It is known that since the formation of human society, people have tried to distinguish between them by naming objects of the same type that they know and see, and as a result, different types of advertisements have emerged. This aspect has manifested itself in the naming of people, geographical objects, and other content and concepts.

In this article, we will talk about hydronyms that exist in the territory of our country and are of historical and cultural significance. It is known that Azerbaijan is located in a very geographically favorable area - the Caucasus. The territory of the Caucasus is rich in natural resources, strategic aspects, underground and surface resources, and climate. One of these riches is the water bodies, sea, lakes, rivers, healing springs, etc. of our country. It is a well-known fact that there is no life without water. It is probably not accidental that our ancestors

chose this area to live and settle down. The existing water bodies in the territory of our country cover the population's water resources, and at the same time, the products obtained from these waters constitute the food ration of the population. The range of food prepared from these products shapes the food culture and economic life of the people. Therefore, the issue of studying hydronyms is on the agenda. However, our main goal is not to talk about the economic efficiency of water bodies, but about their naming.

There are about 500 large and small lakes in Azerbaijan. However, not all of them are accessible to humans. While it is easy for people to approach some and enjoy their beauty, some are not. One of such lakes is the famous Swan Lake. Many lake names in the territory of our country are formed on the basis of zoonyms. These include Bear Lake, Gazelle Lake, Deer Lake, Duck Lake, etc. can be shown. Swan Lake is located in Lokbatan settlement of Garadagh district of Baku. It was registered in state documents and a decision was made on its protection and development.

Tasks on improving the ecological condition of 9 lakes of the Absheron peninsula (lake in front of Khojahasan, Boyukshor, Binagadi settlement sports complex, Red, Puta (Lokbatan), Gu, Zabrat, Bulbula, Zyk lakes) in the state program on socio-political development of Baku and surrounding areas given.

Keywords: hydronyms, lake names, etymology, geographical names ...

XÜLASƏ

Azərbaycan xalqı milli mentalitetinə, adət-ənənələrinə, düşüncə tərzinə və başqa cəhətlərinə görə digər xalqlardan fərqlənir. Belə fərqli cəhətlərdən biri də advermə məsələsidir. Məlumdur ki, insan cəmiyyəti formalaşdıqdan bu günə qədər insanlar tanıdıqları, gördükləri eyni növə aid olan obyektləri adlandırmaqla bir-birindən fərqləndirməyə çalışmışlar bunun nəticəsində də müxtəlif tipli advermə növləri yaranmışdır. Bu cəhət özünü istər insanların, istər coğrafi obyektlərin, istərsə də digər məzmun və anlayışların adlandırılmasında özünü göstərmişdir.

Biz bu məqalədə ölkəmizin ərazisində mövcud olan, tarixi-mədəni əhəmiyyət daşıyan maddi sərvətlərimizdən olan hidronimlər haqqında danışacağıq. Məlumdur ki, Azərbaycan coğrafi cəhətdən olduqca əlverişli bir ərazidə-Qafqazda yerləşir. Qafqaz ərazisi isə istər təbii sərvətləri ilə, istər strateji cəhətləri ilə, istərsə də, yeraltı və yerüstü sərvətləri, iqlimi ilə zəngindir. Həmin zənginliklərdən biri də ölkəmizin su obyektləri, dənizi, gölləri, çayları, şəfəli bulaqları və s.-dir. Məlum məsələdir ki, su olmayan yerdə həyat yoxdur. Ulu babalarımızın yaşamaq, məskunlaşmaq məqsədilə bu ərazini seçməsi də, çox güman ki, təsadüfi olmamışdır. Ölkəmizin ərazisində mövcud olan su obyektləri əhalinin suya olan ehtiyatını ödəyir və eyni zamanda bu suların əldə edilən məhsullar əhalinin qida rasionunu da təşkil edir. Həmin məhsullardan hazırlanan yemək çeşidləri xalqın qida mədəniyyətini və təsərrüfat həyatını formalaşdırır. Buna görə də hidronimlərin tədqiqi məsələsi gündəmə gəlir. Lakin bizim əsas məqsədimiz su obyektlərinin iqtisadi səmərəsindən deyil, onların adlandırılması məsələsindən bəhs etməkdir.

Azərbaycanda 500-ə yaxın böyük və kiçik göl vardır. Lakin onların hamısı insanlar üçün əlçatan deyil. Bir qisminə yaxınlaşmaq, gözəlliyindən zövq almaq insanlar üçün asan olsa da, bir qismi əlçatan deyil. Belə göllərdən biri də məşhur Qu gölüdür. Ölkəmizin ərazisindəki göl adlarının xeyli hissəsi zoonimlər əsasında formalaşmışdır. Bunlara Ayı gölü, Ceyran göl, Maral göl, Ördək gölü və s. göstərmək olar. Qu gölü Bakının Qaradağ rayonunun Lökbatan qəsəbəsində yerləşir. Dövlət sənədlərində qeydə alınmış və qorunmasına, inkişafına dair qərar verilmişdir.

Bakı şəhəri və ətraf rayonlarının sosial-siyasi inkişafına dair dövlət proqramında Abşeron yarımadasının 9 gölünün (Xocahəsən, Böyükşor, Binəqədi qəsəbə idman kompleksinin qarşısındakı göl, Qırmızı, Puta (Lökbatan), Qu, Zabrat, Bülbülə, Zığ gölləri) ekoloji vəziyyətinin yaxşılaşdırılması ilə bağlı tapşırıqlar verilmişdir.

Açar Sözlər: hidronimlər, göl adları, etimologiya, coğrafi adlar...

GİRİŞ

Azerbaycan, Kafkasya'nın stratejik coğrafi bölgelerinden biridir. İklim, yer altı ve yerüstü kaynakları bakımından zengindir. Ülkemizin doğasını zenginleştiren ve tarihini yansıtan birçok su kütlesi bulunmaktadır. Hazar Denizi, Göygöl, Maralgöl, Şor gölleri, Kura nehri, Araz nehri vb.

Ülkemiz topraklarında bulunan birçok göl adı, zoolojik sözcük birimleri temelinde oluşturulmuştur. Bu tür adlar arasında Ayı Gölü, Camishbatan Gölü, Jeyran Gölü, Gochnohur Gölü, Maral Gölü, Ördek Gölü ve diğerleri gösterilebilir. Bakü'nün Garadagh ilçesine bağlı Lokbatan yerleşiminden Puta burnuna kadar olan mesafeyi kapsayan göl, bir karayolu ile ayrılmakta ve doğu kesimi Ku Gölü olarak adlandırılmaktadır. Resmi belgelerde bu gölden bahseder. Sosyo-politik devlet programında Abşerondaki 9 gölün (Hocahasan önündeki göl, Boyukshor, Binagadi yerleşim spor kompleksi, Red, Puta (Lokbatan), Gu, Zabrat, Bulbula, Zykhdölleri) ekolojik durumunun iyileştirilmesine yönelik görevler Bakü terefinden mweyyen edilmiş, Ekonomi ve Sanayi Bakanlığı tarafından belirlenmiştir.

METOD

Bildiride tarihi karşılaştırma ve tesviri metodlardan istifade edilmiştir.

SONUÇ

“Tarihsel olarak *kuğu*, Türk halklarında bir totem olmuştur. “Bir din adamı (şaman olarak adlandırılmaz) üzerinde bir vahşi bir hayvan resmi gezdirermiş. Bu resim kabilenin burada anlatılan hayvanla bağlantısını gösteriyordu. Türk halkları arasında *kuğuyla* ilgili bir efsane vardır: “Kara Han suları yarattıktan sonra bir *kuğu* gönderdi. Kuş, denizin dibinden biraz çamur aldı ve suya serpti. Dünya, toprak var oldu ” (2. s. 73).

MÜZAKİRE

Kaynaklar Ku Gölü hakkında geniş bilgi vermese de, Hazar Denizi'ndeki Ku Adası ile ilgili bir araştırmaya rastladık. Bu adanın Gürğan burnunun yakınında olduğu belirtilmektedir. Ada, yılın belirli zamanlarında burada yaşayan kuğulardan dolayı bu ismi almıştır. Oronym, kuğu ve taş bileşenlerinden oluşur. Adanın eski adı "Lebyajiy ostrov" dur. Peter I tarafından Hazar Denizi'nin batı kıyılarına askeri bir seferin arefesinde başlatılan bilimsel keşif, 1719'da Hazar Denizi'nin bir haritasını hazırlarken Finlandiya Körfezi'ndeki (Baltık Denizi) Lebyaji adasının adını almıştır. -20. Daha sonra bu isim haritalarda resmileştirildi. Son zamanlarda Lebyajye, Rusça'dan Kalka olarak ve ardından Ku adası ve ya Kudaşı adlandırıldı. (1. s. 70). Kaynağa göre, burada Ku kuşları toplaşmıştır.

Bu nedenle, Gudashi oronymi ile Gugolu hidronimi arasında belirli bir benzetme yapmak gerekir. Hidronym Gu golu, kendi ismini gölün çevresine yerleşen kuğulardan almıştır. Burada kuğular hakkında bilgi vermek gerekiyor. Bu kuşlar ya tamamen beyaz, gri ya da siyahtır. Kuğular, daha uzun boyunlu ve daha büyük bir gövdeye sahip oldukları için kazlardan farklıdır. Bu kuşlar esas olarak Hazar Denizi kıyılarında, Kızılağaç rezervinde bulunur. Bu kuşlar aynı zamanda Mil ovası ve Samur-Davachi ovasının su havzalarında da yaşarlar.

1993 yılı bahar nüfus sayımında Sarısu, Ağgöl ve Şirvan rezervlerinde yuva yapan kuşlar kaydedilmiştir. Özellikle Ağzibir Gölü'nde (Deveçi limanı) 10 çiftten fazla kuğu olduğu bildirilmektedir. Aynı yıl yapılan tahminlere göre Azerbaycan'da kışlayan kuğu sayısı 3200'den fazlaydı.

Kular hakkındaki düşünceler, dünyanın tüm halklarının folklorunda ve halk sözlerinde kutsallıklarını hala korumaktadır. Kaynağa göre kuğu, sevginin, dirilişin, saflığın, bilgeliğin, cömertliğin, ilahi yeteneğin, bilgeliğin ve cesaretin sembolüdür. Efsaneye göre insan kalbi bir kuğu şeklinde gökyüzünde uçar.

Greko-Roma efsanelerine göre kuğular Zeus, Afrodit, Apollon ve Opheus ile ilişkilendirilir. Mitolojik resimlerde Helios'un oğlu her zaman kuğulara bağlı bir arabada güneşe uçardı. Bir başka efsaneye göre Kraliçe Leda, Zeus'u güzelliğiyle ele geçirmiştir. Ve bir gün Zeus yaralı bir ku kuşu şeklinde yanına gelir, Leda kuşu görür ve okşar ve sonra yumurta olur. Bu yumurtadan güzel Elena doğar. Elena yüzünden Truva Savaşı

gerçekleşir. Yunanlılar, kuğuların ölmeden önce güneşe uçtuğuna ve son kez "kuğu şarkısını" söylediğine inanıyorlardı.

Almanlar, kuğuların geleceği görebileceğini düşündüler. Slavlarda bir çift kuğu aşkın sembolüdür. Kuğuların birbirine olan sevgisi ve bağlılığı onları bir sadakat sembolü haline getirmiştir (www.google. Az).

Kuğulara karşı tutum Türk halklarının mitolojisinde de ilginçtir. Bu sorun aramada vurgulandı. Kaynağa göre kuğu, Türk inancında kaz kadar önemlidir. Bu ornitonim Türkçede qu, ququ, kumay, leylek, kub, kuva, quu, kuv, ala kuv şeklinde kullanılmaktadır. Bu, birçok ku ve diğer kuş benzeri kuş türlerinin hayalet, ilk anne ve kurtarıcı olarak kabul edildiğini gösterir. Başkurt destanı "Ural Batyr"da Khumay adı var. Kuğu kabilesinin annesidir. Khumay (kuğu annesi) son nefesinde Ural'a şöyle diyor: "Bundan sonra kuğuya döneceğim. Yumurtadan çıkan beyaz kuğular senin örneğin olacak."

Kırgız-kazaklar kuğu kuşunu vurmazlar. Sesinden korktuklarından onu kuşların kralı olarak kabul etmişler. Eskiden kız olduğuna ve sonra kuşa dönüştüğüne inanıyorlar. 921-922'de İbn Fadlan, Volga Bulgarlarının *kuğuyu* kutsal kabul ettiklerini ve ona tapındıklarını söylemiştir. Manas destanında kuğu her türlü tanrıdan haber getirir. Destanda kahramanların Tanrı'nın çocukları olduğuna dair bir işaret vardır. Daha ziyade, o kadim inancın izleri burada hissediliyor. Manas'ın gelini, ona dokunurlarsa kuğuya dönüşeceğini ve gökyüzündeki babasına uçacağını söylüyor.

Kuğu, Çuvaşistan'da kutsal bir kuş olarak kabul edilirdi. Onu öldürmek, herkesin annesini öldürmek kadar suçtu. Çuvaşlar, bir ku-nun bir köyün veya şehrin üzerinden uçarsa, alev alacağına inanıyordu. Böyle bir olay 13. yüzyılda Volga-Bulgar devletinin başkenti Kazan'ın işgali sırasında gerçekleşti. Kırgızlara göre kim bir kuğu öldürürse, kendisine ve ailesine talihsizlik getirirdi. V.G. Rodionov'a göre kuğu denilince Türk halkları kazlara benzeyen tüm kuşları kastetmiştir. Altay Türklerinin folklorunda Umay (ana kuğu) kadınlık tanrıçasıydı. Kibar, bakire bir kızdı. Çocuklarla o ilgilenerdi. Komanlara göre, doğuran annelere yardım eden kutsal bir melektir. Sagaylar, Emevileri ku-nu ateş tanrısı olarak biliyorlardı. Çulum ve Ob nehirleri arasında bulunan 6-8. yüzyıllara tarihlenen iki Hun mezarında bir kuğu resmi bulunmuştur. Araştırmacılar bu geleneği Türk soy efsanesinin en son versiyonuna bağlıyor. Kendisine kuğu ornitonimi adını veren etnosların bir kısmı, güney Rusya bozkırlarına yerleşti. 11. yüzyılda Kıpçaklar batıyı işgal ederek Peçenekleri yendi ve *Quv* kabilesi onların bir parçası oldu. V.V.Radlov, Sibiry'a'da yaşayan Lebed Tatarlarının kendilerini *Ku erkekleri* olarak adlandırdıklarını yazıyor. Kazakistan'da *kuğuya* tapan kabilenin adını taşıyan bir göl var. Kuğuya tapan Türkler de Hristiyanlıktan önce Albaniyada yaşıyorlardı. Kiliseler arasındaki mücadele sırasında *Ala Kuv Kilisesi* rahibi Katolikos Bakura'ya karşı çıktı. Azerbaycan dilinde bir *kuğu türüne* haraychi kuğu denir. 20. yüzyılın başlarında Gazah ilçesine bağlı Boz Engali köyü olmuştur. Enga kelimesi ku kuşunun arapça karşılığı, zümrüt ise Farsça'da karşılığıdır (3. s. 103-104).

Bir kaynağa göre, insanın büyük atası olarak kuğuya tapınma, Altay ve Yakut Türklerinin mitolojisinin özelliğidir. Sayan-Altay'ın bazı kabileleri de etnik isimlerini kuğu (ku, xu) adından almıştır: kumandy kabilesi (bir grup Tatar), ku kiji ("kuğu adam") (Rusca lebed) vb. Pelasglara ait olan Kupavon'un eski literatürde "kuğu-insan" şeklinde tasvir edilmesi ile adındaki ku elementi (Türkçede "kuğu") arasında mantıksal bir bağlantı vardır. Kupavon adındaki ku kelimesinin kup (kuw) varyantının da geçerli olması mümkündür. Bu varyantlara dayanarak, Kıpçak etnik adı Kuban-Kuwan-Kuman etnos adı kurulmuştur. "İnsan ku kuşu" efsanesi, eski zamanlardan beri pelagların yaşadığı İtalya'da yaygındı. Etrüskler tarafından Aeneas'a yardım etmek için gönderilen "gemi kataloğunda" Vergili, çeşitli askeri liderler arasında Ligurların lideri Kinir'den ve müfrezinin lideri Kupavo'dan bahseder. Burada Kupavon, başında *kuğu* tüyleriyle tasvir edilmiştir. Etrüskolog A.I. Nemirovsky, bu ismin Latince veya Oxumbr' dilinde özgü olmadığını gösteriyor. Slavların mitolojisinde yer alan "insan-ku kuşu" görüntüsünün, onlara komşu olan Trak-İlliri kabilesinin mitolojisinden veya genellikle "İgor'un Alayı Hakkında Söz" destanında bahsedilen Truvalılardan kabul edildiğini belirtiyor (s. .33-34).

Ünlü bale "Kuğu Gölü", Kuğu Gölü temelinde yaratıldı. Kuğu Gölü balesinin ülkemizdeki Kuğu Gölü ile bir alakası olmadığı doğrudur, ama dünya kültüründe *kuğularla* ilgili böyle bir sanat eserinin oluşması iyi bir olaydır. Bu eser 1875-1876 yıllarında Peter Çaykovski tarafından bestelenmiştir. Dört perdelik balenin ilk senaryosu bir Rus masalına dayanıyordu. Sonunda, Prenses Odette şeytan tarafından bir kuğuya dönüşür. "Kuğu Gölü" efsanesinin kökeni hakkında çeşitli görüşler vardır. Rus balesinin isimlerinden Fyodor Lopukhov, Kuğu Gölü'nü ulusal bale olarak adlandırıyor. Çünkü baledeki kuğu danslarının eski Slavyan dans

motiflerine dayandığını düşünür. Lopukhov'a göre, her iki Kuğu Gölü tarifi konu Alman kökenlidir. Bale lebretosunun konusu, Alman yazar Johann Karl Augustun "Çalıntı Örtü" hikayesine dayanmaktadır. Rus halk masalı "Beyaz Ördek Yavrusu Hakkında" hikayesiyle bazı benzerliklere sahiptir ve lebrettonun başka bir kaynağının da aynı masal olması mümkündür (wikipedia. Org.).

SONUÇ

Türk halklarında müxtəlif vahşi hayvanlara tapınmak tarihen mevcut olmuşdur: türk etnosları boz kurda, kuğu kuşuna ve diyer hayvanlara tapınmış ve öz sancaklarında onun resmini çekmişler.

Böylece, ülkemizdeki Gu golu hidronimi, ornitonim kökenlidir olup, zoolojik sözlük birimi temelinde oluşturulmuştur.

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THE REFLECTION OF PROBLEMS OF ARAB IMMIGRANT WOMEN IN LITERATURE

ƏRƏB MÜHACİR QADINLARIN PROBLEMLƏRİNİN ƏDƏBİYYATDA İNİKASI

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ABSTRACT

Since the beginning of the XXI century, a lot of interesting novels have been written in Egyptian literature, the main characters of which are in emigration. The developments are taking place in foreign countries. As such, along with the hard life, moral suffering and psychologically tense moments of emigrant Arab men, the literature also features the life of emigrant Arab Muslim women.

In this context, the “Chicago” (2007) novel by Egyptian writer Alya Al-Aswany is a very interesting work. Among various male characters, there are different immigrant women who came to the United States for various reasons.

With the female images created in the novel, Al-Aswany emphasized the importance of pure and high human morality, regardless of country, society, religion and national identity.

Among the numerous works in modern Egyptian literature on the topic of emigrants, Miral At-Tahawi's “Brooklyn Heights” novel is also interesting with the images of an emigrant woman. The work tells the story of an Arab woman who, after her husband's betrayal, divorced, took her only son and moved to the United States.

Summing it up, those who are abroad cannot get rid of emigrant cliché and what they live in is not freedom, but problems, pressure, strangeness and longing.

Keywords: immigrants, Egypt, Arabic literature, migration

ÖZƏT

XXI əsrdən başlayaraq Misir ədəbiyyatında əsas qəhrəmanları mühacirətdə olan, süjet xətti əcnəbi ölkələrin fonunda cərəyan edən çox sayda maraqlı əsərlər yazılır. Beləcə, qürbətdə ağır həyat, mənəvi iztirab və psixoloji gərgin anlar yaşayan mühacir ərəb kişi obrazları ilə yanaşı ədəbiyyatda mühacir ərəb müsəlman qadın obrazları da yaranır.

Bu prizmadan misirli yazar Alyə Əl-Asuaninin “Çikaqo” (2007) romanı çox maraqlı platformadır. Əsərdə rəngarəng kişi surətləri arasında müxtəlif səbəblərdən uzaq ABŞ-a gələn fərqli taleli mühacir qadın obrazları da vardır.

Əl-Asuani romanda yaratdığı qadın obrazları ilə insanın hansı ölkədə, cəmiyyətdə yaşamasından, hansı dinə etiqad etməsindən, milli kimliyindən asılı olmayaraq təmiz mənəviyyata, yüksək insani əxlaqa malik olmasının vacibliyini vurğulamışdır.

“Mühacirlər mövzusu”nda müasir Misir ədəbiyyatında işlənmiş çoxsaylı əsərlər arasında Miral Ət-Tahavinin “Bruklin yüksəklikləri” romanı da mühacir qadın obrazları ilə maraqlıdır. Əsər ərinin xəyanətindən sonra boşanaraq oğlunu götürüb ABŞ-a yerləşmiş bir ərəb qadının taleyindən bəhs edir.

Ümumiləşdirərək nəticə olaraq sonunda qeyd etmək doğru olar ki, qürbətdə olanlar “mühacir” adından qurtula bilmirlər, yaşadıkları isə azadlıq yox, problemlər, təzyiqlər, qəriblik və həsrətdir.

Açar Sözlər: mühacirlər mövzusu, mühacirlər, Misir, ərəb ədəbiyyatı, miqrasiya

TƏDQIQAT

Bu gün ərəb, eləcə də Misir ədəbiyyatında daha bir istiqaməti iş, təhsil, bitməyən silahlı qarşıdurmalar, ekoloji problemlər, siyasi təqiblər və s. səbəblərdən xarici ölkələrə müvəqqəti və ya daimi yerləşmiş ərəblərin yaşamını əks etdirən mühacirət mövzulu əsərlər təşkil edir. Ədəbiyyatda bu tendensiyanın yaranması isə təsadüfi deyil. Belə ki, real həyatı əks etdirmək missiyası daşıyan ədəbiyyat artıq XXI əsrin əvvəllərində sayı 2,7 milyonu keçən misirli mühacirlərin talyinə biganə qala bilməzdi (3, səh. 28).

Xüsusən XXI əsrdən başlayaraq Misir ədəbiyyatında əsas qəhrəmanları mühacirətdə olan, süjet xətti əcnəbi ölkələrin fonunda cərəyan edən çox sayda maraqlı əsərlər yazılır. Qürbətdə Vətən həsrəti, ağır həyat, mənəvi iztirab və psixoloji gərgin anlar yaşayan mühacir ərəb kişi obrazları ilə yanaşı ədəbiyyatda mühacir ərəb müsəlman qadın obrazları da yaranır.

Ümumiyyətlə, 2020-ci ildə dünya üzrə miqrasiya hesabatında ümumi mühacirlərin payında qadınların kütləsi 47 fazidən çox qeyd edilir (5, səh 12).

Hələ 2010-cu ildə “Qadın inkişafda Avropa şəbəkəsi” («WIDE») məruzəsində qloballaşan dünyada işçi qadın miqrasiyasının günbəgün artdığını qeyd etməklə yanaşı, bunun səbəblərinin bəzi ölkələrdə müşahidə edilən iqtisadi gerilik, sosial qeyri-bərabərlik, gender problemləri ilə əlaqəli olduğunu qeyd edib (2, səh.3,4).

Eyni zamanda informasiya və texnologiyaların sürətlə inkişaf etdiyi çağdaş dünyada artan işsizlik problemi, bəzi ölkələrdə qadınlara qarşı diskriminasiya, zorakılıq və təcüvz halları da əsas faktorlar kimi vurğulanır. Çıxış yolunu mühacirətdə görən qadınlar isə çox zaman savadsızlıq, dil, peşə vərdişlərinin olmaması səbəbindən mühacirət etdikləri ölkədə ucuz işçi qüvvəsinə çevrilirlər, ən pis halda isə kölə halında işləyir. İşçi mühacir adı ilə insan alveri qurbanı olan qadınların statistikasını isə daha çox dəhşət doğurur. Birləşmiş Millətlər Təşkilatının Narkotiklər və Cinayətkarlıq İdarəsinin 2019-cu il üzrə hesabatında insan alveri ilə bağlı faktlarda 72 faiz qadın və uşaqlarla bağlı olduğu qeyd edilir (6).

İşçi mühacir qadınların 95 faizi isə əmək müqaviləsi olmadan, ucuz işçi qüvvəsi kimi ən ağır şəraitdə və daha çox xidmət sektorunda (otellər, kafe və restoranlar, şəxsi mənzillərdə xidmətçi, təmizlik personalı) işləyirlər (4).

Ərəb müsəlman qadınların mühacirət səbəblərini təhlil edərkən daha çox işçi mühacir statusu ilə deyil, ərnlərini, ailələrini müşayiət etmək səbəbiylə mühacirət taleyinə məhkum olduqlarını qeyd etmək olar. Belə ki, əksər ərəb ölkələrində qadınların azadlıqlarının məhdudlaşdırılması, din faktoru və mühafizəkar baxışlar, gender problemləri onların bu və ya digər səbəbdən müstəqil şəkildə, təkbaşına mühacirət etmələrinə şərait yaratmır.

Mühacirətdə isə ərəb müsəlman qadınların kişilərdən daha çox dini dözümsüzlüklə, ksenofobiya halları, qapalı geyimləri səbəbindən təzyiqlərlə üzləşdiklərini qeyd etmək olar. Əksəriyyətin savadsız olması və dil baryeri ilə üzləşməsi isə onların yeni, fərqli şəraitə adaptasiyasını ümumiyyətlə mükünsüz edir, mənfi fəsadlara yol açır.

Əlbəttə, bir qism ərəb müsəlman qadınların təhsillə bağlı mühacirət etmə halları da vardır. Onların böyük əksəriyyəti müvəqqəti müacirlər olaraq təhsillərini başa vurduqdan sonra Vətənə qayıdırlar. Başqa bir qism isə müxtəlif şəxsi səbəblərdən ölkəni tərk edənlərdir. Və bütün bu ərəb müsəlman qadınların mühacirətdə yaşadıkları, üzləşdikləri çətinliklər, problemlər, təşvişlər, mənən yalnızlıqları, psixoloji sarsıntıları zaman-zaman ayrı-ayrı yazıçıların bədii əsərlərində real çalarlarla inikas olunur.

Bu prizmadan misirli yazar Alyə Əl-Asuaninin “Çıxaqo” (2007) romanı çox maraqlı platformadır. Əsərdə rəngarəng kişi surətləri arasında müxtəlif səbəblərdən uzaq ABŞ-a gələn fərqli taleli mühacir qadın obrazları da vardır. Bunlardan biri yüksək biliyi ilə fərqlənərək təhsilini davam etdirmək üçün Çıxaqoya yerləşmiş Şaymadır. Onun timsalında yazıçı daim valideynlərin nəzarəti altında olan, milli adət-ənənələr çərçivəsində, şəritət qanunları ilə yaşayan müsəlman ərəb qadınların fərqli mədəniyyətlərin, dünyagörüşlərin toqquşduğu cəmiyyətdə yaşadıklarını təzadlı situasiyalarda, psixoloji detallarla açıqlamışdır. Qara örtülü geyimi ilə daim ətrafdakıların nəzərlərindən sıxılan Şayma ailə nəzarətindən uzaqda həmyerlisi Tarikla tanış olduqdan sonra sanki özgüvən qazanır. Yazıçı bununla kişi-qadın münasibətlərində incə məqamlara toxunur, Misir cəmiyyətindən uzaqda bu iki gəncin timsalında milli, dini əxlaqi dəyərləri, adət-ənənələri Amerika cəmiyyətindəki reallıqların fonunda açıqlayır.

Hər iki obraz ailələrinin mühafizəkar baxışlarına hörmət edir, bunu dəstəkləyir. Hər ikisi üçün valideynin, böyüklərin xeyir-duası ilə nikah vacib ailə aktıdır. Lakin onlar sosial məsuliyyət daşımayan, istər din, istər dövlət qanunları ilə məhdudlaşdırılmayan sərbəst kişi-qadın münasibətləri yaşanan bir cəmiyyətdə axına düşürlər. Şayma artıq mühafizəkar baxışlar altında tərbiyəni doğru saymır, düşdüyü fərqli mühit, ətrafdakıların həyat tərzi fikirlərini qarışdırır, suallar doğurur: “Şaymanın bağlı qapılar arxasında etməyə utandığını, ətrafda gənc qızlar, oğlanlar, elə yaşlılar küçədə, parkda rahatca yaşayırlar. Əgər bu haramdırsa, əxlaqsızlıqdırsa, Allah onlara niyə lənət yağdırmır? Məgər Allah fərqli münasibət göstərərmi, seçərmi bəndələrini? Amerikalılar hər cür günaha batırlar – alkoqol içirlər, qumar, mərc oyunları oynayırlar, narkotik satır, istifadə edirlər, hər cür əxlaqsız münasibətləri yaşayırlar. Allah onları cəzalandırmaq əvəzinə var-dövlət, qüdrət, bilik verir ki, ölkələri dünyada hegemon gücə çevrilsin. Bəs, niyə müsəlmanları cəzalandırır?” (1)

Bu suallarla tərəddüdlər içində qalan Şaymanın Tarıqla çərçivələri aşaraq daha da yaxınlaşdığını görürük. Amma yazıçının burada diqqətə çatdırmaq istədiyi başqa bir məqam da var – hər iki gənc din, cəmiyyət tərəfindən cızılan hədləri aşsalar da, münasibətlərini Misirə qayıdınca mütləq rəsmiləşdirəcəklərinə, nikaha girəcəklərinə, adət-ənənələrə uyğun evlənəcəklərinə söz verirlər. Hər ikisi cismani istəklərini bu vədə söykənib yaşayır və özlərini ovudurlar. Əl-Asuani incə məqamlarla göstərir ki, hər şeyə rəğmən, onlar üçün mental dəyərlər ön yerdedir. Yazıçı yaratdığı bu qadın obrazında dini qanunların hökm sürdüyü, namusun həyat qədər dəyərli olduğu, mühafizəkar baxışların tozlandığı Misir cəmiyyətindən qopub Amerikada fərqli həyat tərzi yaşayan, bunun fəsadları ilə üzleşən qadınların nə hiss etdiklərini, psixoloji sarsıntılarını çox real ştrixlərlə xarakterizə edir.

Daha öncə qeyd etdiyimiz kimi, dinin, şəriətin, cəmiyyətin qanunlarına uyğun olaraq, ərlərinin arzusuyula onları müşayiət etmək səbəbindən mühacir taleyi yaşayan qadınlar ərəb müsəlman mühacir qadınlar arasında böyük pay təşkil edir. Əl-Asuaninin başqa bir mühacir qadın obrazı onlardan biridir. Mühafizəkar ailə tərbiyəsi görmüş həmin qadın həyat yoldaşının hər sözünə, fikrinə hörmətlə yanaşsa da, kortəbii, şüursuz itaəti qəbul etmir. O, həyat yoldaşının yanlışlarını görür, bunu onunla müzakirə edir. Əri ona əl qaldıranda isə bunu özünə qarşı təhqir qəbul edir, küsür, etiraz edir, hətta boşanacağını bildirir.

Burada yazıçı başqa məqamlara da toxunur. Valideynləri onun boşanmaq qərarını doğru saymır, bunun ailənin və onun özünün nüfuzuna xələl gətirəcəyini deyirlər. Ailəsi ilə söhbətdən sonra obrazın düşüncələrində Əl-Asuani əksər müsəlman ərəb cəmiyyətlərində boşanmadan sonra qadını gözləyən həyatı təsvir edir: heç kəs qadın ərindən boşandı deməyəcək, hər kəs ona ərini yanında tuta bilməyən, tərkd edilmiş qadın kimi baxacaq. Ailəsi də rəzil olacaq. Boşanmış qadın ailəsi üçün yük, qayğı, narahatlıq, baş ağrısı olur. Ətrafdakılar isə ona ya təəssüflə baxacaq, ya da ərini saxlaya bilməyən bacarıqsız kimi. Təbii ki, yüngül əxlaqlı da zənn edəcəklər. Kişilər isə boşanmış olduğu üçün ona rahat əldə edilə bilən qadın kimi baxacaq, hər yerdə təqib edəcəklər. Daha sonra isə ən yaxşı halda həmin qadınlar dul, çoxuşaqlı, yaşlı biriləri ilə ailə qururlar. Daha pis aqibət - ömürlərinin sonuna qədər nəzarət altında ata evində xidmətçi qismində qalırlar. Bəziləri isə ailəsinin xeyir-duası, seçimi ilə ikinci, üçüncü, hətta dördüncü arvad olmaq taleyi yaşayır. Bütün bu reallıqlar obraza da məlumdur və ailəsinin öyüd-nəsihətini dinləyib nikahını sürdürməyə qərar verir (1).

Lakin o, ərinin pula hərisliyini, yaltaqlığını, riyakarlığını, öz mənafeyi naminə əxlaqi dəyərlərin belə üstündən xətt çəkdiyini həzm etmir. Əl-Asuani sonunda ərini tərkd edərək Misirə qayıdan, milli kimliyinə sadıq belə bir ərəb qadını obrazı yaratmaqla insanın hansı ölkədə, cəmiyyətdə yaşamasından, hansı dinə etiqad etməsindən asılı olmayaraq təmiz mənəviyyətə, yüksək insani əxlaqa malik olmasının vacibliyini vurğulamışdır.

“Mühacirlər mövzusu”nda müasir Misir ədəbiyyatında işlənmiş çoxsaylı əsərlər arasında Miral Ət-Tahavinin “Bruklin yüksəklikləri” romanı da mühacir qadın obrazları ilə maraqlıdır (7).

Əsər ərinin xəyanətindən sonra boşanaraq tək oğlunu götürüb Bruklina yerləşmiş Hind adlı ərəb qadınlardan bəhs edir. O, hər gün oğlunu məktəbə yola salandan sonra iş tapmaq üçün Bruklini qarış-qarış gəzir, yeni insanlarla tanış olur. Şəhərin təsvirlərində verilən bir epizodla, xırda ştrixlə, fərqli insanlarla yazıçı, obrazın hafizəsində xatirələri oyadır, keçmişə qayıdır. Beləcə, nənəsini, anasını xatırlayır. Atasını işdən ya gec gələr, ya heç gəlməzdi. Anasını atasının yolunu gözləyən, elə hey ağlayan xatırlayır. Atasını isə evə girər-girməz ona bağırırdı: “Nədi?! Elə hey uşaq doğmaqla məni evə bağlayacağımı düşünürsən?!” Yazıçı obrazın hafizəsində oyanan bu cür xatirələrlə ərəb cəmiyyətində kişi-qadın münasibətlərində yaşanan problemlərə diqqət çəkir, xəyanət səbəbindən qürbətə qaçmaqla keçmişini unutmaya çalışan qadının sarsıntılarını vurğulayır.

Buranın işsizlər kütləsinə qoşulub bütün günü iş axtarmaqla məşğul olan obraz üçün gələcək də aydın deyil. Qürbətdə ərəb müsəlman bir qadının təşvişləri başadüşüləndir, o, övladının, özünün sabahı üçün narahatdır. Ələxsüsus yazıçının əsərdə yaratdığı başqa bir misirli qadının faciəsi Hindi haqlı olaraq daha çox düşündürür. Əsl adı Leyla olan bu yaşlı qadın əslən misirlidir. Hind onun keçmiş, ömür hekayəti ilə öz həyatının bəzi anlarını eyniləşdirir, beləcə bu yaşlı qadına baxarkən gələcək taleyini təxmin edə bilər.

Leyla günlərin birində ərinin bitməyən xəyanətlərindən bezib, azyaşlı oğlunu da tərk edib Amerikaya yerləşir və ərinin göndərdiyi pulların hesabına qayğısız, sözün əsl mənasında azad həyata başlayır. Özünü Lilit kimi təqdim edən Leyla həyat tərzini də büsbütün dəyişir - geyimini, saçını, danışığını, yemək tərzini, musiqi zövqünü. Fərqli insanların çevrəsinə, təsirinə düşür, alkoqol, narkotika, hər şeyi dadır. Həyatına çox adam daxil olur, çox macəralar yaşayır, amma xoşbəxtliyi tapa bilmir. Hazırda isə yaddaşa bağlı problemləri olan bu yaşlı qadın çantasında kağız parçasına yazılmış ünvanını gəzdirir ki, itməsin.

Lilit ölür və onu qürbətdə müsəlman qəbiristanlığında dəfn edirlər. Onun bahalı geyimləri, ayaqqabıları və digər əşyaları isə Amerikada adət olduğu kimi, qutulara yığılıb küçəyə qoyulur ki, ehtiyacı olanlar yararlansın. Qutulara yığılmış bəzi nimdaş paltarlar yenə Hindi keçmişə qaytarır, anasının, nənəsinin geyindiği əlbisələri, o günləri xatırlayır. Əşyaların arasındakı ərəb dilində kitablar isə onu məktəb illərinə, gəncliyinə qaytarır. Kitablardan mərhumənin oğlunun ayrı-ayrı illərdə çəkilmiş fotoları, məktublarla bərabər gündəliyi xatırladan cızma-qaralar, qeydlər çıxır. Lilitin yaşadıklarını və unutmaya çalışdıqlarını, qorxularını, göz yaşlarını, arzularını, hisslərini özündə ehtiva edən bu xatirələrini oxuduqca, Hində elə gəlir, sanki bütün bunları o yaşayıb. Lilitin həyatı bir film kimi gözləri önündə canlanır. Yazıçı qəhrəmanların oxşar taleyini işləməklə, əslində, mühacir həyatı yaşayanların hamısının oxşar taleyi, aqibəti, gələcəyi paylaşdığını diqqətə çatdırmaq istəyir.

Bunu ümumiləşdirərək bir nəticə olaraq da sonunda qeyd etmək doğru olar - qürbətdə olanlar “mühacir” adından qurtula bilmirlər, yaşadıkları isə azadlıq yox, problemlər, təzyiqlər, qəriblik və həsrətdir.

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TÜRK VE JAPON HALKLARININ YAŞAMLARI BAĞLAMINDA TÜRK VE JAPON EVLERİ, ÇEVRELERİ VE DOĞALARI

TURKISH AND JAPANESE HOUSES, THEIR ENVIRONMENTS AND THEIR NATURE IN THE CONTEXT OF THE LIVES OF THE TURKISH AND JAPANESE PEOPLE

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ÖZET

İnsanlar, yaşama mekânlarını belirlerken ve şekillendirirken doğdukları ve yaşadıkları coğrafyanın koşullarını da göz önünde bulundurmuş, farklılaşan yaşayış biçimleri ile mekânlarını tasarlamışlardır. Yaşama biçimleri, yaşam alanlarının tasarımlarında ve ayırt edici özelliklerinin ortaya konmasında belirleyici rol üstlenmektedir. Yaşama mekânları tasarlanırken, insanı ölçek olarak odağında tutan, insanın doğa ile ve doğanın insan ile ilişkisini göz önünde bulunduran bazı toplumlar; insan, mekân, gelenek, yaşayış biçimleri ve doğa gibi faktörleri ele alarak mekân tasarımlarını gerçekleştirmişlerdir. Bu bağlamda, yaşam alanları kapsamında bir literatür taraması yapıldığında; iki farklı coğrafya üzerine kurulu, iki farklı toplum olarak varlığını sürdürmekte olan Türk ve Japon halklarının yaşam alanı tasarımlarının, temelde bazı farklı yönleri olsa da benzerliklerinin varlığı ve insanı odak noktasına alan tasarımlara ev sahipliği yaptıkları gözlemlenmektedir. Bu kapsamda Türk ve Japon halklarının yaşamlarını yönlendiren fiziksel, daha da önemle duygusal, algısal özellikleri, yaşama ve doğaya bakış biçimleri, insana, aileye, çevreye ve doğaya karşı yaklaşımları önemle dikkate alınmaktadır. İçinde yaşadıkları mekânların ve çevrenin davranış biçimleri ile yaşam tarzlarını birer seremoniye dönüştüren alışılmışın dışındaki geleneklerini meydana getirmesi ve farklı bakış açılarının yaşama biçimleri üzerinde nasıl etken olduğuna dair ayrıntılı bir araştırma bu bildirinin ana konusunu teşkil etmektedir. Böyle bir araştırmada, belki Türk ve Japon insanların benzeyen özelliklerinin daha az, buna karşılık farklılıklarının daha fazla olabileceği var sayılabilir. Ancak bu farklılıkların oluşumunda temelde; coğrafi bölge, inanç sistemi, davranış-yaşayış biçimi ve bakış açısı farklılığı vb. gibi unsurların etkin olduğu göz önünde bulundurulmalıdır. Çalışmanın başlıca amacı Türk ve Japon toplumlarının geleneklerine, bu toplumları oluşturan insan ruhlarının inceliklerine ve duyarlıklarının mekânlarına nasıl yansıtıldığının özelliklerine değındir. İnceleme yapılırken, yaşam mekânlarının en temel öğelerinden biri olan ev kavramı temel alınmış olsa da, çevre, doğa ve insanın doğanın bir parçası olma eğilimi ve niteliği ön planda ele alınmaktadır. Ele alınan konu bağlamında, literatürde yer alan özgün Türk Evi, çevresi ve Japon Evi, çevresi, aynı zamanda her iki toplumda da vazgeçilemeyen doğa kavramı ve doğaya karşı geliştirilen davranış ve tutumlar dikkate alınmakta, örnekler üzerinden değerlendirme yapılmakta; insan, yaşam, doğa, duygular, algılar, düşünceler, davranışlar vb. kavramlar kapsamında Türk evi, çevresi ve Japon evi, çevresi, doğa içinde ve doğa ile özdeşleşen, doğaya karşı duyarlı iç ve dış mekân kavramları ile irdelenmektedir. Bildiri örnekler ve kavramlar üzerinden matris içinde analiz yöntemiyle bir karşılaştırma gerçekleştirmektedir. Analizin yorumlanmasıyla her iki toplumun yaşam tarzlarının mekânlarına nasıl yansıtıldığı, ve bu özelliklerinin güncel yaşamda devam ettirilip ettirilmediği konusuna gönderme yapılmaktadır.

Anahtar Kelimeler: Türk Evi, Japon Evi, insan, mekân, doğa, çevre,

ABSTRACT

While determining and shaping their living spaces, people also took into account the conditions of the geography they were born and lived in, and designed their spaces with their differing lifestyles. Lifestyles play a decisive role in the design of living spaces and in revealing their distinctive features. While designing living spaces, some societies that focus on the human as a scale and consider the relationship of humans with nature

and nature with humans; They realized their space designs by addressing factors such as people, space, tradition, lifestyles and nature. In this context, when a literature review is made within the scope of living spaces; It is observed that the living space designs of the Turkish and Japanese peoples, which are based on two different geographies and continue their existence as two different societies, have similarities, although they have some fundamentally different aspects, and they host designs that focus on people. In this context, the physical, emotional and perceptual characteristics that direct the lives of the Turkish and Japanese peoples, their way of looking at life and nature, and their approaches to people, family, environment and nature are taken into consideration. The main subject of this paper is a detailed research on how the places and environments in which they live create their unusual traditions that transform their behavior and lifestyles into ceremonies, and how different perspectives affect their lifestyles. In such a study, it may be assumed that Turkish and Japanese people may have fewer similarities, but more differences. However, in the formation of these differences basically; geographical region, belief system, behavior-life style and perspective difference, etc. factors should be taken into account. The main purpose of the study is to talk about the traditions of Turkish and Japanese societies, the delicacy of the human spirits that make up these societies, and the characteristics of how their sensitivities are reflected in their spaces. Although the concept of the house, which is one of the most basic elements of living spaces, is taken as the basis, the tendency and quality of the environment, nature and human being to be a part of nature are discussed in the foreground. In the context of the subject discussed, the original Turkish House, its surroundings and the Japanese House, its surroundings, as well as the indispensable concept of nature in both societies and the behaviors and attitudes developed against nature are taken into account, and evaluations are made through examples; human, life, nature, emotions, perceptions, thoughts, behaviors etc. Within the scope of the concepts, the Turkish house, its surroundings and the Japanese house, its surroundings are examined with the concepts of indoor and outdoor spaces, which are in nature and identified with nature, sensitive to nature. The paper makes a comparison with the analysis method in the matrix through examples and concepts. With the interpretation of the analysis, it is referred to how the lifestyles of both communities are reflected in their spaces and whether these features are maintained in current life.

Keywords: Turkish house, Japanese house, people, space, nature, environment

GİRİŞ

Yaşam, pek çok farklı ve çeşitli parametreyi içinde barındıran çok katmanlı, derin, günden güne dünyanın gelişimine paralel olarak değişen, devingen bir kavramdır. Fizyolojik ve psikolojik etkenler doğrultusunda yön alır. İnsanın varoluşunun merkezinde konumlanır ve her insandaki süreci değiştendir. Buna paralel olarak her bir bireyin yaşamsal süreci farklıdır fakat ortak değerler olgusu bağlamında ele alındığında her bir bireyin biraraya gelen yaşantısı toplumların yaşantısına da ışık tutmaktadır.

Toplum birey için bireyde toplum için önem teşkil etmektedir. Toplumların yaşantısı bağlamında düzen ve huzur seviyesinin artması, bireyin yaşamsal tatminiyetinde arttıracak ve bu şekilde gelişen döngüsel durum birey toplum ilişkisini ve toplumların gelişimini olumlu yönde etkileyecektir. Toplumun huzur içinde yaşaması, içerisinde yaşayan bireylerin huzur içerisinde yaşamlarını sürdürmesi ile doğrudan ilişkilidir. Toplum düzeni insanların birlik içerisinde birbirine yardım ederek yaşaması ve ihtiyaçlarını karşılayabilmesi ile meydana gelmiştir (Baran 1993, s.264). Bireyin topluluk içindeki yerini tanımlaması ve içselleştirmesi, topluluğa karşı sorumluluk bilinciyle hareket etmesi, buna bağlı olarak toplum içinde kendisine yer edinmesi, diğer bir deyişle toplum içinde, olumlu deneyimleriyle yerinin kabul görmesi toplum düzeninin sürdürülebilirliğini etkileyecektir.

Toplumların kendi iç ilişkileri ve birbirleriyle olan etkileşimleri bağlamında bildiri özelinde bir değerlendirme yapılmış; özgün değerlere sahip iki farklı toplum olarak Türk halkı ve Japon halkı ele alınmıştır. Japon ve Türk halklarını daha iyi anlayabilmek amacıyla konu, yaşama ilişkin deneyimler ve gelenekler üzerinden birey, toplum, yaşam alanı çevre ve doğa kavramları bağlamında incelenmiştir. Yaşam alanlarını incelerken bireyin doğumundan itibaren birey olarak gelişiminde mesken tuttuğu en çekirdek mekânı olan ev örnek olarak alınmıştır.

1. Birey, toplum, yaşam ve ev

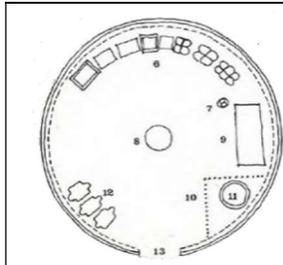
İnsan, topluluğun içerisinde yaşama, var olma, hayatını olabildiğince idame ettirme, yaşama amacını bulma ve onu gerçekleştirme gibi güdülerle yaşamını belli düzeyde idame devam ettirir ve ömür denilen olgusal sürecini tamamladıktan sonra yaşamına veda eder. İnsan, varoluşu itibari ile çevresi ile etkileşimli sosyal bir varlıktır. Birey toplum için toplum da birey için yaşar. Birey bütünü parçalarını oluşturur, parçalar biraraya getirilerek tamamlandığında toplum meydana gelir. Bireyler fizyolojik olarak belli ölçüde kendi ihtiyaçlarını giderebilirler fakat sosyal bir varlık oldukları için psikolojik olarak diğer bireylere ihtiyaç duyacaklardır.

Birey, toplumu oluşturan en temel kavram olarak litetürde yerini almaktadır. Toplumu oluşturan bireyler gibi bireylerin yaşama mekânlarını oluşturan, mimari olarak en çekirdek barınma mekânı örneği olan ev kavramı da bireylerin halkları meydana getirmesi gibi biraraya geldiğinde, halkın komün yaşam alanlarını meydana getirmektedir. Bireyin ve bireye bağlı olarak toplumun oluşumu, değişimi ve gelişiminde yaşam alanı olan mekân önemlidir. Mekânla ilgili edinilen ilk deneyim, kişinin bir sonraki yaşamına taşınır (Özak, Gökmen, 2009, s. 149). Birey, kendi gelişimi için ilk mesken tuttuğu mekân olan ev içerisinde kendi özgürlük alanını tanımlar ve toplum içerisindeki gelişime altyapı oluşturacak içsel gelişimine ev içerisinde başlar ve devam ettirir. Ev birey tarafından içkinleştirilerek özümseir. Ev insanın kendi bedeninden sonra müdahale edebileceği en özgür ve somut alandır, özelliklerini ve sınırlarını kullanıcısı belirler (Barlas, 2019, s. 96). Bireyin ev içerisinde özgür olarak hareket etmesi, içkinleştirdiği mekânda kendi sınırlarını belirlemesi, kendi mekân tanımlamalarını yapması gelişimine katkı sağlayacaktır.

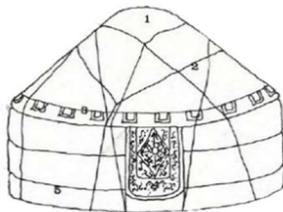
Bir halkı ve o halkın yaşama metodolojisini anlayabilmek için öncül, ev olarak adlandırdıkları mekânları ve evlerin biraraya gelmesiyle sokak, mahalle, cadde gibi birbiri içerisinde etkileşimli yeni alanların oluşmasına olanak tanıyan, toplumun bir arada bulunarak sosyalleşmesine imkan veren yaşam alanı çevrelerini incelemektir çünkü yaşam alanlarında süregelen gündelik yaşam pratikleri, insanların yaşantısı ve tasarıma bakış açısı için tanımlayıcı olacaktır. Bu bağlamda bireyden halkların oluşumuna kadar giden süreci ve yaşantıyı anlamak ancak evin çevresi ile birlikte değerlendirilmesiyle mümkün olacaktır. Konu, evlerin çevresi, biçimi, doğası yani evin eklemleri ile birlikte ele alınmalıdır.

2. Türk halkının birey, toplum anlayışı, yaşam kavramı ve Türk Evi'ne yansması

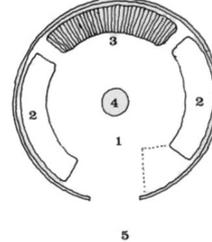
Türkler köken olarak Orta Asya'dan gelen göçebe bir toplum olarak bilinmektedir. Türk halkı, göçebeliliğin getirişiyle, bireyseliğin değil ailenin ve topluluğun birbirine destek oluşunun ağırlıklı olarak kabul gördüğü bir toplum yapısıyla yaşamlarını sürdürmüştür. Türk konut mimarisinin öncül örnekleri biçim olarak Orta Asya yapılarına benzemektedir (Kuban, 2020, s. 42). İlk protatip örnekleri olan ve Orta Asya da barınmak için kullanılan yapılar çadır şeklinde, kolay kurulum kaldırılabilen, göçebe topluluk için geçici kullanıma olanak sağlayan yapılardır. Kuban'a (2020, s. 48) göre "Tek bir mekândan oluşan bütün ilkel ev birimleri, benzer çevresel ve yaşamsal koşullara sahip olmaları sebebiyle çadırlarla doğal bir benzerlik gösterirler." Bu geçici yapılar, gerek dıştan bakıldığında, büyüklükleri ve renkleriyle gerekse içten bakıldığında mekânsal düzenlemesiyle toplum içerisindeki ailenin statüsü hakkında fikir verir (Şahin, 2016 s. 37)



Görsel 1. Orta Asya çadırı planı (Küçükerman, 2017), (Burkut, 2014, s. 22).



Görsel 2. Orta Asya çadırı (Küçükerman, 2017), (Burkut, 2014, s. 22).



Görsel 3. Orta Asya çadırı ve Türk evi planı karşılaştırması – "1. Çok amaçlı orta alan, 2. Oturma için biçimlenen çevresel alan, 3. Kapalı kullanma alanları. Sekiler, sandıklar, yükler. 4. Isıtma. (Küçükerman, 2017, s. 68), (Üstün, 2018, s. 192)"

Sosyal hayat içerisinde göçebe olarak yaşayan aile büyüdükçe mekân ihtiyacı, yanına açılan çadırlar ile giderilir (Şahin, 2016, s.34). Aile bireylerinin artması ile topluluk dağılmaz veya barınmak için kendine yeni alanlar aramaz, aksine ana mekânlara eklenerek büyüyen, birbirine destek veren komün bir yaşam alanı meydana getirilir. Çadırın tam ortasında yer alan ocak mekânın pişirme ve ısınma ihtiyaçlarını karşılamaktadır (Şahin, 2016, s. 31). Şahin (2016, s.36) çalışmasında “Devlet düzeninin temeli aileden ve çadırın içinden başlamaktadır.” diyerek çadırın ortasında yanan ocak için “İlk bakışta ısınma ve yemek pişirme gibi eylemler için kullanıldığı düşünülse de ocak toplumun fertleri için bundan çok daha fazlasını ifade etmektedir, bir devamlılık sembolüdür” söyleminde bulunmuştur.

Ev hayatın idame ettirildiği, gündelik yaşam pratiklerinin sürdürüldüğü, yaşamsal süreçte diğer mekânlara oranla daha fazla zamanın geçirildiği mekânlar olarak insan yaşamının merkezinde yer almaktadır. Hasol (2017, s.68) ev kavramı için “Yalnızca bir ailenin oturabileceği şekilde ve büyüklükte yapılmış konut.” tanımlamasında bulunmuştur. Konu Türk halkının evi ve yaşamı bağlamında ele alındığında Türk Evi; içten dışarıya diğer bir deyişle merkezden çepere doğru büyüeyebilen, tüm ailenin hane bazında kendine tahsis edilen mekânlar (odalar) ile birarada ve ortak mekânlarda paylaşım içerisinde yaşadığı, aile büyüdükçe eklenenebilen ve mahremiyete önem verilen bir yapı olarak göz önüne çıkmaktadır. Çetin (2006, s. 18) çalışmasında ev kavramı için, “Türk toplumunda ev; vatan, devlet, aile gibi kutsal bir kavramdır.” düşüncesine yer vermiştir. Bu bağlamda evine saygı ve özen göstermek, mahremiyetine önem vermek toplumun en çekirdek mekânı olan ev gibi, halkların en çekirdek topluluğu olan aile kavramını da koruyarak halkı ve devletin varlığını sürdürmek ile doğru orantılıdır.

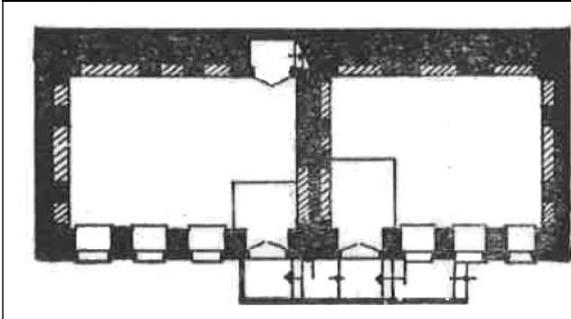
21. yüzyıl Türkiye coğrafyası başta olmak üzere Türk Evi, Osmanlı devletinin farklı coğrafyalardaki geniş hakimiyeti ve yörelerin taşıdığı özelliklere bağlı olarak pek çok farklı yerde ve pek çok farklı tipte görülebilmektedir. Ancak; Eldem’e (1954, s.12) çalışmasında “Birbirinden yüzlerce kilometre mesafede çok farklı şartlar altında inşa edilmiş evlerde bile, planın ana hatları bakımından daima aynı olduğu göze çarpar.” Cümlesine yer verirken, Kuban (1982, s. 197) araştırmasında, “Bu konutlar, bölgesel gelenekler içinde değişiklikler göstermekle birlikte, genel bir kullanım şemasına uyar ve çevreleriyle benzer ilişkiler kurarlar.” düşüncesine yer vermiştir. Evlerin hangi coğrafyada olursa olsun en temelde aynı amaçla planlandığı ve inşa edildiği görülmektedir.

Türk halkı paylaşımcı, misafirperver, cömert, nazik, saygılı ve hoşgörülü, geleneklerine bağlı, inançlarına ve değerlerine sahip çıkan bir toplumdur. Bektaş (2021, s. 33), Türk insanının yaşantısına ilişkin olarak çalışmasında “Bu yaşama kültüründe ‘dünya malı’ geçicidir.”, “Temel olan insan ilişkileridir.”, “Konu komşuya gösteriş ayıptır.”, “Göze batmamalıdır.”, “Kokusu giden yemekten bir kapta komşuya gitmelidir.”, “Ev alınmaz komşu alınır.” cümlelerine yer vermiştir. Türk halkının davranış, tutum ve yaşama biçimi Türk Evi kurgusu ve tasarımıyla yansımıştır. Bektaş (2021) çalışmasında; Türk Evi’nin tasarımında belirleyici ve Türk Evi’ne özgü olarak; tasarım yapılacağı çevrenin bilincinde olma, yaşayan tüm canlılara saygı duyma ve onların yaşamlarını gözetme nezaketinde bulunma, bağlamına uygun olarak tasarlama, iklimsel ve yöresel verileri gözetmeye ilişkin “Yaşama, doğaya, çevre koşullarına uygunluk”, fonksiyonel ve anlaşılabilir tasarıma ilişkin “Gerçekçilik-Usa uyumluluk”, tasarımın ve planlamanın hangi noktadan başladığına ilişkin “İçten dışa çözüm”, dışarıdaki görünümün iç mekân hakkında bilgi vermesine ilişkin “İç ve dış uyumu”, fonksiyonelliğin öne çıktığı, iç ve dış planlamada işlev sahibi olmayan hiçbir tasarımın bulunmadığına ilişkin “Tutum sallık”, en basit yöntemlerle tasarlama ve gereksiz hiçbirşeye yer vermemeye ilişkin “Yapım yöntemleri kolaylık ilkesine dayanıyor”, mimari elemanlar ve mekâna tasarlanan tüm donatılar için insanın anatomik ölçülerinin referans alınarak ergonomik bir tasarımın ortaya konulmasına ilişkin “Ölçüleri insan vücudundan çıkıyor”, doğaya ve çevreye uyumlu tasarımların elde edilebilmesine ilişkin “Gereçler en yakından seçiliyor”, Evlerin tasarımında ihtiyaç durumunda evin eklenerek-eve bir oda daha eklenerek- genişleyebilmesine ilişkin “Esneklik”, evin insan ve davranışlardan yoksun bir obje olmadığının bilincinde olarak mekânın insanların ihtiyaç ve beklentilerine göre tasarlandığına ilişkin “İnsanlarla konuşa konuşa” ikelerine yer vermiştir.

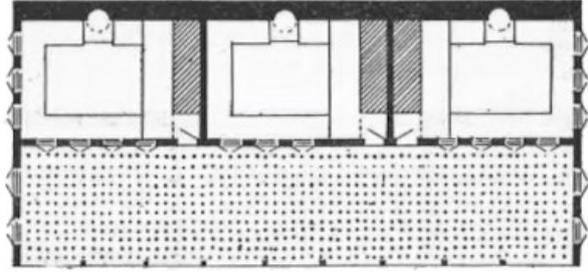
Eldem (1954, s. 14) çalışmasında başlıca mimari planın ana hatlarını belirleyen mekân ve elemanları şu şekilde sıralamıştır: “1.Odalar, 2. Sofalar ve Müştemilat, 3. Geçit ve Merdivenler.” Türk evinin oluşumu planimetrik ölçekte belirleyen ve evin zamanla gelişimine olanak sağlayan en önemli öge odadır. Oda farklı yörelerde ‘otah’ veya ‘otağ’ gibi isimlerle anılmaktadır (Kuban, 2020). 21.yüzyıl Türkiye coğrafyasında yaşam biçimlerinin değişmesi, dünyanın gelişimine paralel olarak kişisel alanların ve bireyseliğinin artmasıyla

tasarlanan modern evlerde, her bir oda farklı işleve hizmet ederek farklı fonksiyonlara sahip olsa da Türk Evi’nde tasarlanan veya sonradan tasarıma eklenen her oda, bir haneyi temsil etmektedir. Odalar; “Oturmaya, yemeğe, toplantıya, misafir ağırlamaya, uyumaya” yarayarak çok işlevli olarak kullanılmaktadır Kuban(2020, s. 133).

Hasol (2020, s. 147) çalışmasında oda kavramı için; “Bir binanın, özellikle bir evin oturmak, çalışmak, yatmak, gibi eylemlere yarayan gözlemlerinden her biri: oturma odası, yatak odası, yemek odası, sandıkodası, dikişodası” tanımlamasını yapmıştır. Türk Evi’nde ana planı yanyana dizilmiş odalar oluşturur. Aile bireylerinden biri evlenerek yeni bir haneye ihtiyaç duyulduğunda odalar çoğaltılır, ev genişler ve yeni bir hane, yeni bir mekân meydana getirilir. Sofa odaların açıldığı, ortak olarak kullanılan alandır. Görsel 4 ve görsel 5 de Eldem’in (1954) çalışmasında yer alan sofalı ve sofasız iki farklı ev planı örneği görülmektedir. Türk Evi sofasız olarak planlanmıştır (Karakök, 2017, s.87). Ancak Türk Evi’nin gelişkin örneklerinde odaları dolaylı olarak birbirine bağlayan ve ortak kullanıma tabi olan mekân sofadır. Sofa odaların birbirine iliklendiği ana mekândır ve odalar konumları farketmeksizin birbirine değil sofaya açılır; odaların sofaya açılım şekline bağlı olarak sofa; iç, orta veya dış olarak adlandırılabilir (Ögel, 1981, s. 227).



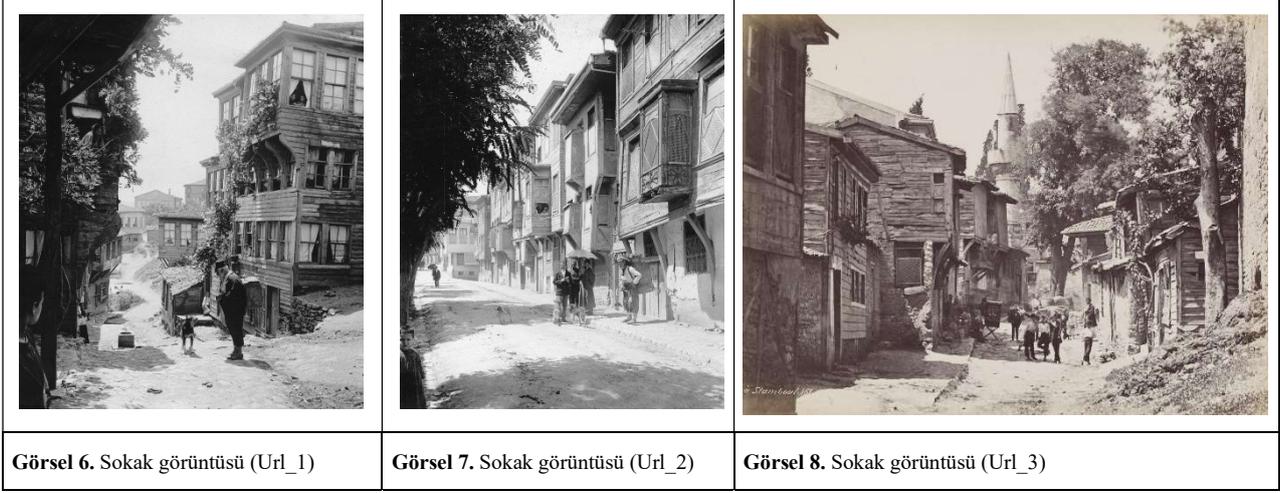
Görsel 4. Sofasız plan örneği, kapıları avluya açılan iki odalı ev, (Eldem, 1954, s.27).



Görsel 5. Dış sofalı ve sıra odalı plan örneği, (Eldem, 1954, s. 34).

2.1. Türk Evi, çevresi ve doğasının yaşam bağlamında özellikleri

Türk Evi, kurulduğu coğrafyanın, yörenin, bölgenin özelliklerine dikkat edilerek yerel ve en temel malzemeler olan; ahşap, kerpi ve taşın kullanımıyla inşa edilir, tasarımı Türk halkının yaşantısından doğrudan etkilenerek, gelenekleri ve mahremiyete verdiği önem bağlamında içe dönük olarak planlanır. Yapısı itibari ile kent ve sokak ile doğal ve sıkı bir bağıntısı varmış izlenimi verir ancak dış mekân-sokak, ev içerisindeki gündelik yaşamdan ve yaşantıdan uzaktır (Kuban, 2020, s. 171). Sokaklar ham ve organik bir forma sahiptir, formlarını evlerin oluşumları belirler. Evlerin ihtiyaca göre düzensiz olarak büyümesi, veya kendine içkin, dışı kapalı olarak inşa edilmesi, sokak ve mahallelerinde değişimini, düzensiz fakat özgün ve organik bir oluşuma tabi kılmıştır. Evin sokak ile form ve malzeme bağlamında kurduğu organik bağıntı, evin çevre ve doğayla uyumlu olmasına olanak tanır. Kuban’a (2020, s. 171) göre “Geleneksel sokak, insan eliyle yapılmış çevre özelliklerini, insan yaşamının organik bir hızla sürüp gittiği tarihi bir dönemi belgeler.”



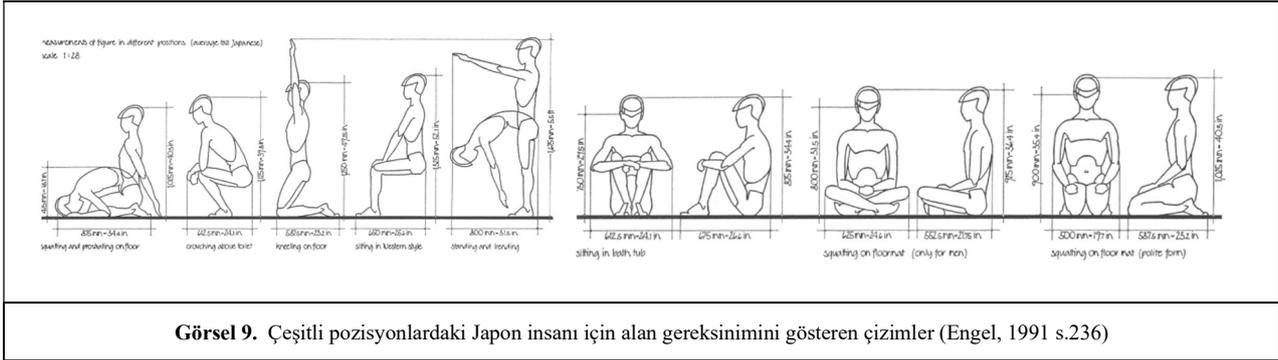
Türk Evi çevreye uygun, doğa ile ilgili bir bütün şeklinde tasarlanır, insanı tasarımının odak noktasında tutar ve yaşama mekânlarını ergonomik ölçülerde, fonksiyonel olarak yapılandırır. Çevresinde yaşayan tüm canlılara saygı duyularak inşa edilir. Bektaş (2021, s. 32) araştırmasında Türk Evi'nin doğa ile kurduğu ilişki üzerine "İncelediğim evlerin belki de en önemli özellikleri doğayla savaştan ona uymaları, belki daha doğru bir deyişle, doğanın kan dolaşımı içinde olmaları...Doğrudan yaşama biçimine doğmaları...Çevreye saygılı kalmaları" ifadelerine yer vermiştir. Evi tasarlayan kişi kendisini çevreyle bütün olarak görmüş, bulunduğu yerin, üzerinde yaşayan tüm varlıklar için sunulduğunu bilmiş, sadece kendisini değil çevredeki tüm varlıkların durumunu gözlemlemiştir (Bektaş, 2021, s. 32).

3. Japon halkının birey, toplum anlayışı, yaşam kavramı ve Japon Evi'ne yansması

Japon halkı, dünya üzerinde varoluşu itibari ile 21. yüzyıla değin geçen zaman sürecine kadar zorlu dönemlerden geçmiş, gelişim sürecinde, kıtlıklar, depremler, seller, savaşlar, ekonomik problemler gibi doğal ve yapay pek çok engel ile yüzyüze gelmiştir. Üzerinde kurulmuş oldukları coğrafya eğimli, dağlık bir yapıya sahiptir ve aynı zamanda kaynak olarak zengin bir yapıya sahip değildir (Koç, 2020, s. 126). Ancak tüm bunlara rağmen, Japon halkı neredeyse tüm bu olumsuzlukları avantaja çevirmeyi başararak kendini geliştirmeye devam etmiş ve varlığını sürdürmüştür. Huffman'a (2020, s.13) göre "Onlar insanlığın en eski seramiklerini üretmişler ve ilk romanını yazmışlardır; eşsiz şiir biçimleri, çiçeksiz bahçeler, kusurlardan zevk alan ve ilkelliği yücelten sanatsal çalışmalar ortaya koymuşlardır."

Din ve kültürel bağlamda: Ada ülkesi olması sebebiyle toplum olarak denizciliğin gelişimine kadar dış etkilere maruz kalmadan kültürel bir gelişim göstermiştir (Güleç, 2018, s. 12). İlk etkileşimlerinde, öncelikle komşu ülkeler ile iletişim içerisine girmişlerdir. Ülke genelinde Şintoizm başta olmak üzere, Konfüçyanizm ve Taoizm yaygın olarak görülmektedir. 6-7 yüzyıllarda Çin aracılığıyla Budizm tüm ülkede etkisini göstermiş, 17. yüzyıllarda Avrupa kültürü, 20 yüzyıl itibari ile ise Amerikan kültürü toplum üzerinden etkili olmuştur (Güleç, 2018, s. 12). Japonların tanrı soyundan geldikleri inancı kendi toplumlarını idealize etme ve yüceltmede etkili olmuştur (Sağlar, 2021, s. 251). Kendi toplumunu, kendi içinde idealize etme olgusu, Japon halkının gelişimine katkı sağlamış ve gelişimi sürdürülebilir kılmıştır.

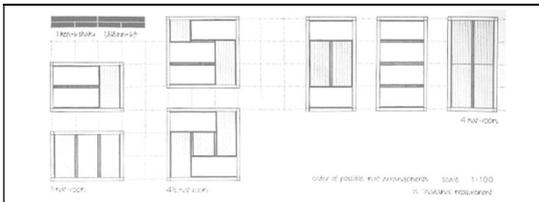
Japon halkı ile ilgili yaşam bağlamında bir inceleme yapıldığında ‘Nihon’ kavramı ile karşılaşılmaktadır. Toplumu oluşturan bireyler, hükümet ve devlet birbirinden ayrılmaz bir bütündür ve bu bütünlüğü ‘Nihon’ kavramı ile anlamlandırmışlardır. Kapıcıoğlu (2019) çalışmasında “ Japonlar ‘Nihon’ dedikleri zaman ülkesi, halkı, taşı toprağı ormanı suyu, hükümeti ve devletiyle tek bir bütünü düşünür.” söylemine yer vermiştir. Bu bağlamda Japon halkının benimsediği ‘Nihon’ anlayışı ile bireyin, ailenin ve toplumun birbirini tamamlayan kavramlar olduğu, birey bazında yapılan herhangi bir eylemin aileyi ve halkı, halkın gelişimine ve değişiminde etki edeceği söylenebilmektedir. Japonlardaki topluluk anlayışına paralel olarak komşuluk anlayışında önemli bir kavram olarak öne çıkmaktadır; her komşu birbirine karşı sorumludur (Kapıcıoğlu , 2019, s. 174).



Görsel 9. Çeşitli pozisyonlardaki Japon insanı için alan gereksinimini gösteren çizimler (Engel, 1991 s.236)

Engel (1991, s. 234) çalışmasında, Japon Evi'nin en ilkel örneklerinin tasarımına yönelik olarak, minimum hacmin bir aileyi barındırmak amacıyla tasarlandığını söylemiştir. Yapılarını anıtsal yerine insan ölçeğinde yapmayı tercih ederler (Kapıcıoğlu, 2019, s. 263). Bu durumda minimal bir tavır benimsedikleri ve minimum hacmin insanın fizyolojik olarak boyutlarına ve psikolojik olarak davranışlarına göre form aldığı söylenebilmektedir (Görsel 9 da boyut ve davranışlara yönelik çizimler gösterilmektedir.).

Japon halkı için ev aileyi yansıtır (Engel, 1991, s. 229). Ailenin yaşantısı ve beklentileri öncelikle, öncül olan ev tasarımına yansır, zaman içerisinde mekân organizasyonuna sirayet eder. Yapı ölçeği Japonlar için önem teşkil etmektedir. Kapıcıoğlu (2019, s. 263) çalışmasında ölçeğe ilişkin olarak; “Ölçek öylesine güvenilir bir ayırtandır ki, yapının enine-boyuna-yüksekliğine, bunların oranlarına bakıp işlevi söylenebilir” ifadelerine yer vermiştir. Japonlar tasarımlarında, mekânın ölçülerini pirinç sapından üretilen ve ‘tatami’ olarak adlandırdıkları bir yüzey matı yardımıyla yaparlar. Tatami'nin mekân içerisindeki davranışı izgara sistemine benzer bir tavidir ve insan ölçülerini baz alır. Yapı inşasında bir standizasyon söz konusudur, mekân ve yapı ölçüleri birbiriyle doğru orantılıdır, eğer bir mekânın ‘tatami’ ölçüleri belliyse strüktürel elemanların ölçüleri mekân ölçüleri doğrultusunda belirlenmiş olur (Kapıcıoğlu, 2019).



Görsel 10. Tatami düzenini gösteren örnek çizimler (Engel, 1991, s. 238).

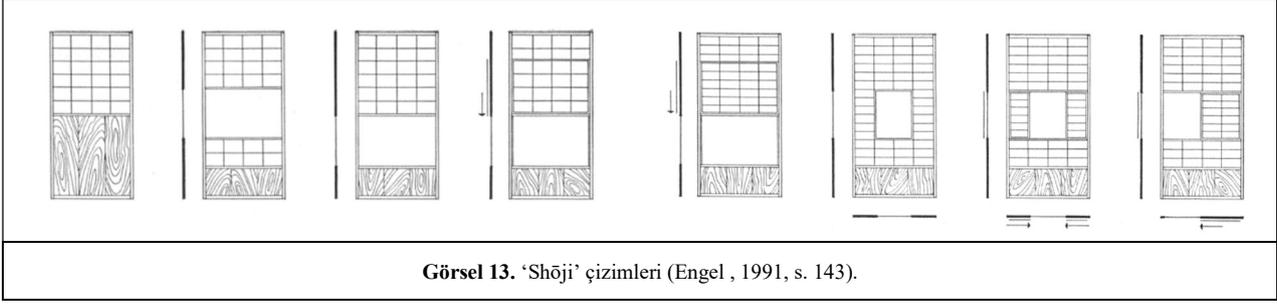


Görsel 11. Tatami kaplı zemin (Url_4).



Görsel 12. Tatami kaplı zemin-oda (Url_5).

Mekân tasarımında bir diğer önemli unsurlar, bölücü görevi gören ‘Shōji’ ve ‘Fusuma’lardır. ‘Shōji’ ve ‘Fusuma’lar hem iç mekânı birbirinden ayırmak için, hemde dış mekânı içeriden ayırabilmek için kullanılabilen, geçici mekânlar oluşturabilen mobil donatılardır. Malzemeleri kağıttır ve stüktürel olarak hafif, ahşap çitelerin biraraya gelmesiyle meydana gelirler; Shōji’ tek kat olarak tasarlanan yarısaydam ve hafif bir kağıt malzemeye sahipken, ‘Fusuma’ mat ve ağır bir kağıt malzemeyle çift yüzeyli olarak üretilir (Engel, 1991, s.142). Kapıcıoğlu (2019, s. 175) araştırmasında bu ahşap strüktürlü kağıt panellere ilişkin olarak “Kağıt kaplı bölmeler ses geçirdiği için evdeki herkes olan biteni duyar, bilir.” ifadelerine yer vermiştir.



Görsel 13. ‘Shōji’ çizimleri (Engel, 1991, s. 143).

3.1. Japon evi çevresi ve doğasının yaşam bağlamında özellikleri

Japon halkının doğa ile kurduğu dengeli ve içkin ilişki yaşamlarının pek çok alanına yakından nüfus ederek yaşantılarını doğrudan etkilemiştir. Japonlar değer verdiklerini herşeyin doğadan geldiğine inanırlar, şükran ve övgülerini doğaya sunarlar (Kapıcıoğlu, 2019, s. 259). Hayatın geçiciliğine inanırlar (Kapıcıoğlu, 2019, s. 34) Yaşamlarını bu geçiciliğin farkında olarak sürdürürler. Yapılarını ve yaşam alanlarını da bu geçicilik ilkesi doğrultusunda tasarlar ve inşa ederler. Mekân organizasyonunda kullandıkları mobil ve şeffaf ayırıcılarının sürekli değiştirilebilir, hafif, narin ve esnek bir forma sahip olması, geçiciliği sempolize eder ve evin iç mekânının dış ile olan kurgusunu kuvvetlendirerek, iç ile dışın sıkı bir bağlantı içinde olmasına olanak tanır. Mobil donatıların ortadan kolay bir şekilde kaldırılabilmesiyle iç mekân, Geleneksel Japon Evi'nin çoğunluğunun vazgeçilmez bir parçası olarak kurguda vücut bulan bahçe ile dolaylı da olsa bütünlüştür.

Yerel inanışlar insanlar üzerinde, doğa ile iç içe bir anlayış mekânizması oluşturmaktadır. Doğaya ve çevreye karşı bilinç düzeyi yüksek ve saygılı bir tavır benimsemeleri başlıca Şintoizm ve Budizm gibi inanışların halk üzerindeki yaşama biçimlerine doğrudan müdahil olması ile ilişkilidir. Budizm'deki Zen anlayışı doğaya duyulan hisleri canlandırmaktadır (Engel, 1991, 256). Zen anlayışına göre gerçek, olduğu gibi, ham haliyle algılanır (Kapıcıoğlu, 2019, s.269). Doğada ham haliyle bulunan tüm materyaller kusursuz değildir, bu bilinçle hareket eden Japon toplumu estetik algısının da bu doğrultuda şekillendirmiştir. Hem mekân hem de malzeme kurgusuyla - özellikle yapılarıdaki ahşap kullanımının süslemeden ve yapay müdahalelerden uzak ve ham olarak kullanılmasıyla - doğa ile iç içe ve doğanın temsili gibidir.



Görsel 14. Japon evi iç ve dış mekân bağlantısı (Url_6)



Görsel 15. Japon evi, iç ve dış mekân (Url_7)



Görsel 16. Japon evi, iç ve dış mekân (Url_8)

4. Türk ve Japon halklarının yaşamları bağlamında birey, toplum, ev, çevre ve doğa kavramları üzerinden benzer ve farklılıkların karşılaştırılması

Birbirinden farklı coğrafyalar üzerine kurulan iki farklı toplum olan Japon halkı ve Türk halkı literatür taramaları sonucu özgün matris aracılığıyla birey, toplum, ev, çevre ve doğa bağlamında karşılaştırılmıştır. Her iki halkın özgünlük değerleri bağlamında farklılıkları olduğu kadar benzerliklerine de rastlanmaktadır.

Tablo 1 . Özgün matris yardımı ile Türk ve Japon halklarının yaşamları bağlamında yapılan karşılaştırma

Türk ve Japon halkları yaşam bağlamları	Birey	Toplum	Ev	Çevre	Doğa
Türk halkı ve yaşamı	toplumu etkileyen, komün yaşamın parçası	değerlerine ve geleneklerine bağlı, din ve inanç etkisi	birlikte yaşam, aile yapısı, insan odaklı, ergonomik, aynı mekân farklı işlevler, her oda bir hane temsili	dağınık yerleşim, dışa kapalı	doğa ile bütün, uyumlu, yaşama biçimine doğan
Türk halkının duygusal davranışsal ve bireysel özellikleri	aile, din ve inanış etkisi	Yaşantı evi yansıtır. Yaşantı toplumu yansıtır.	aile ile ilişkili , mahremiyet, dışa içe kapalı, iç dış ile dolaylı ilişkili	hane sayısının artışına göre genişleme	saygılı, korumacı,
Türk Evi'nin Türk halkı bağlamı	toplumu etkileyici, bütünün parçası, destekleyici güç	Birey, aileyi aile toplumu etkiler.	kutsalın temsili	hem kopuk hem de sıkı ilişkili	organik
Japon halkı ve yaşamı	toplumu etkileyen, komün yaşamın parçası	din ve inanış etkisi, idealize etme, 'Nihon' , geleneklerine bağlı	birlikte yaşam, aileyi barındırma, insan odaklı, insan ölçeğinde	duyarlı, saygılı, bilinci yüksek	iç-içe, doğrudan ilişkili
Japon halkının duygusal davranışsal ve bireysel özellikleri	aile, din ve inanış etkisi	birey toplumun parçası, birey topluma karşı duygusal ve davranışsal olarak sorumlu	aile ile ilişkili, dışa dönük, iç dış ile bütün, değişebilir mekânlar 'Shōji' ve 'Fusuma'	düzenli, sıkı bağlı,	saygılı, doğrudan ilişkili
Japon Evi'nin Japon halkı bağlamı	toplumu etkileyici, bütünün parçası, destekleyici güç	Yaşantı evi yansıtır. Yaşantı toplumu yansıtır.	Aileyi yansıtır.	Sıkı komşuluk ilişkileri, yüksek sorumluluk bilinci	duyarlı, bilinçli, anıtsal değil minimal

4.1 Türk ve Japon halklarının yaşamları bağlamında birey, toplum, ev, çevre ve doğa kavramları bağlamındaki yorumları

Matris yardımı ile yapılan karşılaştırma sonucunda bir değerlendirme yapıldığında; Türk ve Japon halklarında inanış, din, aile, değerler ve geleneklerin önemli olduğu görülmektedir. Bireyin aileye ve topluma verdiği değer her iki toplulukta baskın olarak gözlemlenmekte ve birey toplumu doğrudan etkileyen, bütünün bir parçası rolünü üstlenmektedir. Ev bağlamlarında; Türk halkı için ev, kutsalın temsili, içe dönük, mahremiyet ve insan odaklı odaklı bir yapıda, iç mekândaki kullanıcı dış mekân ile dolaylı olarak bağlantılı fakat dışarıdaki gözlemci için iç mekân dış mekâna kapalı olarak tasarlanmış, hane sayısının artışına paralel olarak genişlemekte ; Japon halkı için ev, ailenin temsili ve aileyi ve yaşantısını yansıtmakta, iç ile dış mobil bağlantılarla ayrılmakta ve birleşmekte, dış ile sıkı bir bağlantı içerisinde bütün bir yapıda tasarlanmış. Türk Evi, sokak ölçeğinde dağınık fakat organik bir yerleşime sahip, organik olması sokak ile organik bir bağ

içerisinde olmasına olanak sağlamakta; hane sayısının artışına paralel olarak eklenen ek yapılar, komşu yapıların birbirinden bağımsız olarak büyümesine sebebiyet vermekte. Malzeme kullanımı, çevresel faktörlere duyarlı olarak inşa edilmesi ve oluşumundaki organik yapısıyla doğa ile bütün, doğadan bir parça gibi - doğa ile iç içe, uyumlu ve uygun bir yapıya sahip. Japon evi, Japon halkının topluma olan yüksek sorumluluk bilinci ile çevreye ve doğaya duyarlı oluşuyla birlikte, doğaya saygılı, doğa ile iç içe ve doğrudan ilişkili bir yapıda tasarlanmaktadır.

BULGULAR

Yaşam her bireyin kendine özgü olarak farklı parametreler ile tanımladığı bir kavramdır. Bireylerin yaşantısı genel bağlamda birarada düşünüldüğünde topluluğun yaşantısına ayna tutar. Bireyler aileyi, aileler toplumu meydana getirir. Birey, içinde bulunduğu toplumun küçük bir temsili gibidir. Bireylerin toplum içindeki yüksek tatminiyetli yaşamı toplumun düzen ve rafa içindeki sürdürülebilirliğine katkı sağlar. Toplumun sürdürülebilirliği bireyin toplum bilincinin yüksek olması ve topluluğun içindeki yerini ve sorumluluklarını bilmesi ile ilişkilidir.

İnsan, yaşamını bir amaç doğrultusunda idame ettirir. Çevresi ile etkileşimli sosyal bir oluşumdur. Bireyin topluma, toplumun bireye ihtiyacı vardır. Birey kendi ölçeğinde temel ihtiyaçlarını giderebilir fakat psikolojik ve sosyolojik bağlamda, yaşamını sürdürebilmesi için diğer bireylere ihtiyaç duyar. Toplumu bireyler oluşturduğu gibi bireylerin en temel barınma mekânlarını ve yaşam alanlarını evler oluşturur. Yaşam alanlarının birarada bulunarak birbirine iliklenmesiyle komün bir yaşam meydana gelir. Birey için ilk mekân deneyimi ev ile başlar, birey ev içinde özgürdür ve kendi alanlarını tanımlar. Bireyin gelişimi ve buna bağlı olarak toplumlarında gelişimi için yaşam alanlarının kurgusu, organizasyonu, yaşam ile olan anlamlı, içli dışlı bağıntısı önem teşkil etmektedir. Halkların yaşama biçimleri evlerin tasarımı, kurgusu ve organizasyonuna yansır. Yaşam, evin çevre ve ile kurduğu anlamlı ilişkiler bütünüdür. Ev tek başına çevresinden kopuk bir organizma değildir, çevresi ile kurduğu zayıf veya güçlü bağlantılar yaşam hakkında bilgi sunar.

Türk halkı yaşamı bağlamında ele alındığında, göçebe toplum yaşantısı alışkanlıklarının toplumun geleneklerine nüfus etmesi, Anadolu mirası olan ev yapısını da etkilemiştir. Osmanlı devletinin geniş coğrafyalara yayılması Türk Ev'nin farklı ve geniş coğrafyalarda görülmesine olanak tanımıştır. Farklı coğrafyalarda görülmesine rağmen, temel bağlamda planimetrik ölçek de aynı amaç ile tasarlandığı ve değişmeyen bir organizasyon şemasına sahip olduğu görülmektedir. Bu bağlamda ev kavramı farklı coğrafyalarda çevresiyle uyum içinde ve yaşama biçimlerinde benzer ilişkiler kurarak özgünlüğünü korumuştur. Yapımında en temel malzemeler olan ahşap, kerpiç ve taş kullanılmaktadır. İnanış ve gelenekler doğrudan mekân tasarımına ve kurguya yansiyarak evi dışa kapalı, mahremiyeti gözetilen bir yapıya bürümüştür. Türk Evi'nin çevresi ve doğası ile olan bağlantısı içeride duran kullanıcı için sıkı bir şekilde gözetilsede, dışarıdaki gözlemci için iç mekân dışarıdan kopuk ve bağımsızdır, içeriye deneyimlemediği sürece bilinemez. Kurguda her oda bir haneyi temsil eder, hane sayısı arttıkça evin yüzey alanı genişler. Düzensiz olarak genişleyen evin formu organik bir yapıya bürünür ve çevresinide etkileyerek sokak ve kent ile doğal ve organik bir ilişki içerisinde olmasına olanak tanır.

Japon halkı yaşamı bağlamında ele alındığında zorluklara göğüs gererek, avantajları dezavantaja çeviren bir toplum yapısı ile karşılaşmaktadır. Toplum kendisini idealize etmekte, değerlerine sahip çıkarak sürekli kendini geliştirmektedir. Geleneklerine bağlı, inanışları doğrultusunda yaşamını idame ettiren Japon toplumunda dinin etkisi baskın olarak yaşama biçimlerinin neredeyse her alanına yansımaktadır. Bütüncül bir düşünce sistemine sahiptirler. Birey aile, yaşantı, ülke, coğrafya ve benzeri etmenler halkı ve bütünü parçalarını oluşturan kavramlardır. Tüm kavramlar biraraya geldiğinde devleti meydana getirir. Tasarlanan ilk mekânların insanı odak noktasında tutması ve minimum ihtiyaçlar doğrultusunda ele alınması ileri dönemlerde tasarlanan Geleneksel Japon Evi'nin tasarımında yansımıştır. Ölçeklendirmede insan ölçeği kullanılır. Yapılar, anıtsal değil minimal düzeyde ve inançları gereği çevreye saygılı ve doğa ile iç içedir. Japonlar için hiçbir şey kalıcı değildir, yaşamlarının geçiciliğine inanırlar ve bunu yaşantılarında benimserler. Yaşam alanlarını bu doğrultuda tasarlar ve organize ederler. Yaşam alanlarını doğa ile bütün ve ham malzeme kullanarak inşa ederler. Güzelliği kusursuzlukla bağdaştırmazlar, doğadaki güzellik ham ve estetik anlayışını yaşama alanlarının tasarımlarında da kullanmayı tercih ederler.

SONUÇ

Yaşam ve yaşama kavramları literatürde genel tanımlamalara sahip olsada, dünya üzerinde kurulu bulunan her halk ve halkların içerisinde yaşayan her bir bireyin ihtiyaç, istek ve beklentileri bağlamında farklı anlamlar taşımaktadır. Bu yüzden yaşam bağlamında bir değerlendirme yapılırken genel tanımlar ve parametreler ele alınarak değerlendirme yapılmamalı farklı parametrelerin birbirini etkileme ve tetikleme durumları toplum içerisindeki bireylerin birbiri ile olan ilişkileri ve rolleri göz önünde bulundurulmalıdır. Birbirlerinin yaşam alanlarına saygı duyan bireyler bir düzen içerisinde yaşamlarını sürdürebilirler. Her insan toplum içerisinde bir bireydir. Toplumdaki bireyler birbirlerinin yaşamlarını gözeterek bir bütün içerisinde yaşamlarını sürdürürler. Bireylerin düzenli olarak yaşamlarını sürdürmesi toplumun bir düzen içerisinde varlığını sürdürmesiyle doğrudan ilişkilidir.

İnsan varoluşu itibari ile, algısal olarak kişisel mekânlarını tanımlayan ve zaman zaman tanımladığı mekânlara ihtiyaç duyan aynı zamanda toplumsal yaşamın getirişiyle kendisine sunulmuş olan veya kendisi tarafından toplum içinde oluşturulmuş olan kişisel alanlarına adapte olarak yaşayan bir oluşumdur. İnsanların fizyolojik olarak ihtiyaçlarını kendine yetebilecek şekilde karşılayabilmesi, kişinin beklentilerine çevresel koşulların ne kadar cevap verebileceği doğrultusunda değişkenlik göstermektedir. Beklentilerinin karşılanmasını isteyen bir birey, hem toplum ile hem de çevresi ve doğa ile faydacı bağlamda döngüsel bir ilişki içerisinde olmalı, kendisini topluma ve çevresine adapte ederek uyum içerisinde hayatını idamet ettirmelidir.

İnsan doğumundan ölümüne kadar yaşamını mekânlarda yani diğer bir deyişle yaşam alanlarında geçirir. Mekânların seçimi ve oluşumu insanın yaşayış biçimine bağlı olarak değişiklik gösterebilir. Yaşam alanları meydana getiren insanın ihtiyaçları, beklentileri ve seçimleridir. Bu doğrultuda insanın gerek içgüdüsel gerekse mantık çerçevesinde mesken tutmak için seçtiği alanlar, hem mekân hemde çevre bağlamında önem arz etmektedir. Kişi beklentilerine cevap verebilecek alanları mesken tutmaktadır.

Çalışma boyunca Japon ve Türk halkları birbirinden farklı iki ayrı coğrafyada yaşayan iki farklı toplum olsalar bile aile yapısı, geleneklerine bağlılık, toplumsallık, doğaya saygı gösterme ve çevreyi önemseme gibi faktörler bağlamında benzerlik gösterebilmektedirler. Aynı benzerliklerin evlerin tasarımına ve yaşantısında yansıdığı ortaya çıkmaktadır. Değişen ve günden güne gelişen dünya ve 21. yüzyıl koşulları, bireylerin gerek aile içi gerekse komün olarak birbirini destekleyerek birarada yaşam anlayışını değiştirmiş, bireyselleşme ve kendileme gibi durumları ortaya çıkarmıştır. Japon Halkı'nın yaşadığı bazı kentlerde betonarme ve çelik konutların da geleneksel yapının yanında tercih edildiği bilinsede, Japon toplumu kendine özgü olarak tasarladığı geleneksel evlerde yaşam anlayışını sürdürmektedir. Ancak Türk Halkı'nın yaşamış olduğu geleneksel Anadolu mirası konutları, şehirler de yerini betonarme konut yapılarına bırakmıştır. Şehirlerdeki bireyselliğin ve nüfus artışının birbiri ile doğru orantılı olarak artması ve değişen dünya düzeniyle bireylerin barınma alışkanlıklarındaki değişimler eve bakış açısını değiştirmiştir ve bu durum geleneksel Türk Evi kavramının unutulma ihtimalini günbe gün arttırmaktadır. Bu çalışma kapsamında, toplumun kendi yapısını koruyarak sürdürülebilirliği için geleneklerin ve değerlerin korunmasının, bireyin toplumu, toplumun bireyi desteklemesinin önemi vurgulanmıştır. Bu bağlamda geleneksel Türk Evi'nin var olan özgün örneklerinin korunması, tanıtılması güncel yaşantıya göre geliştirilmesi ve şehirler ölçeğinde tekrar canlandırılmasına yönelik çalışmaların yapımının teşvik edilmesi gerekmektedir.

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ESKİÇAĞDA YAKINDOĞU'DA BAHARAT KULLANIMI
THE USE OF SPICES IN THE NEAR EAST IN ANCIENT AGES

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ÖZET

Coğrafya ve iklim insan yaşamına yön veren önemli faktörler arasında sayılabilir. Gelişmiş uygarlıkların çoğu, coğrafi özellikler açısından zengin bölgelerde ortaya çıkmıştır. İlk çağlarda insanlar, genellikle hayatta kalabilmek için avcı ve toplayıcı bir hayat sürmüş, doğanın kendilerine sunduğu imkânlardan istifade etmişlerdir. Yerleşik hayatla birlikte doğada hazır bulunan ürünlerin yanı sıra, tarımsal faaliyetler aracılığıyla besin üretimini de başlatmışlardır. Zamanla insanoğlunun, kendi coğrafyalarında yetişmeyen ürünleri ticaret vasıtasıyla diğer bölgelerden temin ettiği bilinmektedir.

İnsanoğlu, çağlar boyunca doğadaki bitkilerin yararlı ve zararlı türlerini ayırt edip, deneyimleyerek kullanım alanlarını ve özelliklerini nesilden nesile aktarmıştır. Farklı özelliklerdeki bitkilerin tohum, çiçek, çekirdek, kök, yaprak ve meyve gibi kısımların tamamının ya da bir kısmının parçalanması, kurutulması ve öğütülmesi ile elde edilen, besinlere tat, koku ve renk veren baharatlar, insanlar tarafından hemen hemen her dönemde kullanılmıştır. Eskiçağ toplumlarındaki baharat kullanımı ile ilgili bilgiler; mezar buluntuları, yazılı kaynaklar, inanç ve hayal gücüyle yorumlanan mitoslardan elde edilmektedir. Baharatların, insanlar tarafından öncelikle bazı besinlerin bozulmasını önleyip, hoş olmayan kokuların maskelenmesinde kullanılırken, daha sonraları yiyeceklerin lezzetlendirilmesinde, tedavilerde, büyü ritüellerinde, kozmetik alanında ve hayvanların avlanmasında kullanıldığı tespit edilmiştir.

Eskiçağ'da Yakındoğu'da farklı coğrafyalarda bulunan çeşitli baharatların varlığı, bu bölgelerdeki flora zenginliğini göstermektedir. Bu coğrafyalarda kullanılan baharatlardan bazıları her uygarlıkta bulunurken, bazıları ise endemik özelliكتedir. Günlük yaşamın pek çok alanında kullanılan baharatlar, bölgeler arası ticarete önemli bir ürün olarak karşımıza çıkmaktadır. Aynı zamanda baharatlar, ulaştığı coğrafyalarda kullanım yönünden de çeşitlilik göstermektedir. Bu çalışmada Eskiçağ'da varlığı bilinen baharatların, toplumların ekonomileri, kültürel yaşantıları, damak tatları ve dini ritüelleri üzerindeki etkileri ile çeşitli uygarlıklarda benzer ve farklı alanlardaki kullanımını incelenmiştir.

Anahtar Kelimeler: Baharat, Beslenme, Yakındoğu, Bitki.

ABSTRACT

Geography and climate are among the significant factors that shape human life. Most advanced civilizations arose in regions rich in geographical features. In the early ages, people generally led a hunter and gatherer life to survive and took advantage of the opportunities offered by nature. Along with the settled life, they have started the production of food through agricultural activities, as well as the products available in nature. It is known that over time, human beings procure products that do not grow in their redundant geographies from other regions through trade.

Throughout the ages, human beings have distinguished and experienced the beneficial and harmful types of plants in nature and transferred their usage areas and properties from generation to generation. Spices, which are obtained by shredding, drying and grinding all or some parts of plants with different properties, such as seeds, flowers, seeds, roots, leaves and fruits, giving flavor, smell and color to foods, have been used by people

in almost every period. Information on the use of spices in ancient societies; the tomb finds are obtained from myths interpreted with written sources, belief and imagination. It has been determined that spices are used by people primarily to prevent some foods from spoiling to mask unpleasant odors and then to flavor foods, in treatments, in magic rituals, in cosmetics and at hunting animals.

The existence of various spices found in different geographies in the Near East in antiquity shows the richness of flora in these regions. While some of the spices used in these geographies are found in every civilization, some of them are endemic. Spices, which are used in many areas of daily life, appear as a significant product in interregional trade. At the same time, spices vary in terms of use in the geographies they reach. In this study, the effects of spices, known in antiquity, on the economies, cultural lives, tastes and religious rituals of societies, and their use in similar and different areas in various civilizations were examined.

Keywords: Spices, Nutrition, Near East, Herb.

GİRİŞ

İlk çağlarda insanlar, hayatta kalma mücadelesinde doğadaki hazır bitki ve bitki köklerini toplayarak ve çeşitli hayvanları avlayarak hayatlarını sürdürmüşlerdir. Avcı-toplayıcılıktan sonra yerleşik hayata geçiş sürecinde tarım, temel geçim kaynaklarından biri haline gelmiştir. Neolitik dönemle birlikte insan hayatına giren tarım, insanın doğada hazır bulduğu besinlerle yetinmeyip, elde ettiği tohumları toprağa ekmesiyle modern hayatın ilk adımını oluşturmuştur. Tahıllarla başlayan tarım serüveni meyve, sebze ve tatlandırıcı olarak kullanılan baharatların yetiştirilmesiyle devam etmiştir.

Baharat kelimesinin kökeni Arapça'dan gelmektedir. Baharat kelimesindeki *bahar* koku anlamına gelirken çoğul anlam oluşturan *-at* ekinin gelmesiyle *güzel kokular* şeklinde ifade edilir. Baharat, İngilizcede *spices* kelimesinin karşılığıdır. Bu kelimenin kökeni de Fransızcadaki *epice*'den gelmektedir. Latince *dünya meyveleri* anlamında olan baharat, Türkçede *ıssı ot* şeklinde ifade edilmiştir. 10 Nisan 2003 tarihli (28614 sayılı) Resmi Gazete'de Türk Gıda Kodeksi Baharat Tebliğine göre baharat: "Çeşitli bitkilerin tohum, çekirdek, tomurcuk, çiçek, yaprak, rizom, meyve, kök, gövde, kabuk, soğan, sap ve yumru gibi kısımlarının kurutulmuş bütün/bir kısmının öğütülerek elde edilen tat, lezzet, renk ve koku vermek amacıyla kullanılan ürünlerdir." diye tanımlanmıştır (Yerasimos, 2014; Ergin & Zorba, 2015). Uluslararası Standartlar Örgütü (ISO) baharatı, yemeğe lezzet vermede ve muhafaza etmede kullanılan aromatik sebze ürünü olarak anlamlandırmıştır (ISO, 1995). Ayrıca mitolojide bitkilerin/baharatların, tanrıların insanın hizmetine verdiği en değerli armağan olduğu düşünülmektedir (Faydaoğlu & Sürücüoğlu, 2011).

Baharatlar, tarım ürünü oldukları için iklime ve yetiştirilme şartlarına bağlı olarak pek çok etkene göre değişiklik göstermektedir. Baharatlar, genellikle tohumlardan, çiçek tomurcuğundan, köklerden, otsu bitkilerin meyvelerinden, ağaçlardan, ağaçlık bağlardan ve aromatik yosunlardan elde edilmektedir (Sherman & Billing, 1999). Genel olarak çiçek tomurcuklarında baharatın tadı ve kokusu daha baskınken, ağaç kabuklarında ve tohumda tat ve koku daha azdır. Çiçek tohumlarında ve yapraklarındaki tat ve kokunun yoğun olmasının nedeni bu bölümlerin bitkinin kendini yenilediği kısımlar olmasıdır. Ağaç kabuklarında ve tohumda tat ve kokunun az olmasının nedeni ise bu bölümlerin uzun sürede oluşmasıdır (Hill, 2019).

Baharat ilk çağlardan beri insanoğlunun beslenmede kullandığı katkı maddelerindedir. İnsanlar baharatların, kendilerine has özellikleri ve kullanım alanları ile ilgili bilgilerini nesilden nesile aktararak günümüze kadar ulaşmasını sağlamıştır. İnsanlar, baharatları ilk dönemlerde özellikle et gibi ürünlerin bozulması ve kokmasını önlemek için kullanmışken daha sonra yemeklerini lezzetlendirip aroma vermek amacıyla tüketmiştir (Yeşilada, 2012). Baharatlar, yiyecekleri lezzetlendirmenin yanı sıra tıp, mimari, dokumacılık, din ve statü göstergesi gibi pek çok alanda da kullanılmıştır (Gürsoy, 2012).

Bitki-insan ilişkisine ait ilk arkeolojik bulgu ve yazılı belgeler Kuzey Irak'taki Şanidar Mağarası'nda ve Mısır'da tespit edilmiştir. Şanidar Mağarası'nda (1957-1961) Neandertal insan kalıntıları ve farklı amaçlı kullanıldıkları düşünülen bitkiler saptanmıştır. Mezarda, ölünün tekrar yaşama döndüğünde tüketebileceği, yenebilen ve şifalı olarak nitelendirilebilen bitkiler bulunmuştur. Bu bitkiler: Mor sümbül, kanarya otu, civanperçemi, peygamber çiçeği, efedra ve gül hatmidir (Tyldesley & Bahn, 1983). Mısır'da MÖ 1500'lere ait

bir metinde hardalın hem korucu olarak hem de yemeklere tat vermek amacıyla kullanıldığından bahsedilmiştir (Başoğlu, 1982).

Arkeolojik çalışmalarının yoğunlaştığı coğrafyalardan biri Yakınoğu'dur. Bu durumun en belirgin nedeni, uygarlıkların temellerinin burada atılıp buranın bir çıkış noktası olarak kabul ediliyor olmasıdır. Bu coğrafyada yapılan kazılarda önemli Neolitik merkezler tespit edilmiştir. Bu merkezler Zawi Cemi, Shanidar mağarası Jericho ve Q. Jarmo'dur. Yakınoğu'daki kazı ve analizler neticesinde toplumların ilk dönemlerde avcı ve toplayıcılık yaptığı daha sonra yerleşik hayata geçerek tarımı geliştirdiği bilinmektedir (Ağcabay, 2006). Eldeki bulgulara göre Yakınoğu'da ilk ehlileştirilen tarım ürünleri buğday, arpa, burçak, mercimek, keten ve kenevirdir (Öksüz, 2002).

1. Mezopotamya

Mezopotamya, Dicle ve Fırat Nehirleri arasında, günümüzde Irak topraklarının bir kısmını kapsayan coğrafyaya verilen isimdir. Yunanca *mesos* (orta) ve *potamos* (nehir) sözcüklerinin birleşmesiyle türetilen Mezopotamya coğrafyası, ilk dönemlerde bu coğrafyada kurulan uygarlıkların adıyla anılmış (güney bölümü Sümer sonra Babilonya kuzey bölümü Asur) ilerleyen dönemlerde de Mezopotamya olarak adlandırılmıştır.

Mezopotamya, uygun iklim koşulları ve verimli tarım arazileri nedeniyle çok eski zamanlardan beri pek çok toplum tarafından iskan edilip istilaya uğramıştır. Coğrafyanın kendilerine sunduğu bu verimlilik sayesinde toplumlar, tarım ve hayvancılıkla uğraşmışlardır. Temel geçim kaynakları haline gelen tarım ve hayvancılığın sürekliliğinin sağlanması için de toplumlar çeşitli tedbirler almışlardır. Kralların temel görevlerinden biri bu sürekliliği sağlamak için su kanalları yapmak, suların tarlalara, bağ ve bahçelere ulaşmasını sağlamaktır.

Mezopotamya coğrafyasının geniş olması pek çok yerinde farklı iklim özelliklerinin yaşanıp farklı bitki türlerinin oluşmasını sağlamıştır. Yaşanan bu farklılık bitki türlerinde de çeşitlilik göstermiştir. İlk tarımın yapılp yerleşik hayatın başladığı bu topraklarda tahıl, meyve (hurma, armut, elma, incir, üzüm ve nar), kök bitkileri (mantar), sebze ve yemekleri tatlandırıcı baharatlar üretilip tüketilmiştir. Ürünlerdeki bu çeşitlilik Mezopotamya'da zengin bir mutfak kültürünün oluşmasını sağlamıştır. Hazırlanan yemeklerde tarımsal ürünlerin yanı sıra hayvansal ürünlerden de (et, süt, yumurta ve yağ) yararlanılmıştır. Baharatlar vasıtasıyla Mezopotamya mutfağındaki gelişmişlik ve çeşitlilik yüzün üzerinde çorba ve yemek tarifinin oluşturulmasını sağlamıştır. Çivi yazılı belgelerde adı geçen baharatlar: kimyon, anason, nane, kişniş, kakule, çemen otu, ardıç üzümü ve hardaldır. Ayrıca günümüzde Arap ve Hint mutfağında kullanılan şeytanteresinin (asafetida/maydanozgillerden) Mezopotamya'da bilinen baharatlardan biri olduğu tespit edilmiştir. Şeytanteresinin yemeklerde tatlandırıcı olarak kullanılmasının yanı sıra ilaç olarak tedavide de kullanıldığı düşünülmektedir (Bottero, 2005).

Mezopotamya yemekleri ile ilgili tabletler günümüzde ABD'deki Yale Üniversitesi'nde bulunmaktadır. MÖ 1700'lere tarihlendirilen 3 adet tablet Akatça olarak yazılmıştır. Tabletler ilk okunduğunda ilaç reçetesi olarak düşünülmesine rağmen daha sonra tabletlerin Mezopotamya mutfağı ile ilgili olduğu anlaşılmıştır. 53 satırdan oluşan tabletlerden biri deforme olduğu için okunamamıştır. 75 satırdan oluşan ikinci tablet iyi korunduğu için okunmuştur. Bu tablette 25 tane tarif yer almaktadır. Tariflerin 21'nin et, 4'ünün sebzeyle dayalı olduğu tespit edilmiştir. Son tabletin bazı kısımları hasarlı olmasına rağmen 200 satırdan oluşup en ayrıntılı tariflerin yer aldığı tablettir. Tabletlerdeki tariflerden birinin malzemelerine bakılarak Mezopotamya mutfağı ile ilgili bilgi edinilebilir. Örneğin, kızıl haşlama adlı yemek tarifindeki kullanılan malzemeler şu şekilde sıralanmıştır: takım ciğer, işkembe, ince bağırsak, yağ, sarımsak, pırasa, shuhutinnu?, öğütülmüş malt, havanda dövülen tuz, soğan, kimyon, samidu, kişniş ve surummu eklenerek yemek hazırlanmıştır (Bottero, 2005).

Mezopotamya'da yemekler dışında ilaçlarda da baharatlardan yararlandığına dair tabletler bulunmaktadır. Tabletlerdeki reçetelerde: kekik, rezene, nane, adamotu, kitre, banotu, meşe mazısı, çöpleme, eğir kökü, hardal, safran, haşhaş, nar kabuğu, terementi gibi baharatların kullanıldığı tespit edilmiştir (Limet, 1978; Faydaoğlu & Sürücüoğlu, 2011).

Mezopotamya'da baharatın farklı alanlarda kullanımının bir göstergesi de kehanetlerdir. Kehanetlerde farklı durumların habercisi olan çeşitli bitki ve baharat isimleri tabletlerde geçmektedir. Bu baharat ve bitkilerden bazıları: salatalık, kimyon, dişotu ve dağ lalesidir. Salatalığın yetişmesi bereketin olacağına; kimyonun çöplükte yetişmesi kışın ağır geçeceğinin, dişotunun yetişmesi düşmanın istilasına maruz kalacağına ve dağ

lalesinin çöplükte yetişmesinin de Tanrının insanlara merhamet edeceğinin habercisi olduğu düşünülmüştür (Freedman, 1998).

1.1. Sümerler

Sümerler, MÖ IV. binin ortalarında Mezopotamya'ya gelerek güneyine yerleşmişlerdir. MÖ. IV. Binin sonlarında ise pek çok şehir devleti kurarak Mezopotamya coğrafyasında söz sahibi olmuşlardır. Aynı tarihlerde geliştirdikleri çivi yazısıyla hem siyasi hem de ekonomik alanlarda belgeler bırakmışlardır. Sümerlerin tahıllardan arpa, buğday ve darı; baklagillerden ise mercimek ve nohut yetiştirdikleri bilinmektedir. Hardal, soğan, sarımsak, salatalık, pırasa, yeşil salata, şalgam, tere, kıvırcık en çok üretilip ve tüketilen sebzelerdendir (Gürsoy, 2016). Sümerlerin tükettiği baklagillerin başında mercimek ve nohut olmasına rağmen beslenmenin temelini arpacık soğan, soğan, sarımsak ve pırasa oluşturmaktadır. “Dilmum soğanı” ve “Maharsi soğanı” olarak adlandırılan çeşitli soğanlar; “Keskin”, “Tatlı” ya da “Güçlü kokusu olan” olarak ifade edilmiştir (Yalçın & Yaman, 2019). Sümerlerde III. Er sülaleler devrine ait iç ticaret ile ilgili vesikalarda halkın arpa, buğday gibi hububatın dışında susam yetiştiriciliği de yaptığı bilinmektedir. Ayrıca susam ve susam yağının tapınak ya da saraya vergi olarak getirildiği bilinmektedir (Arslantaş, 2009; Mendires, 2010). Susamın kullanıldığı Gılgamış'ın sarayında yaşayan Enkidu'nun en beğendiği yemeğin, susam yağında kızarmış pide olduğu bu bilgiyi destekler niteliktedir (Gürsoy, 2016).

Sümerlere ait metinlerde yemeklerin tatlandırılmasında çeşitli baharatlar kullanıldığıyla ilgili bilgiler bulunmaktadır. Sümer mutfağında tuzun önemli bir işlevi vardır. Tuz ile diğer baharatların günlük tüketimi 12-15 gr arasındadır. Elde edilen Sümer kaynaklarında yer alan bir başka baharat olan kimyonun, Sümerce bir kelimeden geldiği (gamun = kimyon) ifade edilmektedir. Arkeolojik bulgulara göre birçok baharatın tercüme edilememesine rağmen, kekik ve mercanköşk gibi bitkilerin varlığı bilinmektedir. III. Ur dönemine ait pek çok baharat çeşidi ekonomik metinlerde yer almakla birlikte elde edilme aşamaları hakkında bilgiler yetersizdir (Yalçın & Yaman, 2019). Ayrıca Sümerlerin ilgin bitkisini bildiği ve şekerli zank elde etmek için yetiştirdiği düşünülmektedir.

Sümer hekimleri, bitkisel, hayvansal ve madensel kaynaklardan yararlanarak ilaçlar yapmışlardır. Hekimler bitkisel ürünlerden myrtle (mersin ağacı), thyme (nane), cassia (çin tarçını), asafoetida (şeytantsi otu), köknar, söğüt, incir, hurma, armut; hayvansal ürünlerden kaplumbağa kabuğu, yılan derisi ve süt madensel maddelerden ise potasyum nitrate (gühercile) ve sodyum chlorid (mutfak tuzu)'den faydalanmışlardır (Kramer, 1999).

1.2. Babil

MÖ. II. bin yıl başlarında Mezopotamya'da Sami göçleriyle birlikte Amurrular Babil kentine yerleşerek Babil Devleti'ni kurmuşlardır. Babil'de yapılan arkeolojik kazılar ve Babil çivi yazılı metinlerden yetiştirdikleri tarım ürünleri hakkında bilgi edinmekteyiz. Babil'de yetiştirilen başlıca tarım ürünlerinin başında arpa ve buğday gelmektedir. Ancak kuraklığa bağlı olarak arpanın buğdaydan daha dayanıklı olması arpanın daha fazla üretilip tüketilmesine neden olmuştur. Babil toplumunda çokça tüketilen temel besin ürünleri pırasa, soğan ve sarımsaktır. Beslenmede tahıl, sebze ve meyve dışında, baharatların da kullanıldığı bilinmektedir. Kullanılan baharatlar: Kimyon, hardal, kişniş ve su teresidir (Oates, 2015).

Babilliler baharatları hem yemeklerini tatlandırmada hem de büyülerde kullanmışlardır. Babil kentlerinden Mari'de tespit edilen bir mektupta, iki kadının büyüleri baharat ve bitkileri kurbanlarına yedirerek onlara kara büyü yapmakla suçlamışlardır (Abusch & Schwemer, 2011).

1.3. Asur

Asurlular, MÖ. II. bin başlarında Dicle kıyısında Asur şehri merkez olmak üzere Asur Devleti'ni kurmuşlardır. Kuruldukları tarih itibarıyla yazıyı kullanmaya başlamışlar ve ticari faaliyetlerle birlikte başta Anadolu olmak üzere pek çok coğrafyaya yazıyı götürmüşlerdir. Gerek bu yazılı belgeler gerekse yapılan arkeolojik çalışmalarla Asur toplumunda kullanılan ve diğer bölgelere ticareti yapılan tarım ürünleri ile ilgili bilgiler tespit edilmiştir. Asur metinlerinde buğday, arpa, bulgur gibi tahılların yanı sıra keten, şamfıstığı, badem, zeytinyağı (yağ ağacı), incir ve nar gibi ürünlerin isimleri geçmektedir. Sümerce SUM, Akadca şumkü terimi bugünkü soğanı ifade ederken, Yeni Asur metinlerinde farklı şekillerde adlandırılmıştır. Soğan özellikle sunu ve ritüel metinlerinde yer almaktadır.

Asurluların susamdan özellikle de susam yağından istifade ettikleri bilinmektedir. Susam yağının geçtiği metinlerde LÚGAL-Ì-ME/rab şamni “yağcılar başı/yağ uzmanın da adı geçmektedir. Asurlar zeytin, susam gibi besinlerden yağ çıkararak üretilen meyvelerden de günümüzde meşrubat olarak tanımlayacağımız içecekler hazırlamışlardır. Sümerce MUN, Akadca tabtu olarak ifade edilen tuz, Asurda özellikle sunu ve ritüellede *tuz serpmek* şeklinde ifade edilmiştir (Florioti, 2018). Asur toplumunun baharat kullandığının göstergelerinden biri de saray bünyesinde çalışan görevlilerden birinin sadece baharatlarla ilgileniyor olmasıdır. Asur metinlerde mutfakta çalışan görevliler: Rab nuhatimmi (aşçı), rab apie (baş ekmekçi/fırıncı), rab karmi (baş tahılçı), rab karkadinni (baş pastacı), rab şamni (yağ ustası), rab zamri (meyve ustası), rab karani (baş şarapçı), rab sirase (baş biracı), ve rab raqqûti (baharat ustası)’dir (Grob, 2013).

2. Anadolu

Anadolu, insan yaşamına uygun toprakları, dört mevsimin aynı anda yaşanması, sayısız su kaynakları, bitki çeşitliliği, hayvan türleri, yeraltı kaynakları ve suda yaşayan canlılarının varlığı gibi özelliklerinden dolayı Paleolitik Çağ’dan beri yerleşim görmüş bir coğrafyadır.

Anadolu’daki avcı-toplayıcı olan insan toplulukları Neolitik Çağ ile birlikte yerleşik hayata geçmiş, bu yeni hayat tüm yaşam alışkanlıklarındaki değişimi de beraberinde getirmiştir. Avcı-toplayıcı hayatın bir sonucu olan rastgele yiyecek bulma serüveni, yerleşik hayatla birlikte daha düzenli ve sürekli bir besin teminini gerekli kılmıştır. Anadolu’daki insan toplulukları, bu çağla birlikte alüvyal havzalarında, kıyı ovalarında ve geniş akarsu vadilerinde kendilerine yaşam alanları oluşturup farklı nitelikteki tarım ürünleri yetiştirmeye başlamışlardır. Anadolu’nun önemli Neolitik Çağ merkezlerinden Çayönü, Hallan Çemi, Göbeklitepe ve Çatalhöyük gibi merkezlerde yapılan kazılarda buğday, arpa, çavdar, nohut ve mercimek gibi ürünler ele geçmiştir (Güveloğlu, 2015). Ayrıca bu bitkiler dışında Anadolu’da fasulye, bezelye, sarımsak, soğan, keten, üzüm, incir, zeytin, elma, muşmula, erik, nar, kayısı ve armut gibi birçok tarım ürününün yetiştirildiği tespit edilmiştir (Macqueen, 2001). Anadolu’daki tüketilen bitkiler hakkındaki bilgiler arkeolojik verilerden (yanmış bitki tohumları ve besin ürünleri), kabartmalardan ve yazılı kaynaklardan (besin isimleri, fiyat listeleri, şifa reçeteleri ve yemek tarifleri) edinilmektedir. Anadolu’nun bu denli zengin ürün yelpazesine sahip olmasında bulunduğu coğrafyanın flora ve faunası bakımından zengin olmasının yanı sıra göçebe kültürlerden gelen toplumların varlığı ve farklı uygarlıklarla yapılan ticari ilişkilerle açıklanabilir (Talas, 2005).

İnsanlar diğer canlılardan farklı olarak, ateşi kullanmaya başladıktan sonra, yiyeceklerini pişirip lezzetini artırmak için de baharat kullanmışlardır. Baharatların yemeklerde kullanılması, mutfak kültürünün oluştuğunun ve damak tadının varlığının bir göstergesidir (Kılıç & Duymuş, 2008). Anadolu’da 12.000 tür bitkinin bulunduğu bunların da alt tür varyetesinin olduğu tahmin edilmektedir. Bu bitkilerin üçte birini endemik türler oluşturmaktadır (Avcı, 2005).

2.1. Hititler

Hititler, MÖ. II. binin ortalarında Kızılırmak kavisinin kuzeyinde, Hattuşa’da kurulan bir devlettir. Anadolu’nun büyük bir kısmı ve Kuzey Suriye’den Mezopotamya’nın batı eteklerine kadar uzanan büyük bir alana yayılan Hititlerin böylesine geniş bir coğrafyaya hakim olması siyasi, ekonomik ve kültürel yönden zenginleşmesine katkı sağlamıştır. Hitit ekonomisini oluşturan unsurlar tarım, hayvancılık, ticaret, haraç-ganimet ve vergilerdir. Hitit ekonomisi için hayati önem taşıdığı düşünülen tarım, tarla, bağ, bahçe ve üretilen ürünleri devlet denetimi altına alınmıştır.

Hitit ekonomisi ile ilgili bilgiler kazılardaki bulgulardan, kabartmalardan ve yazılı kaynaklardan elde edilmektedir. Hitit yazılı belgeleri arasında mutfak kültürleri ile ilgili bilgiler veren tabletler de yer almaktadır. Hititler tahıl, sebze, meyve ve hayvansal ürünleri sofralarından eksik etmemişler, pek çok yiyeceği de tatlandırmak için baharatları kullanmışlardır. Ancak baharat isimleri metinlerde sıklıkla geçmemektedir. Baharatların *karpatum kabı* ve *şimdum* ile tartıldığı ve ödemelerin de gümüş ile yapıldığı tespit edilmiştir.

Çivi yazılı belgeler doğrultusunda Hititlerin kullandığı mineral/baharatlardan biri tuzdur. Boğazköy belgelerinde tuzu ifade etmek için MUN Sümerogramı kullanılmıştır. Tuzun Hititçe karşılığı için çeşitli görüşler ileri sürülmüştür. Hititçesi tam olarak bilinmemesine rağmen Hititçe tuzlamak eyleminin *mumia*-olduğu düşünülmektedir (Erkut, 1990). Hititlerin yer aldığı coğrafya tuz bakımından oldukça zengindir. Hititlerin tuz ihtiyacının sadece kaya tuzundan karşılandığı düşünülmektedir. Hitit mutfağında oldukça önemli

bir yere sahip olan ekmeklerin, yapımında tahıl kaynaklı unlar, su, tuz ve mayanın kullanıldığı bilinmektedir (Sandıkçioğlu, 2009). Tuz, koyun, sığır, tavşan ve kuşların tuzlanarak muhafaza edilmesinde kullanılmıştır (Ünal, 2007). Ayrıca Hititlerin tuzu ritüellerde kullandığı da bilinmektedir. Tuz, doğum ritüellerinde kullanılmıştır (Gölbaş & Başbüyük, 2012).

Hitit çivi yazılı belgelerde birkaç tane baharat adı geçmektedir. Bu baharatlardan *kamunum* “kimyon”, *kisibirritu(m)* ise “kişniş” dir. Tatlandırmada kullanılan bu baharatlardan kişnişin Hitit mutfağında hamurun üzerine serpilerek ekme ile birlikte tüketildiği bilinmektedir. *Kuddimmum* olarak adlandırılan bitkinin “bir çeşit kekik” (Albayrak, 2003) ve sadece bir belgede geçen *azupūrum/azappurum* bitkisinin ise safran olduğu düşünülmektedir (Larsen, 2010). Sümercede U.TIN.TIR olarak adlandırılan çemen ve çörek otunun Hititçe karşılığı *kappani*’dir. Çörek otunun beyazının (BARBAR) ve siyahından (GE6) Maştiğga Ayini’nde bahsedilmiştir (Kılıç & Duymuş, 2008).

Günümüzde yemek tarifi olarak adlandırabileceğimiz bir tablette, hangi malzemenin nasıl ve ne kadar pişeceği hakkında bilgi verilmemesine rağmen hangi ürünlerin kullanıldığı anlatılmıştır. Narlı koyun budu olarak adlandırılan yemekte et, nar, kuyruk yağı, bal ve kırmızı şarap kullanılmıştır. Ayrıca yemeğe kekik, nane ve defneyaprağı eklendiği de yazılmıştır. Son olarak da yemeğe iri öğütülmüş kaya tuzu serpildiğinden bahsedilmektedir (Ünal, 2019). Bu ve bunun gibi birçok tarif bizlere Hititlerin yemeklerinde hayvansal ürünler, tahıllar, sebze ve meyveleri kullandıklarını, tatlandırmak için de farklı aromalardaki baharatları tercih ettikleri göstermektedir. Ayrıca Hitit ekmekleri, içerisinde kullandıkları ürünlere göre çeşitlilik arz etmektedir. Ekmeklerinde tahıl, meyve ve baharatları kullanarak ekmeklerini tatlandırmışlardır. Bu ekmeklerden bazıları: Buğdaylı, arpalı, susamlı, susamlı ballı, elmalı ve fasulyeli ekmektir (Gürsoy, 2016).

Hititler, bitki/baharatları yiyecekleri tatlandırma amaçlarında kullanmalarının yanı sıra büyü vasıtasıyla ayinlerde ve farmakolojide kullanmışlardır. Büyülerde, arındırma ayinlerinde ve kurban sunularında güzel kokulu bitkiler tercih edilmiştir (Ünal, 2003). Tabletlerde şifa için bitkiler kullanılmıştır. Farmakolojik bir metinde ekme türleri ve bir kabın içerisinde lapa gibi şarapla hazırlanan otuz üç adet bitki isminden söz edilmektedir (Şensoy, 2012). Hitit tabletlerinde kayıtlarda geçen bitkilerden bazıları: Aksırıkotu, arpa, adamotu, alıç, buğday, badem, söğüt, dişotu, defne, haşhaş hardal, safran, kraliçe otu, kayısı, kızılca buğday, üzerlik, köknar, mazi, meyankökü, mersin, sarımsak, sedir, selvi, soğan, susam, şimşir, sütleğen, üzüm ve zeytindir. Bunlar dışında Hititler şeytanteresi, mekke pelesengi, abanoz gibi ithal bitkiler de kullanmıştır (Bryce, 2003).

2.2. Urartular

Urartular, MÖ. I. bin yılda Van Gölü ve çevresinde, başkenti Tuşpa olan bir devlet kurmuşlardır. Urartu Devleti, doğuda Kuzeybatı İran, batıda Malatya ve çevresi, kuzeyde Kafkas ötesi ve güneyde Toroslara kadar uzanan geniş bir coğrafyaya egemen olmuştur. Devlet tarafından organize edilen Urartu ekonomisini oluşturan unsurlar tarım, hayvancılık, ticaret, haraç-ganimet ve vergilerdir.

Urartuların, temel geçim kaynakları hayvancılık olmasına rağmen, tarımsal faaliyetler devlet organizasyonu ile gerçekleştirilmiştir. Urartular sulanabilen arazilerdeki üretilen ürünlerle sulanamayan arazilerdeki üretilen ürünleri birbirlerinden ayırtmışlardır. Sulanabilen arazilerde buğday, arpa, darı gibi ürünler ekilirken; sulanamayan arazilerde ise nohut, mercimek gibi ürünler yetiştirmişlerdir (Belli, 2006). Ayanis Kalesi’nde yapılan araştırmalarda arpa, ekmeçlik buğday, süpürgelik darı, akdarı, tilkikuyruğu darısı, çavdar, burçak, bezelye gibi ürünlerin yanı sıra maydanoz, kimyon ve kişniş gibi baharat kalıntıları da tespit edilmiştir (Cocharro, 2001; Çilingiroğlu, 2001). Yoncatepe Sarayı’ndaki tahıllar arasında arpa, çatal siyez buğdayı, ekmeçlik/sert buğday, çavdar, nohut, mercimek, üzüm, yoğurt otu, delice, pelemir, kazayağı, çobandeğneği yer almaktadır (Dönmez ve Belli, 2008: 186-188). Ayrıca Yoncatepe mezar yapısında üzüm tohumlarının yanı sıra yağından yararlanıldığı düşünülen ketencik (*Camelina sativa*) tohumları da tespit edilmiştir (Dönmez & Belli, 2007). Yukarı Anzaf Kalesi’nin I. ve II. depo odalarındaki pitoslarda şarapların saklandığı, 14 nolu depo odasındaki pitoslarda susam yağının bulunduğu görülmektedir. Urartular susamı yemeklerde kullanmalarının yanı sıra aydınlatmada da kullanmışlardır (Belli, 2000). Ayrıca Urartu topraklarına ticaret yolu ile doğudan gelen ürünlerde baharatların da olduğu tespit edilmiştir. Bu ürünler değerli/yarı değerli taşlar, fildişi, koku maddeleri ve kınadır (Belli, 2004).

2.3. Frigler

Frigler, MÖ. I. binde Gordion merkez olmak üzere Orta Anadolu'da Ankara, Sinop, Boğazköy, Alacahöyük, Konya'nın bir kısmı, batıda Afyon, Manisa ve Doğu Anadolu'da da Malatya'ya kadar uzanan bir coğrafyada yerleşmişlerdir. Frig ekonomisinin temeli tarım ve hayvancılıktır. Frigler'de tarımın önemli olduğunun göstergesi, en büyük tanrılarının Bereket Tanrıçası Kibele olması ve saban kırmanın cezasının ölüm olmasıdır.

Frig tarımının temelini tahıllar oluşturmaktadır. Ayrıca Aşağı Sakarya ve Menderes ovalarında bağlar bulunduğu ve şarap tanrısı Dionizos için bağbozumu şenlikleri düzenlendiği bilinmektedir (Bülbül, 87). Friglerin tükettiği ürünler hakkında detaylı bir bilgi bulunmamaktadır ancak Midas'ın cenazesinde verilen yemekten geriye kalan içki ve yemek kaplarındaki kalıntılara bakılarak hangi ürünlerin bulunduğu dair incelemeler yapılmıştır. Bu yiyeceklerden tahıl, baklagiller, et ve yağlar; içeceklerden üzüm şarabı, arpa birası ve balla yapılmış bir içki tespit edilmiştir. Yemek, kuzu/keçi etli bol baharatlı mercimekli yahni olduğu düşünülmektedir. Yemekteki malzemeler; et, zeytinyağı, bal, şarap, soğan gibi ürünlerin yanı sıra kimyon, kekik, rezene ve anason gibi baharatlardır (Demirayak, 2016).

2.4. Lidyalılar

Lidyalılar, MÖ. I. bin yılda, Sardes merkez olmak üzere Gediz ve Küçük Menderes Nehirlerinin oluşturduğu vadileri kapsayan bir coğrafyaya yerleşmişlerdir. Lidya coğrafyasında bulunan su kaynakları, zengin tarım arazilerinin oluşmasını sağlamıştır. Halkın temel geçim kaynaklarından biri tarımdır. Lidya'da üretilen ürünlerle ilgili bilgilere kazılarda tespit edilen evlerdeki yiyecek ve pişirme ekipmanları kalıntılarında edinilmektedir. Bu kalıntılar arasında hayvansal ürünler, arpa, buğday, nohut, mercimek, sarımsak ve zeytin gibi bitkisel ürünler tespit edilmiştir. Lidya'da sıklıkla pişen Lidya yahnisinde; et, dereotu, sarımsak ekmek kırıntısı ve Frigler'e özgü peynir bulunmaktadır. Ayrıca *karyke* adı verilen bir Lidya sosunda kan ve baharat bulunduğu saptanmıştır (Greenewalt, 2010a).

Lidyalıların sevdikleri yemeklerden biri yerel hayvanlardan olan Turaçtır. Bu yemekte yaban tavşanı eti ile birlikte, susamla terbiye edilen ve bala batırılan bir hamur ile birlikte şölen yemeği olarak tarif edilmiştir. Romalı hekim Dioskorides yaptığı farmakolojik incelemelerde Lidya coğrafyasındaki birçok baharat ve çesni olarak kullanılan bitkiyi isimlendirmiştir. Aynı eserde Lidyalılar tarafından tüketilen bitki çaylarına da yer verilmiştir (Greenewalt, 2010a).

Bitkilerin kullanıldığı alanlardan biri de parfüm ve kremlerdir. Eskiçağda parfüm ve kokulu yağların kullanım alanları genel olarak, ritüeller, cenaze törenleri, tıbbi ve kozmetik alanları olarak sıralanabilir. Parfümler, kokulu yağlar ve tütsüler eskiçağların en pahalı lüks ürünlerindedir. Eskiçağda parfüm fiyatının yüksekliği kokuların elde edildiği bitki ve yağların uzak coğrafyalardan getirilmesi ve kokunun hammaddesinin bitkilerden az miktarda çıkması ile açıklanmaktadır. Fiyatlardaki yükseklik sahte parfüm üretimini doğurmuş, bu sebeple üreticiler parfüm formüllerini saklamışlardır. Parfüm ve kokulu kremlerin orta sınıf arasında da yaygınlaştığı MÖ 6. yy. da Filistin ve Mısır'ın parfüm kaplarının dışında yeni bir formun ortaya çıktığı görülmüştür. Bu yeni form Batı Anadolu, Frigya, İtalya ve Yunanistan'da görülmüş, fakat bu formun çıkış noktası Lidya toprakları olduğundan bu kaplara *lydion* adı verilmiştir (Temiz, 2007; Greenewalt, 2010a). Kozmetikte kullanılan ve özellikle mezar hediyesi olarak görülen diğer bir kap formu da *Alabastron*'dur. Parfüm kokuları arasında *nard*, *kinamomon* (tarçın ya da Çin tarçını), ve güvey otu (mercanköşk) yoğun olarak görülmektedir (Greenewalt, 2010b).

SONUÇ

Yakındoğu, elverişli coğrafi özellikleriyle çeşitli baharatların yetiştiği floraya ve faunaya sahiptir. Bölgeden elde edilen tarımsal ve hayvansal ürünlerin beslenmede kullanılması mutfak kültürünün gelişmesini sağlamıştır. Bölgede endemik bitkilerin yanında o yöreye ait olmayan baharat türlerine de rastlanılmıştır. Baharatların yetiştiği coğrafyalardaki çeşitliliği ve kullanımı yerel damak tatlarının oluşmasına sebep olmuştur.

Yakındoğu'da, belli bölgelerde yetişen baharatlar önemli bir ticari emtia olarak karşımıza çıkmaktadır. Bu durum baharatların yerel mutfaklar dışında, farklı coğrafyalarda da kullanıldığının kanıtıdır. Yerel baharatların

ulaştığı bölgelerdeki toplumlarca kabul görmesi, ticareti elinde bulunduran devletlere zenginlik ve statü kazandırmıştır. Aynı zamanda baharat, devletlerarası ilişkilerde önemli bir vergi çeşidi olarak da karşımıza çıkmaktadır.

Baharat, Eski Yakındoğu’da yiyeceklerin korunması ve tatlandırılması dışında tıp, din, kozmetik, dokumacılık gibi pek çok alanda da kullanılmıştır. Birçok hastalığın şifasının bitkilerde aranması, günümüz insanının da sıklıkla başvurduğu bir yöntemdir. Hatta günümüzde modern tıbbı alternatif olarak geliştirilen Fitoterapinin antik çağlarda da ilgi görmesi pek de şaşırtıcı değildir. Bu bağlamda baharatların kullanıldığı reçeteler, eskiçağ hekimleri ve şifacıları tarafından kayıtlara alınmıştır.

Yakındoğu toplumları genel olarak tütsü gibi uygulamalarla, kötü ruhların sebep olduğunu düşündükleri hastalıkları tedavi etmek için baharatları kullanmışlardır. Çeşitli baharatların birleşmesiyle oluşturulan büyülerde ve gelecekte haber alma isteği sonucunda ortaya çıkan fal uygulamalarında da baharatlar kullanılmıştır. Dini ritüel ve ayinlerde tütsü ve sunu olarak kullanılması, baharatın değerini artırmıştır. Bu durum yönetici kesimin baharatlara olan ilgisini arttırmış, bunun sonucunda da saraylarda baharat ile ilgilenen bir meslek grubunun ortaya çıkmasına zemin hazırlamıştır.

Bitki yağları ve hoş kokuları sebebiyle baharatlar, kozmetik alanında geniş bir yer kaplamıştır. Özellikle parfüm yapımında kullanılan baharatın oran olarak az olması veya kokunun işlenen bitkinin oranına göre az olması parfüm fiyatlarının çok yüksek olması sonucunu doğurmuştur. Yükselen fiyatlar kaçak parfüm üretimine sebep olmuş, parfüm formüllerinin saklanarak günümüze ulaşmasını zorlaştırmıştır.

Baharatlar, boyama özellikleri sayesinde tekstilde, halı ve dokumalarda kullanılmıştır. Ayrıca bitki yağlarının aydınlatmada kullanıldığı da bilinmektedir. Baharatların bu kadar çeşitli kullanım alanı bulması pazar payının da artmasına sebep olmuştur.

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THE ROLE OF PERSONALITY HARDINESS, SELF-EFFICACY, AND SOCIAL SUPPORT IN PREDICTING RESILIENCE AMONG HEALTHY PERSONS AND IN PATIENTS WITH NON-COMMUNICABLE DISEASES

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ABSTRACT

This study aimed to ascertain the role of Personality hardiness, Self-efficacy, and Social Support in predicting Resilience among Healthy Persons and in patients with non-communicable diseases. This study also explores the predictive role of perceived and received social support in relation to resilience. Cross sectional questionnaire-based survey and purposive sampling technique was used. Sample consisted of N=332 from which healthy sample (n=153), patients with Non-Communicable Diseases sample (n=179). Data was collected from different hospitals of Rawalpindi, Islamabad, and KPK (Pakistan). A booklet comprised upon informed consent, demographic information sheet, Connor-Davidson Resilience Scale, Short Hardiness Scale, Generalized Self-efficacy Scale, Berlin Social Support Scale were administered. The findings of the present study revealed that Personality hardiness, Self-efficacy, and Social Support as significant predictors of Resilience among healthy persons and in patients with non-communicable diseases. The results revealed perceived social support as a stronger predictor of resilience than received social support among healthy persons. However, among the patients perceived social support appeared as the only predictor of resilience. Resilience was found to be positively correlated with positive hardiness among all study samples, while a negative relationship was observed between resilience and negative hardiness in healthy, disease-related, diabetic, and hypertensive samples. Based on the study's findings, mental health professionals should initiate intervention programs for enhancing resilience among individuals through utilizing their internal or external resources such as personality hardiness, self-efficacy, and social support.

Keywords: Resilience; Self-Efficacy; Personality Hardiness; Social Support

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**AZERBAIJAN'S ECONOMY AT A NEW STAGE OF DEVELOPMENT: ACHIEVEMENTS,
PROSPECTS**

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SUMMARY

The article examines the economic reforms implemented in our country, which regained its independence at the end of the twentieth century, and the contribution of these reforms to the economic development of our country. At the same time, the appropriated programs and economic results were taken into account, and the impact of international projects on the country's economy was studied. In addition, the article discusses the integration of Azerbaijan into the world market, the impact of events in the world economy on the economy of our country, the dynamics of basic macroeconomic indicators are analyzed. The article reflects the level of economic development of Azerbaijan in the international ranking.

At the same time, the victory of our country in the Second Karabakh War, as a result of the liberation of our lands from occupation, contributed to the development of the country's economy. Future development goals are reflected in the article.

Keywords: reform policy, national economy, business environment, competitive country, private sector

As a result of the consistent, long-term economic policy implemented in our country, which regained its independence in the last decade of the last century, a solid foundation for macroeconomic stability and dynamic economic development has been established and significant achievements have been achieved in integration. world economic system. If we pay attention to the past period, this path of development can be divided into the following stages:

Tablo 1.

Azerbaycan Cumhuriyeti'nde ekonomik gelişmenin aşamaları [6]

	Stages of development	Main measures taken
I	Realization of the basic principles established for the restoration of independence and development	Preventing Armenian aggression, eliminating civil war, chaos and chaos, regaining the lost trust of the people and ensuring economic stability
II	Ensuring economic stability	More than 70 laws were passed, more than 100 decrees and orders were signed, and about 30 state programs were approved to regulate and ensure economic stability. More than 2,000 laws and resolutions adopted in 1992-2003 were presented to the National Assembly.
III	Achieving an oil strategy aimed at a strong economy and social welfare	The signing of the "Contract of the Century", which laid the foundations of international cooperation in the Caspian Sea, is one of the most important steps in connecting Azerbaijan to the world economy. Diversification of oil export routes with the construction of Baku-Novorossiysk, Baku-Supsa, Baku-Tbilisi-Ceyhan main export pipeline. Establishment of the Oil Fund, taking into account the efficient use of oil revenues and the welfare of future generations.
IV	Ensuring economic diversification	A number of important decrees and orders signed to further improve the business environment laid the foundation for a new stage in the development of entrepreneurship in the country. Ensuring the development of profitable farming and productive entrepreneurship in the agricultural sector was one of the important aspects. took important measures for the interests of entrepreneurs and agricultural workers, past tax debts of agricultural producers were cleared, periodic tax strikes were initiated, exempted from all taxes except land tax, and these concessions are still in effect.
V	Ensuring balanced development of regions	The TRACECA, North-South, BTK, INOGATE Program projects implemented to strengthen Azerbaijan's international transportation system should be particularly noted in this regard. As a result of the successful implementation of such important projects, Azerbaijan has become an important multimodal transport hub in the Caspian region and an oil and gas transit country of international importance.
VI	To ensure the sustainable development of the country's economic regions by ensuring territorial integrity	New economic zone units have been established in order to ensure efficiency in the implementation of the strategic roadmaps and socio-economic development programs of the regions. By defeating the Armenians in the Patriotic War, the potential of the liberated lands began to be put into economic circulation.

As a result of this progressive development strategy, Azerbaijan is now at the forefront of world economic growth. Thus, while ensuring economic and political stability was the main objective in the first stages of this development strategy, the infrastructure was modernized, the non-oil economy was developed, social welfare was improved and state assets were increased in the later stages. Strategic foreign exchange reserves have been created in excess of GDP.

With all these positive aspects, it should be noted that being a part of the world economy makes the impact of economic fluctuations in our country and in the world inevitable. As a matter of fact, as a result of the sharp decline in oil prices since 2014 and the economic crisis in the trading partner countries, the slowdown in economic growth in the country, institutional and structural difficulties, the balance of payments and non-oil budget deficit, a transition to the finance and banking sector development approach is required.

In this regard, the President of the Azerbaijan Republic issued Order No. 1897 to provide an in-depth analysis of the current economic situation and to develop a new strategy of economic development in order to ensure the sustainability of economic policies and reforms in the country. The "main aspects of the roadmap" were approved, and the relevant Working Group was established to ensure that the development plans are developed in line with these aspects. [3] In accordance with this Directive, the Working Group has prepared strategic roadmaps for the national economy and eleven key sectors of the economy, in effective cooperation with international organizations, with the participation of local and foreign experts, experienced experts, consulting companies and scientific organizations. The strategic roadmaps include an economic development strategy and action plan for 2016-2020, a long-term vision for the period up to 2025 and a target vision for after 2025. [3]

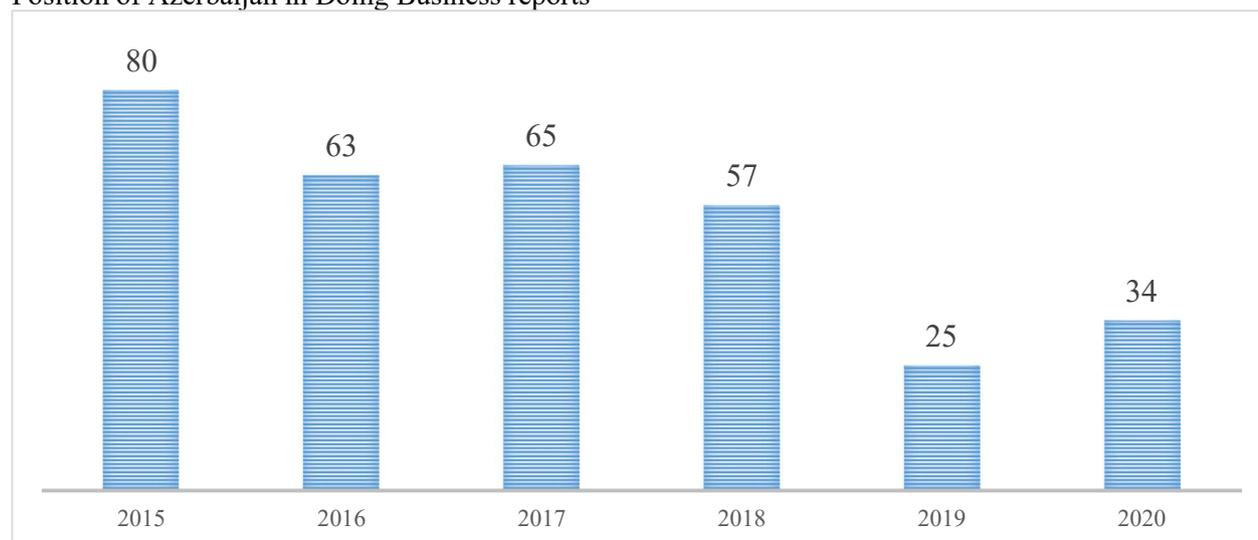
Important measures are taken to develop the non-oil sector within the framework of strategic roadmaps. The implementation of these roadmaps has contributed to achieving sustainable economic development and

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improving the country's international ranking. One of these rating indicators is the Ease of Doing Business Development Index, which is based on various economic indicators of the countries included in the Doing Business reports and allows the measurement of favorable conditions in the business environment to develop entrepreneurship and making comparisons by country. Based on this index, the dynamics of our country's position over the years can be seen more clearly in the figure below.

Figure 1

Position of Azerbaijan in Doing Business reports



As can be seen, our country, which ranks 80th among 189 countries in the "Doing Business 2015" report, which also includes Azerbaijan, strengthened the position of our country as a result of the reforms and measures taken in the following years, and strengthened our country's position in 2019. ranked 25th in the ranking. [6] In another report, the United Nations Development Program (UNDP) ranked our country 88 out of 196 countries. [9] The content of all such reforms and measures envisaged in the strategic roadmaps is also reflected in the basic macroeconomic indicators.

Table 2

Dynamics of important macroeconomic indicators in the Republic of Azerbaijan over the years, million

	2014	2015	2016	2017	2019	2020 ¹
Gross domestic product, million manats	59014,1	54380,0	60425,2	70337,8	81896,2	72432,2
Income of the population, million manats	39472,2	41744,8	45395,1	49187,9	56769,0	55726,1
Average monthly nominal salary, manat	444,5	466,9	499,8	528,5	635,1	707,7
State budget revenues:						
mln. manatee	18400,6	17498,0	17505,7	16516,7	24398,5	26075,4
as a percentage of gross domestic product	31,2	32,2	29,0	23,5	29,8	36,0
State budget expenditures:						
mln. manatee	18709,0	17784,5	17751,3	17594,5	24425,9	26416,3
as a percentage of gross domestic product	31,7	32,7	29,4	25,0	29,8	36,5
Deposits of the population in banks (at the end of the year) million. manatee	7188,4	9473,9	7448,7	7561,2	8637,9	8177,9
Investments in the economy, million. manatee	21890,6	20057,4	22706,4	24462,5	24986,6	22484,0

Based on the data in the table, we can say that economic stability started in late 2016 and growth was observed in 2017-2019. [1,2]

At a time when countries were trying to overcome the global financial crisis and our country was achieving economic stability, a new wave of crisis occurred in the world due to the pandemic (COVID 19). The closure or minimization of economic ties between countries, the suspension or complete closure of economic formations within countries, since the first months of the epidemic, have led to very serious losses. It should be noted that this began to manifest itself with different results in different sectors of the economy. Many of the service industries most severely affected during the pandemic have not yet resumed their operations. All these have led to the implementation of economic policies in the face of the pandemic, and the measures taken to eliminate unemployment among the people have led to an increase in state budget expenditures in Azerbaijan, which constitutes 22.5 percent of GDP, as in other countries. There was a rise in interest rates. At the same time, a significant decrease of 11.6 percent was observed in nominal GDP compared to the previous year. In addition, the income loss due to stigmatization decreased to 5.3 percent in the volume of deposits in the bank account of the population compared to the previous year, and to 10.0 percent in the volume of investments in economic sectors. [7]

Although the pandemic conditions continue in the country, a new development phase started in our country at the end of 2020. The factor determining this stage of development is to ensure the territorial integrity of our country after the liberation of our occupied lands by the Azerbaijani army. It should not be forgotten that before the occupation, this region came to the fore with its special importance in the socio-economic development of the country and made significant contributions to the country's economy. This can be seen in the figures below.

¹ İlkin məlumatlara görə

Table 2

According to the statistics of the Azerbaijan SSR for the year 1988, the share of some indicators of liberated lands in the total indicator of the country at that time, as a percentage.

Country's share of GDP	Specific gravity in the country as a whole, in percent
Gross industrial output of Azerbaijan SSR in 1988	24
Fixed assets	2,7
construction lime	3,4
Construction Materials	7,8
shoes	3,0
Raw silk	11,0
Barama	13,5
wine supplies	17
Preserves	35
Grain	6,9
grape	14,3
Meat	31,5
Milk	14,5
cow fat	17,1
Wool	25,2
Country's share of GDP	19.3

Based on the research, we can say that the industries operating on the liberated lands played an important role in the economy of the republic. These industries include the food, light and building materials industries. The development of these industries was based on the availability of sufficient domestic raw materials for the production of these products and the transformation of the production of these raw materials into a traditional industry in these areas. As can be seen from the table, 2.7 percent of the gross industrial production and 3.4 percent of the fixed assets of the Azerbaijan SSR in 1988 fell on the occupied territories. In addition, the share of the Republic of Azerbaijan before the conflict was as follows: wall materials - 11.0%, construction lime - 7.8%, building materials - 3.0%, shoes - 11.0, meat - 14.5%, canned - 6.9%. , cow fat - 25.2%, wine materials - 35%, raw silk - 13.5%, wool - 19.3%, mineral water - 15%, etc. At the same time, Istisu and Turshsu mineral water bottling factories, marble and cut stone factories in Nagorno-Karabakh and Agdam, wineries producing quality and even "Aghdam" type wines and others popular in the former USSR, butter and cheese factories, textile and shoe factories factories, Karabakh Silk Factory etc. was operated on. More than 50 new branches of its enterprises in Baku operated in the occupied territories. There were more than 310 industrial and construction facilities in the region, of which 183 were industrial and 127 construction enterprises. There was also more than 1 million hectares of farmland, including approximately 128,000 hectares of irrigated land and approximately 35,000 hectares of vineyards and orchards. Before the occupation, these regions accounted for 24% of the country's GDP, 41% of grape production, 46% of potato production, 18% of meat production and 34% of milk production. At the same time, 25% of the total forest area, or 280,000 hectares, fell into occupied lands. [5,6,7]

All this gives reason to say that as a result of liberating the lands from occupation, it is possible to restore at least the above-mentioned potential in our country. Winning this war will enable our country to further expand its transportation and logistics network, to open alternative international transportation corridors and to strengthen our country as a regional center. It should be noted that over the past decades, Azerbaijan has always been an active participant and important initiator of regional and interregional reconciliation projects, hosting events at various levels, initiating and participating in important projects, and playing a strategic role as a natural bridge. between Europe and Asia. Today, Azerbaijan is a country that emphasizes the importance and economic importance of Zangazur, East-West and North-South Transport Corridors and ensures the successful implementation of the project, which ensures the implementation of practical measures in this direction. The first container train from China to Europe via Central Asia, the Caspian Sea, Azerbaijan and Georgia was

launched in 2016 via this transport corridor. This test train proved that it can reduce the transit time of the route from 30-35 days to 15 days. Azerbaijan has also started the construction of another notable project - the New Baku International Maritime Trade Port (Alat), the largest and multi-purpose port in the Caspian Sea basin, with a cargo capacity of 25 million tons per year. Alat Airport's location at rail crossings to Europe, Russia and Iran and close to Baku Airport provides efficient rail access to other Caspian ports and unhindered access to regional coastal areas and border areas. [7]

Azerbaijan is also one of the active initiators of the North-South international corridor, which will provide goods transportation from Northern Europe and Russia to the Persian Gulf, India and other countries. Construction work has been completed on the Kazvin-Rasht (164 km) section of the Kazvin-Rasht-Astara (Iran) railway. Completion works were also carried out on the Astara-Astara section of the Astara (Azerbaijan) railway line (up to the Iranian border) and the railway bridge over the Astara River. The only missing part - the construction of the Rasht-Astara section - is nearing completion and Azerbaijan has allocated funds for it. After the successful commissioning of the project, it will make a significant contribution to regional cooperation by connecting Azerbaijan, Russia and Iran railways.

At the same time, the opening of the Zangazur Corridor will enable the restoration of the historical Silk Road as well as the shortest distance of the transport corridor connecting Europe and Asia. Completion of the Fuzuli airport in a short time will make a special contribution to the development of the region.

Moreover, the issue of regional energy cooperation is already at the forefront. A number of positive achievements have been achieved in this field, such as the establishment of the ECO Regional Electricity Market. Through the initiative and implementation of sustainable energy projects, Azerbaijan has established itself as a reliable energy supplier and an important bridge between Asia and Europe. Today, Azerbaijan is one of Europe's largest infrastructure and energy projects. The implementation of these energy projects will increase the security of transport and energy supply, as well as diversify energy sources in the region and beyond. We consider it appropriate to promote the implementation of beneficial projects in the region and to cooperate more closely with UN specialized agencies and international financial institutions to successfully implement regional economic projects. Azerbaijan supports the reform process through joint efforts that can provide an opportunity to improve activities for the future development of the ECO. The new ECO-2025 action plan should reflect the interests of all member states. This reform process will increase the efficiency of activities and existing institutions within the ECO.

The main directions of economic reforms especially emphasize the importance of human capital development in accordance with strategic roadmaps. As an integral part of the reforms to be implemented to transform the economy in Azerbaijan, measures aimed at ensuring continuity in the development of human capital, increasing labor productivity and increasing the role of knowledge in economic development are fully supported. This will be provided at two levels:

- 1) improvement of the quality of education at all levels for the formation and development of human capital;
- 2) to invest in research and development to promote the continuous development of human capital, increase labor productivity.

One of the characteristic features of the economic policy followed at this stage was the development of entrepreneurship, attracting domestic and foreign investments by creating a suitable business and investment environment, and ensuring the development of the non-oil sector. As a result of the purposeful measures taken, an entrepreneurial class was created in Azerbaijan and the role of the private sector in the socio-economic development of the country increased. State support for entrepreneurship, especially small and medium-sized enterprises in Azerbaijan, has created ample opportunities to attract domestic and foreign investments.

"Commodity Market Efficiency", "Labor Market Efficiency" and "Financial Market Development" indices, which show the development of entrepreneurship, employment and financial stability in the country, progress in index indicators especially for Azerbaijan "Global Competitiveness Report 2017-2018" To improve tax legislation and tax administration. reforms have played an important role in improving performance.[8] Among the measures taken to increase the efficiency of the commodity market are the reduction of the taxpayer registration period from 2 days to 1 day in relation to starting a business in the 2016-2017 Tax Code, profit

(income), property for commercial entities received. In order to create a favorable tax environment for entrepreneurship, investment incentive certificates, land tax and value added tax exemptions, changes in VAT calculation from trade additional tax in order to reduce the tax burden on consumers in retail sale of agricultural products produced in Turkey [4]

While it is pleasing that Azerbaijan is the most competitive country among the CIS countries, it is also commendable that it is included in the most prestigious ranking compiled by the world's leading economic forums. This confirms once again that the reforms in the non-oil sector in Azerbaijan have led to an increase in the competitiveness of the country, an improvement in the investment environment in the country despite the declining oil revenues, and a stable and competitive economy. The improvement of our country's position in the World Economic Forum report is a signal to foreign investors about the current state of the Azerbaijani economy and is undoubtedly important in terms of attracting foreign investment to our country.

Thus, in addition to benefiting from the modern models of the new public relations system based on democratic values, it aims to establish the conceptual foundations of the new governance model created in line with national-historical statehood traditions, national governance education and interests. public service, transparent and effective governance. An important conceptual innovation of the reforms is to adapt and apply the positive aspects of progressive models to political succession and national interests in the formation of a modern citizen-oriented governance model. The citizen is at the center of the state policy, which aims to build an effective public administration, which is an important condition for a new stage of development in the country. His satisfaction is an important indicator of the quality and convenience of public services.

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INFLUENCE OF SARS-CoV-2 ON THE MEDIATING EFFECT OF ENTREPRENEURIAL PASSION IN THE RELATIONSHIP BETWEEN ENTREPRENEURIAL SELF-EFFICACY AND INNOVATIVE BEHAVIOR

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ABSTRACT

This research evaluated the mediating effect of entrepreneurial passion in the relationship between entrepreneurial self-efficacy and innovative behavior in a SARS-CoV-2 period. Partial least squares structural equation modeling (PLS-SEM) was used in a sample of 358 textile entrepreneurs. Results show a significant complementary mediation effect of entrepreneurial passion on the relationship between entrepreneurial self-efficacy and innovative behavior. The model shows a moderate explanatory power with an R² of 36 %. This finding is important for further understanding the indirect and direct causes of innovative behavior and the interrelationship between the variables. Finally, this research helps understand innovative behavior in a developing country during a SARS-CoV-2 period.

Keywords: Mediation effect, PLS-SEM, complementary effect, textile industry, emerging economy

FROM CLASS TO MASS CONSUMER MOTIVATIONS FOR BUYING SECOND HAND LUXURY

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ORCID: 0000-0003-4647-8870***ABSTRACT**

The definition of the luxury has changed, and the luxury consumption market has become a relative mass market. However, the theory of luxury consumption falls short of answering the question of why consumers prefer mass luxury consumption. Accordingly, this study seeks to understand the consumers' motivations for mass luxury consumption in terms of second-hand luxury. This study examines consumer reviews made to the Bag, Borrow or Steal (BBOS) website to determine consumers' mass luxury consumption motivations. A qualitative thematic analysis was conducted on the collected textual data. Findings show that there are four reasons motivating consumers for mass luxury consumption: affordability, convenience, social reasons and company-related reasons. The study reveals that facility to borrow, reaching low prices, discounts and abundance of brand options are among the reasons that motivate consumers to buy second-hand bags from BBOS. Findings also reveal that social reasons like being fashionable and impressing others motivate consumers to prefer mass luxury. The study extends the previous literature by examining the company-related reasons for buying second-hand luxury. Company-related reasons like website characteristics and better customer service also motivate consumers to buy second-hand luxury.

Keywords: Luxury for the masses, democratization of luxury, second hand luxury, second hand consumption

INTRODUCTION

The concept of luxury, which was formerly defined by uniqueness, rarity and inaccessibility for the masses (Dubois & Paternault, 1995), has now evolved into a new luxury concept that expresses accessibility and affordability in the mass market (Eckhardt, Belk and Wilson, 2015). This type of luxury consumption conflicts with Veblen's ideas, arguing that consumers value luxury only when few have it (Kastanakis and Balabanis, 2012).

Over the last decade, several studies (Silverstein and Fiske, 2003; Kastanakis and Balabanis, 2012) show that luxury is no longer about the rich or privileged. Traditional views of luxury have changed so much that; luxury product manufacturers are no longer able to control how their offerings are perceived in an era of consumer control over the market (Granot et al., 2013). The most important reason for the democratization of luxury is the developments in internet technologies. Technological developments, especially the internet, have made luxury products widely available and expanded the possibilities of buying luxury goods (Okonkwo, 2009).

The antecedents of traditional luxury consumption and mass luxury consumption are different. However, the theoretical basis of luxury is inadequate to answer significant questions like why consumers are involved in mass luxury consumption. Although the literature assumes the pursuit to achieve status and ideal self as the underlying reasons for mass luxury consumption (Kumar and Paul, 2018), other motives that motivate such consumption have not been explored. The need for more empirical evidence on this subject is the starting point of this study.

In this study, what motivates consumers to buy mass luxury products are investigated through the example of Bag, Borrow or Steal (BBOS). The study aims to understand the concept of mass luxury in terms of second-hand luxury. Previous literature on luxury consumption (Truong et al., 2009; Han et al., 2010; Hung et al., 2011) has focused on new luxury products and neglected the availability of second-hand luxury goods. Therefore, this study tries to answer this question by evaluating mass luxury consumption in terms of second-hand luxury fashion brands in handbags.

1. LUXURY FOR THE MASSES AND SECOND-HAND LUXURY

Kapferer et al. (2014) argue that price is crucial in building a perception of luxury in the minds of consumers. Previous research on luxury marketing (Kumar et al., 2020) shows that marketing a product or a service at a very high price is the best way to position it as a luxury. Mostly, consumers try to meet their need to gain status by consuming luxuries that others consume in high status. However, today while consumers are looking for status, they can buy products that they could not reach in the past with the concepts of mass luxury or affordable luxury. The democratization of luxury (Silverstein and Fiske, 2003) means that luxury is not only for the wealthy few, but that luxury has already been democratized (Roper et al., 2013).

Mass luxury goods are priced below traditional luxury goods (Silverstein and Fiske, 2003; Heine, 2012). While mass luxury goods are offered at a reasonable price, they often focus on symbolic utility, prestige, and design (Heine, 2012). Mass luxury is defined as marketing strategies that lead to the mass prestige of a luxury brand, especially among middle-class consumers (Kastanakis and Balabanis, 2012). Brands like Gucci, Versace and Louis Vuitton benefit from mass luxury in certain markets (Kumar et al., 2020). A common feature of mass luxury brands is that they make the brands prestigious, keep their prices high, and maintain their affordability by giving importance to the product and promotion (Kumar et al., 2020).

Literature shows that consumers also buy used luxury goods (second-hand) and even rent luxury goods, such as luxury bags (Yeoman, 2011). Today, luxury product rentals facilitate consumers to borrow premium products with a low frequency of use. There are many examples of these businesses, such as Deluxe Seconds, Bag, Borrow or Steal, and Rent the Runway (Özbölük, 2021). The market value of the second-hand luxury sector has reached \$2 billion in 2019 (Park and Martinez, 2020). However, previous literature is limited in understanding the motives of consumers to buy used luxury products. Good price-quality ratios, bargains (Turunen and Pöyry, 2019) and affordability (Amatulli et al., 2018) were found as the motivators of buying second-hand luxury products. Research also shows that consumers do not buy these products only for affordability but also for other motivations such as nostalgia seeking (Guiot and Roux, 2010; Steffen, 2017). This study advances previous studies by using a qualitative method in understanding consumer motivations.

2. METHODOLOGY

Why consumers turn to mass luxury consumption is a subject that has not been researched much in the literature yet. This study tries to answer this question. The study aims to understand consumer motivations to buy second-hand luxury products by answering the following research question:

RQ: What are the motivations of consumers to buy second-hand luxury

2.1. Data Collection and Data Analysis

In this study, consumer reviews for Bag, Borrow or Steal were examined to determine the consumers' motivations for mass luxury consumption. Bag, Borrow or Steal is a website that facilitates consumers to buy or borrow second-hand luxury handbags from brands like Louis Vuitton, Tom Ford, Coach, Gucci, Prada, Chanel, and so on. The author carried out a qualitative thematic analysis of the collected textual data. Statements about consumer motivations mentioned in the data were first coded. The author coded the user comments directly or indirectly point to mass luxury consumption. Then the author used these codes to create categories. Repetitive codes are divided into themes to encode more data from user comments. The coding involved grouping key phrases by units of meaning and incorporating them into themes to make an integrative explanation that is shown in user comments. Generating the final codes consists of an iterative process, including reviewing and combining the initial codes to create themes. For this purpose, the author grouped statements into codes and classified these codes under categories. Table 1 shows the generated codes and themes:

3. FINDINGS

Data analysis revealed four dimensions of consumer motivations that are described below. Findings show that there are four reasons motivating consumers for mass luxury consumption: affordability, convenience, social reasons and company-related reasons (Table 1).

Table 1. Codes and Themes

Themes	Codes
Affordability	Low end prices
	Discounts
	Best deals / bargains
Convenience	High Quality
	Brand Options
	Borrowing option
Social Reasons	Impressing others
	Being attractive
	Fashion involvement
Company-related reasons	Trustworthiness and reputation
	Customer Service
	Website characteristics

Affordability (Economic Reasons)

Affordability refers to consumer willingness to pay less. Consumers' affordability concerns stem from economic reasons. These concerns reflect consumers' need for better prices, bargains and discounts. Affordability is the most important aspect of consumers' motivation for mass luxury. Low-end prices for high-end products is an important motivation of consumers to buy second-hand luxury. Better prices, competitive prices and discounts motivate consumers to buy luxury handbags from BBOS. Many comments illustrate consumers' price-related motivations (See Table 2, Statements 1.1 and 1.2).

Convenience (Product-Related Reasons)

Convenience refers to product-related reasons like high quality, brand options and borrowing options that motivate consumers to buy luxury bags. The facility of reaching high quality is the most appreciated aspect of BBOS. Accessing more brand options also appeals to consumers in terms of preferring second-hand luxury. In many comments, BBOS is appreciated for its important service in presenting consumers the brands they cannot reach. The company's keeping up with the trends and the facility to borrow the latest trend bags is especially valued by consumers (Table 2, Statements 2.1. and 2.2.). In addition, the borrowing option is also appreciated by consumers as it facilitates consumers to access high-end products without spending a fortune. The option of borrowing instead of purchasing is very convenient and appealing for consumers as it facilitates trying a variety of new bags before purchasing.

Social Reasons

Social reasons are also found to motivate consumers to buy second-hand luxury products. Consumers also prefer borrowing or buying a luxury bag from BBOS for social reasons. They prefer to buy luxury handbags for impressing others and being attractive, particularly when they attend a special occasion, like a wedding, an event or a meeting. (Table 2, Statement 3.1). Another social motivation of consumers is concerns about style and fashion. Consumers also prefer buying luxury handbags to create a fashionable style. Changing style with a luxury handbag accessory is emphasized in many comments (See Table 3, Statement 3.2.)

Company-related reasons

There are also company-related reasons such as trustworthiness and reputation, customer service and website characteristics. Trustworthiness and reputation are particularly important in terms of creating trust among consumers. Credibility of the website and website characteristics have strong influences on consumers' trust and are important for consumers to shop from BBOS. Website efficiency, user friendly website design, clear and easy navigation motivates consumers to use BBOS. Customer service is also appreciated by consumers in using BBOS. Particularly, quick shipping and quick respond to customer questions are appreciated by consumers (Table 2, Statements 4.1 and 4.2)

Table 2. Sample Consumer Reviews

Motivations	Illustrative Comments
Affordability	1.1. "This has proven to be a wonderful and affordable way to enjoy all my favorite designers without having to shell out thousands of dollars."
	1.2. "It's a great way to get high end products for a much less than what you'd pay at the stores direct."
Convenience	2.1. "I love having options every month. Whoever came up with this is my favorite person ever!"
	2.2. "I find this website to always have the latest bags in great condition."
Social Reasons	3.1. "Because I am going to attend an event, I would like to accessorize beautifully."
	3.2. "Especially when I get tired of the same bag and or style all the time. This way I can switch out looks every time. Thank you for that."
Company-related reasons	4.1. "Best customer service representatives. They are quick to respond to my questions and they go above and beyond in helping me."
	4.2. "Amazing service! Quick shipping and easy to return and change out bags or if you really love it, keep it for another month!"

4. CONCLUSION

For the last decade, the global market has been experiencing democratization of luxury driven by an ever-growing segment of enthusiastic consumers. The definition of the luxury has changed, and the luxury consumption market has become a relative mass market. This change affects the behaviour of both consumers and brands. Luxury brands are developing new offerings to meet the needs of these new customers. They expand their product range and offer their products to middle-class consumers at affordable prices. While the need to achieve status and ideal self (Kumar & Paul, 2018) is shown as the underlying reasons for mass luxury consumption in the literature, other motivations for such consumption have not been explored yet.

The findings of this study show that affordability, convenience, social reasons and company-related reasons motivate consumers to buy products from BBOS. The main reason motivating consumers to buy mass luxury is affordability. When searching for second-hand luxury options, consumers particularly appreciate low-end prices and discounts. Another reason that motivates consumers is reaching high quality and latest brand options through BBOS. Consumers also buy second-hand luxury products for social reasons. They aim to create a fashionable style and impress others with luxury handbags when they attend events like meetings or weddings. Findings also show that website characteristics and customer service are important for consumers in buying second-hand luxury.

The findings of this study validate the previous research (Amatulli et al., 2018; Turunen and Pöyry, 2019), suggesting that affordability and better price-quality ratios are the most important factors motivating consumers to buy second-hand luxury products. Findings also support the previous studies (Cervellon et al., 2012; Steffen, 2017), which argue that consumers buy these products also for non-economic reasons. The study extends the previous literature by examining the company-related reasons for buying second-hand luxury. The study reveals that consumers also look for convenience, like reaching more brand options with a borrowing facility. Company-related reasons like website characteristics and better customer service also motivate consumers to buy second-hand luxury.

Second-hand luxury as a mass luxury consumption is a relatively new subject that needs to be investigated further. Future research may compare this type of luxury consumption in different cultures. Another missing

aspect of the existing literature is that the qualitative aspect of mass luxury consumption has not been investigated much in terms of methodology. Further studies may reveal the hidden dimensions of mass luxury using qualitative methods. Future research may also examine mass luxury consumption in different contexts. Mass luxury for the brands such as Uber and Airbnb, which are the subject of the sharing economy, can be researched. Comparisons can be made in terms of different countries.

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FINTECH EVOLUTION AND REVOLUTION AND A NEW PARADIGM FOR THE OVERALL FINANCIAL SYSTEM

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ABSTRACT

The emergence of technology-enabled innovation in financial services is the result of different circumstances. Fintech is often seen today as the new merger of financial services and information technology. However, this interlinkage has a long history and has evolved over three distinct time periods.

The spread of COVID-19 pandemic and the need of social distancing have greatly contributed to the development of digital financial services. The FSB divides them into five parts: payments, clearing and settlement; deposit, lending and capital raising; insurance; investment management; and market support.

The paper aims to analyse the reshaping of financial industry with Fintech advancement and to underline challenges. It, as well, depicts Fintech entrance in financial services resulting in the factors such as: customer preferences and economic development, and driving the adoption of innovative financial technology in the emerging market. All the technology that apply to the internet, mobile and computing innovation are initial triggers altering the financial industry. The regulatory claim, that reduces a traditional financial intermediate, activates the open door for a new financial entity called "unicorns" and finally, the outburst of the pandemic and the urgency for social distancing have significantly let to the enhancement of digital financial services. In the appropriate condition and regulation Fintech adoption could reduce existing financial stability risks, rather than orient on a sole focus on new or increased risks. In additional, Fintech can promote financial inclusion in remote or poor areas where the physical presence of financial institutions is absent.

Keywords: Fintech Evaluating and Adoption; Digital Financial and Cloud Services, Inclusion and Engagement; Financing Platforms.

INTRODUCTION

The innovative technology has a great impact on all kinds of businesses, especially on the way financial services are provided.

For a financial intermediate Fintech means innovation, disruption and an opportunity. This can be proved by the survey that was conducted by PwC which is one of the four biggest accounting companies in the world. Most of financial institutions believe that business is at risk to innovators, so they must put disruption at the heart of their strategy and also adopt a block-chain as part of an in-production system. At the same time the financial institution is ready to increase Fintech partnerships in the short run, because 88% of them believe they will lose an important part of their business to stand alone Fintech companies over the next 5 years [10]. The year 2020 was the year of Fintech adoption and the year 2021 has been the year of Fintech innovation [3]. The IMF has conducted a research completely proving that “digital financial services can promote financial inclusion in remote or poor areas where the physical presence of financial institutions is absent”. [9] Fintech companies triggered the advancement of crediting, thus providing a positive impact on economic growth indicators [7]. A Fintech hub that is built outside a banking center are also hubs for the wider technology industry [8].

We would like to emphasize that technology has influence on an education system. In the early 20th century the education process was based on a vocational and practical model. In the late 20th century it included an

academic and research model. And currently, in the 21st century is it a business + technology model? The Best Employer Survey suggests that students in the US and Europe prefer to work for a big technological company [1].

The paper aims to analyze the reshaping of financial industry with Fintech development through focusing on challenges.

RESARCH METHOD

The desk research method was implemented in the process involving the review and analysis of all academic sources and mostly official reports related to the research topic. In this paper, we review the scholarly literature on Fintech adoption as a driver of financial integration in financially developing and underdeveloped markets that is the basis of the avoidance of economic predicament.

RESULTS AND DISCUSSION

Financial technology is used to describe innovation that aspires to improve the use of different kinds of financial services. Fintech offers a lot of innovation that reduces costs, increases efficiencies, builds client relationships, facilitates regulatory compliance and also ensures security. Fintech has seen a significant growth in bringing financial inclusion and making the prevention of financial crisis possible in most cases [6].

Fintech innovation areas include: AI & Robotics, cloud technology, blockchain technology, regtech, financial Inclusion, payments, cybersecurity, insurtech, open banking, wealthtech, captech and edtech. The FinTech Ecosystem is formed by the government, financial service companies, and FinTech startup companies.

All Fintech ecosystem players can be divided into 4 parts: As, Bs, Cs, and Ds. “As” are large, well-established financial institutions such as City Bank, JP Morgan and Goldman Sachs. We sometimes refer to them as “incumbents.” Bs are big tech companies that are active in the financial services space but not exclusively, such as Amazon, Apple, Google and Facebook. Cs are companies that provide infrastructure or technology that facilitates financial services transactions. This broad group includes companies like American Express, MasterCard, and exchanges such as NASDAQ. Ds are disruptors: rapidly growing companies, mostly startups, focused on a particular innovative technology or process. Companies include Arcus (mobile payments), Betterment (automated investing), Prosper (peer-to-peer lending), Moven (retail banking), and Lemonade (insurance) [13].

It seems sometimes that Fintech emerged in the twenty first century, but has evolved over three distinct time periods which began 150 years ago [4].

Date	1866 - 1967	1967 - 2008	2008 - Current	
Era	FinTech 1.0	FinTech 2.0	FinTech 3.0	FinTech 3.5
Geography	Global / Developed	Global / Developed	Developed	Emerging / Developing
Key elements	Infrastructure / computerisation	Traditional / internet	Mobile / Start-ups / New entrants	
Shift Origin	Linkages	Digitalization	2008 financial crisis / smartphone	Last mover advantage

TABLE 1. Fintech evolution over three distinct time periods [12]

Fintech 1.0 is about infrastructure: from the first transatlantic cable to the first credit card used for exchanging goods.

Fintech 2.0 is about banks: the first ATM was installed by Barclays, the world’s 1st digital stock exchange NASDAQ was established, SWIFT was founded, and online banking was realized in the UK.

Fintech 3.0 is about start-ups. The release of Bitcoin v0.1 in 2009. Smartphone became the primary tool for everyone and Google introduced Google Wallet, which allowed a user to make purchases from their mobile phones. Apple pay was introduced in 2014 following Google Wallet.

The consideration of Fintech evolution over three distinct time periods make possible to prove that while technological advances are slightly new to finance, digital innovation has already brought major successful improvements in the financial system. These improvements have alleviated transaction costs and given rise to new business models and new entrants [2].

Currently, big tech companies are offering various financial services that financial institution are providing as illustrated in the table below and these giants are gradually turning into a threat for the financial intermediate.

Big tech	Main business	Banking*	Credit provision	Payments	Crowd-funding	Asset management	Insurance
Google	Internet search/advertising	✓*		✓			
Apple	Tech/producing hardware			✓			
Facebook	Social media/advertising			✓			
Amazon	E-commerce/online retail		✓	✓	✓		✓
Alibaba (Ant Group)	E-commerce/online retail	✓	✓	✓	✓	✓	✓
Baidu (Du Xiaoman)	Internet search/advertising	✓	✓	✓	✓	✓	✓
JD.com (JD Digits)	E-commerce/online retail	✓	✓	✓	✓	✓	✓
Tencent	Tech/gaming and messaging	✓	✓	✓	✓	✓	✓
NTT Docomo	Mobile communications	✓	✓	✓	✓		
Rakuten	E-commerce/online retail	✓		✓		✓	✓
Mercado Libre	E-commerce/online retail		✓	✓		✓	

✓ Provision of financial service through big tech entity and/or in partnership with financial institutions outside big tech group in at least one jurisdiction. ✓* Launch expected in 2021. % The core activity of an entity engaged in banking is taking deposits, though regulations vary across countries.

TABLE 2. Financial service offerings by big tech companies [11]

The latest Global Fintech Adoption Index proved that Asia retains its global leadership in Fintech adoption. China, India and other emerging markets never had time to develop Western levels of physical banking infrastructure, which has left them more open to new solutions. In the case of China, the fintech penetration is well above the average global adoption (33%) as well as that of the average adoption across emerging markets (46%) [5].

What helps keep the East on the cutting edge is a new openness to innovation by regulators; the advent of virtual banks; the growth of the API ecosystem; the entrance of new competitors backed by Chinese financial and technology giants.

CONCLUSION

Fintech entrance in financial services is the result of the factors such as: customer preferences; economic development, that are driving adoption of innovative financial technology in an emerging market; all technology that apply to the internet, mobile and computing innovation are initial drivers that change financial

industry; regulatory claim that reduces a traditional financial intermediate activates the open door for a new financial entity so called "unicorns" and finally, the spread of pandemic and the need of social distancing have greatly contributed to the development of digital financial services. In the appropriate condition and regulation fintech adoption could reduce existing financial stability risks, rather than sole focus on new or increased risks. In additional, fintech can promote financial inclusion in remote or poor areas where the physical presence of financial institutions is absent.

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BUILDING A TOURISM MARKETING STRATEGY FOR THE SOUTH CENTRAL REGION OF VIETNAM IN ADAPTING TO THE COVID-19 PANDEMIC

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ABSTRACT

This study develops a competitive strategy, especially a marketing strategy for tourism in the South Central Coast region of Vietnam in adapting to Covid-19, thereby pointing out advantages and policy implications for tourism in the South Central Coast region of Vietnam. Expert and visitor discussion methods were used in the research. Results show that the South Central Coast region of Vietnam, where tourism is oriented towards becoming a spearhead economic sector based on 3 pillars: nature, people, and culture, has been facing difficulties as tourism has been frozen due to the Covid-19 pandemic. Covid-19 has brought the world tourism to zero, giving equal opportunity for all countries. If the South Central Coast region of Vietnam does not have a new strategy or reshape its branding and policies, it will lose not only in terms of arrivals but also in the destination's competitiveness. The study gives an overview of competitive and marketing strategies used for tourism in the South Central Coast region of Vietnam; points out difficulties and challenges facing the region as well as the reasons behind it, thereby providing some policy implications, suggesting a group of values typical for tourism in the South Central Coast region of Vietnam.

Keywords: marketing strategy, tourism, South Central Coast, Vietnam

1. INTRODUCTION

The Covid-19 pandemic has had a major impact on the tourism industry as countries closed their borders, flights were halted and billions of people had to stay at home. The World Tourism Organization (UNWTO) estimates that the Asia-Pacific tourism industry has suffered the most negative impacts from Covid-19, while in Asia, the epidemic is still developing complicatedly. It can be seen that the world in general and Vietnam in particular are in the most stressful time of the Covid-19 pandemic, which has been having a great impact on human health as well as the entire economic sector especially the tourism industry.

Currently, tourism is an important economic sector of Vietnam, accounting for nearly 10% of Vietnam's GDP in 2018 (World Bank, 2019), which has many impacts on overall economic and social development. However, tourism is still considered as one of the most sensitive economic sectors to epidemics (Chen et al., 2007). The Covid-19 epidemic (also known as SARS-CoV-2), which began seriously in early 2020, has become the world's pandemic with the most serious severity in the past 100 years on a global scale. The impact of the Covid-19 pandemic on the tourism industry is expected to be huge, far exceeding the epidemics experienced by the world in recent decades. The Vietnamese government also quickly came up with solutions to provide specific policies and relief packages to help businesses in the tourism industry fight and survive the Covid-19 pandemic.

In the South Central Coast region of Vietnam, where tourism is oriented to become a spearhead economic sector based on 3 pillars: nature, people and culture. However, as the epidemic situation continues to develop complicatedly on a global scale, the development scenarios and impacts of the Covid-19 pandemic also need to be analyzed specifically in the tourism industry in order to have a systematic, synchronous, strategic approach to a long-term problem.

This study develops a marketing strategy for tourism in the South Central Coast region to adapt to Covid-19, thereby showing the tourism advantages of the South Central Coast region. The results provide an overview of

competitive strategies, tourism marketing strategies in the South Central Coast region; difficulties and challenges are being encountered and reasons for limitations and obstacles. From there, some policy implications are given, giving a typical value group for tourism in the South Central Coast region.

2. CONTENT

2.1. Theoretical basis and overview of related research

2.1.1. Impact of the Covid-19 epidemic on the tourism industry

When epidemics occur, the tourism industry is considered to be one of the most affected sectors (Chen et al., 2007; Zeng et al., 2005). Over the past few decades, the world tourism industry has witnessed many crises caused by epidemics such as Hand Foot and Mouth Disease in the UK (2001), SARS in East and Southeast Asia (2003), MERS in Middle East (2012), Ebola epidemic in Africa (2014) or Zika mosquito epidemic (2016) (Global Rescue and WTTC, 2019). The impacts of the epidemic on the tourism industry are near-immediate and long-lasting.

The impact on demand for travel occurs almost immediately at the onset of the outbreak, increases with the severity of the outbreak, and lasts even after the outbreak. The impact of the epidemic can be seen from both a micro and a macro perspective, when tourists are concerned about their own safety, and countries that send and receive guests also issue policies to limit travel mobility (Cooper, 2005). The epidemic also negatively affects economic development in general, reducing people's incomes, leading to a decrease in their ability to spend on tourism.

The impact of epidemics is different in different markets, depending on psychological characteristics, behavior, economic conditions, geographical location... The psychology of people's response to diseases also tends to direction of change towards more adapting to actual conditions. This suggests that tourist destinations need to have a clearer and more effective orientation for each suitable market segment during different times of the epidemic (Au et al., 2004; Global Rescue and WTTC, 2019). Tourism supply may also be affected immediately when countries apply restrictive policies, even suspending tourism business in response to the epidemic. Without revenue, tourism businesses must quickly implement measures such as cutting labor and marketing costs (Pine and McKercher, 2004; Global Rescue and WTTC, 2019). This leads to long-term impacts on businesses and the tourism industry after the epidemic due to labor shortages, broken supply systems, disruptions to distribution systems, etc. Investment in the tourism sector is also at risk chance of a sharp decline (Chen et al., 2007), affecting the long-term development of the tourism industry.

The 2003 SARS epidemic took up to 2 years for the most affected countries to recover the tourism industry (Global Rescue and WTTC, 2019), mainly in Hong Kong, China, Taiwan, Vietnam and during this period defined as 3 months (Pine & McKercher, 2004). Meanwhile, the Covid-19 epidemic has spread globally with a completely new virus, although the Covid-19 vaccine has been deployed and put into use in many countries including Vietnam currently not enough to meet the needs of a large number of users worldwide. Continuing to develop vaccines to deal with new strains that are considered more dangerous and have a fast spread rate is still a long-term battle that continues (CDC, 2020). The characteristics of the Covid-19 epidemic not only limit the needs of tourists but also make local people suspicious, even refusing to welcome tourists. Tourism is a community-based economic sector. The impact of Covid-19 will be huge on both tourism supply and demand, especially when it lasts.

The World Tourism Organization (UNWTO) said that in 2021, the COVID-19 pandemic is expected to cost the global economy about \$2.4 trillion due to the collapse of the international tourism industry. Among them, the countries with the highest GDP reduction due to the drop in tourism industry because of the COVID-19 pandemic are Turkey (-9.1%), Ecuador (-9%), South Africa (-8.1%), Ireland (-5.9%).

Previously, in July 2020, the United Nations Conference on Trade and Development (UNCTAD) also forecasted that the period of international travel stagnation will last from 4-12 months, causing the global economy to decline damage from 1.2-3.3 trillion USD. But in fact, the tourism industry is affected for a longer time, the damage figure is much higher, because the pandemic does not know when to end.

According to the United Nations Report, international tourist arrivals fell by about 1 billion, or 73% in 2020, while in the first quarter of 2021, the decrease was 88%. The most affected regions are Northeast Asia, Southeast Asia, Oceania, North Africa and South Asia; while those less affected are North America, Western Europe and the Caribbean.

The International Labor Organization (ILO) recently conducted an assessment of the impact of the COVID-19 pandemic on tourism jobs in Asia and the Pacific. A report released on November 18 by the ILO said that the Philippines, Vietnam, Thailand, Brunei and Mongolia recorded one-third of the job losses due to the COVID-19 epidemic in the tourism industry. The report affirms that the job loss in tourism-related industries in 2020 is four times higher than in other industries.

Faced with the effects of the epidemic, UNCTAD said that the recovery of the tourism industry depends largely on the global vaccination of COVID-19 vaccine. According to UNCTAD Acting Secretary-General Isabelle Durant: "The world needs a global immunization effort to protect workers, minimize negative impacts on society and the tourism industry to receive strategic decisions."

Understanding this, over the past time, all countries have made efforts to promote the vaccination campaign against COVID-19 - considering this as a passport to restart the tourism industry. Along with that, new trends in tourism also appeared to adapt and match the current epidemic situation.

2.1.2. Responding to the Covid-19 epidemic and the trend of adaptive tourism covid 19

The experience of previous epidemic crises shows the importance of response policies of countries and businesses to the recovery of the tourism industry (Global Rescue and WTTC, 2019; Au et al., 2004; Gu and Wall, 2006; Cooper, 2005). Facing the threat of epidemics to the tourism industry, countries have quite similar responses in steps from controlling the spread of the disease to gradually recovering the tourism industry, re-establishing confidence in tourist's international travel (Global Rescue and WTTC, 2019). However, a number of other tactics were also applied such as creating the image of "a country that controlled the disease during and after the epidemic" to create confidence for tourists, which Japan applied during the SARS epidemic in 2003. (Cooper, 2005). Response solutions also need to be developed on a national scale due to the inclusive nature of the tourism industry.

Before the serious impact of the epidemic, businesses have taken immediate response actions. In the short term, businesses focus on cutting costs...; for medium-term solutions, businesses tend to gradually adjust their business policies, such as adjusting business plans, reorganizing markets, restructuring supply and loan systems. However, businesses still do not have clear solutions in the longer term.

If before the pandemic, tourists just need to "pack their bags and go" regardless of whether the destination is in the country or abroad, now, tourists need to go through medical examination procedures. Accordingly, vaccination certificates, masks, etc. will be indispensable items that tourists need to carry for a long time, while the epidemic is still complicated.

Touchless tourism - an inevitable trend to limit contact and prevent disease. From the recommendations of the health authorities, contactless travel has become a hot trend now and in the not too distant future. No-touch while traveling is not only limiting contact between people, between people and objects and surfaces, but also the travel experience with automation devices and technologies. In the past, all kinds of travel documents were handed over during check-in, check-out, control... This made people wait in line and increased the risk of infection. But with COVID-19 travel, every process at the check-in counter and the front desk will be automated. On planes, at tourist destinations, at restaurants and hotels, many modern non-touch devices are applied such as touch-sensitive faucets; Doors open/close automatically... All will make travel activities safer and more convenient.

Healthcare tourism reigns supreme. This is a travel service that focuses on relaxation, beauty, and health care. When traveling, visitors can participate in meditation courses, yoga, health care, and hot mineral baths... to restore physical health and regenerate spirit. Tourists will also tend to seek out unspoiled lands; isolated places, such as quiet countryside, high mountains, and islands or beaches that have not been exploited for tourism. These locations not only provide a quiet place to rest, but also provide peace of mind by reducing the risk of disease spread. According to the forecast of the World Tourism Organization (UNWTO), tourism associated

with health will grow strongly in the post-COVID-19 era. According to the Global Wellness Institute (GWI), this type of tourism could reach \$919 billion in revenue by 2022.

Working in combination with relaxation is a type of choice for many people in the context of the trend of remote working becoming popular. The year 2021 has seen more and more people working in the islands instead of at home. According to the World Travel and Tourism Council, about 34% of travelers would consider booking in another destination to stay and work, while 43% would be willing to quarantine if they could work from far away. Guest rooms will be designed as home offices to attract this new wave of "digital nomads".

Domestic travel and close to home is a prominent trend in the context that travel between countries still has many strict regulations. According to UNWTO, in 2021, positive signals about domestic tourism are happening in many markets, with people tending to travel near their places of residence. The rise of domestic tourism will boost the demand for outdoor activities, closeness to nature and rural tourism. Experts also mentioned the emergence of the trend of "slow travel" and community tourism, towards authentic, responsible and sustainable experiences.

Clearly, difficulties for the global tourism industry still pile up. However, the recent adaptation efforts of tourism in other countries are optimistic signals, which are expected to contribute to "melting the ice" and helping to restore the world economy in the face of major impacts magnitude of the COVID-19 pandemic.

2.1.3. Competitive Strategy and Marketing Strategy

Currently, in the world, there are still many different views on competitive strategy being discussed. According to M.E. Porter (2010), competitive strategy is to take actions that are different from competitors, or similar actions in a completely different way, to achieve the goal of positioning the organization in a fiercely competitive environment harsh. Competitive strategy revolves around the issue of potential strengths, weaknesses in relation to market characteristics and corresponding potentials, strengths and weaknesses of competitors. M.E. Porter has even developed his view of competitive strategy into a system of national competition concepts, which focuses on national competitiveness, puts productivity at the core, and develops sectors and groups of industries with competitiveness at the national level.

Meanwhile C.K. Prahalad and V. Ramaswamy (2015), point out that consumers are dynamic, highly connected and highly informed – associated with industries and technologies. Value no longer lies in products and services being created and delivered to consumers. The two authors said that value is the co-creation of customers and manufacturers. Along with the rapid development of the global information system, consumers play an increasingly important role in creating experiential value for products. They are no longer a single individual, lacking information, but have become a cohesive, dynamic, multi-experienced, global community. Therefore, manufacturers in this century cannot focus solely on the product and its value alone, instead, they must aim to combine with consumers to create products together with unique values for each individual.

Philip Kotler (2007), said that a marketing strategy "big" is one that is both locally and globally relevant. The people of a country are an important factor in the image of a country. Philip Kotler et al., (1997) suggested that countries must assess their strengths, weaknesses, opportunities, and threats and focus resources on areas where that country has strengths. Vietnam needs to find out what needs are there in the country as well as in other countries in the bloc and other countries in the community, from which it can build industries that really create value.

2.2. Research Methods

2.2.1. Sources of data used in the study

Primary data source: Primary data was collected through questionnaires and face-to-face interviews. In addition, the study also used the method of expert assessment with the participation of 50 tourists to the South Central Coast region.

Secondary data sources: Secondary data are collected from the Departments of Tourism or the Departments of Culture, Sports and Tourism of the South Central Coast provinces of Vietnam, the Statistics Offices of the South Central Coast provinces of Vietnam.

2.2.2. Research data analysis

Methods of synthesizing and processing data: On the basis of collected information and data, the author synthesizes and processes data related to the research problem over the years.

Analytical and comparative methods: The author conducts correlation analysis between factors related to the research problem, compares data between years to help the research work smoothly and achieves good results.

Descriptive statistical method using Excel software to make statistics and describe the observations of the survey subjects.

Qualitative research method is applied through group discussion techniques and interviews with experts and visitors.

2.3. Research results

2.3.1. Actual situation of tourism in Vietnam and the South Central provinces

The number of international visitors to Vietnam in the whole year of 2020 reached only 3.8 million, down 78.7% compared to the previous year. Travel revenue in 2020 only reached 17.9 trillion VND, down 59.5% compared to the previous year. Many localities have a sharp decrease in tourism revenue in 2020 such as: Khanh Hoa down 85.1%; Quang Nam down 78.7%; Ho Chi Minh City decreased by 76.7%; Da Nang down 73.3%; Ba Ria - Vung Tau down 64.3%; Binh Duong decreased by 60.1%; Quang Binh down 58.2%; Can Tho down 55.3%; Hanoi down 48.4%; Binh Dinh fell 40.1%.



Figure 1: International visitors to Vietnam in the period 2016 – 2020 (million people)

Source: General Statistics Office, 2021

The fact that foreign tourists cannot come to Vietnam has a huge impact on tourism revenue and the economy in general, because compared to domestic tourists, international tourists have much stronger spending power (McKinsey and Company, 2021). In 2019, foreign tourists accounted for only 17% but spent more than half of them on tourism: on average, a foreign visitor spends 673 USD, while this figure for domestic tourists is only 61 USD.

The accumulated difficulties have forced the tourism industry to focus on exploiting and developing domestic tourism. The tourism industry has launched a program to stimulate domestic tourism; the first time in May 2020 with the theme "Vietnamese people travel to Vietnam" and the second time in September 2020 with the theme "Vietnamese tourism is safe and attractive". However, the Covid-19 epidemic in the world and in Vietnam is still complicated and unpredictable, and the time to completely control the disease globally has not been determined.

The South Central Coast includes 8 provinces and cities: Da Nang, Quang Nam, Quang Ngai, Binh Dinh, Phu Yen, Khanh Hoa, Ninh Thuan and Binh Thuan. Sea and island tourism in Vietnam's tourism development strategy to 2020 and vision to 2030. This is an area with great potential for marine tourism.

The South Central Coast region has outstanding tourism potential due to the system of marine and island resources and heritage - cultural resources. However, each locality has its own unique and unique resource values. Da Nang has Non Nuoc beach, Ngu Hanh Son stone carving, international fireworks festival in Da Nang, ... Quang Nam stands out with Hoi An ancient town and My Son Sanctuary, Cua Dai beach, Cu Lao Cham island, full moon night festival of the old town, agricultural tourism... Quang Ngai has Sa Huynh beach, Son My ruins, Ly Son island, Chum Sa Huynh tomb ruins, Cham cultural relics, the ceremony to honor the soldiers of Hoang Sa. Binh Dinh has Quy Nhon beach, traditional martial arts festival and many craft villages. Phu Yen, in addition to many beautiful beaches such as Tuy Hoa, Bai Bang, ... also has a system of lagoons and rapids such as O Loan, Cu Mong, Xuan Dai bay, Da Dia rapids, Nhan tower. Ninh Thuan is famous for Ninh Chu beach, Cham culture, vineyards, Bau Truc pottery, Nui Chua national park. Khanh Hoa is famous for Nha Trang Bay - one of the most beautiful bays in the world, a famous tourist city of Vietnam. Binh Thuan has Mui Ne, Phu Quy Island, and dragon fruit specialties. In short, each locality has its own unique and unique tourism potential. These are factors that have great appeal to tourists.

In addition to the natural potential, the human values associated with the coastal culture, the Sa Huynh culture with a long history and tradition creates a unique style and lifestyle of this region, also creating a magical attraction attract tourists. The thickness of the Cham culture and the coastal culture creates its own characteristics in the service style here. Hoi An Ancient Town, My Son Tower Temple, Phan Rang Cham Tower, regional cultural centers in coastal cities, traditional festivals such as Thap Ba Ponaga festival, Nghinh Ong festival, fishing festival, Kate festival. Traditional craft villages and other tangible and intangible heritages create a population of natural and humanistic tourism resources that are extremely rich, attractive, and unique to the region attractive and attract tourists.

However, according to local leaders in the South Central Coast region, the preservation and promotion of cultural values of sea and islands still have many limitations, such as: not fully promoting traditional cultural values; In many places, marine exploitation lacks orientation, causing environmental damage; many new cultural elements penetrated, damaging traditional culture; the risk of disappearance of many craft villages is increasing; degraded relics; polluted environment... In addition, marine and island tourism resources are quite similar, but the provinces still lack linkages and coordination, leading to duplication of tourism products and unbalanced development. In the coming time, these limitations need to be overcome by localities in the region, strengthening linkages so that the exploitation of cultural values of sea and islands for tourism development is most effective.

2.3.2. SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) tourism in the South Central Coast region

After a preliminary assessment of the current marketing-mix status of tourism in the South Central Coast region, the authors refer to: "Recommending a marketing strategy for Vietnam's tourism to 2020 and an action plan for the period 2013 - 2015" (Environmental and Socially Responsible Tourism Capacity Development Program Project funded by the European Union - EU), then conducted a discussion with 10 experts and 50 tourists to the destinations. South Central Coast Province of Vietnam to produce a full SWOT analysis for tourism in the South Central Coast region as follow:

Strengths

Product

Diversity of products at the destination to meet the different needs of the market.

There are cultural traditions, heritage, temples, festivals, ethnic groups rich in identity.

There are many new destinations for those who want to rest and explore.

The natural attractions are widely distributed (and downright impressive).

Has a unique historical value with many evidences for the efforts to overcome difficulties, the current attractiveness of the landmarks.

Iconic attractions.

Newly built tourist areas and hotels are of high quality.

In the city, there are many large and small hotels.

Overall the price is not high.

Market

The market has a name.

Located near the main gateway centers.

The tour operators have some good market connections and innovations.

As a familiar and safe destination for tourists, the dishes are suitable.

As a unique destination for foreign markets, interested in Vietnamese cuisine and culture.

The staff is committed to their work.

Research capacity of scientists in Tourism.

Promotions of tour operators (some of the top companies), of airlines.

The demand for vacationing at the world's beaches is increasing (but so is the supply).

The domestic market is very strong, creating a solid foundation for the tourism industry.

Weaknesses

Product

This is a safe destination (but there are still some perception issues).

The capacity of staff working in the field of tourism marketing is not properly developed, especially the staff at the provincial level.

Market research for development orientation is still limited.

Provinces compete with each other to attract tourists and investment, while management is still limited.

Inadequacies in destination management, especially issues related to mass tourism.

Standards change frequently and are sketchy, lacking in premium products.

Lack of real commitment to responsible tourism.

The number of trained human resources cannot keep up with the growth of tourism development, thereby limiting business capacity.

Risk of “overdevelopment” in some tourist destinations.

Access costs when compared to other locations at home and abroad.

Local public transport is also an issue.

Market-oriented products in sub-destinations lack the variety to keep visitors longer.

The supply of community-based tourism services and ethnic villages is still lacking.

The idea of product development is limited to the public sector: it is necessary to encourage the participation of the private sector.

Major quality issues (shortage of trained staff, inconsistencies across service levels, erratic pricing, unreliable property ratings, hygiene, traffic, poor quality attractions).

Inexperienced investors in tourism, success in the future is only emotional, some depend on loans and therefore are very susceptible to crisis.

Lack of understanding in "branding" to bring products with consistent quality.

Market

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State investment in tourism marketing is very limited.

Lack of coordination among stakeholders in tourism promotion activities

Lack of coordination in the private sector.

The market research currently being carried out has many shortcomings, especially related to visitor satisfaction.

Websites promoting destination tourism are lacking and weak.

Delay in the decision-making process related to marketing, so it is not timely to grasp the immediate opportunities.

Limited awareness of product diversity and locality.

In some source markets, the perception of tourism in the South Central Coast as a holiday destination may be inadequate.

The danger of relying too much on a few source markets.

Unprepared for tourists from many countries to be rubbing together, and (especially) for tourists to be rubbing against people.

Many travel agencies sell the wrong products and services, leaving customers with the wrong impression and dissatisfaction.

Reluctance to disseminate information remains – the private sector does not receive the planning and market-related information it deems appropriate.

There are many obstacles to marketing coordination at the provincial and regional levels.

Understanding of the concepts of “marketing” and “promotion” is limited.

Opportunities

Product

The quality of ground transportation (road, rail) is improved, promoting the type of discovery tourism and increasing the length of stay of visitors.

Many new products to meet the needs of specific market segments.

A string of attractions, routes and potential resources in the market but not yet fully exploited can be developed/expanded to become an offering.

Destination Management helps bring the public and private sectors together to solve problems (responsible tourism).

IT skills of the South Central Coast provinces and private sector IT companies develop.

Market

The popularity of the coastal area as a "new" destination.

With the explosion of low-cost airlines, the quality of flight schedules has improved.

The market for international visitors from several countries before the Covid-19 epidemic is emerging.

Can take advantage of the current domestic stability compared to other countries.

Attract more airlines with schedules to the South Central Coast provinces of Vietnam, low-cost airlines and transport by private charter.

New routes to new markets.

Gradually reduce dependence on key source markets – spread risk.

Some suitable and potential markets, including potential MICE tourism.

Attract more cruise lines.

Promote domestic tourism to increase occupancy during off-peak periods.

Towards international travel agencies that take Thailand, Malaysia... as the focus, not Vietnam in general, the South Central Coast of Vietnam in particular.

E-marketing develops tourism connections.

Anticipate the dominance of online and offline bookings.

Collaboration in Marketing.

Overseas Vietnamese return home to visit people and invest.

Threats

Product

The constant degradation and pollution will make it more difficult to promote the product to make a profit.

Lack of coordination among agencies will threaten the achievements set out in the Tourism Strategy.

There is a lack of coordination among organizations at the national and regional/provincial levels in tourism marketing, especially in the domestic market.

Market

The marketing investment of the competitors is very high.

International tourist arrivals from several key, high-growth markets have unforeseen constraints.

Economic recession, epidemics... have the most impact on the far-flung tourism markets. Rising fuel prices will continue to impact airfares.

As the global economic and epidemic crisis has gradually been resolved, environmental concerns caused by long-distance travel have begun to return to attention.

Changes in tourism (Covid-19, due to SARS, avian flu).

Political disputes in the region.

Natural disaster (tsunami, earthquake, flood).

Loss of skilled labor due to moving to other destinations (because of higher wages).

Loss of domestic market to other nearby tourist destinations (low-cost airlines offer many opportunities).

2.3.3. Competitive strategy in tourism marketing

According to Michael Porter (2010), the competitive challenge is to offer what competitors do not have, the challenge of strategy is to make a difference. Therefore, tourism in the South Central Coast needs to learn how to become unique and develop its unique position. Now, however, it's all about copying, imitating each other, looking alike, and doing the same things. This approach will not improve efficiency if tourism in the South Central Coast wants to improve its competitiveness and reach a higher level. It's time to travel to the South Central Coast to find a way to be different. When it comes to strategy, there is a lot of confusion about strategy. We need to make a clear distinction between strategy and vision.

Strategy is the competitive advantage of the locality, the difference that the locality makes, this must be very specific, not big, big hammer statements. Competitive advantage must be detailed and concretized. What is the advantage of tourism in the South Central Coast region - that is the strategy? What is the competitive advantage of tourism in the South Central Coast region, and also know how to explain that advantage to tourists, to those involved in the tourism industry, to the local community direction? Because if the people involved in the tourism industry don't know, how can they contribute to it?

Besides, a good strategy needs to have appropriate financial goals. Competition now is not a simple matter. The competitive advantage in tourism of tourism in the South Central Coast 10 years ago is no longer an absolute advantage. For sustainable tourism growth, tourism in the South Central Coast needs high-quality human resources to attract tourism projects that bring great added value. Tourism in the South Central Coast needs to give more priority to fighting corruption, improving the market, etc. In the fight against corruption, it needs to be done in many ways, not just changing regulations. Corruption is caused by too many regulations, lack of transparency and openness, and lack of access to information. Experiences of many countries and places show that, in order to fight corruption effectively, it is necessary to implement many solutions at the same time, and must coordinate closely. An anti-corruption commission is not enough, the guilty must be dealt with, but otherwise, the procedures must be simplified, because otherwise, it will make it easier for people to engage in corruption.

Philip Kotler (2007) said that the people of the country are the important factors that make up the image of a country. In the case of tourism in the South Central Coast region, this locality is having a very favorable image, the South Central Coast people are seen as friendly, hospitable, hardworking and aspirational people. Singapore Airlines has helped build the image of a Singapore country just by the image of airline employees in their advertisements. Tourism in the South Central Coast can also do the same thing. Once tourism in the South Central Coast region has decided what image it wants to build in the eyes of tourists and foreign investors, tourism in the South Central Coast needs to take steps to make the tourism industry more attractive. People and their businesses live that image (“live” the image). This will be easier to achieve if citizens and businesses also participate in the process of determining the image they represent. Their consent must come naturally and motivate them to project the desired image to build.

2.3.4. Developing a detailed marketing strategy for tourism in the South Central Coast to adapt to Covid-19

On the basis of the above analysis of the tourism marketing environment, strengths, weaknesses, opportunities and challenges of tourism in the South Central Coast region, the authors propose to develop a detailed marketing strategy for tourism. The schedule of the province during the Covid-19 adaptation period is as follows:

Targets

+ Period 2022 – 2030

Marketing objective first: Positioning tourism in the South Central Coast as a must-visit tourist destination in Southeast Asia based on the brand value and key products of the country (culture, coast, mountains, etc.) in the Asian market and some Western markets have been selected, and ensure this is always a favorite resting place of Vietnamese people.

The second marketing objective: Effective communication about the diversity of tourism products being offered for sale and key tourist areas; prolong the stay of guests and increase on-site spending, attracting tourists to return (feel more about tourism in the South Central Coast).

Third marketing objective: Effective management cooperation with the private sector, targeting good market segments as well as cost-effective new markets.

+ Period 2031 - 2040

Based on the strategic goals of tourism marketing in the South Central Coast region in the period of 2022 - 2030, in the period 2031 - 2040, it is necessary to re-evaluate the progress and adjust the marketing objectives accordingly.

Marketing objectives need to meet the following criteria:

Promote the internationally recognized brand name for South Central Coast tourism, consistently apply brand values in all marketing activities of the South Central Coast

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Increase market share in target markets: Strengthen industry cooperation and trust the promotion work of Departments of Tourism or Departments of Culture, Sports and Tourism of the South Central Coast, agencies by specializing to industrialize operations and ensure further contributions to marketing initiatives.

Positioning and branding

+ Pictures of tourism in the South Central Coast

The main results from the authors' research on tourism in the South Central Coast show that tourists who have been to the South Central Coast from all markets in the world perceive cultural aspects as a key image building for the South Central Coast. Nature is also an important factor, especially for visitors from Europe, while for visitors from Australia or Asia South Central Coast cuisine is an important factor. One of the special concerns of this survey is the attitude of tourists who have visited the South Central Coast more than once; and so they have a more realistic view of the South Central Coast.

For this group of tourists, the factors associated with tourism in the South Central Coast are: Culture, People, Cuisine, Adventure Tourism, and Hospitality.

+ Strengths in providing the unique type of tourism of the South Central Coast tourism

For tourists who have returned to South Central Coastal tourism, they are less likely to associate nature with South Central Coast tourism than first time visitors to the South Central Coast.

Although the unique selling point of South Central Coast tourism has not been clearly identified, those familiar with this destination all have the same opinion: South Central Coast tourism is different from places in Thailand. (a soft, calm and luxurious image); tourism in the South Central Coast other than those in Malaysia (a prosperous country, with a Muslim majority but still a "true Asia"); South Central Coast tourism is different from Singapore (a country known for a modern image, a thriving metropolis).

The uniqueness of tourism in the South Central Coast is hidden in the diverse and rich culture, delicious dishes, vitality and relentless energy.

+ The position of tourism in the South Central Coast

The core products of South Central Coast coastal tourism are marine, cultural, urban and ecological tourism. The tourist position of South Central Coastal tourism aims to translate basic sentimental angles and core competence advantages into powerful and convincing images. The core factors in the position of tourism brand in the South Central Coast region are:

Time: South Central Coast tourism is a destination that can "spend time" but also a place where "time can stand still". Here, tourists can re-emerge and experience unforgettable moments – whether it's watching a cultural performance or resting on a white sand beach.

Powerful: South Central Coast tourism is home to powerful travel experiences (thrill tourism) - from natural wonders and cultural delights to bustling cities. Tourism in the South Central Coast is adventurous, authentic, and pristine and still needs to be discovered.

Mysterious: South Central Coast tourism has a harmony of strange yet authentic cultures, peoples, beliefs and traditions set in a wonderful setting of misty mountains, Green rice fields and endless horizon over the sea. Here, tourists can collect unforgettable stories to pass on to family and friends.

Dedication: The South Central Coast people provide tourists with a service rooted in cultural traditions and qualities of loyalty, friendliness and grace – the prerequisites for good service are gathered get the core advantages and basic emotions mentioned above in a single scope or title. Tourists are provided with authentic travel experiences with the power, mystery of nature and culture and dedication, experiences that are special, memorable and forever in the minds of tourists.

+ Challenges in branding

The challenge in branding South Central Coast tourism is to transform this vague or fickle perception of the locality as "a tourist destination" into a more positive reality. It is this "positive fact" that needs to be applied in all respects.

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In the messages that make up the brand, the product aspect needs to be better managed, because this image is the real measure.

Tourism in the South Central Coast does not have an official logo: Not only the country, but each locality also needs a slogan and logo to promote tourism and attract tourists. The South Central Coast is a famous tourist center of Vietnam, known by many domestic and international tourists. However, so far, the tourism industry in the South Central Coast has not had an official logo. Therefore, finding a new logo and slogan for tourism in the South Central Coast region is very necessary.

In order to attract tourists, in addition to tourist products and attractive service quality, tourism in the South Central Coast region needs to have a slogan with a message that touches the hearts of tourists, so that tourists want to come to the region right away. this land. And when there is a slogan and logo, it is necessary to have a methodical communication campaign to promote the value of the brand identity. Besides, this is an opportunity to emphasize the culinary aspect of tourism in the South Central Coast as one of the main competitive advantages to determine the position for the South Central Coast.

According to UNWTO's forecast of tourism growth in the coming time, Vietnam's tourism market in the next few years tends to be overwhelming in Asia (with a very strong domestic tourism market share). Therefore, the Asian image of Vietnam in general, tourism in the South Central Coast in particular, and its ability to convey this image need to be a key factor to be considered when developing a future brand.

+ Branded products

Based on this brand strategy, four product groups have been identified to be introduced in the respective market segments. All four of these groups have products that focus on people and food, listed as follows: (i) The first branded product group: Cultural Tourism; (ii) The second group of branded products: Sea Tourism; (iii) The third branded product group: Ecotourism; (iv) Fourth branded product group: Urban tourism.

+ Connecting markets and products

If the product is not suitable for the higher spending visitor, no long-term marketing strategy will be successful. Therefore, when developing products and marketing, it is necessary to have an integrated approach, both to ensure visitor satisfaction and to fulfill brand commitments. The marketing method requires close coordination with travel agencies to promote:

- Existing products offered for sale with high spending, by serving specific market segments within identified markets for cultural tourism, city tourism, tourism sea and mountain tourism (such as North Asia, Europe, North America market segments), and assist the industry in identifying new segments in new markets (such as India, South America, Middle East).

- Increase the number of marine, cultural, city and mountain tourism products by focusing on improving the quality of destination management and product quality to enable sustainable growth based on larger economies of Southeast Asian countries, North Asia, Russia as well as the domestic market. Tourism in the South Central Coast will focus most of its efforts on the markets that are geographically more likely to be connected to the South Central Coast, with respect to aspects such as the number of tourists visiting the region customers, air access and market-product connectivity. Considering the actual budget, the adjacent markets will be the most focused. Where there is potential to be a market in the future, building awareness and developing tourism trade partnerships will be a priority during the planning phase.

- Develop tailor-made experience tours. In the context that the Covid-19 epidemic is still ongoing, and the needs of tourists want to travel safely, to an isolated destination where there are many people, experience tourism is becoming more and more popular as an alternative for luxury accommodation needs. With the majestic natural terrain, the harmony between the sea and the mountains, the South Central Coast tourism is an ideal place to deploy adventure tours, explore nature through sports activities, outdoors to challenge altitude, train the spirit, will and bravery of customers who love to experience adventure and thrills. Some types of locally available and famous sports that can be incorporated into the adventure tour are: parachuting (parachuting – skydiving), paragliding (paragliding), scuba diving, motorcycling country...

+ Target markets

The Government's Tourism Development Strategy places the target market in the high-spending and long-stay group of tourists, corresponding to Vietnam's tourism products, with specific proposals focusing on the following target markets:

- Asia - Pacific - neighboring markets Northeast Asia (China, Japan, and Korea), Southeast Asia (Singapore Malaysia, Indonesia, and Thailand) and Australia.
- Western markets: Western Europe (France, Germany, UK, Netherlands, Spain and Scandinavia); North America (USA and Canada), and Eastern Europe (Russia, Ukraine).
- New markets: Middle East and India.

Proposing to specifically connect the key products of the South Central Coast coastal tourism with the main markets. The key to this success is improving the product to meet market expectations and further promoting the destination management mechanism. Below is a detailed analysis of tourism marketing objectives and activities for the main tourism markets/clusters of the South Central Coast.

+ Pictures

We will also conduct an assessment of the quality of information needs as well as conduct a market survey on the image of South Central Coast tourism in the hearts of tourists to continue to make more contributions to the process of shaping tourism structure and brand communication.

Search for beautiful images of areas, sub-destination, travel experiences, recreational activities, select high-resolution and good-quality images to source (from media partners). A set of guidelines for the use of commercial images will be published to provide information on the use of these images. An image database on the website will also be built, providing appropriate, branded images for key domestic and foreign partners.

+ Explanations

Small stories will be incorporated into current and future marketing campaigns (especially used in footnotes/social media), providing story templates for audiences to ensure authenticity, consistency in brand communication.

+ Campaign

The focus of brand campaigns is to focus on the highlights of the brand, especially towards different target market segments, to innovate and be creative when communicating tourism products in different regions experience. Specific activities in this campaign include:

Operation: Contract with a national/creative advertising agency or an individual to design campaigns, promotional materials, information points and unit locations sell.

Printing: Implement guidelines for the use of logos and slogans in accordance with business-oriented as well as tourist-oriented messages.

Website: Launch a centralized and sustainable website forum for B2C and B2B users.

Social Media: Research current social media activities to promote South Central Coast tourism as a tourist destination, and implement a targeted social media campaign.

Tourism is one of the industries that benefit from digital marketing methods, like other industries, digital marketing in the tourism industry has developed quite strongly in recent years. And the tools to help digital marketing succeed are:

Search engine marketing: A Google study with Ipsos Media CT found that 65% of leisure travelers start searching for tourist destinations online with no intention in mind, nor knowing how to get around which convenience. Therefore, online search plays a very important role in the decision-making process of users, so tourism businesses need to have a team of staff with expertise in SEO applied to their website.

Social Media Marketing: In today's online and hyper-connected world, brands cannot ignore social media as it is an aspect of their digital marketing strategy. Research shows that most people today use websites for social networking and spend 30% of their time online social networks. To tap into this vast world community, the tourism industry establishes interactions and maintains a social media presence that is useful and valuable for followers and fans.

Email marketing: Email marketing is one of the most successful factors in the field of Digital Marketing, not only responsive, but also low cost, time saving, and easy to measure.

In parallel, the types of offline marketing are gradually moved to online or television advertising, signs (OOH), events, roadshows, etc. are activities that will have to be adjusted or reduced. Digital channels are given more attention, however, businesses will have to adjust their advertising budgets, especially in the tourism, retail, entertainment services, etc. while production is stagnating. At the same time, businesses need to change their communication messages. In the face of the current complicated epidemic situation, choosing an appropriate way to convey the message of the tourism industry is one of the first things to determine.

Communication messages need to be clear and straightforward. One of the main goals of marketing activities during the pandemic is to create trust in customers' hearts; or further to show the business's support for the current situation; change the customer approach; Changes in consumer behavior have led to differences in the "touch points" that the tourism industry can reach customers. The most typical example is that from daily interests, customers have turned their attention to updating information about the epidemic. To adapt to this change, tourism marketers need to listen to customers, track customer journeys and learn their current concerns through social listening tools, thereby finding ways to bring the story "touch" to customers with the most appropriate message. And also from the basis of understanding customers, marketers can rethink their strategies such as shifting focus to effective online channels, changing content to fit the situation, adjusting strategies translate current advertising towards more cost optimization.

Newsletter – Publishes a newsletter for the tourism industry which covers most of the content related to the key activities of the Tourism Department of the South Central Coast

Video – Create promotional videos that include destination images that create a brand for tourism in the South Central Coast region (about a specific issue/destination).

+ Product management implementation

“Urban short break” is identified as a key product chain to highlight the role of the city as a key tourist experience in the South Central Coast.

+ Priority is given to city breaks

Forming local product management teams (South Central Coast Tourism Department, Destination Management Organization, regional and private sector partners), supporting the development of management organizations professional destination, defining priority areas according to sub-destination and thematic travel demand.

+ Communication

Products that convey the essence of the South Central Coast tourism brand will be promoted in marketing campaigns, and will conduct training on product development skills at the regional level (such as value chain, value harvesting, product package introductions, pricing, storytelling marketing, branding), product improvement seminars in sub-destinations (like “making a unique product”).

+ Quality

Priority areas for quality improvement will be identified according to key tourism experiences within the destination. The need to improve the quality of products, processes and management will be assessed to get an overall picture, and a national tourism program in the short, medium and long term will be developed with high quality. An action plan for the South Central Coast Tourism Department regarding the program's strategic leadership will also be designed and implemented.

2.4. Recommend solutions

Regarding the tourist market, tourism must take the domestic market as the backbone; International visitors also need to target high-spending customers. Tourism products need to be more diversified. Sea and islands are the strength of tourism in the South Central Coast, but in order for tourism to develop quickly and sustainably, it is not possible to rely forever on the natural beauty of the sea and islands, but it is necessary to have the construction and development of new product.

The South Central Coast region must expand tourism space to the South and North to minimize the overload of tourism infrastructure. In the immediate future, the South Central Coast needs to limit the construction of high-rise buildings in the city to keep the fresh environment of the coastal city. In the long term, it is necessary to build cultural works such as theatres, museums, etc. to increase the value of the region; research and develop night economic models with entertainment, entertainment and food services at night to attract tourists and have better income.

Tourism in the South Central Coast needs to have more than novel products. In the coming time, tourism in the South Central Coast needs to be comprehensively restructured, from tourism development orientation, infrastructure construction, guest market to specific products, to digital transformation. At the same time, tourism in the South Central Coast needs to cooperate and closely associate with other localities in the country to share the source of visitors. To do this, tourism in the South Central Coast needs the companionship of businesses, because in tourism activities, state agencies only play the role of management and orientation, while the "competition" is for businesses.

3. CONCLUSION

This study develops a competitive strategy, especially a marketing strategy for tourism in the South Central Coast of Vietnam to adapt to Covid-19, thereby pointing out the advantages and policy implications for tourism of the South Central Coast region of Vietnam. Expert and visitor discussion methods were used in the study. The results show that the South Central Coast region of Vietnam, where tourism is oriented to become a spearhead economic sector based on three pillars: nature, people and culture, is facing difficulties due to tourism. The study provides an overview of the competitive and marketing strategies used for tourism in the South Central Coast of Vietnam; pointed out the difficulties and challenges facing the region as well as the causes, thereby providing some policy implications, suggesting a group of specific values for tourism in the South Central Coast of Vietnam.

In order to make tourism truly become a spearhead economic sector, tourism in the South Central Coast needs to implement a tourism development strategy that is both in breadth and at the same time, gradually shifting in depth, towards the development of tourism lasting. Accordingly, tourism in the South Central Coast will restructure tourism activities to ensure three main objectives: (i) develop tourism into a spearhead economic sector; (ii) sustainable development associated with green growth and (iii) tourism business with focus, focus, towards improving quality and professionalism.

The recovery and tourism development of South Central Coastal tourism in the coming time will still face many difficulties; Therefore, it is necessary for the participation and drastic actions of the State management agencies, organizations and individuals doing business in tourism services to promptly transform, create a breakthrough, and increase the attraction of returning tourists and improve the competitiveness of tourist destinations in the South Central Coast region. Departments, sectors and localities in the South Central Coast have implemented solutions to increase the application of information technology in the management and administration of tourism activities, contributing to meeting the specific and specialized needs of the market tourists, especially those that changed after the Covid-19 pandemic. At the same time, put into operation a digital communication system for communication solutions and tourism promotion in the South Central Coast region, gradually replacing old communication methods that are no longer suitable with current market trends.

Tourism businesses continue to invest in improving the quality of tourism products, diversifying products; have plans to train and foster professional skills and foreign languages to improve the quality of human resources; proactively coordinate in promotion, advertising, introduction to attract other international tourist markets,

especially traditional markets that have been reduced in recent years... In the long term, coastal tourism The South Central Coast needs to have preferential policies to attract investment projects in entertainment areas, high-class shopping, night markets, art performance spots, etc. to improve the quality of tourism services in the South Central Coast region.

In fact, the trademarks of "Central Heritage Road" and "Central Sea-Island Tourism Paradise" are a relatively clear direction for localities in the South Central Coast to build linkages in the region and with neighboring regions, in order to promote this place as a beach tourism paradise of Vietnam and the world. "Eight trees bunched together to form a high mountain?" The strong connection is the answer and the starting point for the process of forming a sustainable tourism brand for the whole region and for each locality.

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ARE TUNISIAN BANKS MOVING MORE TOWARDS CAPITAL MANAGEMENT RATHER THAN EARNINGS MANAGEMENT?**Amina ZGARNI***Dr., Faculty of Economics Sciences and Management of Tunis, University of Tunis El Manar, Tunisia
ORCID: 0000-0002-7071-4442***ABSTRACT**

The banking sector is characterized by the complexity of information asymmetry, strong regulation and the accentuation of agency problems and conflicts of interest between multiple stakeholders, which constitutes more favorable to earnings management than any other company. In fact, bank managers, who are the most knowledgeable about their situation, have the opportunity to use the manipulation or management of accounting figures to achieve the desired objectives. Such earnings management practices would allow executives to signal misleading prospects for future returns. The two past decades have been marked by a multitude of bank failures and financial scandals (the Enron failure, WorldCom. etc.) mainly caused by the practices of earning management that have challenged the financial reporting quality disclosed. The purpose of this research is to study the determinants of discretionary loan loss provisions in banks. To achieve this objective, we selected a sample of the main Tunisian banks over the period from 2001 to 2014. The estimation results shows that the banks are opting for earnings management practices through the discretionary loan loss provisions in order to align with international standards, in particular with respect to regulatory capital. In opposition, we found a non-significant relationship between earnings before taxes and provisions and discretionary provisions.

Keywords: discretionary loan loss provisions, earnings management, capital management, Tunisian commercial banks

1. INTRODUCTION

The banking sector is characterized by the complexity of information asymmetry, strong regulation and the accentuation of agency problems and conflicts of interest between multiple stakeholders, which constitutes more favorable to earnings management than any other company. In fact, bank managers, who are the most knowledgeable about their situation, have the opportunity to use the manipulation or management of accounting figures to achieve the desired objectives. Such earnings management practices would allow executives to signal misleading prospects for future returns.

Otherwise, a thorough review of the financial literature on earnings management shows that there are two streams of research. The first trend is that earnings management could take accounting form. The accounting earnings management is first done either by choosing the accounting methods or by applying these methods (Holthausen, 1981; Cheng & Coulombe, 1993). It is then turned around the estimate of accruals that groups all the adjustments and can be calculated by the difference between the net profit and the cash flow. On the other hand, the second current supports the idea that the earnings management could take, rather, the real form. The real earnings management is based on the decisions made by the executive having a direct influence on the cash flows (Shayan-Nia et al., 2017). According to Schipper (1989), this decision is often difficult to detect because of the difficulty of distinguishing between the desire to manipulate the accounting figures and the optimal management decision.

Attacking the banking sector, some studies including those of Beatty et al. (1995), Beatty et al. (2002) and Cornett et al. (2009) showed that earnings management in banks is done through the realization of securities gains. However, Zhou and Chen (2004), Ahmed et al. (1999), Kanagaretnam (2004), Taktak and Mbarki (2014) and Ben Othmen and Mersni (2016), Zgarni et al. (2018) argue that managers generally use loan loss provisions as the main tool for earnings management. In fact, several factors can influence the recording of these

provisions for doubtful debts, including: the level of earnings before taxes and provisions and the level of regulatory capital. Taktak et al. (2010a) and Ben Othmen and Mersni (2014), among others, have emphasized these two factors as important incentives for managing loan loss provisions in banks.

However, the literature review on this subject shows a lack of consensus on the relationship between loan loss provisions and the earnings management in banks. Indeed, some authors have shown that this relationship is positive including Niswander and Swanson (2000), Shrieves and Dahl (2003), Dantas and al. (2012), Olson and Zoubi (2014) and Sheng et al. (2016). While some other studies, particularly those of Ahmed et al (1999) and Fernando and Ekanayake (2015), have denied this relationship. Similarly, studies of the effect of capital management on discretionary loan loss provisions show divergences. Indeed, Ahmed et al (1999), Anandarajan et al. (2007) and Abu El Sood, (2012), have demonstrated the negative effect of capital management on discretionary provisions. In addition, Collins and al. (1995) and Anandarajan and al. (2011) denied the use of discretionary provisions as a capital management tool in banks.

These arguments have prompted us to question the nature of discretionary practices in Tunisian banks, especially following the IMF report (2015) which ensures the publication of a poor quality of financial reporting by these banks.

The purpose of this paper is to study the discretionary behavior of Tunisian commercial banks in the earnings and capital management. Thus, the contributions of this work are therefore double. On the theoretical level, this work constitutes a contribution to the literature on earnings management in Tunisian banks. From an empirical point of view, we hope that our results can be of considerable interest to the various stakeholders, in particular the regulatory and standardization bodies as well as the financial market authorities. Indeed, our results provide an opportunity to question and review the regulatory requirements for banks' provisioning policies.

This work will be organized as follows: in a second section we will present the theoretical framework of earnings management in banks. In the third section, we will unveil the methodological framework of the research. The fourth section is devoted to analyzing and discussing the results. The conclusion, which is the subject of the fifth section, will take away the main lessons from the empirical study that has gone out in this paper.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Among the most commonly used techniques of earnings management in banks are loan loss provisions (Ben Othmen and Mersni 2014, 2016) and realization of securities gains (Cornett et al., 2009; Taktak & Elleuch, 2010). Nevertheless, the review of the literature has allowed us to remember that bank managers most often use accruals accounting (specific accruals) to convey the information that best meet their objectives. (Kanagaretnam (2004), Anandarajan et al. (2007), Kwak et al. (2009), Taktak et al. (2010b), Taktak and Mbarki (2014), Ben Othmen and Mersni (2016), Fekri et al., (2015). In addition, the literature review reveals several factors that can influence the calculation of loan loss provisions in banks, namely: accounting standardization, external financing and the bank's economic visibility. However, two factors that have been unanimously supported by most research and empirical investigations, namely: the level of the earnings and the level of regulatory capital. Zhou and Chen, (2004) provided empirical evidence for the importance of these two incentives in managing loan loss provisions in US banks. By the same, and on various samples, other authors like Ben Othmen and Mersni (2014, 2016) as well as Taktak and Mbarki (2014) prove the primacy of these two factors in the incentive to the earnings management of banks.

a) earnings management and loan loss provisions

A careful scan of the literature suggests that loan loss provisions are an earnings management technique that bank managers rely heavily on. Cornett et al. (2006) found that bank managers appear to use discretionary provisions to increase revenues and, subsequently, their own personal wealth. This assumption is, by the same, certified by Bhat (1996) which confirms that banks tend to manipulate their earnings in case of a low market value of their assets and / or equity; a loan / deposit ratio or a high debt ratio or a low growth opportunity.

Thus, Collins et al. (1995), Kanagaratnam (2004), Anandarajan et al. (2007), Mismam and Ahmed (2011), Ben Othman and Mersni (2014), Taktak and Mbarki (2014) and Ahmad et al. (2014), among others, have shown the positive relationship between loan loss provisions and bank earnings. Indeed, the low level of the result encourages the managers to record a lower level of loan loss provisions in order to increase their earnings.

However, Kwak et al. (2009) proved rather a negative and significant association between discretionary provisions and earnings before taxes and provisions. For their part, Fernando and Ekanayake (2015) found, on a sample of commercial banks in Sri Lanka, that earnings before taxes and provisions do not have a significant effect on provisions.

In our study, we will test, in the manner of these authors, the effect of earnings before taxes and provisions on discretionary loan loss provisions. Referring to the existing literature, we expect, like Ben Othman and Mersni (2014) that managers underestimate discretionary loan loss provisions if earnings before taxes and provisions is low and overestimate them if this result is high. We then propose the existence of a positive relationship between earnings before taxes and provisions and discretionary loan loss provisions.

Thus, we emit our first hypothesis (H1):

H1: earnings before taxes and provisions have a positive effect on discretionary provisions in Tunisian commercial banks.

b) capital management and loan loss provisions:

An in-depth review of the literature suggests that banking regulations that require a minimum level of capital adequacy ratio can lead some bank managers to opt for capital management practices. Indeed, when banks fail to meet this regulatory ratio, managers manage their capital through the handling of accruals, in order to escape the costs they can bear. Banks give a false image of its ability to cope with potential deficits. In fact, the capital adequacy ratio, expressed in terms of the accounting ratio, is a possible way for managers to manipulate the accounting part of this ratio in order to reach the required threshold. Severe penalties may be incurred as a result of non-compliance with this regulatory rate, thus constituting, according to Ahmed and al. (1999), a strong constraint for managers to manipulate their results for capital management purposes.

The use of loan loss provisions for capital management purposes has been proven by many authors including Kim and Kross, (1998), Collins, Shackelford and Wahlen, (1995), Moyer (1990) and Anandrajana (2007). In this regard, Anandarajan et al. (2005) and Lobo and Yang (2001) have shown that managers tend to increase provisions where the capital ratio is low, thus increasing the tier II capital.

In fact, the literature review in this area shows the existence of two groups of research: research carried out before the Basel agreement and research carried out after the Basel agreement. In this context, Moyer (1990), Scholes et al. (1990) and Beatty et al. (1995) proved the use of loan loss provisions by banks to manage their capital before the Basel Accord (1988), where loan loss provisions are a component of the numerator of the capital ratio, which encourages banks to act on provisions to improve their capital. However, after the Basel agreement, banks act directly on the result, which is a major component of equity. In fact following this agreement, only a maximum of 1.25% of provisions, is required at the level of own funds. This eliminated the costs associated with managing the results through bad debt provisions for the banks. This leads to the assumption that, under the Basel Accord, banks remain more aggressive in managing results through discretionary provisions.

However, Ahmed et al. (1999) did not find a strong relationship between loan loss provisions and earnings management in US banks following the 1990 reforms. In addition, they concluded that these banks use discretionary provisions to manage their capital even after the reforms of 1990. In the same vein, Kim and Kross (1998) showed in their study on a sample of American banks, that following the Basel agreement (1988), the management of loan loss provisions allows banks to deceive their regulatory capital. They proved that the banks that handle their provisions have low levels of capital.

All in all, studies of the relationship between bad debt provisions and capital management have mixed results. In this work, and in the same vein as Ahmed et al. (1999), Kanagaratnam (2004), Ben Othman and Mersni (2014) as well as Fekri et al. (2015), we estimate the existence of a negative relationship between the capital

ratio and the discretionary loan loss provisions.

Thus, we emit second hypothesis H2:

H2: The capital ratio has a negative effect on discretionary provisions in Tunisian commercial banks.

3. RESEARCH METHODOLOGY

a) Presentation of the sample

The sample of our study is made up of ten Tunisian commercial banks that are listed on Tunis Stock Exchange. These banks hold the vast majority of assets of Tunisian banks, more than 80% of total assets of commercial banks. Also, they participate in 88% of the total credits granted.

b) Regression models

Loan loss provisions are used as the main tool for earnings management (Ahmed et al., 1999; Kanagaretnam, 2004; Taktak & Mbarki, 2014; Ben Othmen & Mersni, 2016; Zgarni et al., 2018). These provisions are broken down into two parts: a non-discretionary and a discretionary portion. Thus, in order to examine the determinants of discretionary provisions, we followed the Kanagaretnam (2004) approach, which is manifested in two stages. In the first step, we will estimate the total provisions by identifying the normal component of the provisions (non-discretionary provisions). The second step is to determine the discretionary portion of total provisions by calculating the difference between total and non-discretionary provisions (the residue of the first estimate).

Total Provisions (LLP) = Non-Discretionary Provisions (LLPND) + Discretionary Provisions (LLPD) Our first model is as follows:

First model:

With:

$$LLP_{it} = \alpha_0 + \alpha_1 NPL_{it} + \alpha_2 \Delta NPL_{it} + \alpha_3 \Delta LOAN_{it} + \varepsilon_{it} \quad (1)$$

LLP_{it} : Bank loan loss provisions at year t normalized by total loans of year t-1

$NPL_{i,t-1}$: The opening balance of non-performing loans of bank i at the date t-1 divided by the total loans of year t-1;

ΔNPL_{it} : The change in non-performing loans from bank i to year t divided by the total loans in year t-1; $\Delta LOAN_{it}$: The change in loans from bank i to year t divided by the total loans in year t-1;

ε_{it} : The residue of the equation that represents the discretionary part of the provisions of bank i to year t.

First, the total provisions are estimated in order to obtain the α_0 , α_1 , α_2 and α_3 coefficient estimators. The obtained estimators (α_0 , α_1 , α_2 et α_3) will allow us to calculate the non-discretionary provisions noted by $LLPND$.

$$LLPND_{it} = \alpha_0 + \alpha_1 NPL_{it} + \alpha_2 \Delta NPL_{it} + \alpha_3 \Delta LOAN_{it} \quad (2)$$

The second step is to calculate Discretionary Provisions (LLPD):

$$LLPD_{it} = \varepsilon_{it} = LLP_{it} - LLPND_{it}$$

That is to say:

With:

$$LLPD_{it} = LLP_{it} - [\alpha_0 + \alpha_1 NPL_{it} + \alpha_2 \Delta NPL_{it} + \alpha_3 \Delta LOAN_{it}] \quad (3)$$

$LLPND_{it}$: Provisions for non-discretionary bad debt provisions for bank i in year t; $LLPD_{it}$: Provisions for discretionary bad debts for bank i in year t;

Second model:

Like Ahmed et al. (1999), in the second model of our study we will introduce two variables of interest that seem to affect the discretionary provisions namely earnings before taxes and provisions (EBTP) and the capital ratio. (CAR) and two control variables which are the return on assets (ROA) and the size of the bank (LASSET). The ultimate interest of this

second model is to test our two research hypotheses. We will thus check whether Tunisian banks use discretionary provisions for profit and capital management purposes. Taking inspiration from the work of Kanagarelman (2004), Kwak et al. (2009), Taktak and Mbarki (2014), Ben Othman and Mersni (2014) and Fekri et al. (2015), we propose to estimate the following model:

$$LLPD_{it} = \beta_0 + \beta_1 EBTP_{it} + \beta_2 CAR_{it} + \beta_3 \Delta LASSET_{it} + \beta_3 \Delta ROA_{it} + \varepsilon_{it} \quad (4)$$

With:

$LLPD_{it}$: Provisions for discretionary bad debts for bank i in year t ;

$EBTP_{it}$: The result before taxes and provisions of the bank reported to the total assets of bank i in year t ; CAR_{it} : capital ratio of bank i to year t ;

ROA_{it} : return on assets of bank i in year t ; $LASSET_{it}$: size of bank i in year t ;

ε_{it} : The error term of the equation.

4. EMPIRICAL RESULTS

a) Statistical Descriptions

The Table 1 below presents the descriptive statistics of our sample for all the variables used in our study.

Statistical results show that the ratio of loan loss provisions to total loans represents 2.7% on average with a maximum of 15.98%. Based on a standard deviation of 2.68%, we advance no differences between banks in loan losses provisioning practices. These results are similar to those found by Ozili (2015) who find an average value of loan loss provision equal to 2%. In addition, the mean of non-performing to total loans is 17.32% with a maximum of 64.60%. This table also shows that the average of the change in non-performing loans is 1.3% with a maximum of 17.66%. Results show also that on average of change in the loan is 9.21% with a maximum of 30.66%.

Table 1. Descriptive Statistics of Variables

Variable	Mean	MIN	MAX	S.D	Observations
LLP	.027186	.0000167	.1598903	.0268898	140
NPL	.1732123	.0000802	.6460603	.1497344	140
Δ NPL	.013004	-.1154509	.1766946	.0438628	140
Δ LOAN	.0921152	.0270438	.3066719	.0600232	140
LLPD	-6.96e-12	-.0329875	.1301552	.0257245	140
EBTP	.0209971	.0040253	.0387311	.0078695	140
CAR	.0969434	-.0093675	.3051355	.0465889	140
LASSET	14.98996	13.81444	15.99403	.5575623	140
ROA	.0078196	-.0882665	.031	.0112917	140

LLP: Loan Loss Provisions; NPL: opening balance of non-performing loans divided total loans; Δ NPL: change in

non-performing loans divided by total loans; Δ LOAN: change in loans divided by total loans. LLPD: discretionary loan loss provision; EBTP: earnings before taxes and provisions; CAR: capital ratio; LASSET: size of bank; ROA: return on assets

The discretionary provisions represent an average value of -6.96e-12, with a maximum value of 13.01% and a minimum value of (-3.29%). This result is comparable to that of Zhou and Chen (2004) who found an average value of 0.000 in their sample of US banks. Likewise, this result is close to that found by Kwak et al. (2009) on a sample of Japanese banks: with an average LLPD value of 0.0000, a minimum value of -0.0261 and a maximum value of 0.0688. The standard deviation is 2.57% indicating low volatility of the banks in our sample. These results allow us to deduce the existence of discretionary practices regarding provisions at Tunisian banks throughout our study period (2001-2014). These practices tend both upwards and downwards. The results of the descriptive statistics also show that the average of the earnings before taxes and provisions

(EBTP) is 2.09%. This ratio varies between 0, 40% and 3. 87% with standard deviation of 0. 78%. This shows a low volatility of this variable in our sample. This result is similar to that of Fernando and Ekanayake (2015). The average capital ratio (CAR) is 9.69%, with a standard deviation of 4.65%, a maximum value of 30.51% and a minimum value of

-0.936%. Taktak et al. (2010b) Which is 20.04% on average in a context of Islamic banks. Considering the size of the bank (LASSET), measured by the logarithm of the total assets, our results indicate that this variable represents an average value of 14. 98% which varies between 15.99% and 13.81% with a standard deviation of 55.75%. This proves that the bank sizes of our sample have been scattered.

For the accounting performance variable (ROA), the latter presents an average of 0.78% with a minimum value of -8.8% and a maximum value of 3.10%. The standard deviation is 1.12%, indicating a very low volatility. These values are similar to those found by Lepetit (2006) in a context of European banks, which found an average value of return on assets equal to 0.61% and a maximum value of 3.09%.

b) Results and discussions

The results of the estimation of our two models by the GLS method (Panel corrected) are presented in Table 2 and 3.

- Regression results of the first model: The determinants of loan loss provisions

By performing the Hausman test, the fixed effects model is most appropriate for our study. Moreover, the results of the estimation of the first model by the GLS method (corrected-panel) show, as expected, the significant positive effect of non-performing loans as well as the variation of loans on total provisions (table 2).

Table 2. Results of the Regression of the First Model

Variable	Coefficient.	Std. Err	z	P> z	[95% Conf.	Interval]
NPL	.0396327	.0146796	2.70	0.007***	.0108611	.0684043
ΔNPL	.050814	.0501121	1.01	0.311	-.0474039	.149032
ΔLOAN	.0711009	.0362552	0.050	0.050 **	.000042	.1421597
Constant	.0131109	.0047612	2.75	0.006	.0037792	.0224426

NPL: opening balance of non-performing loans divided total loans; ΔNPL: change in non-performing loans divided by total loans; ΔLOAN: change in loans divided by total loans.

***Significant at 1%, **Significant at 5% and *Significant at 10%

Table 3. Results of the Regression of the Second Model

Variable	Coefficient.	Std. Err	z	P> z	[95% Conf.	Interval]
EBTP	.2990678	.2826665	1.06	0.290	-.2549484	.853084
CAR	-.1328809	.0521253	-2.55	0.011**	-.2350445	-.0307172
LASSET	-.0247416	.003577	-6.92	0.000***	-.0317523	-.0177308
ROA	-.290105	.1904788	-1.52	0.128	-.6634367	.0832267
Constant	.4642297	.038464	12.07	0.000	.3888416	.5396178

EBTP: earnings before taxes and provisions; CAR: capital ratio; LASSET: size of bank; ROA: return on asset.

***Significant at 1%, **Significant at 5% and *Significant at 10%

- Relationship between income before taxes and provisions and discretionary provisions

Regarding the effect of earnings before taxes and provisions on discretionary provisions, we note that the

results obtained reject our first H1 research hypothesis. Indeed, we found a non-significant positive relationship between earnings before taxes and provisions (EBTP) and discretionary provisions (LLPD). This indicates that earnings management does not seem to be a determining factor for discretionary provisions in Tunisian commercial banks.

Our findings agree with those found by Ahmed et al. (1999), which shows that banks do not use discretionary provisions for earnings management purposes in the period following the regulation of sufficient capital in 1990. Similarly, our results are similar to those of Fernando and Ekanayake (2015) who consider that the earnings before taxes and provisions do not have a significant effect on provisions of Sri Lankan public banks over the period from 2003 to 2012.

However, our result was rejected by Kanagaretnam (2004), Taktak (2008), Kwak et al. (2009) Ben Othman and Mersni (2014) and Taktak and Mbarki (2014) who hold that provisions are an essential ingredient of earnings management.

- Relationship between regulatory capital and discretionary allowances:

Regarding the assumption of capital management, it turns out that our regression results are in line with our expectations (H2). Indeed, we are in compliance with our second research hypothesis, a negative and significant relationship at the 5% threshold between the Capital Ratio (CAR) and the Discretionary loan loss Provisions (LLPD). This indicates that at the moment when the Tunisian commercial banks reach the regulatory limit, the managers manipulate the discretionary provisions upwards in order to increase the total provisions which will improve the tier II of the capital and consequently improve the level of their capital regulatory. In other words, the weakness in the capital ratio pushes managers to adjust their balance sheet to the regulatory limit while engaging more and more in risky activities. On the other hand, banks with sufficient regulatory capital choose to engage in less risky activities.

Like Boudriga et al. (2009), El Sood, (2012) and Liu et al. (2012), it seems to be accepted that the discretionary behavior of Tunisian banks is justified by the desire to reach the regulatory capital ratio. Taktak and Mbarki (2014) and Fernando and Ekanayake (2015) reinforce this idea. Indeed, at the end of their empirical study, they find that any increase in the capital ratio leads to a significant decrease in the loan loss provision. However, it is important to note that our results differ from those of Collins et al. (1995) and Anandarajan et al. (2011) who deny the use of discretionary provisions as a capital management tool in banks.

For the control variables, the results obtained testify par excellence the role that could play the size of the bank in determining the amount of provisions. Indeed, the size allows to mitigate the discretionary provisions and consequently the discretionary behavior of the Tunisian banker. Any increase in the size of the firm generates a significant drop in discretionary provisions. This can be attributed to the inverse relationship between information asymmetry and size. Thus, any increase in size generates a decrease in information asymmetry and consequently a decrease in discretionary provisions. For the second control variable, just as Baccouche et al. (2013) and Ittonenn et al. (2015), the results certify that the return on assets has no impact on discretionary provisions.

5. CONCLUSION

At the end of this study, we showed, in accordance with the work of Kanagaretnam (2004) and Fekri et al. (2015), the dependence of total provisions on the opening balance of non-performing loans and the variation in loans. In addition, and in order to better understand the behavior of leaders in the earnings management, like Kanagaretnam (2004), Taktak (2008), Taktak and Elleuch (2010), Taktak and Mbarki (2014) and Ben Othman and Mersni (2014, 2016), we noted the importance of the level of discretionary provisions in Tunisian banks.

Faced with this empirical observation, which can hurt the shareholders enormously, and referring to the pioneering academic research of Kanagaretnam (2004), Kwak et al. (2009), Ben Othman and Mersni (2014) and Fekri et al. (2015), we moved, in the second model, towards a new direction in order to decipher the earnings management, measured by the discretionary provisions. The latter were explained by two variables

of interest namely, capital ratio and earnings before taxes and provisions and two control variables commonly tested in the empirical literature on earnings management in banks. The empirical results obtained, which corroborate those of Ahmed et al. (1999) and Fernando and Ekanayake (2015), and reject those of Collins et al. (1995) and Anandarajan et al. (2011), refer to the idea that discretionary provisions depend on the level of regulatory capital of banks. Thus, when the bank reaches the limit of the regulatory capital ratio, the earnings management practices tend to increase so as to improve the Tier II capital, and thus improve the ratio of regulatory capital. In view of these results, it is also surprisingly that the earnings management in Tunisian banks does not depend on the level of earnings before taxes and provisions. This last result goes against the works of Fekri et al. (2015), Ben Othmen and Mersni (2014) and Kwak et al. (2009) but joins those of Ahmed and al (1999) in the American context and Fernando and Ekanayake (2015) in the context of Sri's public banks.

Since the financial reporting quality is the driving force behind the decision-making process of the various stakeholders, we believe that our results aspire to contribute in the Tunisian context to the literature dealing with the earnings management in banks, which is still abundant. Empirically, these results provide regulators and financial market authorities with an opportunity to challenge and compete with regulatory requirements when it comes to provisioning policies. Indeed, the proven significant relationships between capital management and discretionary provisions can be an appeal to regulatory authorities to strengthen their regulation to improve the quality of published accounting information and thereby avoid critical situations that may be prejudicial for the economy in general. Our results are also intended for auditors, who, by their responsibility for the regularity and soundness of financial statements, can find incentives for more in-depth controls and appropriate provisioning policies in banks, with a view to limiting accounting manipulations and possible opportunistic practices.

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FACTORS AFFECTING ECONOMIC GROWTH IN KHANH HOA PROVINCE, VIETNAM

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ABSTRACT

This study studies the factors affecting economic growth in Khanh Hoa province, Vietnam. Descriptive statistics, expert methods, and regression are used in the study with 5 economic variables as representatives, namely gross regional domestic product (GRDP), foreign direct investment (FDI implementation), labor (L), human resources (STU) and openness to trade (OPEN). The results show that there is a one-way causal relationship between economic growth (GRDP) and foreign direct investment (FDI) in Khanh Hoa, economic growth (GRDP) has a positive impact on foreign direct investment (FDI) attraction, but not found foreign direct investment (FDI) affects economic growth (GRDP). At the same time, the results also show that human resources (STU) has a positive impact on GRDP and FDI, but openness to trade (OPEN) has not been found to have an impact on economic growth (GRDP), FDI. From there, the study proposes a number of policy implications that contribute to enhancing economic growth in Khanh Hoa province, Vietnam in a sustainable way, improving negative impacts, taking advantage of positive and diverse impacts structuring the economy, avoiding the current dependence on trade and tourism

Keywords: factors, economic growth, Khanh Hoa

DİJİTALLEŞEN EKONOMİDE VERGİLEDİRME TAXATION IN DIGITALIZED ECONOMY

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ÖZET

Teknolojik gelişmeler ve küreselleşme, dijitali ve ekonomiyi aynı çatı altında buluşturarak yeni bir iktisadi alan ortaya çıkarmıştır. Bu yeni iktisadi alan dijital ekonomidir. Dijital ekonomi bilgi ve iletişim teknolojileri aracılığıyla küresel ekonomik faaliyetlerin bütününe kapsamaktadır. Dijital ekonomi aynı zamanda sayısallaştırılmış verileri kullanarak ticari, ekonomik, sosyal, kültürel vb faaliyetleri de içermektedir. Dijital ekonominin uzlaşmış bir tanımı ve kapsamı bulunmamaktadır. Literatürde kavramın ik kez Japonya'nın 1990'lı yıllarda yaşadığı durgunluk döneminde iki japon bilim insanı tarafından kullanıldığı, ardından Don Tapscott'un 1995'de çıkarmış olduğu Dijital Ekonomi kitabıyla batı dünyasına taşındığı ifade edilmektedir. Mevcut uluslararası vergi sistemi, özellikle dijital ekonomi alanındaki güncel gelişmelere tam olarak cevap verememektedir. Aynı zamanda dijital ekonominin vergilendirilmesi konusunda da henüz fikir birliği oluşmamıştır. Her ne kadar ekonominin dijitalleşmesi, hizmet ve ürüne kolay, hızlı ve ucuz erişimi mümkün kılarsa da, uluslararası vergi sisteminde belirsizliğe ve haksız rekabete yol açabilecek bir takım olumsuzlukları da beraberinde getirmiştir. Örneğin fiziksel varlığa dayalı olmayan yeni dijital iş modellerine sahip şirketler genellikle işyerlerinin veya genel merkezlerinin olmadığı bir pazarda yüksek katma değer elde etmekte ve rekabeti bozabilmektedir. Bu nedenle dijital ekonomide adil ve etkili bir vergi sistemine ulaşmak için uluslararası alanda küresel bir vergi reformuna ihtiyaç vardır. Bu ihtiyaca yönelik olarak OECD başta olmak üzere uluslararası kuruluşlar dijital ekonomide değer nasıl tanımlanması ve vergilendirilmesi gerektiğine ilişkin fikir birliği oluşturmaya çalışmaktadır. Bu çalışmada dijital ekonomiye ilişkin genel bir bilgilendirme yapılarak, ülkelerin dijital vergi uygulamalarına ilişkin bilgi verilecektir. Bununla birlikte uluslararası kuruluşların dijital vergilemeye ilişkin çalışmaları değerlendirilerek, dijitalleşen ekonomide vergilendirme adil bir vergilendirme perspektifinde yorumlanmaya çalışılacaktır.

Anahtar Kelimeler: Dijital Ekonomi, Vergi, OECD.

ABSTRACT

Technological developments and globalization have brought together digital and economy under the same roof and created a new economic field. This new economic field is the digital economy. The digital economy covers the whole of global economic activities through information and communication technologies. The digital economy also includes commercial, economic, social, cultural, etc. activities using digitized data. There is no agreed definition and scope of the digital economy. In the literature, it is stated that the concept was used for the first time by two Japanese scientists during the recession in Japan in the 1990s, and then it was moved to the western world with the book Digital Economy published by Don Tapscott in 1995. The current international tax system cannot fully respond to current developments, especially in the digital economy. At the same time, there is no consensus yet on the taxation of the digital economy. Although the digitalization of the economy makes it possible to access services and products easily, quickly and cheaply, it has also brought with it some negativities that may lead to uncertainty and unfair competition in the international tax system. For example, companies with new digital business models that are not based on physical assets often achieve high added value in a market without workplaces or headquarters and can distort competition. Therefore, in order to achieve a fair and effective tax system in the digital economy, there is a need for a global tax reform in the international arena. To meet this need, international organizations, especially the OECD, are trying to create a consensus on how value should be defined and taxed in the digital economy. In this study, a general information about the digital economy will be given and information will be given about the digital tax practices of the

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countries. In addition, by evaluating the studies of international organizations on digital taxation, taxation in the digitalized economy will be tried to be interpreted in a fair taxation perspective.

Keywords: Digital Economy, Tax, OECD.

PUBLIC INVESTMENT IN VIETNAM ECONOMY

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ABSTRACT

Objective:

The paper investigates the public investment in the Vietnam economy. The public investment covers the government budget financed investment, which has potential contribution on the economic growth.

Methodology:

The paper employs a quantitative method which examines a time-series data sample of Vietnam economy. The public investment is jointly analyzed with the economic growth up to recent quarters of 2020, so that, the analysis can shed a new light on the macroeconomic role of public investment on the context of Covid-19 pandemic.

Findings:

The results prove that the public investment has a significant contribution on the economic growth of Vietnam economy over the recent period. This role of public investment is stronger when the economy experiences the economic recession period.

Implications:

The results uncovers that the public investment is an important policy tool to ensure and recover the economic growth rate. And this implication can be also a reference case for other developing economies, especially during the current pandemic time period.

Keywords: Public Investment; Economic Growth; Public Policy.

INTRODUCTION

The public investment is crucial for economic growth, by stimulating the capital accumulation within an economy. First, the public investment generates an additional increase of aggregate demand on the short run. The Keynes fiscal multiplier implies that one unit of increase in the public expenditure, which covers the public investment, can raise the aggregate demand by more than one unit. Second, the public investment also enhances the convergence of capital-effective-labor ratio toward its long-run equilibrium. This convergence process also underlines an ongoing economic growth rate. During the economic recession, these two aspects of public investment even become more important for the economy can recover to its normal growth path. Therefore, the current Covid-19 pandemic time uncovers the new research question on the role of public investment within a developing economy like Vietnam.

The current paper analyzes the impact of public investment on the economic growth rate in the Vietnam economy. We first investigate the pattern of public investment in comparison with that of economic growth rate. This step provides the information on the correlation of these two macroeconomic variables. Then, we focus on the current pandemic Covid-19 time period to shed a new light on the role of public investment toward the economic growth rate in the Vietnam economy.

The results show that the public investment follows closely the fluctuation pattern of economic growth rate over the recent years in the Vietnam economy. This implies that there can be a high correlation of public investment and economic growth rate over time. Moreover, during the pandemic time, the public investment

tends to be employed by the government to recover the economy. And this policy seems to be effective in the context of the Vietnam economy.

The paper is structured as following. After the Introduction section, the second section on the Framework presents the theoretical background and associated data sample. Then, the third section on the Evidence shows the results on the impact of public investment on the economic growth in the Vietnam economy. Finally, the fourth section on the Conclusion closes the paper with the policy discussion and future research prospects.

FRAMEWORK

Theoretical Background

Within this paper, the public investment is measured by the government-budget investment, which is a component of public sector investment, beside the government-borrowing investment and state-owned enterprises investment. With this definition, the public investment is financed only by the government budget, which is based on the taxation income. This feature is different to other type of public-sector investment. In particular, the government-borrowing investment is financed by the funds borrowed by the government, while the state-owned enterprises investment is financed by the net income by the stated-own enterprises.

The public-sector investment together with the foreign investment and private-sector investment form the total whole-economy investment. Thus, within the current paper, the public investment only contributes a share of total whole-economy investment. Note that in the literature, some other papers considers the whole public sector investment as the public investment. Thus, within these papers, the share of public investment and its share over the total whole-economy investment can be more significant than the corresponding value according the definition in this current paper.

The public investment can affect the economic growth by the capital accumulation mechanism, which is underlied by the neoclassical growth model (Solow, 1956). In particular, there exists a long-run equilibrium, i.e, steady state, in which the capital-effective-labor ratio is constant. At that equilibrium point, the economic growth rate, measured by the growth rate of output, is equal to the growth rate of technology progress and labor force. Along the convergence path toward the steady state, the public investment, as a type of investment, makes contribution on the building of domestic capital stock, then, enhancing the economic growth rate.

The role of public investment on the economic growth rate can be also referred to the aggregate demand in the short-run. In details, the public investment is a component of public expenditure. The public expenditure, in turn, forms the aggregate demand. Then, an increase of public investment can raise the aggregate demand. Given, the aggregate supply, this increase of public investment can increase the income of the whole economy. Thus, the economic growth rate in the short-run also improves.

Recent emprical evidence also records the positive impact of public investment on the economic growth. In particular, the public investment can exert a positive impact on the economic growth (Blanchard & Perotti, 2002), enhance both economic growth and foreign investment (Clarida & Findly, 1994), and work as an effective tool to combat the recession (Petrovic, Arsic & Nojkovic, 2021).

Empirical Data

The dataset is one quarterly time series sample with 51 observations for Vietnam, from first quarter of 2008 to fourth quarter of 2020. This sample covers both the economic expansion period, such as the 2016-2019 period, and also economic recession during the pandemic in 2020. Thus, the sample is convenient to explore the correlation of public investment and economic growth in the context of Vietnam economy.

The data is collected from the Vietnam General Statistics Office. First, the public investment is measured as the year-on-year growth rate of government-budget investment on percentage. Second, the economic growth rate is measured as the year-on-year growth rate of GDP (Gross Domestic Product) on percentage. The descriptive statistics show that each variable has a high standard deviation, which offers a quite large variation to investigate the relationship of public investment and economic growth rate in the Vietnam economy.

RESULTS

The data analysis records that the fluctuation of public investment tends to follow with the pattern of economic growth rate. During the 2009Q1-2010Q3, the public investment growth rate goes up from 1% to 2%, while the economic growth rate raises from 3% to 7.5%. This positive correlation also remains for whole data sample. Especially, in 2020, when the growth rate of public investment raise from 2.7% in 2020Q1 to 7.2% in 2020Q3, the economic growth rate also tends to recover with a lag of two quarters, from 0.5% in 2020Q2 to 4.5% in 2020Q4.

For the decomposition of the public sector investment, the data shows that the public investment (government-budget investment) accounts for the largest share over the public sector investment. The share by the government-borrowing investment is the second largest while the share by the state-owned enterprises is the smallest one. Moreover, the share by the public investment tends to be stable over time. This tendency is difference to that of two other types of public sector investment: the share of state-owned enterprises tends to decrease while that of government-borrowing tends to increase over time.

Recently, the public investment is intensively employed by the Vietnam government to fight against the Covid-19 pandemic impact on the economic growth. In 2020, when the pandemic expands in Vietnam, the quarterly economic growth rate reduces sustantially: from 6.97% in 2019Q4 to 3.68% in 2020Q1, then to 0.39% in 2020Q2. This decrease is even stronger than the time period of 2009-2011, when the domestic economy is under the impact of the 2008 global financial crisis.

Within this context, to recover the economy, the domestic government has stimulated the public investment. The growth rate of government-budget investment raises from 19% in 2020Q2 to 52% in 2020Q3, before going down to 34% in 2020Q4. This increase of public investment makes a contribution on the recovery of the economy: the economic growth rate goes up to 2.69% in 2020Q1, then, to 4.48% in 2020Q4. In fact, the public investment is realized by the building up of the domestic infrastructures, such as the new highways to connect different regions. And to stimulate the disbursement of the public investment, the government usually organizes the national summit, twice a year, to discuss the solution to enhance the public investment.

CONCLUSION

The current paper analyzes the role of public investment on determining the economic growth rate by a quarterly data sample over 2008-2020. The evidence records that the public investment can make a positive contribution toward the economic growth rate in the Vietnam economy. And this role tends to be significant on the recession time period under the impact of Covid-19 pandemic.

The results uncovers that the public investment is an important policy tool to ensure and recover the economic growth rate. And this implication can be also a reference case for other developing economies, especially during the current pandemic time period.

For the future research avenue, the empirical analysis can update the data sample to observe the recent effect of the public investment, together with the state-owned enterprises and government-borrowing investment. Moreover, the case of Vietnam economy can be compared with some other economies in the East Asian region, such as Singapore and China, to provide more economic insights on the recovery of economy during the pandemic Covid-19 time period.

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IMPACT OF ARTIFICIAL INTELLIGENCE ON HR PRACTICES IN INFORMATION TECHNOLOGY COMPANIES

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ABSTRACT

This study explores the current use of artificial intelligence (AI) in HR practices. This study investigates the potential adoption areas explicitly for tools across training and development for artificial intelligence. The existing literature was broadly surveyed to recognize potential AI-application areas supporting the training and development program to accomplish that purpose. The technique used in the current study is a systematic literature review covering training & development. The studies were investigated using keyword searches such as, "artificial intelligence" and "training & development" from the selected databases, including Science Direct, Emerald, and Google Scholar. The current study results revealed that artificial intelligence is positively related to training & development. Most organizations' acceptance of these AI tools will generally be bigger, tech-focussed, and innovative practices. But, still many organizations still can't seem to arrive at an overemphasis point as they presently show unwillingness toward putting resources into that innovation for better training & development programs. Because of the qualitative and subjective nature behind the research, this review shows a lot of subjectivity, and consequently, needs generalisability. Regardless of this constraint, this review makes way for some changes for scholarly investigation, both subjective and quantitative. This paper tends to the gigantic exploration hole encompassing AI in training & development, relating explicitly to the shortage and low quality of the current academic literature.

Keywords: HR Practices, Technology, Development, Innovation, Performance management

INTRODUCTION

The world is continually becoming more inclined to innovation because of globalization which infers organizations need to keep awake to date to be economical. Human Resource Management (HRM) is a higher priority than ever, particularly with an emphasis on recruiting fresh individuals who will carry abilities and information to an organization (Bhalgat, 2019). Data-driven technological developments also come the valuable chance to smooth out exercises that must be done by people beforehand. Accordingly, it is of the most tremendous significance to contemplate and assess the effect of innovation on human resource practices (Davenport & Ronanki, 2018). The primary purpose of this paper is to explore the consequences that innovative headways, specifically Artificial Intelligence (AI), impact on Human Resource Practices (HRP)

In the present globalized world, already existing standard methods of leading business are being tested. There could be, as of now, not just nearby firms as competitors. However organizations need to contend continually worldwide as innovation makes the world more modest (Erixon, 2018). This infers that accepting these new technological developments is critical for an organization to keep awake to date and maintain an upper hand. At present, HRP is done for the most part by a workforce that examines every one of the sources to track down competitors (Stuart & Norvig, 2016; Bhardwaj *et al.*, 2020). As people have restricted capacities, staying aware of the relative multitude of fundamental assignments is undoubtedly not simple work and typically requires bunches of committed time from each recruiter (Kaplan, 2016).

The issue recognized is human restrictions, for example, tendencies, expectations, and time limitations, which can frustrate how successful a recruitment process (McRobert *et al.*, 2018). This is an issue as it, thus, recruitment process, delay in T&D, inefficient assessment of employee performance, helpless pay the

executives, and money monetary value (Baron *et al.*, 2018). It has been distinguished that the strategies for exploring innovation-based HRP are missing and come behind the current practice. Thus more top to bottom experimental examinations should be directed in the future concerning innovation, permitting more adaptability and preferable access over previously. Notwithstanding, quite a while later, a similar issue is still here (Samarasinghe & Medis, 2020). The current literature is deficient regarding the new innovation-based HRP that should be satisfied. What's more, the implications of recent advancements for HRM are still in some way indistinct for managers and pioneers whether these new and effective innovations involve difficulties or open doors (Stone *et al.*, 2015; Bondarouk & Brewster, 2016).

The present literature is deficient regarding a similar issue as during the 2000s. A more inside and out comprehension of the theme should be led with the genuine innovations being a piece of the HR Professional's everyday work (Tambe, Cappelli, & Yakubovich, 2019). In today's intuitive organizations, HRM & HRP are enormously impacted by data innovation (Albert, 2019). To recover hierarchical information from human information, Artificial Intelligence assumes an imperative part. Implementation of advanced and robust HR practices to take down the market rivalry can be satisfied by trend-setting innovation like Mechanization, Amplified Intellect, Automation, which helps redesign their personnel (Stuart & Norvig, 2016; Reilly, 2018). The effect of AI has four folds; the first is consumer loyalty, which promotes organizational success. Until we prepare our workforce to absorb system language to build the nature of client support up to that point, purchaser assumptions and fulfillment can't be satisfied. The second zone is the process of recruitment, where AI can be utilized in various ways to work on the general results. The following viewpoint can associate with developmental programs. In this manner, to oversee worldwide rivalry, our HR ought to be prepared to the point of managing innovative techniques because mechanization upholds innovation (Davenport & Ronanki 2018; Rana, 2018).

Organizations have shifted information creating consistently, so the time has come to utilize data recovered from information investigation. A few difficulties in HR practices because of information science are broad HR peculiarities, and there are numerous restrictions because of little informational collections (Ved, Kaundanya, & Panda, 2016). The motivation behind this study is to investigate the present status of AI and its influence, application, and approach on traditional HRP. Factors influencing AI innovation have on HRP and would be generally valuable in the HRP (Kaplan, 2016). Influential application of Artificial Intelligence on HR practices depends on how the future workforce investigates its potential explicitly in the IT industry in India. To display the problem statement, the accompanying inquiries are sufficient to incorporate a structure for the effective execution of Artificial Intelligence on Human Resource Practices.

Research Questions have been developed in this study to explore, understand, and collect relevant data from summarizing the influence of Artificial Intelligence on Human Resource Practices.

RQ. 1. What is the present state of AI in the HRP?

RQ. 2. To what extent has the management implemented AI into HR practices?

LITERATURE REVIEW

The idea of AI is one of the most significant innovative areas in recent technology, science, and engineering contemplated since the Second World War (Tecuci, 2012). The name of AI was checked in 1956 (Stuart and Norvig, 2016). AI is similar to many strategies that permit computers to achieve tasks that somehow require the thinking abilities that human knowledge brings (Salin and Winston, 1992; Nilsson, 2005). Inferable from the boundless limit and uses of AI, organizations' HR processes and functions have embraced Artificial Intelligence in their processes (Davenport & Ronanki 2018; Rana, 2018). Amazon, Apple, Google, Tesla, IBM, and so on are involving Artificial Intelligence in their HR techniques that tackle issues of employees connected with HR creatively (Aspan, 2020). In addition, reluctance is noticed for the transformation and venture of AI in organizations that are working organizations around the world (Brin & Nehme, 2019).

RECRUITMENT & SELECTION

Acquiring and retaining competent skill people in an organization is a critical task, and it is a challenge to many organizations. Because of the significant human resource has for the organizations, the recruitment process that how these assets are acquired is the way to progress (Kok and Uhlaner, 2001). Significant parts of HRM and innovation can be consolidated in later years because of the motorized fluctuations and investigation. Generally, studies are directed at the way that the process of recruitment can be flatter and upgraded with the assistance of innovation (Galanaki, Lazazzara, and Parry, 2019). At present, the spotlight lies much further on scientific developments that help in selection representatives; Because of this, it may be expressed that the human touch in mobilization is becoming diminished (Baron, Mustafa, & Agustina, 2018; O'Donovan, 2019). Baxter (2018) attempts to anticipate the patterns that assume control over the recruitment process. He recommends analytical results to remove a portion of the speculating in recruitment; however, he likewise raises AI as an apparatus that will be utilized when meeting competitors (Aspan, 2020; Upadhyay & Khandelwal, 2018). This proposal expects to investigate the part of one of the more up-to-date advances: Artificial Intelligence.

TRAINING & DEVELOPMENT

Creating career improvement and development plans prompts further developed results and less truancy because of employees' requirements (Coley et al., 2019). Likewise, one new kind of preparing and improvement method worked with by AI is developing specific employee plans. Training and tutoring are one more significant capacity of HR, which is least conceivable to be supplanted by AI (Galanaki, Lazazzara, & Parry, 2019). The versatile mentor is the kind of programming that helps workers comprehend their necessities and foster tweaked preparing and advancement programs to the workforces (Yuldoshev *et al.*, 2018).

The workforce creates a ton of judgment and mental characteristics because of the conduct, proficient information, and appearance of preparing speakers (Samarasinghe & Medis, 2020). Notwithstanding, an intelligent machine has better soundness to the brain science of neighborhood people, and it was challenging to deliver threatening effect. Artificial intelligence can be utilized preparing as featured experts of great business preparing (Kaplan, 2016). Through AI, an individual can investigate distinctive proper models for big businesses preparing to utilize a lot of data information. Yet, further can notice and adjust the preparation circumstance of employees (Pandey *et al.*, 2020). The mediation of Artificial Intelligence can't only supplant the coach as the featured expert and upgrade the preparation impact, but it can help HR prepare employees. Despite what is generally expected, AI can likewise play a prepared, maid, and advantageous job; along these lines, every individual has an Artificial Intelligence coach, with a blend of privately modified mentors. It saves the expense significantly yet additionally improves the organization's effectiveness.

PERFORMANCE MANAGEMENT

There are a few components elements, and assessing it accurately for a more significant part of occupations is very complex (Pfeffer & Sutton, 2006). For example, evaluation of performance scores is the most generally utilized measurement of legitimacy issues and unwavering quality just as for bias. A large portion of the businesses is offering them all in all (Cappelli et al., 2018). Any legitimately troublesome occupation is connected with different positions and; henceforth, individual execution is confounded to unfasten from bunch execution (Eriksson & Pesämaa, 2007).

Conservative performance management has the effect of manner and causal relations among workforces because of the enthusiastic abstract trade between people; in this way, the performance appraisal process can't be unbiased (Younis, and Adel, 2020). Simulated intelligence precisely and impartially records information to relieve the day-by-day exhibition evaluation blunders brought about by the mental workers' misfortune (Coley et al., 2019). What's more, examining big business improvement status information, metropolitan advancement status, and industry performance information can make man-made brainpower foster a reasonable and objective presentation evaluation framework to figure out performance standards (Anagnoste, 2018). Besides, it tends to be fitted employing information investigation with the goal that the exhibition of the whole

organizations is not generally coagulated, more agreeable for employees, more functional, improve the excitement of employees, and moderate the insignificant expense of big business misapplication (Haenlein & Kaplan, 2019).

METHODS & DISCUSSION

In this section, suitable research methods, proposals, and approaches are chosen in light of the necessities of the study. In the present study, positivism research theory has been selected for the convenience of current advances like AI in HRP. With the support of positivism, we gather suitable real information about present-day innovations and recruitment. The existing literature was broadly surveyed to recognize potential AI-application areas supporting the training and development program to accomplish that purpose. The technique used in the current study is a systematic literature review covering training & development. The studies were investigated using keyword searches such as "artificial intelligence" and "training & development" from the selected databases, including Science Direct, Emerald, and Google Scholar. The current study results revealed that artificial intelligence is positively related to training & development. Most organizations' acceptance of these AI tools will generally be more considerable, tech-focussed, as well as inventive practices.

A deductive approach has been selected for this dissertation. The research began by first formulating the hypothesis that Artificial Intelligence is playing a vital role in the modern-day recruitment process at an organizational level (Thomas *et al.*, 2015). The hypothesis will then be tested by gathering data relevant to the research to prove whether the theory is correct. Furthermore, the study's prominent theoretical aspects would help establish abundant data for active synthesis and analysis.

To assess the genuineness of a particular research study, it is similarly vital to arrange the arranged undertaking in a successful way that would help in the deliberate fulfillment of the previously mentioned objectives and targets of the specialist that the review plans to discover. Thomas *et al.* (2015) proposed that research methodology is the bit by bit manual of the sequenced tasks that are similarly huge in finishing the exploration study inside the specified period. Likewise, the examination methodology is a game plan that gives an extra course to create practical realities and ends (Kaplan, 2016; Bothma, 2018). Also, the legitimate sequencing of additional assignments in the research concentrates on bits of help in keeping away from undesirable postponements at the appointed time of the review.

Artificial intelligence not simply facilitates yet empowers the work employing AI calculations and apparatuses (Pathak and Solanki, 2021). It further helps with choosing the best plan straightforwardly, offering the employees an endeavor, and causing the two sides to foster a good work relationship under reasonable and objective conditions. Simulated intelligence has made more sure proposals and coordination for improving organizations and employees' career planning (Bothma, 2018). The sound culture of employee work relations can't simply work with organizations in decreasing the expense endured by work questions. It can also find out an incorporated employee's corporate culture so that the corporate culture can assume a social part with the assistance of AI (Coley *et al.*, 2019).

Stuart & Norvig (2016) Additionally, distinguishing proof of the dumps in the current snippets of data, in this manner giving a solid edge to the investigation. As avowed by Venable *et al.* (2016), the assessment of additional novels in the current bits of writing helps investigate the noticeable danger factors in propels, consequently giving an unmistakable personality to the current review (Bothma, 2018). The secondary data collection process realizes all the secondary data sources that incorporate books, paper, magazines, diaries, journals, online entryways, etc. Due to the powerful presence of information in an assortment of assets, one of the most concerning issues that the research needed to look at at the appointed time of the review was, choosing the proper arrangement of secondary data sources for the further investigation of realities.

CONCLUSION

This study aims to give the exploration foundation, research background, and purpose of the relationship between human resource practices and artificial intelligence in today's world. The outcomes show that AI in

HRP is somewhat new, and there are very few organizations that use AI in major channels to progress better results in HRP. The most prerequisite areas to execute AI in HRP are the traditional recruitment process, training and development, and performance management system. The fundamental advantages of AI were viewed as the speeded quality, accuracy, transparency, unbiasedness, and end of common these elements make overall readiness towards new technologies. All in all, the discoveries have shown that removal of routine assignments and speeded quality was the fundamental advantages brought by AI. Similarly, lack of training and technological readiness was the main challenges. AI is expected to replace authoritative tasks in HRP, which will interfere with managers' inputs and organizational outcomes.

LIMITATIONS

The present study has many limitations that can be addressed in future studies. The current research is wholly grounded on the systematic literature review and upcoming research investigations' necessity to empirically test the connection between Artificial Intelligence and Human Resource Practices. Future research investigations should explore the other possible outcomes of AI on HRP. Since this study aims to examine the influence of AI on HRP, the exact data obtained during the secondary data collection was restricted to organizations using AI to some extent in their human resource practices. Subsequently, the researcher does not collect any primary data from concluding the general understanding of the phenomenon of AI on HRP.

Future studies may determine the mediating role of Artificial Intelligence and Human Resource Practices. Grounded on the systematic review, researchers have charted a few breaks in the literature that heaps additional consideration. AI as a construct has increased significant concern from both researchers and academicians. Nevertheless, the consequences of AI need further investigation. There is a lack of agreement about AI's probable effects, and researchers have used AI both as a dependent and an independent variable in their research. Other studies have recycled AI as a predictor and a mainstream of the research use AI as an outcome. There is enough space in the room to progress some influencing variables on Artificial Intelligence and Human Resource Practices.

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**EFFECT PERFOBOND RIB CONNECTOR ON SHEAR BEHAVIOR OF STEEL TUBE
COMPOSITE BEAMS UNDER PUSHOUT TEST**

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ABSTRACT

The shear connector is one of the main parts in composite steel-concrete structures that resist horizontal shear and vertical uplift forces. One of the common connector types is the perfobond rib, which is mainly used in composing steel girders in bridges. The load-slip behavior has a significant effect on the composed section. In the current work, three specimens of pushout models were experimentally investigated; the results showed that the filled beam had enhanced the strength by 14%, while suitable modifying the concrete properties should follow increasing the interface of concrete slab and beam. The test results were compared with the predicted shear strength found in the literature. The comparison showed that some of the introduced equations in literature overestimated strength, and others underestimated. Moreover, it is concluded that some parameters are omitted in the proposed equations.

Keywords: pushout test, composed steel girder, perfobond rib connector, shear connector, and shear strength

ÖZET

Kesme bağlantısı, kompozit çelik-beton yapılarda yatay kesme ve dikey kaldırma kuvvetlerine direnen ana parçalardan biridir. Yaygın bağlantı tiplerinden biri, esas olarak köprülerde çelik kirişlerin oluşturulmasında kullanılan perfobond nervürdür. Yük kayma davranışı oluşan kesit üzerinde önemli bir etkiye sahiptir. Mevcut çalışmada, üç örnek itme modeli deneysel olarak incelenmiştir; Sonuçlar, dolgulu kirişin dayanımı %14 artırdığını, buna karşın beton özelliklerini uygun şekilde değiştirmenin, beton döşeme ve kiriş ara yüzünün artırılmasını takip etmesi gerektiğini göstermiştir. Test sonuçları literatürde bulunan tahmin edilen kesme mukavemeti ile karşılaştırıldı, karşılaştırma literatürde tanıtılan bazı denklemlerin mukavemeti olduğundan fazla, diğerinin ise olduğundan az tahmin edildiğini gösterdi. Ayrıca önerilen denklemlerde bazı parametrelerin ihmal edildiği sonucuna varılmıştır.

Anahtar Kelimeler: itme testi, çelik kirişten oluşan, perfobond nervürlü bağlayıcı, kesme bağlayıcısı, kesme mukavemeti

INTRODUCTION

A composed steel beam and concrete deck slab system is widely used in bridges and other structural construction. The interface between the deck slab and the steel beams is subjected to high forces that develop

a certain amount of slippage. A shear connector is an important part that should be used; in turn, the efficiency of the composing action is based on that connector because the connector is used to resist the horizontal shear and the vertical uplift forces [1]. There are many types of shear connectors such as Leonhardt’s Perfobond, Perfobond, Crestbond, and studs [2] [3], the most common type is the headed stud that many studs have to weld in one intensive area of high shear. However, these connectors need a long time to construct and obstruct the rebar arrangements [4]. Therefore, the perfobond rib connector is proposed to be a good alternative. A perfobond rib is a steel plate with a number of holes that are welded to the beam’s flange. The reinforcement bars pass through it, the number and diameter of these holes is the main parameter that affects the ultimate strength of the shear connector model [5]. Perfobond rib is easier in installation, has adequate shear force resistance, and has higher fatigue and stiffness resistance [6] [1].

Many equations were proposed to estimate the pushout perfobond ribs’ shear strength. Oguejiofor and Hosain [7] assumed that the strength depends on the effect of reinforced concrete slabs, the effect of the properties of the transverse bars, and the effect of dowel action of the holes. They proposed Equation 1. It is shown that the calculated strength due to Equation 1 was optimistic higher than the experimental strength in the current work by seven times. The two terms in Equation 1 assume that the spalling is resisted by the whole portion of concrete that is overestimated.

$$Q = 0.59 A_c \sqrt{f'_c} + 1.233 A_{SX} f_y + 2.871 n d_{rib}^2 \sqrt{f'_c} \tag{1}$$

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Therefore, Oguejiofor and Hosain [8] revised the first term in Equation 1, the spalling resistance was considered, and the effect of rib dimensions was included, as depicted in Equation 2.

$$Q = 4.5 h_{rib} t_{rib} f'_c + 0.91 A_{SX} f_y + 3.31 n d_{rib}^2 \sqrt{f'_c} \tag{2}$$

.....

Yoshitaka et al. [9] compared the effect of increasing the rib thickness. They found that two different failures can happen in the area surrounding the steel strip; for a thin strip, a tension failure can occur, while a shear failure can occur in specimens with thick strips. They introduced their equation (Equation 3) on these two assumptions.

$$Q = 1.45 [(d_{rib}^2 - d_b^2) f'_c + d_b^2 f_y] - 26.1 \tag{3}$$

.....

Sara and Bahram [10] proposed Equation 4 that included the effect of the interface area as an additional parameter to Equation 2. Moreover, a significant modification was applied to the other terms.

$$Q = 0.747 H_{slab} h_{esc} \sqrt{f'_c} + 0.413 b_{beam} L_c + 1.66 n \pi \sqrt{f'_c} \left(\frac{d_{rib}}{2}\right)^2 + 0.9 A_{SX} f_y \tag{4}$$

.....

Where; Q is the shear capacity at the shear connector (N), f'_c is the compressive concrete strength (MPa). A_c is the shear area of the concrete slab (mm²). Where the A_{SX} is the area of the transverse rebars in the rib holes (mm²), f_y is the yield strength of the transverse rebar (MPa), n is the number of rib holes, d_{rib} is the diameter of the rib hole (mm), and h_{rib} is the height of the rib (mm). Where t_{rib} is the thickness of the rib (mm), d_b is the bar diameter (mm), while L_c is the contact length between the concrete slab and the steel beam flange (mm).

The behavior of the shear connector is assessed by a pushout test method. The forces proposed to control the connector are concrete end-bearing resistance, dowel action, and transverse rebars in the rib holes [1].

EXPERIMENTAL WORK

A. Specimens dimensions and test setup

The experimental program involved the testing of three pushout specimens. Each sample comprised three main parts, one steel beam and two reinforced concrete slabs of 500 mm length and two different widths. The rectangular steel beam was fabricated from a mild steel sheet of 4 mm thickness. The sheet was cut and then bent to form the two flanges of the beam and single web. A strip of length equal to the remaining web width was cut, then the two parts were tack welded with a single bevel butt weld, as shown in Fig. 1. Ribs of 450 mm length and 50mm width were welded to both sides at the center of the beam's flanges, six holes of 8 mm were punched to allow the transverse rebars to pass through it. Two beams (R1 and R2) were infilled with lightweight concrete (LWC) to mimic the loaded flexural members, while a reference beam (R0) was kept hollow, the LWC was filled in layers that vibrated from in and outside via a poker vibrator. The second and third parts of the pushout test specimens were two slabs of normal concrete. Both slab thicknesses were 75mm for all samples, while the slab widths (380 and 400mm) varied based on the beam's flanges width. So the wings of 150mm were guaranteed. The length of the slabs was 500 mm. The three parts were connected, so a 50 mm gap between the ends of the slabs and steel beam was earned. The slabs were reinforced with double layer conventional reinforcement of diameter 6mm in each direction Fig. 2. The numbers of transverse and longitudinal rebars were (6 and 5) respectively, the reinforcement was laid so that 15 mm concrete cover was obtained.

The specimens of pushout were supported by stiff area from the two edges of the slabs while the load was applied at the edge of the steel beam in monotonic increasing rate up 4 to failure. Fig. 2 shows the test setup. The loading rate was 1 kN/sec via a loading machine of 200 ton-force capacity.



Figure 1. Hollow steel tube and typical pushout specimen

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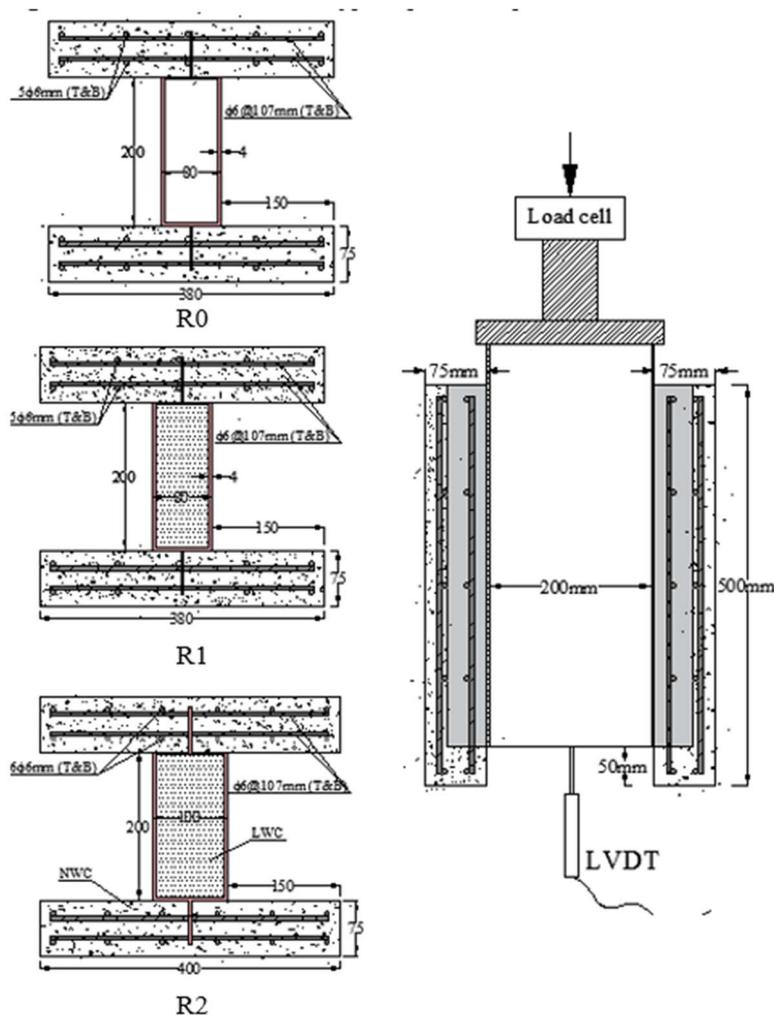


Figure 2. Hollow steel tube and typical pushout specimen

B. Mixing proportion and mechanical properties

As mentioned in the previous section, two types of concrete were used, normal-weight concrete was used to construct the two slabs, and lightweight concrete was used to infill the steel beams. For the two mixes, Ordinary cement (type I) was used. Moreover, local natural sand graded conformed to ASTM C330 was used as a fine aggregate, while natural gravel with a maximum size of 10 mm was used as coarse aggregate for the conventional concrete. However, lightweight coarse aggregate that conformed to ASTM C330 of Clay Lumps and Friable Particles that decreases the weight of the produced concrete was used as coarse aggregate in LWC.

The average of three standard cylinders of 150×300 mm was evaluated to overcome the expected error in such a test. In the first set, standard cylinders were subjected to uniaxial compression load to assess the concrete compressive strength (f'_c) according to ASTM C39. More other three cylinders were subjected to indirect splitting load to evaluate the concrete tensile strength (f_{ct}) according to ASTM C496.

All casted specimens and cylinders were kept under laboratory conditions for 24 hours. Then the pushout specimens and the associated cylinders were removed from their molds and cured in water pools for 28 days so that both beams and cylinders were exposed to the same curing conditions. Low strength concrete was used for both LWC and NWC to include the effect of high drying shrinkage. Therefore, the NWC mix was designed to achieve a 28-day compressive strength (f'_c) of 25 MPa, while the strength of the LWC was designed to be 15 MPa. The materials' proportions for the two mixes are summarized in Table 1.

Table 1. Materials Proportions

Mix	C	S	NG	LG	HWR	W/C
LWC	1	1.75	-	0.5	0.4%	0.3
NWC	1	1.875	2.75	-	0.1%	0.33

The C represents; cement, S; sand, NG; natural gravel, LG; lightweight gravel, HWR; high water reducer; and W; water.

The f'_c and f_{ct} were evaluated under the standards mentioned provisions; the ratio of f_{ct} to the f'_c depends upon the magnitude of the concrete strength. Where the higher f'_c , higher f_{ct} but the rate of increase of f_{ct} is of decreasing order. The f_{ct} of the concrete is more sensitive to curing than the f'_c . The f'_c of LWC was less than that of NWC by 29%. Moreover, the tensile strength of the LWC was less than that of NWC by 31%. The proportion of the $k = \frac{f_{ct}}{\sqrt{f'_c}}$ For LWC and NWC were 0.38 and 0.32, respectively. Table 2 shows the f'_c and f_{ct} for both LWC and NWC.

Table 2. Details of the specimen

Sp.	Type	f'_c (MPa)		f_{ct} (MPa)		P_u (KN)	δ_u (mm)
		LWC	NWC	LWC	NWC		
R0	hollow	-	27.2	-	2.0	186	9.2
R1	filled	19.2	27.2	1.4	2.0	212	14
R2	filled	19.2	27.2	1.4	2.0	167	16

The failure mode of the standard cylinders was investigated. It is found that the failure of cylinders under splitting load was due to the crashing of the lightweight aggregate for LWC, while the NWC cylinders were failed due to matrix cracking. The crack patterns of the cylinders confirmed this mode under uniaxial load, where the cylinders of LWC were damaged at the half that was exposed directly to the moving machine plate. This means that the compression stress was slowly transformed from the contact surface to the middle of the cylinder. At the same time, the NWC cylinders show cracked approximately equally around the cylinders.

Experimental results and discussions

A. Push out strength

The shear strength (P_u) of the pushout specimens were tested in a universal machine of 200 ton-force capacity. Because estimating the ultimate shear strength of the perfbond rib is difficult [1], monotonic loads were applied up to failure. Centric slip (δ_u) between the steel beam and the concrete slab was investigated using LVDT installed at the center of the steel beam.

The experimental results showed a significant effect of the infilled concrete in the beams. Comparing the pushout strength between the hollow beams (R0) and the filled specimen (R1) showed an increment in the shear strength by 14%. Although the contact area was increased by 25% in R2, the surprising results were the decay in the shear strength compared to R1. The decay was 21%. Table 3 lists the expected shear strength and corresponding slip for the tested specimens.

The shear strength of the perfbond connector was calculated according to equations listed in Section 2 that were found in the literature. Therefore, it is deemed appropriate to say that the mentioned equations 1, 2, and 3 were highly optimistic, while Equation 4 was pessimistic, as shown in Table 3, which is underestimated the ultimate shear strength limited to the result of the current work. In addition, the effect of infill concrete and the interface between concrete and beam were not considered in the first three equations, while the infill effect is missing Equation 4 so that the local buckling of the steel beam is omitted.

Table 3. Comparing the test results with predicted shear strength found in the literature

Spec.	PEXP (KN)	PEq.1 [7] (KN)	PEq.2 [7] (KN)	PEq.3 [9] (KN)	PEq.4 [10] (KN)
R0	186.6	954	1037	580	107
R1	212.8	954	1037	580	107
R2	167.0	954	1037	580	107

B. Failure mode

Chug et al. [6] reported three failure modes of the pushout specimens that can be categorized. The first is related to the shear connector. This failure can be occurred due to the low size of connectors and high size and strength of concrete. The second failure is occurred due to low concrete strength, while the third failure can be occurred due to a quasi-balance between concrete strength and rib size. For perfbond connectors, the second mode is common, and this is because the contact area is wider than in other shear connectors. According to the test conducted in the current work, the perfbond rib shear connectors showed the second failure mode, which is the failure of the concrete slab. Representative crack patterns are shown in Fig. 3. R1 and R2 show longitudinal cracks along with the slab up to 400mm. While shear cracks occur from the end of the connector forward to the end of the slab, these cracks were developed due to high shear stresses that transferred from the center of the slab at 50mm from the end to the two supports. For the hollow beam R0, different cracks were shown, no longitudinal cracks appeared, however, inclined bearing cracks at the area above the supports were another cracks that developed, and this is due to high stress at supports.

**Figure 3.** Crack pattern

C. Load-slip relation

The relation between the applied load and the slip was investigated; the results showed that after reaching the ultimate strength, all specimens were failed suddenly, and there were three stages before peak strength because the specimens comprised many parts that sequentially failed, Fig. 4. However, all specimens behave elastically up to 24%, 55%, and 21% of ultimate shear strength of R0, R1, and R2. The small concrete dowel still resists the shear stress-induced from the applied load; the concrete dowel resistance is relatively small and limited by concrete strength. Hence, losing this action increased the slip rate under load applied. Meanwhile, shear stress and a moment along the steel-concrete interface were induced. Different load transferring at the ends of the two edges of the beam flanges were developed, the strut stresses at these points increased, and the cracks were spread toward the supports and provided a new increment slip rate, depending on the concrete strength. Increasing the interface area negatively acted on the load-slip curve where R2 shows separation in the curve with a short plateau. However, R2 was more ductile than the other two specimens.

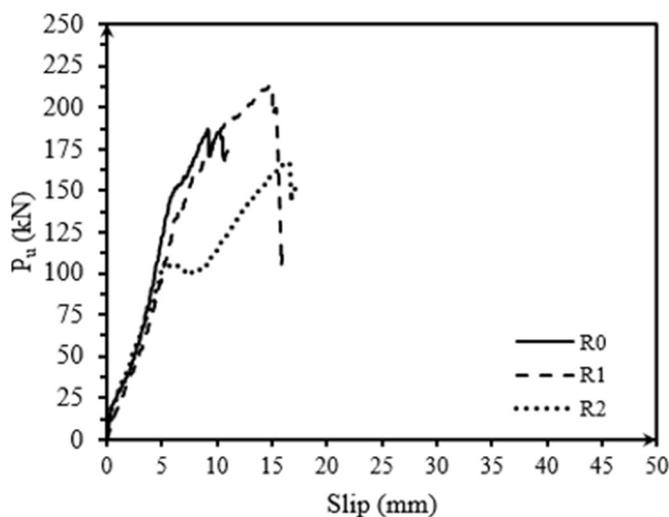


Figure 4. Load-slip relation of the pushout tested specimen

CONCLUSIONS

Based on experimental work and comparison, the following conclusions can be drawn limited to the current paper;

1. Beams in the pushout test model infilled with concrete significantly improved shear strength and ductility compared to the hollow beam. However, increasing the load resistance and ductility is followed by a high chance to segregate the two parts. Therefore, the shear connector is essential in resisting the high shear produced in the slab and beam interface.
2. The most common failures in pushout tests with perfobond ribs connectors are longitudinal shear cracks, end tension cracks, and local cracks at the supports. All failures are due to the concrete bearing.
3. Increasing the interface area between concrete and beams flanges negatively affected the ultimate strength of the pushout specimen if other parameters were not adequately chosen.

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**USING THE SWOT APPROACH FOR EFFICIENT MANAGEMENT OF A CEMENT PLANT
STUDY OF THE HAMMA BOUZIANE CEMENT PLANT IN CONSTANTINE, ALGERIA**

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ABSTRACT

All companies have forces that increase their market opportunities. However, supply chains are increasingly exposed to a variety of risks. These risks can be considered weaknesses and threats that reduce its market position. Therefore, it becomes necessary take a comprehensive look at all internal and external resources and threats to support a company's satisfactory commercial activities. Indeed, Algerian companies are no exception. They always aspire to progress and develop in a market economy and to open themselves to the world market. Our current work is aimed at identifying all factors involved in commercial decision-making. The working method used is the technique of interviews with the actors of the study company and field observation in order to obtain a clear vision of the situation while using the SWOT approach. This strategic assessment allows decision-makers to have a better idea of their company's activity, and thus detect and correct risks, or even engage in a process of continuous improvement. This approach aims to improve the company's operations and sustainability. As a case study, we chose the Hama Bouziane cement plant in Constantine, located in Algeria.

Keywords: Cement plant, SWOT, sustainability, risk, opportunities, threats.

INTRODUCTION

Today, companies have a great interest in their development, as well as in acquiring all the standards that make their position at the highest level. Indeed, the continuity of productive companies depends on their ability to market their products and meet the wishes of their customers; it depends on the availability of products on the market in the right place and at the right time, as well as the price / quality ratio. All companies have potential forces that increase their market opportunities. However, supply chains are increasingly exposed to a variety of risks (Kleindorfer and Saad, 2005; Tang, 2006). These risks are often closely linked to profitability, growth and customer satisfaction (Chand et al, 2017). These risks can be seen as challenges and negative factors that reduce its market position. As a result, it becomes necessary to manage these risks and overcome them so that the company does not miss its objectives (Besma et al, 2021; BESMA and RACHID, 2021). Thus, the assessment and diagnosis of the business situation is necessary to support the satisfactory commercial activities in any company. Managers will need to identify all factors that may have a positive or negative impact on the progress of their business program and Algerian companies are no exception. Indeed, Algerian companies still aspire to progress and develop in a market economy and open themselves to the world market. To exhaust our theoretical knowledge, we chose a cement production sector known for its various advantages and risks and, as a case study, we chose the Hama Bouziane SCHB cement plant in Constantine, located in Algeria. The cement plant is a manufacturing company. This company is one of the cement producers that supplies its products locally and regionally, created to meet the growing needs of the national cement market and help

reduce speculation. This to meet our expectations, we try through this study to answer the following questions, in particular:

- What factors can strengthen the SCHB cement industry program?
- What are the challenges and factors that may adversely affect the achievement of the objectives of this company?

METHODOLOGY

The main objective of this work is to answer the questions asked above. The most appropriate tool for this type of question was the SWOT method (Figure 1). It is a tool for strategic assessment of the situation of the company. The quality of this work depends on the information collected about the company in a qualitative way (Bolarinwa, 2015). This method allows us to access the real data of the system, where it allows companies to develop an action plan that meets the expectations of promising companies. For a safe assessment and a clear view of the company's situation, interviews with the company's stakeholders were used. This allowed us to make the right decisions, even an action plan based on the reality on the ground. According to (Rowley, 2012), interviews allow for the gathering of expert opinions in different contexts. The analysis of the data collected using the content analysis technique identified by (Allard et al, 1999; Voynnet, 2004), the processing of this data obtained, allows the actors of the company to propose adequate solutions.

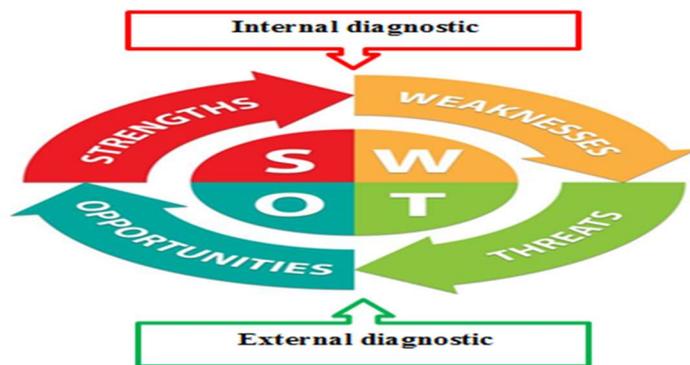


Figure1. Proposed Work Methodology

APPLICATION AND RESULTS ANALYSIS

The SWOT analysis is done through the diagnostic of internal and external data of the company. This analysis allows us to identify the company's strengths and weaknesses and thus orient the company towards successful strategies.

Internal diagnostic

Internal diagnostic is the first step in a SWOT analysis, an important source of information where it helps identify strengths and weaknesses. The company's internal factors include all available means and production tools that can be controlled by the company (Dyson, 2004).

➤ Identification of Strengths

Strengths refer to internal factors and describe what a company excels at, what puts it at the top of the market and what distinguishes it from the competition (Musanganya and Sinumvayo, 2017), are all intrinsic factors that have a positive impact.

This company has several advantages that make it strong and increase its value in the market, including:

The SCHB cement production unit is located north of the city of Constantine, which brings the unit close to the network of land, sea and air communications. In addition to being close to the network in general, it is also located in a region rich of raw materials where its power lies in the availability of an excellent reserve of raw materials. Where its semi-manufactured material is extracted from a limestone mine whose area is estimated at 129 hectares. With also a clay deposit, whose area is estimated at 138 hectares. These two mines supply the unit for an estimated 50 years with a large production capacity of 3000 tons per day. It is also characterized by human capacities made up of competent workers, and the proof is the sustainability of this institution and the achievement of good results, since it has 480 workers.

The company’s product is characterized by quality requirements. In recent years, the company has focused on integrating environmental and social dimensions into product specifications by applying quality standards, and is proud to have been ISO 9001 certified since 2008. In doing so, the company seeks global leadership in quality and brand recognition. Its slogan is continuous improvement and sustainability.

Another one of SCHB cement production unit’s strength is the only factory in Algeria that markets 16 kg of bags, which gives it a competitive advantage.

Another strength that has helped SCHB is highly rated relationship with their clients where the establishment seeks to develop relationships with its clients on an ongoing basis and to listen to them in order to meet their needs.

➤ **Identification of weaknesses.**

Weaknesses also refer to internal factors that prevent the Organization from functioning well and from fulfilling its mission (Dyson, 2004). These factors need to be worked on and improved in order for the company to remain competitive in its field

Looking at the company system, it is included: A major weakness that SCHB is facing right now is this unit is largely affected by numerous failures and breakdowns in production equipment, the majority of which are in the aging phase. As well as a lack of maintenance and upkeep skills, as with the option of early retirement, relevant staffs have retired especially in the event of breakdowns and the use of foreign specialists is a major weakness to the company. Once another competitor settled in. Also the working methods used are very old and it is still monotony that reigns. This influences innovation and development. It should also be noted that there is no incentive among workers, lack of a chip leader to introduce new ideas and change working methods. Although all the company’s interests benefited from information systems, it did not play the role of accelerating operations, eliminating errors and reducing paper use. As regards to the distribution policy, the product benefiting from a limited distribution where This company relies on a selective distribution policy which depends on a few intermediaries and constitutes a weakness due to the lack of information from distributors of the difficulty to find suitable criteria. Another weakness is the lack of product diversity for this company.

Both strengths and weaknesses are grouped in (figure 2).

Strengths	Weaknesses
<ul style="list-style-type: none"> - An excellent reserve of raw materials - A large production capacity; - Product quality; - Human capacities made up of competent workers; - The only factory in Algeria that markets bags of 16 kg(competitive advantage); - A highly rated relationship with their clients; - Excellent strategic location and proximity to the land, sea and air communications network; 	<ul style="list-style-type: none"> - Lack of product diversity; - Frequent failures and failures of production equipment; - working methods used are very old; - Product benefiting from a limited distribution; - Lack of maintenance specialists and recourse to foreign specialists;

Figure2. The strengths and weaknesses of the SCHB cement company.

External diagnostic

The next step is external diagnostic. Since external factors are as important as the internal factors of a company’s success and distinction, external factors are all elements that have a potential impact on work, which cannot be controlled whether they are associated with an opportunity or a threat (Dyson, 2004).

➤ **Identification of Opportunities**

Opportunities refer to external factors that can help a company grow and profitable.

According to our study, some of the opportunities for this production unit have been deduced, the most important of which are: There's a strong demand for clinker from African and Latin American countries this offers an opportunity to open up to world markets. The African continent is an open market, which is an opportunity, especially given the large shortage of cement in African countries, because their countries are not going to finish cement plants because the latter require energy consumption, so the price of products will be high. Therefore, it is moving towards establishing grinding stations and importing (Clinker). The latter is high quality semi-manufactured cement manufactured according to international standards.

Another opportunity also the possibility of benefiting of the energy economy project of the University of Constantine 1 to reduce gas consumption and replace it with used oils to reduce the amount of energy and increase the volume of production at a lower cost. The money that the SCHB cement plant will save will increase the company's competitiveness.

➤ **Identification of Threats**

Threats indicate adverse factors that may affect a company's objectives and sustainability in the absence of an organization response.

Several threats were detected during our diagnosis. These threats affect the company’s operations as they are considered sources of risk that may impede the achievement of the organization’s objectives. Although SCHB has a large market Algerian share in the cement industry it still faces major threats from its competitors in terms of product diversity and transporting products to customers while granting them numerous privileges. High prices of strategic equipment can also be seen as a threat, another constraint arose in the route to arrive at the factory. The difficulty of reaching the plant when trucks pass over one of the hills has become a concern for customers and they prefer to go to factories with easily accessible routes. This makes it a constant threat that cannot be fully mitigated without further privileges. This company is facing lower sales and a high level of store reserve stocks given the saturation of local markets; this is a major threat to SCHB. Another threat also is freezing projects in sectors related to construction as a result of the financial and health conditions; finally Lack of competition in product prices similar to that in world markets is an obstacle to export.

Both opportunities and threats are grouped in (figure 3).

Opportunities	Threats
<ul style="list-style-type: none"> - Strong demand for clinker from some African and Latin American countries (The possibility of exporting raw materials (clinker)); - Possible use of the energy economy project of the University of Constantine 1 to reduce gas consumption and replace it with used oils to reduce the amount of energy and increase the volume of production at a lower cost; 	<ul style="list-style-type: none"> - Competitors in the same field; - High prices of strategic equipment; - Difficult access to the factory due to a hill; - Decrease in demand compared to supply; - Saturation of local markets; - Lack of competition in product prices similar to that in world markets is an obstacle to export; - Freezing projects in sectors related to construction as a result of the financial and health conditions;

Figure3. The opportunities and threats of the SCHB cement company.

SWOT matrix of the SCHB cement plant

Both the internal and external diagnoses are grouped in the form of a SWOT matrix (figure 4).

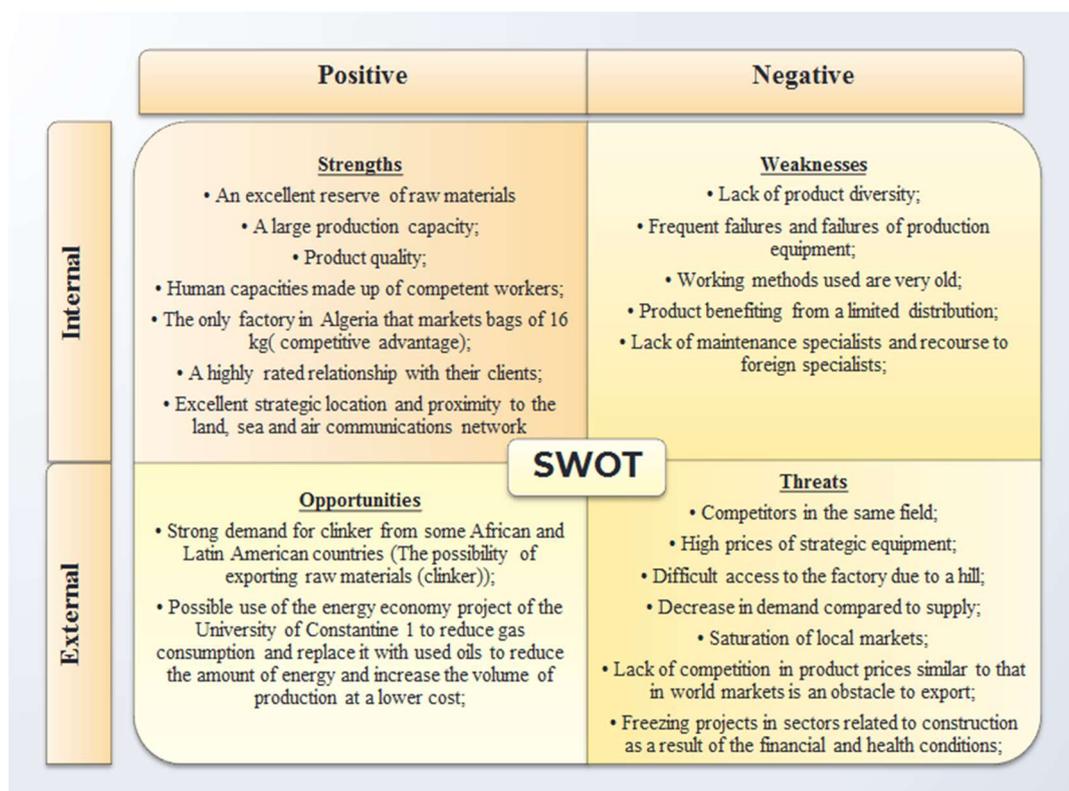


Figure4. the SWOT matrix.

Strategies and Clarification to be implemented using SWOT matrix

Based on the results of internal and external diagnosis, different strategies and guidance could be developed to address business and sustainable development issues were consistent with the literature (Musanganya and Sinumvayo, 2017) including :

- **Strengths / opportunities:** strategies seek to support fixed assets within the system and pursue external opportunities.
- **Strengths / Threats:** This type of strategy focuses on combat threats in the external environment through the use of strengths.
- **Weaknesses / opportunities:** strategies emphasize restructuring the Organization and overcoming weaknesses by taking advantage of opportunities.
- **Weakness / Threats:** strategies establish a plans to prevent or even reduce internal risks to avoid the severe effects of external threats.

CONCLUSION AND RECOMMENDATION

This analysis shows that strategic assessment is an essential aspect of continuous improvement and helps to synthesize the situation and is a valuable measure of a company’s position. It also makes it possible to identify actions to be taken in the future. The analysis of Swot done at the SCHB cement Production Company allowed us to highlight the strengths that are at the source of a company’s sustainability. Weaknesses have also been

identified that need to be addressed that could impede the achievement of the Organization's objectives. Here, Decision makers should rely on their strength and take advantage of their opportunities to better protect against threats to the company. This analysis will allow us to better assess the position of the company towards these competitors, the national market and to increase its efficiency by identifying the most important points that characterize it. In addition, the compilation of information will thus enable decision makers to develop and provide better services to the business, as well as to manage risks and respond to threats and to achieve the desired goals and sustainability of the company. And at the end of any diagnosis, it must come up with proposals to improve, modify or overcome obstacles. And in the above, in order to address this gap and support its strengths, the following points are recommended:

- Marketing of 16 kg cement bags is a very strong point of cement production unit and is always demanded by customers, so preservation must be taken into account.
- Any company wishing to develop its position and enter the world of competition must base its procedure on information derived from the reality of the field of the company's situation;
- Employees and highly qualified workers must be selected and additional training must be put in place to improve the competence of staff;
- Strengthening of cooperation between the various actors in the company and ongoing discussion and development of working methods;
- Exploit opportunities to maintain a competitive advantage and overcome external threats affecting the smooth running of the business.
- Use of new marketing techniques to attract additional domestic and foreign market shares
- Use the expertise of the national community abroad to diversify products to counter competition;

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FOR A BETTER SYNTHESIS OF THE SITUATION IN URBAN TRANSPORT BY BUS IN THE CITY OF CONSTANTINE

KONSTANTİN ŞEHİRİ OTOBÜS İLE ŞEHİR TAŞIMACILIĞINDA DURUMUN DAHA İYİ SENTEZİ İÇİN

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ABSTRACT

In all the cities around the world, good efficiency of mobility and displacement conditioned the life of the citizen. From the historical point of view, it is through mobility across modes of transport that the human being has asserted his individualism by freeing himself from the constraints imposed by proximity. According to the foundations of sociology, it is through mobility that the transition from “community” to “society” has taken place. Among the means of facilitating mobility and travel are buses. Thus, bus travel captures most of the population’s demand for public transit in Constantine. Therefore, good use of the latter guarantees us a better quality of mobility or even makes life easier daily. This work serves to represent the service situation of urban buses in the face of the Constantines market, using one of the most effective methods to synthesize the situation, while based on statistical data and field observations.

Keywords: Urban transport, SWOT, BUS, Mobility, efficiency, Constantine

ÖZET

Dünyadaki tüm şehirlerde, hareketliliğin ve yerinden edilmenin iyi verimliliği, vatandaşın yaşamını koşullandırdı. Tarihsel bakış açısına göre, insan, yakınlığın dayattığı kısıtlamalardan kendisini kurtararak bireyselliğini ileri sürmesi, ulaşım modları arasında hareketlilik yoluyla. Sosyolojinin temellerine göre “topluluk”tan “toplum”a geçiş hareketlilik yoluyla olmuştur. Hareketlilik ve seyahati kolaylaştıran araçlar arasında otobüsler de yer almaktadır. Böylece, otobüs yolculuğu, nüfusun Konstantin'deki toplu taşıma talebinin çoğunu yakalar. Bu nedenle, ikincisinin iyi kullanılması bize daha kaliteli bir hareketlilik garantisi verir ve hatta günlük hayatı kolaylaştırır. Bu çalışma, istatistiksel verilere ve saha gözlemlerine dayanarak, durumu sentezlemek için en etkili yöntemlerden birini kullanarak, Konstantin pazarı karşısında şehir içi otobüslerin hizmet durumunu temsil etmeye hizmet etmektedir.

Anahtar Kelimeler: Kentsel ulaşım, GZFT, OTOBÜS, Hareketlilik, verimlilik, Konstantin

INTRODUCTION

The process of development and development of a city is inseparable from the history of modes of transport. Their progress had completely disrupted the layout of the city and the way of life of its occupants (DIABI, et al., 2018). The transport function is directly the reason for being urban forms. However, the effectiveness of this function faces indisputable difficulties on a global scale. These difficulties present themselves with considerable acuity and of a very different nature from one city to another. The causes remain, on their basis, identical. It is in general about a lack of harmony between urban growth on the one hand and the development of transport on the other (BELDJOUDI, et al., 2012)

The city of Constantine, the capital of eastern Algeria, has no exception to this rule. This city is one of the oldest cities in Algeria, located on a site with huge positioning qualities, which confirms more and more its strategic positioning in the heart of the Eastern region. Indeed, all the communication channels converge towards it making it very attractive and radiant. This privileged position naturally gives it a function of crossroads and a privileged place of exchanges.

Adding to this attractiveness, excessive urbanization has threatened this metropolis for years, while its urban transport is experiencing a very slow development. However, today it suffers from an immense problem related to the displacements of these inhabitants (BELDJOUDI, et al., 2012, DIABI, et al., 2018, Khaoula, et al., 2021).

Through this work, we try to highlight the efficiency of the BUS transport system, which is the most used and most criticized means in this city. We base the proposed work method on statistical data and field observations, using one of the most effective methods to synthesize and assess the current situation (kelilba and Chaib, 2021) for a better orientation of progress approaches.

METHODS

The stakes of this study will highlight the situation of the urban bus system in Constantine. To achieve this aim, we intend to establish first, an analysis of the microscopic and macroscopic scale of the system. The literature shows that SWOT analysis is often used and known for decision-making in sustainable planning issues (Solangi, et al., 2019, Wang Y, et al., 2020). The English acronym [SWOT] refers to four English terms - strengths, weaknesses, opportunities, and threats. Thus, this analysis allows the general development of the company by crossing two types of data: internal and external. The internal information considered will be the strengths and weaknesses of the company. External data will address threats and opportunities in the vicinity. SWOT is an essential tool for analysing any environment. It can synthesize the entire conceptual framework of a system. It refers to the assessment and evaluation of various strengths (S), weaknesses (W), opportunities (O), threats (T), and other factors that influence a specific topic. This tool describes systematically and precisely the scenario in which the subject is situated. It helps to plan the corresponding strategies, plans, and countermeasures, which are based on the results of the evaluation. This approach identifies factors that maximize strengths and opportunities and minimize the weaknesses and threats of the organization. It provides an excellent opportunity for the development of any strategic plan (Wang Y, et al., 2020, Marttunen, et al., 2017, Wang J, et al., 2020).

This work is the follow-up to a study project on urban transport problems in Constantine (kelilba and Chaib, 2021). The internal factors (strengths and weaknesses) and external factors (opportunities and threats) of the analysis were identified from a questionnaire provided to citizens of Constantine, results of previous studies, and observations in the field.

We showed the work procedures in the following diagram:

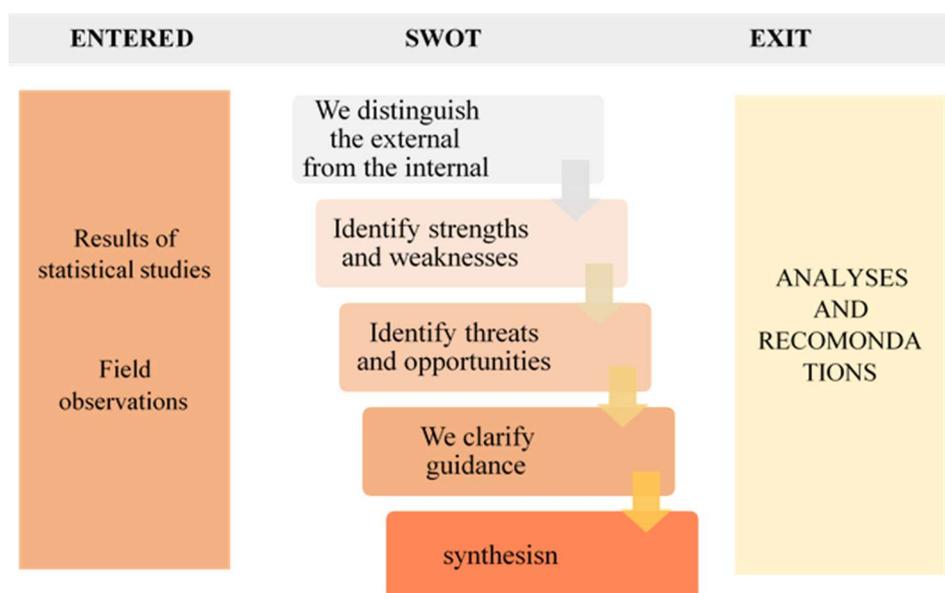


Figure 1. Proposed Work Methodology

APPLICATION

Distinguish the internal from the external

This study is interested in the system's situation of bus in Constantine. According to the observations of the field, we can differentiate the internal and external scale of the system:

Table 1. the internal and external scale of the BUS transport system

	INTERNAL	EXTERNAL
Rolling Stock	Private Operator BUS / BUS public operator	Taxi Tramway Personal Vehicle The two wheels
human factor	BUS personnel Drivers Conveyors	The users Public service personnel (police, gendarme, etc.)
Infrastructure	Bus stops and stations	Roads Road signs
Operation	Journey time BUS Rotation Downtime at stations Time of first departure and last arrival Price	Rotations of other means of transport Unforeseen situations (accidents, congestion, etc.)

Identification of Strengths and Weaknesses

According to the literature, strengths are the resources or capabilities that the organization can use effectively to achieve its objectives, but weaknesses are the limitations, faults or shortcomings in the organization that will prevent it from achieving the objectives (Jasiulewicz-Kaczmarek, 2016). Based on the results obtained from the questionnaire and observations, the strengths and weaknesses of the system can be identified as follows:

Table 2. Strengths and weaknesses of the BUS system

Strengths	Weaknesses
The most used means of transport, over 50% of the population use the BUS Rates allowable An allowable site of bus stations	Poor condition of buses Bad BUS rotation plans Lack of professionalism of the staff Very low-security level Very low comfort level Lack of quality of service

Identification of Threats and Opportunities

According to the literature, opportunities are all favorable situations in the system environment, and threats are unfavorable situations in the system environment, which is potentially detrimental to its strategy (Jasiulewicz-Kaczmarek, 2016).

Following the collected results and observations, we can identify the threats and opportunities of the system:

Table 3. BUS system threats and opportunities

Opportunities	Threats
Over 67% of the population does not make a personalized car Existing infrastructure (roads and works) A local company for urban bus manufacturing (Revue de presse, 2017). Vocational training centers for bus drivers Qualified engineers within management’s reach	A remarkable lack of road signs Mismanagement of contingencies (congestion, accidents, etc.) Over 94% of users prefer the use of other competing modes (tramway, taxi, VP) A degraded brand image Lack of control Lack of flow of information

Clarification of Guidance

The SWOT analysis is carried out by developing four types of strategic directions, which are composed of the following elements:

Strengths and opportunities

By considering the opportunities for action in the external environment, this type of strategic orientation makes it possible to take full advantage of the achievements of the system. These strategic directions allow for the best optimization of the system.

Weaknesses and opportunities

This type of strategic direction emphasizes the various weaknesses that the system must overcome. Weaknesses can also be overcome by taking advantage of external opportunities.

Forces and threats

This type of strategic guidance provides information on how best to use the system’s hard assets to overcome and minimize emerging threats in the external environment.

Weaknesses and Threats

Strategic directions such as this encourage people to think about how best the system can solve internal problems to avoid the destructive effects of external threats (Jasiulewicz-Kaczmarek, 2016).

This analysis allowed us to plan and evaluate strategic directions according to their intended objectives. Thus and for well orientated the approach of our application, we followed the following process (Figure2)



Figure 2. Guidance Process

The synthesis

For a better summary of this evaluation, the results are presented in the SWOT matrix shown in the following table (Table 3):

Table 4. Results of the SWOT analysis

	Strengths	Weaknesses
INTERNAL	<ul style="list-style-type: none"> The most used means of transport, over 50% of the population use the BUS <ul style="list-style-type: none"> Rates allowable An allowable site of bus stations 	<ul style="list-style-type: none"> Poor condition of buses Bad BUS rotation plans Lack of professionalism of the staff <ul style="list-style-type: none"> Very low-security level Very low comfort level Lack of quality of service
	Opportunities	Threats
EXTERNAL	<ul style="list-style-type: none"> Over 67% of the population does not make a personalized car Existing infrastructure (roads and works) <ul style="list-style-type: none"> A local company for urban bus manufacturing (10). Vocational training centers for bus drivers Qualified engineers within management’s reach 	<ul style="list-style-type: none"> A remarkable lack of road signs Mismanagement of contingencies (congestion, accidents, etc.) Over 94% of users prefer the use of other competing modes (tramway, taxi, VP) <ul style="list-style-type: none"> A degraded brand image Lack of control Lack of flow of information

The elaboration of this matrix allows us to see a global vision on the situation of the system for a better decision at the choice of orientations, or even establish a sustainable action plan based on the priority actions. This allows the concerned continuous and sustainable improvement.

RECOMMENDATIONS AND CONCLUSION

The aim of this work is the identification of the four main parameters that influence the BUS system for a better decision that serves the continuous and sustainable improvement of the latter.

The SWOT matrix is the best tool to achieve this goal. It helps us to synthesize the situation, to better understand our weaknesses, to merge our strengths, and to develop our opportunities, to better protect against threats.

According to the guidance process mentioned above, the approach begins by properly preserving the strengths and developing the opportunities. In our case, the high number of citizens who do not own a personal vehicle can be a strong point for BUS operators or even increase its market share of users. Also, the price is a very positive point and very mentioned by citizens. Therefore, the latter’s protection must be taken into consideration. However, we pay attention to the various weaknesses that the system must overcome. For a better reflection on that one appeals to the principle escalator of Pareto, It is an iterative process that consists in renouncing to act on the problems of a category, by reducing the time devoted to the others, to focus the

efforts in the category of aim (kelilba, et al., 2021), According to a previous study on urban transport problems in Constantine, the predominant problems of buses mentioned by users are the degradation of buses and poor planning of rotations (kelilba and Chaib, 2021), as a result, we take advantage of external opportunities: the BUS rotation plan (number of rotations, departure time, end-of-service time, etc.), or be updated with the help of qualified engineers; a strategy of aid to the BUS operators must be adapted for the renovation of the BUS park more comfortable and safer, with a serious thought to install a whole system of the flow of information between the 3 parameters concerned (operators, BUS drivers, users), a professional training of BUS staff in specialized centres is necessary to increase the performance of the system), This serves to overcome and minimize emerging threats in the external environment while taking into consideration the implementation of road signs for better system management.

In the end, a study of weaknesses and threats should consider how best to operate the system to better solve internal problems, or avoid the destructive effects of external threats and engage in safe and sustainable improvement actions

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MODIFYING MACPHERSON SPRING COMPRESSOR FOR GREATER EFFICIENCY

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ABSTRACT

The purpose of this project is to design the existing Macpherson spring compressor so it can remove coil springs from shock absorbers quicker and more efficiently. The process of removing the coil spring for maintenance and repair purpose often takes longer time and it can be difficult to perform. Hence, this project was intended to obtain perspectives and opinions of selected respondents who had used the existing Macpherson spring compressor and compared their opinions with the modified version to identify the practicality of the newly modified spring compressor that operates through battery. The research will be conducted at a car workshop at a local vocational school. The methods used to gather the data were Likert-scale questionnaire and rating checklist. The findings can shed lights on how to improve the design of the existing Macpherson spring compressor so it can be commercialized and used widely across automobile workshops in Malaysia.

Keywords: Macpherson Spring Compressor, Shock Absorber Spring, Coil Springs

MULTIFACTORIAL FORECAST OF RIVER RUNOFF FOR RESERVOIR UNDRT LIMITED INFORMATION CONDITIONS

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ABSTRACT

Effective management of water resources in the period of global warming is a major challenge of modernity. For territorial distribution of water resources and water management it is important to use water reservoir efficiently.

For any reservoir to use water resources efficiently according to its intended purpose it is necessary to plan and use effectively existing water resources.

For this it is necessary to determine the amount of water resources for certain periods of time. It is for this purpose the amount of river runoff (actual and forecast) inflowing into the reservoirs during different periods of the year needs to be determined.

The amount of water accumulated in the reservoir of energy purpose should not only remove the peak loads of the energy system, but also contribute to the sustainable functioning of the country's energy system during of dry water periods.

The article presents the forecasting method of inflow into the reservoir amid climate change in Georgia and under limited hydro meteorological information. Hydrological calculations of the river runoff are mainly based on the variability of the regime of atmospheric precipitation (liquid – rainfall and solid – snow melt) coming into the river basin. The calculation and forecast of rainfall runoff are formed for individual river basins under the influence of many natural factors. Also the forecasts accuracy improvement of the water inflow into the reservoir during planning of water and energy regime are one of the important goals too.

Keywords: Forecast; River runoff; Water inflow; Water resources; Energy purpose reservoir.

INTRODUCTION

For territorial distribution of water resources and water management it is important to use water reservoir efficiently. The normal functioning of the reservoir and the efficiency of its operation depend essentially on the amount of river runoff and its distribution on an annual basis. Accurate assessment of actual reservoir water storage for different time periods determines the function of the reservoir. The amount of water accumulated in the reservoir of energy purpose should not only remove the peak loads of the energy system, but also contribute to the sustainable functioning of the country's energy system during of dry water periods.

River runoff is the result of the interaction of many climatic factors (air temperature and humidity, atmospheric precipitation, solar radiation, evaporation, etc.) and the physical and geographical conditions of the river basin (landscape, soils, geological structure, vegetation cover, etc.). Global and regional climate, which is most tangibly manifested by an increase in air temperature and a change in the precipitation regime, significantly affects the change in water resources and the hydrological regime of water bodies, changes in the quantitative and qualitative characteristics of river runoff.

Runoff forecasting at different times of the year allows rationally distributing water resources of any purpose reservoir according to the needs of different sectors of the economy, such as: provide increase in electricity generation, improve water supply, etc.

In the century of technology, unfortunately, there is a number of countries where the hydro meteorological network has been reduced and the modern forecasting models cannot be used. Nowadays we are presenting the river runoff forecasting methodology using the example of one of the reservoirs in the Caucasus region, in Georgia. As you know Georgia occupies an important place in the world with medium height of fresh water formed within one year. Excess of atmospheric precipitations, especially in the Black sea region, and mountainous landscape provides ideal conditions for that. Since the beginning of the 90s of the last century, the number of gauging stations (Hydrometric station) in Georgia has significantly decreased, therefore, the possibility of studying the hydrological regime of the rivers have been severely limited. Although hydrometeorological observations have been restored in some places in recent years, the overall situation is still far from desirable. Information on the factors influencing river runoff was severely limited due to the reduction of the hydrometric network. It is therefore very important to be guided by the forecasting methods used under limited operational information. Under the global warming and limited hydro meteorological information the forecasting of river runoff has become a very important and relevant issue.

METHODS

The article discusses the need to update existing hydrological forecast methods for river runoff under limited information network reduction. We present the forecast of river runoff under limited operational information and the practical side of its use. The work presents the method - „The multifactorial forecast of river runoff for reservoir under limited information conditions”

DISCUSSION

Determining the river run-off forecasting method and developing the control methodology using the example of existing energy purpose water reservoir

Modern hydrological forecasting methods are based on the water balance equation, which contains many different elements, such as: runoff, precipitation, temperature, evaporation, condensation, infiltration, transpiration and etc. Such forecasting models can be used where operational information on hydro meteorological elements from different elevation zones is regularly received. The influencing factors of the river runoff are characterized by a kind of variability in time and altitude zones in the catchment basin of each river. Therefore, it is necessary to develop individual forecasting methods for each river. Various kinds of forecast are determined by different variants of forecasting dependencies, which require by various types of information. For forecasting are used: the Predictive factor and the Determining factor.

Predictive factor - the preliminary (earlier) factor refers to the factor known at the time of forecasting and will have an influence in the future. For example, existing snow storage in a river catchment area. Determining factor - the future factor that is directly formed and operates during the development of the forecast element, such as rainfall, air temperature. [1]

Runoff is an important component of the natural water cycle. Surface runoff is water from rain, snowmelt, or other sources, that flows over the land surface, and is a major component of the water cycle. The main partial processes forming the complex of the whole process of runoff generation are the following: a) Precipitation over the watershed surface and its partial interception by vegetation cover; b) Snow cover formation if precipitation is solid. c) Processes of infiltration and surface runoff generation if rain intensity or water yield from snow cover and hydro-physical soil properties allow that. d) Depression storage of a part of surface runoff in hollows of microrelief without drain. e) Surface runoff transformation by runoff elements. f) Dynamics of soil waters, their phase transformations, detention of part of water in suspended condition and its expenditure for evaporation and transpiration, soil and underground runoff generation. [2]

The formation of runoff at any time of the year (intra-annual distribution) is determined by the following factors:

Meteorological factors affecting runoff: Type of precipitation (rain, snow, sleet, etc.) Rainfall intensity; Rainfall amount; Rainfall duration; Distribution of rainfall over the drainage basin; Direction of storm movement; Precipitation that occurred earlier and resulting soil moisture; Other meteorological and climatic conditions that affect evapotranspiration, such as temperature, wind, relative humidity, and season.

Physical characteristics affecting runoff: Land use; Vegetation; Soil type; Watershed area, ridge exposure, watershed slope and configuration; Elevation; Topography, especially the slope of the land; Drainage network patterns; Ponds, lakes, reservoirs, sinks, etc. in the basin, which prevent or delay runoff from continuing downstream.

Vegetation cover: forests and shrubs; Vegetation cover intercepts precipitation and determines transpiration input into evapotranspiration.

Anthropogenic factor: Reservoir, melioration, urbanization.

The source of all rivers energy is atmospheric precipitation, which changes its appearance when it reaches the earth according to the climatic, geographical, geological and other natural conditions of the place. The equation of water balance of a river basin for the average multi-year period can be written as follows: $Y = X - Z$, where Y is the river runoff; X - precipitation, Z - evaporation. Usually runoff, precipitation and evaporation are expressed in millimeters as a water layer conditionally evenly covering the catchment area (F). They can also be represented by volume (W , km^3 or m^3). The volume of the runoff (W) and the height of the runoff layer (Y) are related by the ratio: $Y = W \times 10^6 / F$; And the ratio of runoff to precipitation gives the coefficient of runoff which shows what part of the rainfall was converted to runoff. [3]

The forecast equation always takes into account the area of the river basin, the amount of precipitation (rainfall, snowmelt) and diversity of micro-relief of river catchment area. River basin is a part of the surface layer of lithosphere formed as a natural united whole in the process of functioning of the surface part of hydrological cycle for a long enough period of geological time and, therefore, inherited from the climatic conditions of the past; connected with the system of relief forms and limited by divide line; including layer of weathered rocks and soil-vegetation cover; having own hydrographic network including river network and developed ways of surface and underground flowing down into it. The character of relief of any river basin and mainly its altitude and ruggedness are of exceptional significance. Many sides of runoff generation processes and some specific hydrological phenomena are directly determined by slope inclination. Vegetation cover intercepts precipitation and determines transpiration input into evapotranspiration.

One of the important issues of short-term forecasting is to predict rainfall runoff based on the factors listed above. Runoff is generated by rainstorms and its occurrence and quantity are dependent on the characteristics of the rainfall event, i.e. intensity, duration and distribution. There are, in addition, other important factors which influence the runoff generating process. It is also important to estimate the amount of snow storage accumulated during the winter in the catchment area. The predicted values obtained are compared with their norms in order to errors caused by incorrect information or incorrect calculation. It should be noted that one of the important factors in hydrological forecasting issue is the air temperature and its values at different altitudes. Under limited information and network reduction, in the case of absence of the required volume of observational data, approximate methods for determining air temperature are used, such as, for example, the construction of an empirical relationship between the observational data of two meteorological stations- $t_2 = f(t_1)$.

The temperature gradient is determined by the following equation:

$$\gamma_1 = 100 \frac{(t_1 - t_2)}{\Delta H}, \text{ where,}$$

ΔH is the difference in altitude of the location of meteorological stations;

Atmospheric air temperature observed at lower t_1 and upper t_2 meteorological stations;

For a time, hydrological process preserves a certain constant regularity of change which allows extrapolation of river flows for a certain period of time based on previous period river runoff. It also allows the extrapolation of the river flow for a certain period of time based on the daily flows (inflows) of a previous period measured for 1–2 days. The daily forecast equation for the rivers of Georgia according to the previous daily flows (inflows) looks like this:

$$Q_n = f(Q_{n-1}). \quad (1)$$

Such relations are made separately: rainy and rainless, when the air temperature increase or decrease which allows to take into account the influencing factors of forming the river runoff. In the case of automation of the forecasting process, the daily flow (inflow) forecast can be determined taking into account more influencing factors.

$$Q_{i+\tau} = f[(X_T + X) i, t_i, \Delta t_i, \sum t_i, Q_i, Q_i], \quad (2)$$

Where, i day of forecast, τ - forecast period ($X_T + X$) the sum of solid and liquid precipitation from the date of snow covering i till today; t_i - average air temperature i till today; Δt_i - Change in air temperature; $\sum t_i$ - the sum of positive air temperatures from the beginning of snow melting i till today; Q – Changing of river flows for forecast day- i .

In case of limited information such a forecasting equation can not be used, so we used the existing data

$$Q_\tau = f(Q_{\tau-1}); \quad (3)$$

Runoff is a comprehensive result of meteorological and hydrological processes, this forecasting equation can be extended by adding other influencing elements, for example such as the forecast of daytime air temperature or rainfall. By adding information about meteorological elements, it is possible to specify the forecast which uses values that are taken according to the meteorological forecast. The forecast equation of river runoff is as follows:

$$Q_\tau = f(Q_{\tau-1}, T_{\tau-1}); \quad (3.1)$$

Where, the Predictive factor (preliminary predictor) - is a previous actual daily inflow ($Q_{\tau-1}$) and Determining factor (the future factor)- air temperature ($T_{\tau-1}$).

With the addition of rainfall, the forecast equation of river runoff has been extended to the following form:

$$Q_\tau = f(Q_{\tau-1}, P_{\tau-1}, T_{\tau-1}); \quad (3.2)$$

Where, the Predictive factor (preliminary predictor) - is a previous actual daily inflow ($Q_{\tau-1}$) and Determining factor (the future factor)- air temperature ($T_{\tau-1}$) and rainfall ($P_{\tau-1}$). [4]

Therefore, Multifactorial forecast of river runoff under limited information conditions is determined by the data obtained from the meteorological and hydrometric stations located near the river catchments basins which influence the runoff generating process. As regards the meteorological elements of neighboring watersheds, they are poorly characterized water content of river and using them is inefficient. When compiling a multi-factor operational forecast for calculation should be selected into the account the forecast method which used the existing data at the forecast period. The forecast equation is derived from the available information and considers duration of the forecast period.

Determining forecast value of river runoff inflowing to Shaori reservoir

The production and use of energy and the capture and use of water are vital to the economy and the health and welfare of all nations, and the wise stewardship of these resources is essential to the protection of the environment. In the introduction it was mentioned that runoff forecasting is also important for rivers flowing into reservoirs. Multipurpose hydropower reservoirs are designed and/or operated to provide services beyond electricity generation, such as water supply, flood and drought management, irrigation, navigation, fisheries, environmental services and recreational activities, etc. Reservoirs play an important role in flood management. They store floodwater and reduce flood risks by attenuating the flood peaks and intensity of flooding in the downstream reaches. [5;6]

In our days, there is a big interest in studying the water balance of reservoirs. Reservoir is an artificial element of the geographical environment. It radically changes hydrological regimes of rivers and their catchment basins. For any reservoir to use water resources efficiently according to its intended purpose it is necessary to plan and use effectively existing water resources. For this it is necessary to determine the amount of river runoff in flowing into the reservoirs and determine the forecast value of water runoff inflowing to reservoir during different periods.

In view of the above, we have developed a reservoir inflow forecasting method under limited information conditions. We will use as an example the Shaori reservoir. The Shaori Reservoir is an energy purpose reservoir which serves one of the most important HPP of Georgia - the Shaori HPP. Shaori reservoir is located in Racha-Lechkhumi and Kvemo Svaneti region, some 1100 m above the sea level. [7]

The forecast method takes into account the operational information obtained before forecasting and adds to it information about meteorological elements. Operational information is information recorded at the HPP before forecasting. It is then verified by meteorological elements taken from the meteorological forecast of the needed day.

In that method the HPP operational information includes the hydrological regime of the reservoir, such as: a) Actual reservoir water level and corresponding storage; b) Actual inflow into the reservoir the previous day; c) Evaporation (in case such exists); d) Filtration (in case such exists).

Water level of reservoir is determined by means of staff gauge and by automatic water level measuring device. The accuracy of measurements depends on well planned placement and installation of the measuring network. The average daily water level and surface area is determined by hypsometric parameters of reservoir.

Water inflow into reservoir is measured by a water gauge (hydrometric station). In cases when it is not possible to measure the water inflow of a reservoir, a methodology for determining each element of the balance using the reservoir parameters should be applied.

I would like to mention one more point that deserves attention, namely that the Shaori reservoir has a peculiar characteristic. In particular, the water inflow into the Shaori reservoir cannot be gauged due the specific conditions. Specific conditions include: impossibility to install a hydrometric station due to natural conditions such as the existence of karst lakes. This means that the river bed is completely covered by the reservoir and the river is engulfed by it. The example of Shaori reservoir shows that in cases where the traditional water balance equation cannot be used, it is important to use a methodology for determining each element of the balance using the reservoir parameters. The actual flow is determined by the water balance-according to the rate of regulation of the reservoir.

In particular, the parameters that are used for determining water inflow of Shaori reservoir include: (a) Water level is monitored by means of staff gauge and by automatic water level measuring device. By hypsometric parameters of reservoir, the average daily water level and storage is determined. (b) HPP generation multiplied by specific water discharge gives amount of water used for generation. (c) The amount of water for filling is added to water for generation and the amount of water used (emptying) is deducted from water for generation. (d) Also pumped water is taken into account (additional feed source is the amount of water from the pumping station). [8]

Keeping in mind the above, lets now consider the additional factors included in the multifactorial forecast equation – the meteorological elements. As we have mentioned, by adding information about meteorological elements, it is possible to specify the forecast which uses values taken according to the meteorological forecast. It is known that precipitation on the surface of the reservoir is measured by meteorological stations in the area and by precipitation measuring points installed by HPP itself. The weighted average of precipitation layer on the water surface area is determined by the weighted average of all values from the nearest measuring points. When we determine volume of precipitation, the precipitation layer belongs to average area of the water surface. For example, in case of Shaori reservoir the meteorological forecast includes information such as: The amount of forecast rainfall (mm) on the surface area of the reservoir and in the catchment area;

Therefore, in order to determine forecast value of river runoff inflowing into Shaori reservoir existing operational information is used: a) Actual inflow in to the reservoir in previous day; b) Reservoir water level;

c) Reservoir water storage; d) Reservoir energy capacity; e) Amount of rainfall forecast; f) The surface area of the reservoir; g) Watershed area; h) Forecast rainfall volume for the reservoir; i) Forecast rainfall volume for the watershed area.

See the table #1 below.

Table # 1

Determining forecast value of river runoff in flowing into Shaori reservoir

Day	Reservoir Water Level	Reservoir Water storage	Reservoir energy Capacity	Amount of rainfall forecast	The surface area of the reservoir	Forecast rainfall volume to surface area of the reservoir	Watershed area	Forecast rainfall volume for the watershed area	Actual inflow in to the reservoir in previous day	forecast value of river runoff	Reserve height of reservoir level	Daily level fluctuation
	m	mln m ³	GWh	mm	km ²	mln m ³	km ²	mln m ³	mln m ³	mln m ³	m	m
04.01.2022	1129.86	46.47	41.05	28.60	13.20	0.38	112.80	2.26	0.058	2.694	3.34	
05.01.2022	1130.10	49.15	43.56	18.80	13.20	0.25	112.80	1.48	0.058	1.791	3.10	0.24
06.01.2022	1130.26	50.92	45.22	0.00	13.2	0.00	112.8	0.0	0.058	0.058	2.94	0.16

CONCLUSION

Proper management of existing water resources is crucial for the effective use of a reservoir. This involves determining amount of water for specific periods. For this reason, water inflow both factual and forecasted is determined for different periods of the year.

The presented approach determines the forecast rate of river runoff at different time intervals. The efficiency of the reservoir depends on the amount of river flow and its distribution. The amount of water accumulated in the energy purpose reservoir should not only remove the peak loads of the energy system, but also contribute to the sustainable functioning of the country's energy system during of low water season.

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DIELECTRIC BEHAVIOR OF TERNARY COMPOSITE MATERIALS: APPLICATION TO THE MINIATURIZATION OF MICROWAVE ELECTRONIC CIRCUITS

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ABSTRACT

A composite material is one that is made up of two or more constituent materials. The component materials in a composite remain separate and distinct, distinguishing them from solid solutions and alloys. These materials take on some of the properties of their constituents and can even develop new properties as a result of a synergy between them. This opens up the possibility of imbuing the properties of one material with those of another. Given the wide range of possible combinations and conformations, connectivity, which is a way to represent the possible conformations of the component materials in the final solid, is a convenient way to categorize composite materials. The properties of attractive polymer-titanate oxide composite materials with high permittivity and low losses, over a frequency range that can extend up to ten GHz, have already opened up a promising avenue for designers of microwave components, The feasibility of a titanate oxide polymer composite material with characteristics of high permittivity and low dielectric loss, due to the inclusion of deferent titanates (barium titanate BaTiO₃, calcium titanate CaTiO₃, strontium titanate SrTiO₃, magnesium titanate MgTiO₃) of very high dielectric constant perovskite structure in an epoxy resin matrix. The complex permittivity real and imaginary parts were measured using TDS time domain spectroscopy in the frequency range of DC to 30 GHz. The effects of the frequency and titanates de strontium volume fraction on the complex permittivity of (TSr_FE_RE) composites were investigated. The results of this study could be oriented towards applications in microelectronics (miniaturization of integrated circuits) or in microwave frequencies (antennas, resonators).

Keywords: Dielectric, composite, Characterization, spectroscopy, microwave.

1. INTRODUCTION

The composition of various materials in the polymer matrix provides the possibility of obtaining optimal properties. The use of ferroelectric phase-based composites in microwave circuits has many advantages in terms of both miniaturization and agility due to the particular properties of these materials.[1] Indeed, they have high dielectric constants which can be modified by the addition of other phases and whose integration in

microwave devices is relatively easy. In addition, the increasingly strong demand for new materials is linked to the development of laser and transistor technologies, the miniaturization of electronic components and recent discoveries in nanotechnology. [2] The composite materials that we used in this study are based on epoxy resin (RE), which will be charged with strontium titanate (SrTiO_3 or TSr) and iron oxide (Fe_3O_4 or FE) in order to determine their permittivity's.

2. EXPERIMENTAL METHODS

2.1 Preparation of samples

The samples prepared are of a ternary structure composed of epoxy resin (RE), strontium titanate (SrTiO_3), and iron oxide (Fe_3O_4). In this structure we call RE-TSr-FE. The epoxy resin is used as a matrix medium accelerated by hardener ensuring the role of binder in a proportion of 70% of the total volume of the composite. The additional charges of a titanate and oxide constitute 30%. Table 1 shows the different volume fractions in which the samples were produced:

Material Designation	SrTiO_3 (TSr) (Vol%)	Fe_3O_4 (FE) (Vol%)	Epoxy Resin (RE) (Vol%)
0%TSr_30%FE_70%RE	0	30	70
10%TSr_20%FE_70%RE	10	20	70
20%TSr_10%FE_70%RE	20	10	70
30%TSr_0%FE_70%RE	30	0	70

Table 1: Composition and designation of composites.

After Solidification, the material is molded adapted to the dimensions of the measuring cell. These are toric-shaped samples compatible with the geometry of the coaxial line used with 7mm standards looks like the one in Fig 1:

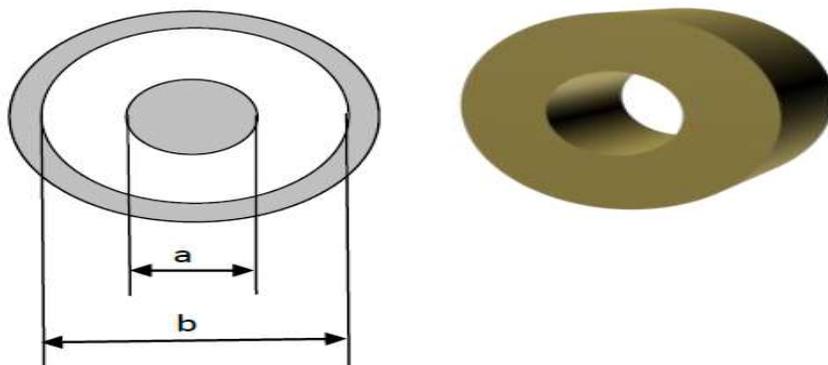


Figure 1. The Shape of the Guide and the Sample.

2.2 Characterization bench

The dielectric measurement of the various samples was carried out using a time spectroscopy measurement bench. This measurement technique, credible for decades, is designed around a system composed of:

first, a time domain reflectometry TDR measurement system, consisting essentially of a step generator, a coaxial line, and a sampling oscilloscope. This equipment also requires a digital system for the acquisition, storage and processing of the measured temporal data. A simple microcomputer with the appropriate software can perform these different tasks. Such a system is shown schematically in the figure 2.

The measurement was carried out over a large band of frequencies (from DC to 30 GHz frequencies) in order

to estimate the real, static and imaginary dielectric permittivity's.

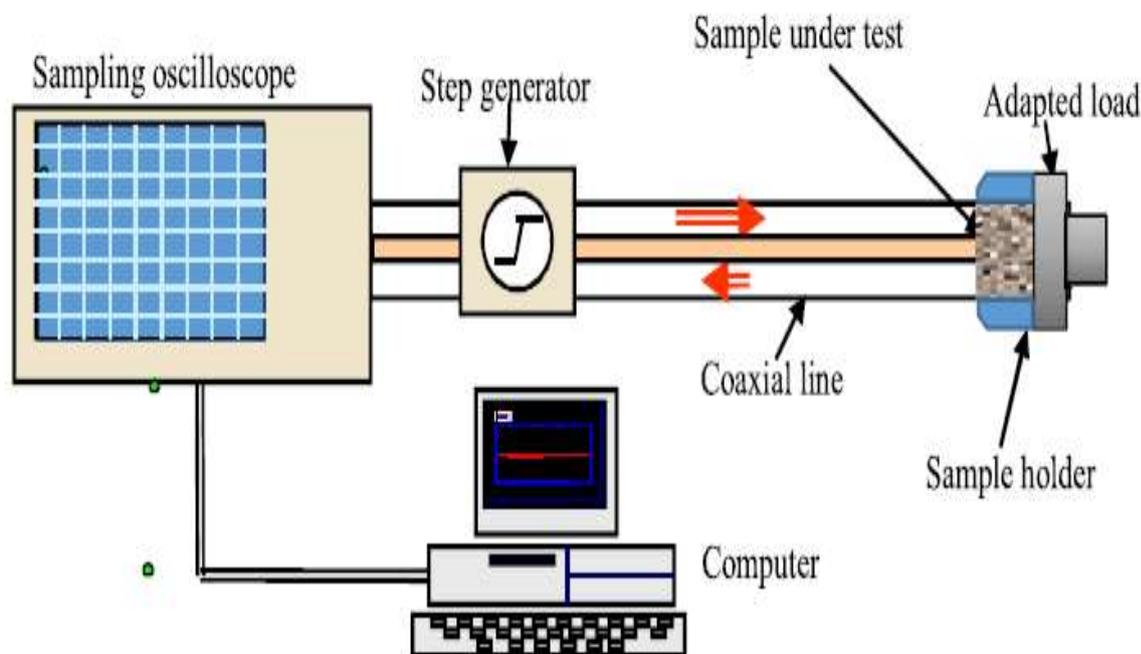


Figure 2. Measurement setup. [4]

2.3 Measurement techniques

There are two characterization methods that can be used in time domain reflectometry (TDR). The first, called the first reflection method, requires a very long sample because it effectively takes into account only the first reflection resulting from the air-sample interface. The second is called the multi-reflection method, and does not require long samples and this is our case. This method is implemented through several experimental protocols making it possible to determine the electromagnetic parameters of the material by precisely taking its thickness d and its terminal impedance. These protocols being that of the short-circuited line ($Z_t = 0$), of the open line ($Z_t = \infty$) and of the adapted line which we adopted because it is best suited to our case. [5]

3. RESULTS AND DISCUSSION

3.1 Complex permittivity determination

In this section, we want to study the complex permittivity (real and imaginary parts), over a DC – 30GHz frequency band. The real and imaginary parts were measured for different samples of RE / SrTiO₃ / Fe₃O₄ ternary composites produced in different ratios of these constituents.

These two components of the dielectric permittivity are inferred from the reflection coefficient, as mentioned previously, which is measured by the technique of time domain reflectometry.

3.2 Interpretations and analysis

- A phenomenon of dielectric relaxation is due to the vibrations of dipoles or space charges. Debye-type dielectric relaxation is characterized by a constant value of (ϵ') followed by a sharp drop, while (ϵ'') exhibits a broad peak which passes through a maximum at the resonance frequency f_r .

- A resonance curve is characterized by a narrow peak of (ϵ''), the maximum of which corresponds to the resonant frequency. As for the variation of (ϵ') with the frequency, the curve increases hyperbolically while passing by a maximum, then drops abruptly, reaches a minimum with a negative value then increases again asymptotically.
- The resonance frequency of composites changes on depends of concentration of TSr.

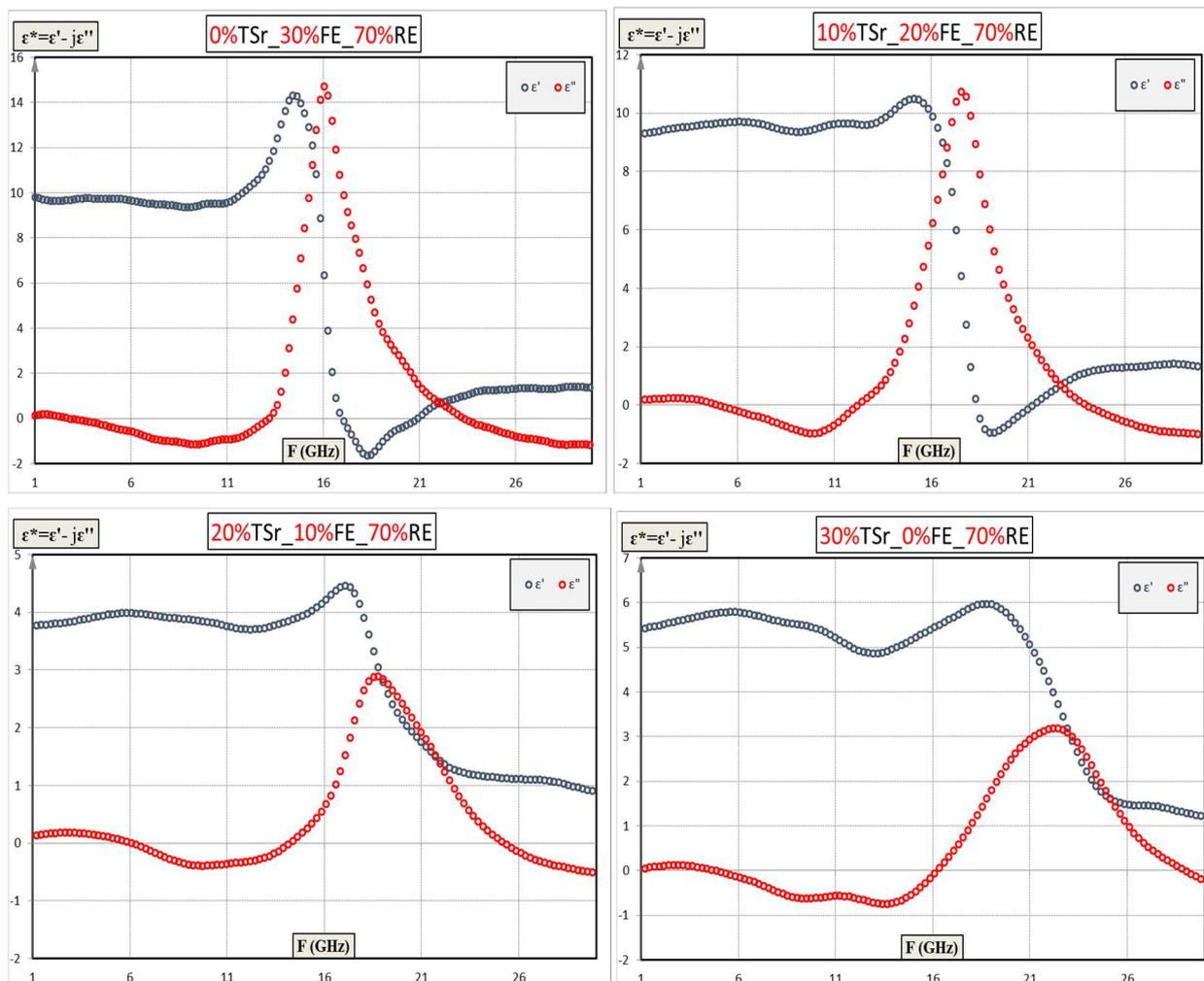


Figure 3. The complex permittivity for (TSr_FE_RE) composite for various TSr content as function of frequency.

4. CONCLUSIONS

The principal objective of this work was to study the behavior of dielectric ternary composite materials. These are composed of a host matrix, namely the epoxy resin and inclusions, in powder form. The method used to achieve the above objective is that of time domain spectroscopy (TDS) based on the signal processing of data acquired from a measurement bench based on time domain reflectometry (TDR). This study is in fact, subdivided into two distinct parts, the first concerns only the low frequency range, while the second covers a range up to 30 GHz (microwave frequencies). The results of this study could be oriented towards applications in microelectronics (miniaturization of integrated circuits) or in microwave frequencies (antennas, resonators).

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SOLUTIONS FOR EARLY DETECTION OF UNSAFE INCIDENTS IN THE ENGINE ROOM OF THE FISHING VESSELS

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ABSTRACT

With the desire to ensure the safety of ships and people, the fishing vessels are regularly monitored and warned when something goes broken, both while operating at sea and mooring at the port. However, not all fishing vessels are equipped with a warning system, especially those fishing along the coast because it is subjective by fisherman and most of these ships have dynamic systems old, easy to leak fuel from the pump, leak in the fuel tank, leak the pipeline, leak the lubricating oil, these leaks if not detected in time, will cause great damage such as broken engine, fuel spillage can cause fire and explosion. Moreover, gas leaks due to cooking food on ships in hot weather are also possible causes of many unsafe incidents. To prevent such incidents, the article presents a solution to use the warning set on the fishing vessels along the coast, warning of fuel and flammable gas leakage with at place sound, and warning via mobile phone waves, for the fastest warning, timely repairs. The research results have successfully arranged the installation and experimental organization, helping to detect early unsafe incidents in the engine room of the fishing vessels.

Keywords: warning, gas, fishing vessel, diesel engine, mobile phone wave.

INTRODUCTION

Vietnam is a country with a large sea area, so the number of fishing vessels of Fishermen is increasing, especially fishing vessels with small power, working in the sea area near the mainland. However, due to operating in conditions near the mainland, Fishermen often have a subjective habit, not caring much attention to factors that can cause unsafety such as fuel leakage from the pump, leakage in the fuel tank, pipeline leak, lubricating oil leak [9]. These leaks, if not detected in time will cause great damage such as engine damage, fuel spillage that can cause fire and explosion [2]. In addition, most of the gas tanks used for cooking food on the ship are located near the engine room, because fishing vessels near the mainland are small ships, other spaces on the ship are often used for seafood, ice storage, and fishing tool.

To improve the safety of the above fishing vessels, as well as implement ensure safety solutions for the ships both when operating at sea and mooring at the port, the use of technical equipment for measuring and warning is very important [1]. Specially equipment that is not too complicated, easy to use and replace, suitable for the operating conditions of fishing vessels, and the working environment of Fishermen will be priorities for selection [3-4].

On that basis, in this study, the use of warning devices with sensors for measuring fuel leaks and flammable gas leaks in the engine room of the fishing boats is presented to give early warning to users on the vessel when a leak occurs. At the same time, warn via phone waves to managers, technical experts, exploitation, and operation consulting centers to promptly support, limit dangerous incidents, and ensure safety for ships and people.

MATERIALS AND METHODS

Fuel leak sensor, flammable gas leak detection sensor:

Leakage of fuel is always happening, the leak causes great damage such as engine broke, spillage can cause fire and explosion. Therefore, it is necessary to have a leak detection sensor for the fastest alarm and timely

repair. Fuel leak detector sensor is designed to detect leaking fuel, diesel fuel, and gasoline, used in detecting fuel pump leaks, fuel tank leaks, pipeline leaks. For safety against fire and explosion in the engine room and on the ship, the leak detection sensor for flammable gas, gas, and liquefied petroleum gas is selected and presented as shown in Figure 1, Table 1 [6-7].

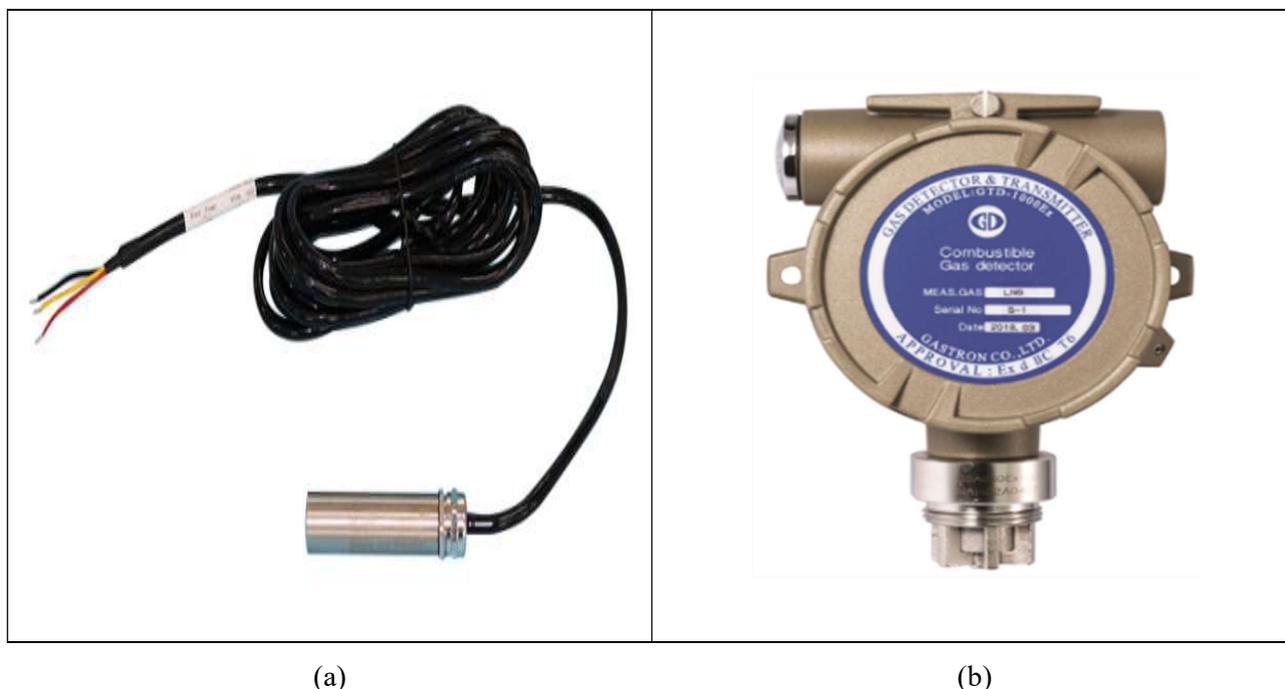


Figure 1. (a) Fuel leak sensor and (b) flammable gas

Table 1. Sensor specifications

Fuel leak sensor		Flammable gas sensor	
Made in:	China		
Brand:	WINDBELL		
Product's name:	CLS200 leak detector sensor	Product's name:	GTD-1000Ex
Measurable medium:	Gasoline, diesel oil	Measurable medium:	Flammable gas
Working temperature:	-40 to + 60°C	Working temperature:	-20 to + 50°C
Resonse time:	<2s	Resonse time:	<15s
Operating current:	<35mA	Operating current:	4-20mA

Signal and alarm processors:

Arduino nano circuit has a domino pin output, used to receive signals from gas and fuel leak sensors, process the signal, and send a two-way alarm to the audible alarm (speaker) mounted on the ship and the part that transmits the signal via phone waves to the user's phone through the phone number loaded into the control program of the control circuit as shown in Figure 2 [5, 8]. The flowchart of the control circuit is as shown in the Figure 3.

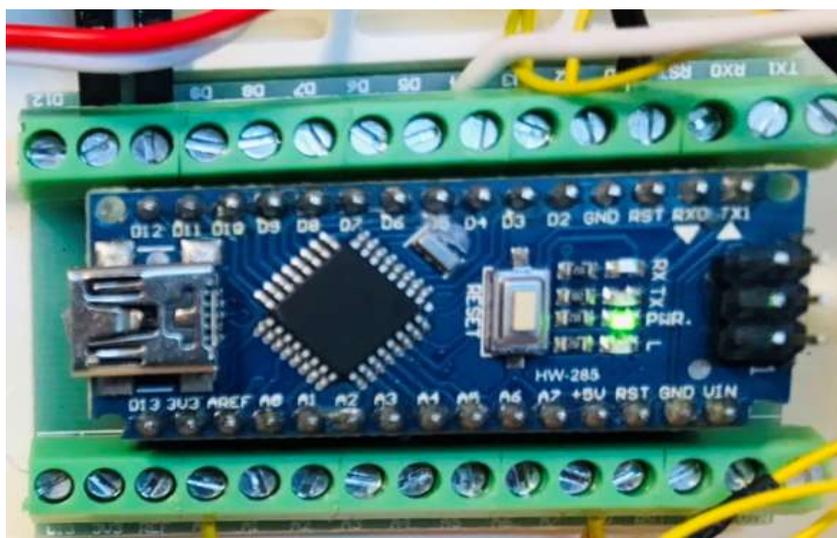


Figure 2. Arduino Nano controller circuit

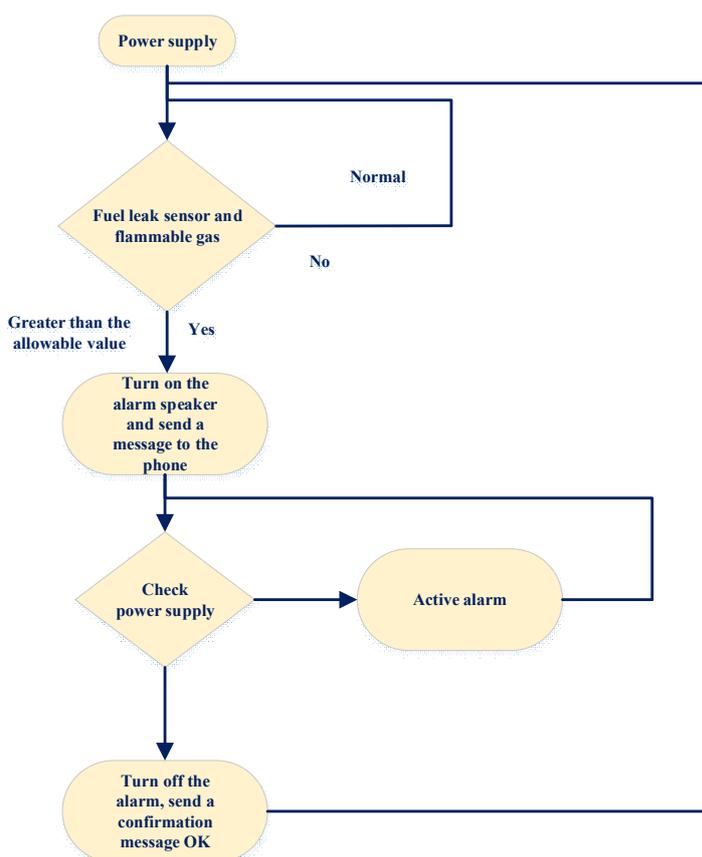


Figure 3. Flowchart of signal and alarm processors

Program code to load the controller circuit:

```

#include <Arduino.h>
#include <Sim800l.h>
    
```

```
#include <SoftwareSerial.h>
SoftwareSerial sim(11, 10);
int warnPin = 3; // loa,den ket noi Pin 10
int button = 4; // button ket noi Pin 2
int gas_din = 2; // Dout ket noi Pin 9
int gas_ain = A0; // Aout ket noi Pin A0
int ad_value; // bien luu gia tri adc
int button_value; // bien luu trang thai button
Sim800l Sim800l;
String textSms, numberSms;
String text1;
void SendMessage()
{
  Serial.println("Sending Message");
  sim.println("AT+CMGF=1"); //Sets the GSM Module in Text Mode
  delay(1000);
  sim.println("AT+CMGS=\"" + numberSms + "\"\r"); //Mobile phone number to send message
  delay(1000);
  String SMS = text1;
  sim.println(SMS);
  delay(100);
  sim.println((char)26); // ASCII code of CTRL+Z
  delay(5000);
}
void setup()
{
  pinMode(gas_din, INPUT); // set Input
  pinMode(gas_ain, INPUT); // set Input
  pinMode(warnPin, OUTPUT); // set Output
  pinMode(button, INPUT_PULLUP); // set Input
  Serial.begin(9600); // ket noi UART, baud = 9600
  sim.begin(9600);
  Sim800l.begin();
}
void loop()
{
```

```
//Serial.println("BINH THUONG"); // thông báo bình thường
//Serial.println(ad_value); // thông báo bình thường
//delay(500);
ad_value = analogRead(gas_ain); // đọc giá trị adc
if (digitalRead(gas_din) == LOW) // so sánh vs LOW, nếu = thông báo có gas, đèn và loa báo
{
    text1 = "WARNING! CO GAS. CẢNH BÁO CO GAS";
    Serial.println("CO GAS");
    Serial.println(ad_value);
    digitalWrite(warnPin, HIGH);
    numberSms = "+84977413768";
    SendMessage();
}
button_value = digitalRead(button); // đọc trạng thái button
if (button_value == LOW) // nhấn button
{
    while (button_value == LOW) // đợi phím nhả
    {
        button_value = digitalRead(button);
    }
    digitalWrite(warnPin, LOW); // tắt loa và đèn
    Serial.println("BINH THUONG"); // thông báo bình thường
    text1 = "OK, TRẠNG THÁI BÌNH THƯỜNG";
    numberSms = "+84977413768";
    SendMessage();
}
}
```

The equipment layout diagram for early detection of unsafety incidents in the engine room of a fishing vessel is shown in Figure 4.

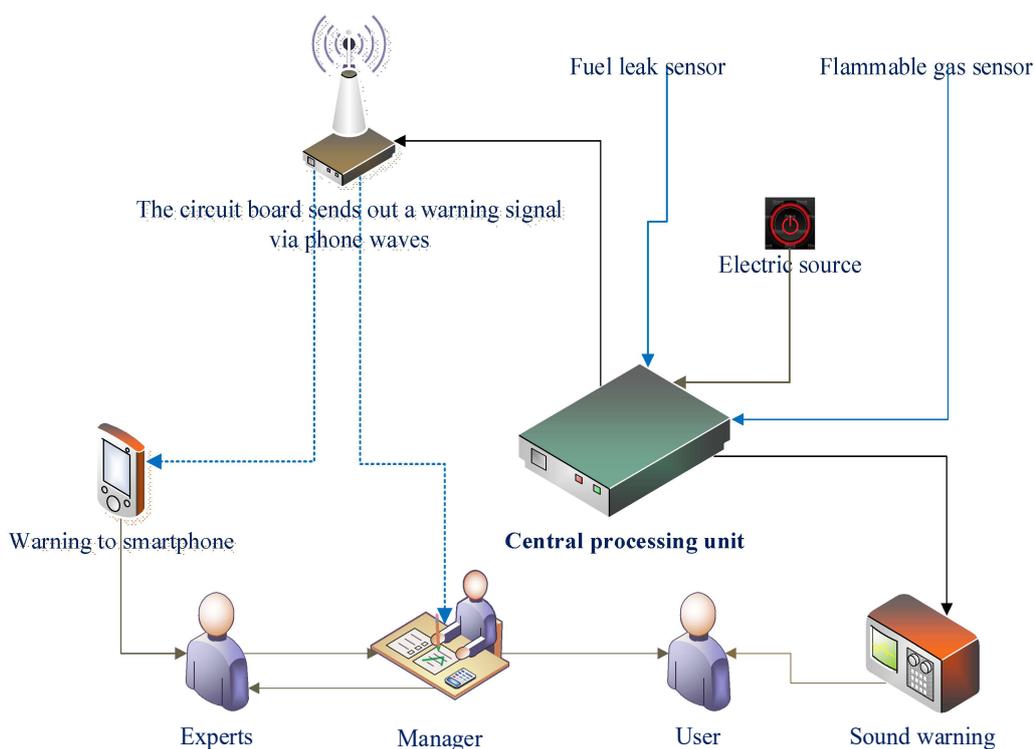


Figure 4. Overview diagram of the application of equipment to detect unsafe incidents in the engine room of a fishing vessel

RESEARCH RESULTS AND DISCUSSION

The equipment after test, installation, and assembly is shown in Figure 5. In which, the structure of the warning device includes: 5V-DC-5A power supply, to provide electrical energy for operating equipment (1); Sim800A module to broadcast alarms to users via phone waves (2); Loudspeakers (3) for sounding warnings; Switch (4); Arduino nano controller board (5); fuel, flammable gas leak sensors and signal amplifiers (6). The phone number has been set up in the program, which can notify many different users at the same time.

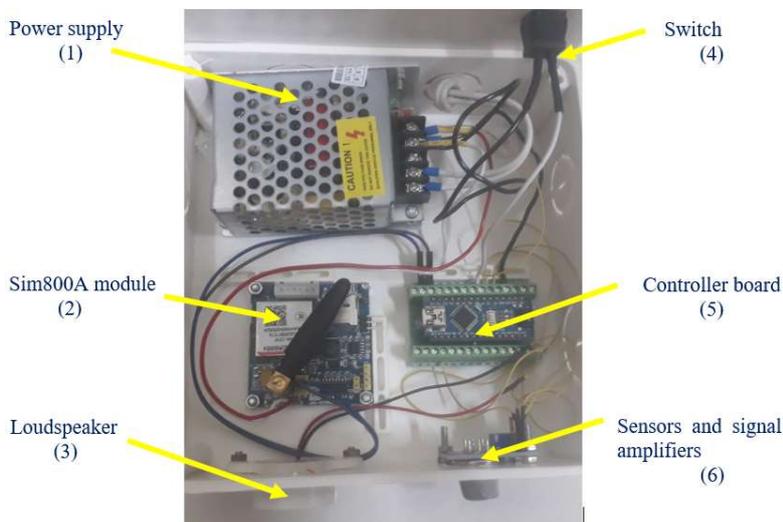


Figure 5. Fuel and flammable gas leak warning device after assembly

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The above equipment has been installed on a fishing vessel of Fishermen in Nhatrang city, Khanh Hoa province, Vietnam. The results show that the device works stably and has high reliability. Warning messages are sent to the user's mobile phone when a fuel leak in the engine room and a flammable gas leak is detected on the fishing vessels as shown in Figure 6.



Figure 6. Mobile phone alert message interface when detecting fuel and flammable gas leaks on a fishing vessel.

CONCLUSION

Research results have selected sensors suitable for warning requirements when there is a leak of flammable gas, especially a fuel leak in the engine room of a fishing vessel, writing a program for the control circuit. Set up and organize successful experiments on the fishing vessels of Fishermen. The device has a low cost, can be applied on all fishing boats operating in the near-land area, helping to detect unsafe incidents in the engine room of fishing vessels early, thereby timely remedial measures, ensuring safety for people and ships.

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3D CNC PLOTTING MACHINE

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ABSTRACT

The growth in the fast development of innovation overall extended the use and usage of CNC machines those are yet very costly. This project examines the outline, viewpoints and machinability investigation of low-cost CNC machine which is fit for 3-axis synchronous operation with less complexity. The lower cost is accomplished by interfacing standard PC with micro controller-based CNC framework in an Arduino based embedded system. After the completion of machining, experimental trials to define machining parameters were held. The purpose of the Self-Guided CNC project is to construct a functional CNC type machine capable of tracking lines on and object to guide the armature in cutting the piece correctly. The device would be capable of functioning independent of off-board computers for both operation and determining Plotting paths. The goal is not only high-precision sketches but also design and plot.

Keywords: Operating voltage, Operating current, Detent torque, Rotor inertia, Steps per Revelation.

INTRODUCTION

The world is now in a highly technological phase with many things getting smaller and smaller. The rapid growth in technology and production development, industrial requirements, such as good quality and high precision, has helped develop the CNC machine plotter.

Mini CNC Machine is the small CNC Machine which can function equal likes any other CNC device. A milling system is a device that has spindle that is equal because the router, with a unique device that spins and cuts in diverse instructions and actions in 3 distinctive instructions alongside the X, Y, and Z axis a Patrick Hood-Danie, James Floyd Kelly [1]. In 1968, John Parsons acquired the Joseph Marie Jacquard commemorative award from the Numerical Control Society. In 1975, the Society of Manufacturing Engineers commemorated Parsons as "The father of the second one commercial revolution" [2]. The Japanese scientist M. Iri et al. [3] proposed an approximate method to limit printing times. The X-Y printing gadget is a greater simplified device than the CNC device because the CNC gadget works withinside the 3-axis path and the programming is greater complicated. G-Code is the accepted call for a manage language for Reprap machines. It is a feature to inform the gadget to transport to numerous factors on the preferred velocity, to manipulate the spindle velocity and to interchange on and stale extraordinary actuators. The feature, shape and technique of the G-code interpreter for the automatic numerical manipulate device (CNC) had been analyzed through Chinese researchers Z. Chengrui, et al in 2002 [4]. Park, et al. [5] talk the dynamics of a dual-force servo mechanism and develops an XY gantry version along with cars for Y manage with every other motor sliding the gantry withinside the X direction.

Linyan Liu et al. in 2014, [6] provides a method control framework targeted on expertise for the layout and improvement of numerical manage system tools (D&D) with the combination of method and information. The

necessities for the framework are generated based on the character of the system device layout practice. Venkata Krishna pabolu et al. in 2010 [7] discusses the layout and implementation of a low-price three-d automatic numerical control (CNC) device for commercial applications. In this record a prototype of an integrated CNC system became created. D.J. Jayachandraiah et al in 2014 [8] provide the concept of growing a low-price device able to concurrently interpolating three axes. The low price of prototyping is executed through incorporating the capability of the same old PC interface with the fundamental microcontroller CNC gadget in an included Arduino-primarily based totally machine. Ahmed A.D. Sarhan et al. in 2015 [9] proposed a preliminary shape of the CNC portal milling device turned into designed and analyzed with the capability to provide an excessive floor finish. The author's aim is to attain the bottom modal frequency of 202Hz similar to 12000 rpm in all motion amplitudes with a complete variety of suitable frequency responses. A modal evaluation of the preliminary layout of the porch shape becomes accomplished and its modal frequency becomes 102.36 HZ. Nikita R. Saharkar et al. in 2015 [10] designed the CAD version in Solid-works and accomplished the FEA evaluation at the hyper mesh device imparting the suitable constraints, masses and momentum values. According to the author, he received the pressure free round 14 Mpa, that is decrease than the allowed strain free of M.S. Sundar Pandian et al. in 2014 [11] increase low-price 3-axis CNC machines that use wellknown components, stepper motors with controllers, Arduino open supply software, microcontroller and open supply motor control. Subsequent works in 2010 centered at the layout and implementation of a low-price 3-dimensional CNC system, designed thru using an embedded device primarily based totally on an 8-bit microcontroller which will acquire the desired accuracy and reliability. from modes for commercial programs a Pabolu, V.K. and Srinivas, K.N.H. [12]. Xu, X., Li, Y., Sun, J. and Wang, S. a powerful open CNC gadget and PC-primarily based totally movement controller that makes use of algorithms primarily based totally on interpolations of orders and the interpolation of the segmentation of cubic b-spline curve agreements lately evolved for powerful software [13].

Focused on automated device extrude control (ATC) with inside the CNC device to shorten the time c language among device alternate a Karthick, M., Sundarraj, M. and Raja, T. [14]. Sridhar Yesaswi, Ch., Subrahmanyam, T., Sai Karthik, G., Sai Sudheer, N. and Farooq Basha, S. proposed Nano graphene cloth coating with inside the mattress of the CNC milling system to achieve the preferred precision and resistance [15]. Kajal J. Madekar, Kranti R. Nanaware, Pooja R. Phadtare, Vikas S. Mane. A utility of the CNC system and the G codes are prolonged to the layout and drilling of published circuits (PCB), electric discharge processing (EDM), extraction and production of metals, letters and engravings logo. Few researchers have attempted to increase a mini CNC automated gadget for PCB layout, drilling [16]. Mohammad Kamruzzaman Khan Prince, Muhsin-Al-Mukaddem Ansary, Abu Shafwan Mondol. Implementation of a low-price CNC plotter the usage of spare parts [17]. Mya Thandar Kyu et al [18] designed an XY-Plotter that is a transportable mini CNC system. A XY-plotter that operate on two axes of ("X" and "Y") to create non-stop vector graphics. XY-Plotter makes use of a pencil to hint the paper this is withinside the aircraft floor of the plotter.

2. DESIGN, MATERIAL, AND METHOD

2.1 Modeling of system

Heavy machinery like milling and lathe machine have great role in industrial life in today's world, but they are not transportable due to its weight. Mini CNC plotting machines are flexible and easily transportable from one place to another and can be converted into milling machine. The bed size of the plotter has standard dimensions which is same to the magnitude of the base. The wood used in the base is design capable for absorb the vibration generated by the motion of lead screw.

2.2 Mechanical System Design

The design consists of 3 individual single beds for the 3-axes positioned on linear tracks to limit movement on a single axis. Furthermore, an 8 mm threaded rod passes through each screwed bed and extracts two wing nuts fixed to the bed, initiating the bed to move along the axis while the motor rotates step by step. The structure is designed so that the base is composed of an X and Y bed with the Z plane suspended perpendicular to the base with the help of U-shaped mount. Furthermore, sliding bearings are installed on to the linear guide rails to

make the movement smooth and fair. A similar technique can be used assemble the Z axis assembly on the X axis, which is perpendicular to both the X-axis and Y-axis.

2.2.1 Base of the machine

The base of the machine is made of two pieces, aluminum sheets with thickness of 5mm, the dimension of the base is 180 mm × 100 mm. The sides of the base are supported by the two pieces of 20 mm thick wood with the dimension of 228mm × 75mm. Wood have higher damping power than aluminum.

2.2.2 Guide Rail

The ordinary guide rail framework: comprising of a direct movement bearing and a group of shafts, which would just permit unhindered development along its lengths. The size of the diameter of the guide rail can be found by equation 3.1

$$d = \sqrt{4p/\sigma\pi} \quad (1)$$

Where,

p is the load on the shaft

π is the ultimate strength of the material

The diameter of the guide rail was calculated by equation 1 and estimated to be 8 mm.

Figure 1 show the solid works model of the base along with the guide rail system.

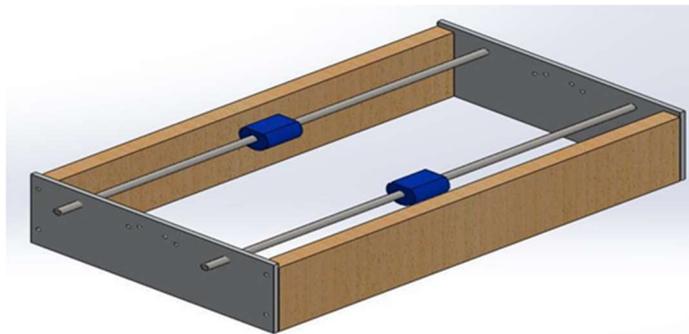


Figure1. Solid works model of the base, guide rail and linear bearings

2.3 Lead Screw

Lead screw is the backbone of the CNC plotting machine. In order to achieve the shortest (1.5 micrometer) movement of the pen, the thread pitch was selected to be 5mm after calculations.



Figure2. Fabricated model of the Lead screw

2.3.1 Flexible Coupling

Flexible couplings can be useful to transmit torque and power from one shaft (motor) to another shaft (spindle) even if the two shafts are slightly misaligned while the rigid coupling does not have the capacity to compensate misalignments of the shafts.



Figure3. Flexible Coupling

2.4 Stepper Motor

Stepper motors are electromechanical devices that convert electrical energy (in the form of pulses) into discrete mechanical movements. The position of the motor can be precisely controlled without any feedback mechanism, provided that the motor is carefully dimensioned for the application. They are used in open loop control system applications. Stepper motors are similar to switched reluctance motors. The stepper motor uses the theory of magnet operation to rotate the crankshaft to a precise distance when an electricity pulse is supplied. The stepper motor is a brushless motor that distributes full rotation in several equal steps. The rotation of these motors can be controlled by the electric pulses which pour into A, B, C and D coil using full-step mode.

2.4.1 The Resolution of the CNC Plotting Machine

The resolution the CNC plotting machine is related to the step size of the stepper motor. The position of the motor can be easily controlled by the knowing the full step angle of the stepper motor and thread pitch of the lead screw. The distance traveled by the lead screw by applying pulse train to the stepper motor.

2.5 Electronic System and Wiring

The stepper motor is controlled by electrical pulse train generated by the stepper motor driver module while the driver module is operated by the microcontroller. Microcontroller is the brain of the CNC plotting machine.

2.5.1 Microcontroller

An Arduino microcontroller is used to manipulate the CNC plotting machine. Its maximum or typically used model is Arduino UNO primarily based totally at the 8-bit Atmel ATMEGA328 microcontroller. It has virtual and analog input/output pins which could interface into numerous improvement forums and different circuits. It has 14 virtual input / output pins and six analogs Inputs that may be appraised the use of the on-chip analog to virtual convertor (ADC). Arduino IDE makes use of the avr-gcc compiler and the avrdude loading tool. UNO does now no longer want a separate hardware (known as a programmer) to load a brand-new code into it; simply use a USB cable to attach it to the PC.

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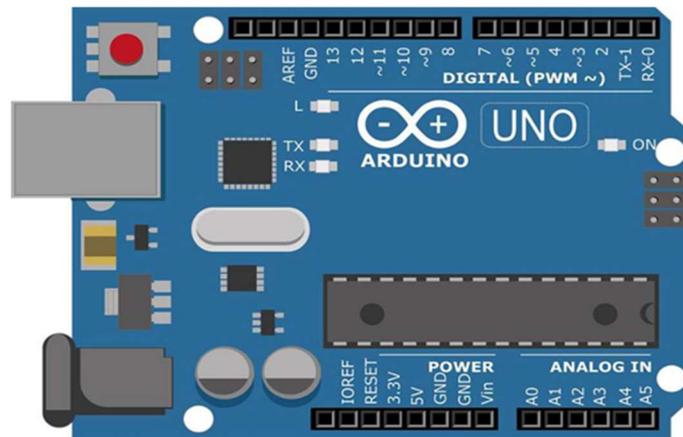


Figure4. Arduino UNO Microcontroller

2.5.2 Stepper motor driver and CNC shield

A4988 is a micro stepping controller for controlling bipolar stepper motors with an integrated translator for easy use. This means that one can control the stepper motor with only 2 pins of microcontroller controller; one to control the direction of rotation of the stepper motor and the other to control the steps. They small PCB boards normally come with heatsinks. They are easy to install on CNC shield.

2.6 Computer Tools and G code formation

G-Code or Geometric Code is the common call for a manage language for numerical manage machines. The widespread model of the G code is referred to as RS-274D. Since the G-codes are preparatory codes, in CNC software they begin with the letter G and direct the machine.

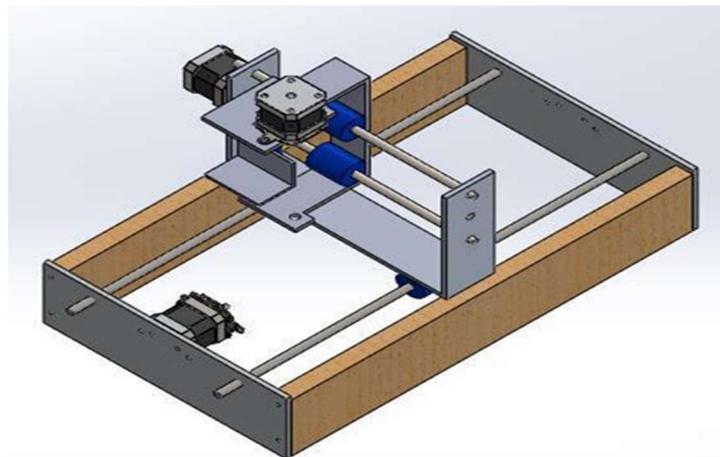


Figure5. Solid works model of the CNC plotting machine

2.6.1 Creating G-Code File Using Inkscape

Inkscape is a pc software program and may be used to layout the plot or the published textual content. In this venture, the use of this software program, the G code report of a specific photo or textual content is created. The CNC plotter of this machine can make paintings on A4size paper.

The G-code generated with the aid of using inscape is loaded in to the CNC plotting device with the aid of using laptop software program called Grbl-controller. Here you'll add a G-code record in addition to manually

G-code instructions. For example, to transport the pen up or down, one input the code M3 or M5 with inside the command bar.

3. TESTING & RESULTS

3.1 Testing

Before trying out the CNC printing system, the device become calibrated with the least mistakes approximations primarily based totally at the take a look at technique called hit and trail. After calibration, the CNC plotting system became geared up to work. The plotting device turned into applied and produced as expected; therefore, it may hint and write any picture and text, this plotting system can gather information from the programming that derives from pc-aided design (CAD) and pc aided manufacturing (CAM) or some other software program able to producing G-code like inkscape. The packages produce the G-code record after which executes the command to run the device. The application is transferred to Arduino thru the serial port (USB) after which loaded into the plotter to begin printing. After calibration and checking out, the plotter become in ideal running order geared up for use. Figure 6 indicates the CNC plotting device whilst operating on a job, which has an implementation with minimum cost.



Figure6. CNC plotting machine in action

3.2 Results

In this test five distinct square shapes were independently drawn by machine while calculating the time of the operation and measuring the occurred error. Figure 7 demonstrates the drawing plotted by CNC plotting machine. The data obtained from the experiment is tabulated in table 1.

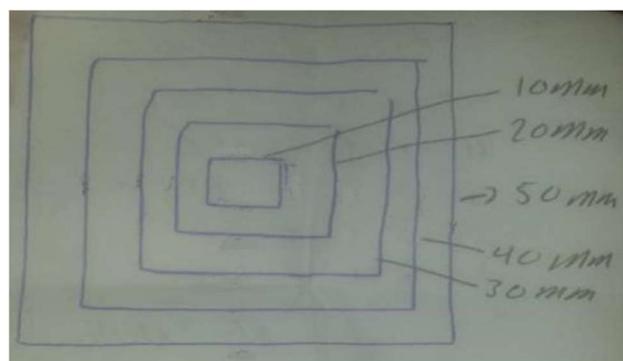


Figure7. Results of the experiment

Drawing no.	Dimension (mm*mm)	Distance (mm)	Time taken (sec)	Error in the X-axis(mm)	Error in the Y-axis(mm)	Total Error (mm)
1	10x10	40	14	1	2.0	6
2	20x20	80	20	0	1.0	2
3	30x30	120	27	1	1.0	4
4	40x40	160	33	1	0.5	3
5	50x50	200	38	2	0.5	5

Table1. Experimental results of the CNC Plotting Machine

Figure 9 shows the relationship between the distance traveled by the Pen of the machine vs the total time taken to complete each closed path diagram. From the graph it is clear that the relationship between the distance traveled and time taken is almost linear. Figure 10 gives the relationship between the distances traveled by the Pen of the machine vs the total error occurred while completing each closed path diagram. The pattern of the error occurred is varying randomly, however the mean of the error in the distance travelled is shown by straight line in figure 11.

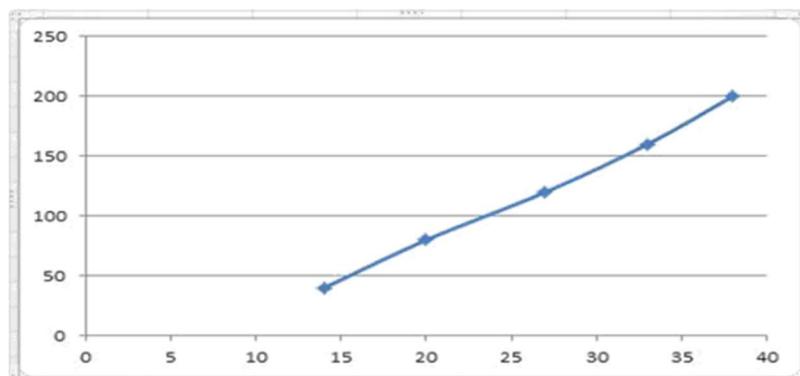


Figure9. Distance vs time taken



Figure10. Distance vs Total Error

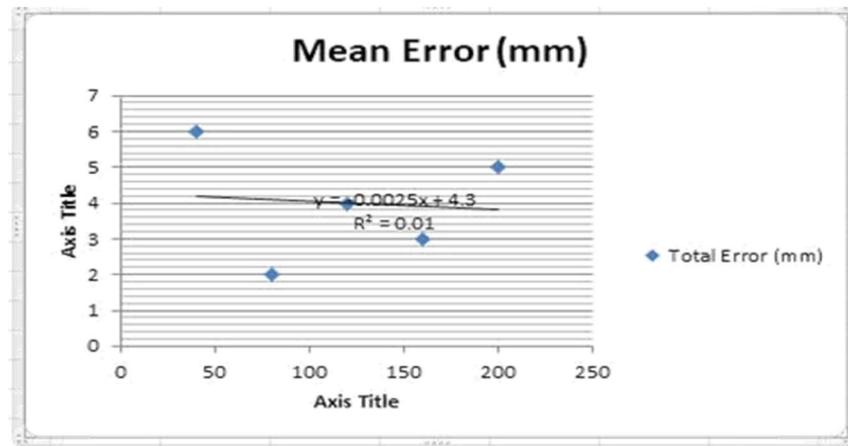


Figure11. Mean Error

3.3 Performance of the CNC plotting machine

An experimental test was performed on the CNC plotting machine to evaluate the performance of the machine. In this experiment five concentric rectangles of different sizes were constructed by the machine with a single command. The sketch drawn the machine is attached with the report. The data obtained from the experiment is as follow.

Total distance travelled by the pen = 600 mm

Total time taken by machine = 112 Sec

Total error measured = 28.5 mm

Calculated Percentage error = 4.75%

Hence;

Performance of the CNC plotting Machine = 95.25%

The G-code generated with the aid of using inkscape is loaded in to the CNC plotting device with the aid of using laptop software program called Grbl-controller. Here you'll add a G-code record in addition to manually G-code instructions. For example, to transport the pen up or down, one input the code M3 or M5 with inside the command bar.

4. CONCLUSION

This 3D CNC plotter can execute different construction plans as requested by the customer. These require design modifications that can be obtained by making changes to the G-code manually or by generating via the computer software like inkscape. The proposed 3D CNC plotter offers instant printing or sketches of buildings and drawings on an A4 sheet. The application of the proposed 3D CNC plotting can also be extended in the field of the design and drilling of printed circuits (PCBs), the extraction and fabrication of metals, the engraving of letters and logos.

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CARREAU FLUID MODEL NEAR THE PARABOLIC SURFACE WITH SLIP VELOCITY

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ABSTRACT

In the last few years, the specialist gained their research in the field of Non-Newtonian fluid due to its large range of applications in industrial and engineering sides. In the automobile industry, vehicles are designed with a paraboloid surface in mind, so that vehicles can withstand minimal resistance. The shape of jet plane, car's bonnet, upper shape of a submarine and shape of a rocket are some useful daily life examples of upper paraboloid surface. The movement over these surfaces depends on boundary layer which is formed within the immediate space on it. At free stream of paraboloid surface the fluid flow will create by the reaction of catalytic surface and stretching between fluid layers.

In this article, Carreau fluid model is used to formulate the 2-D boundary layer equations past over the surface of parabola. The Carreau fluid model is adequate for many non-Newtonian fluids, and this model characterized the flow behavior of fluids having both properties of shear thinning and shears thickening. Here we investigate the consequences of velocity slip condition on the wall of paraboloid surface. The heat and mass transfer rate are calculated by considering variable thermal conductivity and diffusivity. The reaction between catalyst and Carreau fluid produces generous difference in temperature consequently made buoyancy-driven flows in the boundary layer region.

The modeled equations of Carreau fluid with mentioned effect are obtained in form of PDEs and then we convert these equations into coupled ODEs by assuming set of similarity transformations. For sake of numerical and graphical results, the resulting ODEs are numerical solved on MATLAB software using BVP4c technique. Computation are achieved on velocity profile by using innumerable values of Weissenberg number, power law index, thickness coefficient of paraboloid surface and buoyancy parameters. The temperature and concentration profiles are attained by Prandtl number, thermal conductivity parameter, Schmidt number, chemical reaction parameter and diffusivity parameter. Also comparison with previous published data is performed and they are in good agreement.

Keywords: Paraboloid Surface; Non-Newtonian fluid; Carreau Fluid; Velocity Slip Condition; Variable thermal conductivity and Diffusivity.

IMPACT OF SOCIOECONOMIC DEVELOPMENT ON FERTILITY TRANSITION: VECTOR AUTOREGRESSIVE MODEL

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ABSTRACT

This study investigates the impact of some of the socio-economic factors on fertility transition in Saudi Arabia over the period of 1968 to 2018. This study used time-series Vector Error Correction Model (VECM) approach of stationary test, cointegrating test, stability test and Grange causality test. The results of empirical models using the World Bank data for Saudi Arabia indicate that the total fertility rate (TFR) decreases over the time from 7.267 in 1968 to 2.319 in 2018. The long run coefficient is negative and significant which shows long run causality between TFR as target variable and the percentage of females in the labor force, life expectancy at birth and per capita income as endogenous variables. The percentage of females in the labor force has a negative and significant impact on TFR in the long run. Life expectancy at birth and per capita income have a positive and significant impact; this result support the demographic transition first stage that life expectancy increase fertility. Wald test show that there is short run causality running from the percentage of females in the labor force to the TFR, but there is no short run causality running from life expectancy at birth and per capita income.

Keywords: fertility transition, vector error correction model (VECM), cointegration, Grange causality test, and Wald test.

PREAMBLE

Saudi Arabia's fertility rate has declined over the last five decades. The total fertility rate (a measure of the average number of babies born to a woman over her lifetime) has declined early in Europe in the last nineteen century, and in America has declined in early twentieth century (Guinnane, 2010). Fertility rate has been declining in different manner as whether couples reduce the number of surviving offspring by spacing their child-bearing or ending child-bearing before that is biologically necessary.

In 1985, UN inspect the relation between fertility rate and women labor force participation for a panel of countries. There is a negative relationship between women employment and fertility rate. Kreider et al. (2009) study's find that woman's educational attainment, infant and child mortality and growth in per capita income has a strong theoretical and empirical relationship in 47 countries of Sub-Saharan Africa, Caribbean, Asia, Latin America and North Africa. This study shows that as the GDP growth increase over the time the fertility reductions will be smaller in magnitude.

Fertility transition is a complex process explain with many exogenous variables. Guinnane, 2010 explain these an exogenous variables as decline in infant and child mortality, availability of contraceptive devices and innovations in the technology of contraception, increases in the direct cost of childbearing, explanation is based on changes in the opportunity costs of child-bearing, a net increase in returns to child quality and children were an important way to ensure against risk and to provide for old age, and that the rise of state social insurance as well as private insurance and savings vehicles led households to substitute out of children.

better-educated women are motivated to increase their labor market attachment and postpone childbearing due to fear of losing their job and jeopardizing progress in their work career. Given that women still bear most of the time costs associated with childrearing, women with higher occupational position and high wage face higher opportunity costs than those with low-income potential (Schultz 1974, Becker 1981, Gustafsson and Kalwij 2006). More women than ever are participating on the labor market, most couples use reliable contraception that enables them to flexibly postpone their childbearing plans (Sobotka 2008).

Crafts (1989) finds that there was negative correlation between women's local labor-force opportunities and marital fertility, with elasticities ranging from -.13 to -.34 in England and Wales (census 1911).

For instance, a study on Australian fertility in 1976-2000 (Martin 2004) reported a highly significant and positive relationship between GDP and TFR changes. Billingsley (2009) found that GDP change was positively correlated with fertility rates at all age groups above 20, controlling for inflation and wage growth. She also found, however, that GDP rise was positively linked to fertility postponement; similar result was obtained in a more extensive model on first births in Hungary (Aassve et al. 2006). This result may be peculiar to the former state-socialist countries. unemployment is included in the model. In a model using individual-level data for ten countries, GDP change is positively linked to first birth transitions, even when controlling for unemployment. Using a longer time series of data on the changes in GDP, births and marriages in 1908-1990 Palloni et al (1996) found a significant pro-cyclical association between GDP trends and marital births with a 1-year gap in only five out of 11 Latin American countries analyzed (significant only in Cuba).

International Conference on Population and Development Program of Action (1994) promotes the slogan to reduce fertility and takes it to replacement rate since the mid of 21st century. For this purpose they mention the importance of family and individual well-being, optimum health facilities, timing and space of child birth and preventions from high-risk and unwanted childbirth. Although at the beginning of New Millennium, all the developed nations are showing their fertility rate below the replacement rate. But still fertility rate is one of the main causes of increase in population. The focus of recent population policies about fertility is to help women to avoid unintended birth for improving child and maternal health.

Fertility decline is also one of the important and complex socio-economic phenomena in developing countries. In existing literature different theories and hypothesis are presented by demographers and researchers to explain this complex phenomenon. Millennium Development Goals of United Nations also highlights some socio-economic factors for reducing fertility in developing countries. Empirically, urbanization, women education and economic status of a family are some important socio-economic factors affecting fertility rate (Ellis, 1988). According to socioeconomic and demand theories of fertility, there are socio-economic factors behind the incentives for fertility decline. Individual decisions are affected by the level of income, life expectancy of children, education and social status (Galloway, Hammel, and Lee (1994) Potter, Schmertmann, and Cavenaghi (2002).

FERTILITY AND SOCIOECONOMIC FACTORS

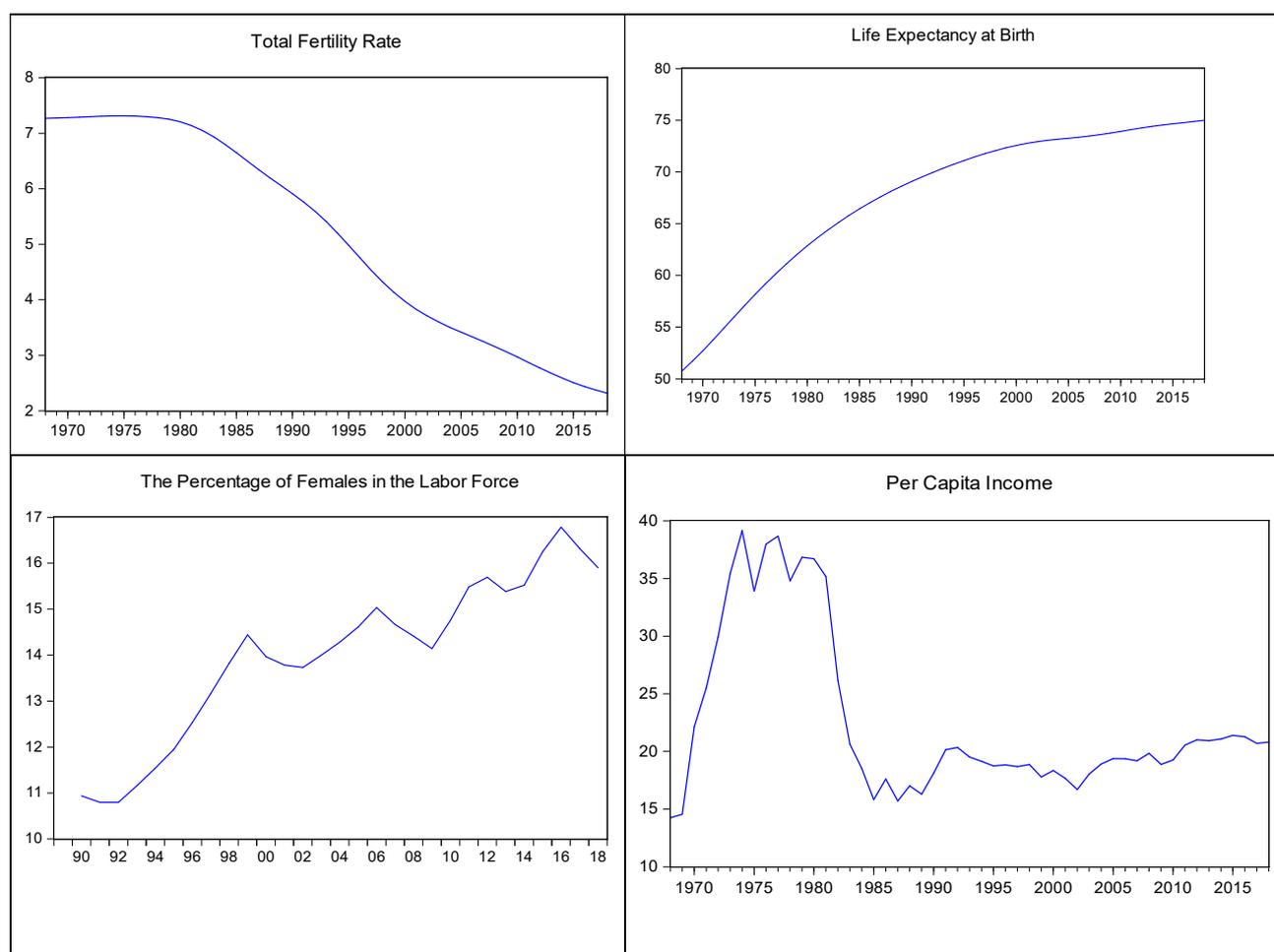
This research explains the impact of the development in socio- economic factors on fertility transition in case of Saudi Arabia over the period of 1968 to 2018 using the World Bank data. Total fertility rate is taken as dependent variable whereas the percentage of females in the labor force (LABORR), per capita income (PCI), female education rate (EDUR) and life expectancy at birth (EAGE) are taken as explanatory variables. The result in table (1) presents the descriptive statistics of the factors. These statistics show that total fertility rate and female education rate are positively skewed, on other hand the percentage of females in the labor force, per capita income (PCI), and life expectancy at birth are negatively skewed. The factors are normally distributed since the values of skewness and kurtosis reveal that all factors are statistically insignificant. Which confirmed by the estimated values of Jaque – Bera that indicate that all factors have zero mean and finite covariance.

Table (1): Descriptive Statistics

	EAGE	EDUR	PCI	LABORR	TFR
Mean	72.70289	22.85706	19.38130	14.10439	3.808250
Median	73.10500	16.26193	19.22518	14.34936	3.553000
Maximum	74.87400	69.87621	21.39911	16.78479	5.911000
Minimum	69.07800	0.270100	16.69641	10.79371	2.373000
Std. Dev.	1.658500	20.91535	1.212286	1.674102	1.088373
Skewness	-0.663640	0.806521	-0.042673	-0.570574	0.515998
Kurtosis	2.421576	2.592156	2.338641	2.506902	2.057895
Jarque-Bera	2.708493	5.190457	0.516512	1.873918	2.408555
Probability	0.258142	0.074629	0.772397	0.391817	0.299909

Total fertility rate in Saudi Arabia declined from 7.267 in 1968 to 2.319 in 2018. While the percentage of females in the labor force and life expectancy at birth are increase over all the time. The per capita income was increased from 14252 1968 to 36703 in 1979. Then began to decrease in 1980 in different rate. Figure (1) present the trend of the model variables which indicate nonstationary series.

Figure (1): TFR and Socioeconomic Factors



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VECTOR ERROR CORRECTION MODEL

Granger causality test is one of number of causality approach that widely used with the vector error correction model (VECM). Engle and Granger (1987). Table (2) show that there is bidirectional causality running between total fertility rate with per capita income and the percentage of females in the labor force. There is one directional causality running from life expectancy at birth to total fertility rate, per capita income, and the percentage of females in the labor force. There is an unidirectional causality running between total fertility rate, life expectancy at birth, per capita income, and the percentage of females in the labor force to female education rate. And there is an unidirectional causality running between the percentage of females in the labor force and per capita income.

Table (2): Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
EDUR does not Granger Cause EAGE	41	1.55988	0.2240
EAGE does not Granger Cause EDUR		1.01152	0.3738
GDP does not Granger Cause EAGE	49	0.62126	0.5419
EAGE does not Granger Cause GDP		8.67363	0.0007
LABORR does not Granger Cause EAGE	27	0.57389	0.5715
EAGE does not Granger Cause LABORR		13.1048	0.0002
TFR does not Granger Cause EAGE	49	2.91863	0.0645
EAGE does not Granger Cause TFR		8.50800	0.0008
GDP does not Granger Cause EDUR	41	0.14945	0.8617
EDUR does not Granger Cause GDP		0.22068	0.8030
LABORR does not Granger Cause EDUR	26	0.02562	0.9747
EDUR does not Granger Cause LABORR		0.80742	0.4594
TFR does not Granger Cause EDUR	41	0.94937	0.3965
EDUR does not Granger Cause TFR		1.29184	0.2872
LABORR does not Granger Cause GDP	27	0.69080	0.5117
GDP does not Granger Cause LABORR		0.53239	0.5946
TFR does not Granger Cause GDP	49	8.99560	0.0005
GDP does not Granger Cause TFR		3.86076	0.0285
TFR does not Granger Cause LABORR	27	15.8944	5.E-05
LABORR does not Granger Cause TFR		4.00035	0.0330

As a result of pairwise Granger causality test; female education rate has not any direct impact on fertility transition in Saudi Arabia. So we can determine the VECM variables: total fertility rate, life expectancy at birth, per capita income and the percentage of females in the labor force as endogenous variables.

Time series data have unit root problem that makes regression results unfavorable for policy implications. Nelson and Ploser (1982). Stationarity of the time series data is necessary and sufficient condition for examining the cointegration among the variables. To examine the stationarity for these variables used Augmented Dickey – Fuller test. table (3). Show that all variables are non-stationary.

Table (3): Unit Root test

variable	Total fertility rate	life expectancy at birth	per capita income	the percentage of females in the labor force
Augmented Dickey-Fuller test statistic	-2.8365	0.1499	-0.3631	2.1346
P – value	0.0611	0.7249	0.5494	0.9900

Then we must choose the optimal lags using the information criterion: Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC), and Hannan-Quinn information criterion (HQ). table (4) present that the optimum lag order is (2) for total fertility rate, the percentage of females in the labor force and per capita income and life expectancy at birth as endogenous variables.

Table (4): VAR Lag Order Selection Criteria

Lag	FPE	AIC	SC	HQ
0	10.48269	10.86327	11.00472	10.90757
1	8.61e-07	-5.456770	-4.890993	-5.279576
2	5.12e-11*	-15.35915*	-13.85483*	-14.82629*
3	5.27e-11	-15.26927	-13.52037	-14.78327

Table (5) present Johansen cointegration test using maximum eigenvalues indicates that the null hypothesis of no cointegration among the variables of this model is rejected at level 5% and the second hypothesis is accepted which support co-integration of order (1) among the variables of the model. This confirm that total fertility rate, the percentage of females in the labor force, per capita income and life expectancy at birth have long run relationship in Saudi Arabia.

Table (5): Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	P-value
None *	0.704396	38.50122	29.79707	0.0039
At most 1	0.228092	6.814089	15.49471	0.5994
At most 2	0.003186	0.082956	3.841466	0.7733

Since the variables are non-stationary at level, and they are cointegrated of order (1). We will estimate the Vector Error Correction model (VECM) using (2) lags.

The long run model (cointegrating equations) is:

$$ect_{t-1} = 1.00 TFR + 0.269 LABORR(-1) - 0.370 EAGE(-1) - 0.066 PCI(-1) + 0.106 @TREND + 16.711$$

[5.557]
[-4.246]
[-3.055]
[6.223]

The long run model reveals that total fertility rate is the target variable, the percentage of females in the labor force has a negative and significant impact on TFR in the long run. One percent increase in the percentage of females in the labor force will lead to a decline in TFR by 0.269 in Saudi Arabia; so, empowerment of women in the labor market is playing an important role in decreasing TFR. Life expectancy at birth and per capita income have a positive and significant impact. An increase of life expectancy at birth by one year increase TFR by 0.37; this result support the demographic transition first stage that life expectancy increase fertility. The estimates show that one thousand \$ increase in per capita income led to increase TFR in the long run by 0.066. The total fertility rate trend to decrease over the time significantly.

Table (6): Vector Error-Correction Model, Short Run model, Dependent variable (TFR)

variables	D(TFR)	t-statistics		Wald test	
		Value	p-value	value	p-value
D(TFR (-1))	1.7659***	14.824	0.0000	701.566	0.000
D(TFR (-2))	-0.8544***	-8.4077	0.0000		
D(LABORR(-1))	0.001139*	0.6537	0.0252	6.438	0.040
D(LABORR(-2))	0.004447*	2.4088	0.0276		
D(EAGE(-1))	0.029613	0.4251	0.6761	0.431	0.806
D(EAGE(-2))	-0.012371	-0.1996	0.8442		
D(PCI (-1))	8.91E-05	0.1071	0.9160	0.622	0.732
D(PCI (-2))	-0.000672	-0.7838	0.4439		
constant	-0.01528**	-3.6081	0.0022	13.01841	0.0003
ect_{t-1}	-0.0171*	-2.6758	0.0160		
Adj. R-squared	0.998				
F-statistic	1196.597				
Prob(F-statistic)	0.0000				
Akaike AIC	-15.288				
Schwarz SC	-13.111				

Table (6) reveal the short run dynamic among the model variables through the Vector Error Correction Model (VECM). Using the Wald test the results show that there is a short run causality running from the percentage of females in the labor force to the TFR at 5% level. But there is no short run causality running from life expectancy at birth and per capita income to the TFR. ECM has significant negative value (-0.0171) which shows that there is a long run causality between TFR and the endogenous variables. The negative sign showing the ability to bounce back to equilibrium. The value of ECM gives the speed of adjustments within which the model will restore its equilibrium following any disturbances. The estimates of ECM reveal that short run needs 58 years and six months to converge in the long run equilibrium. This shows that for achieving the determinant level of fertility rate in Saudi Arabia the government must plan because most of socioeconomic factors need a long run change.

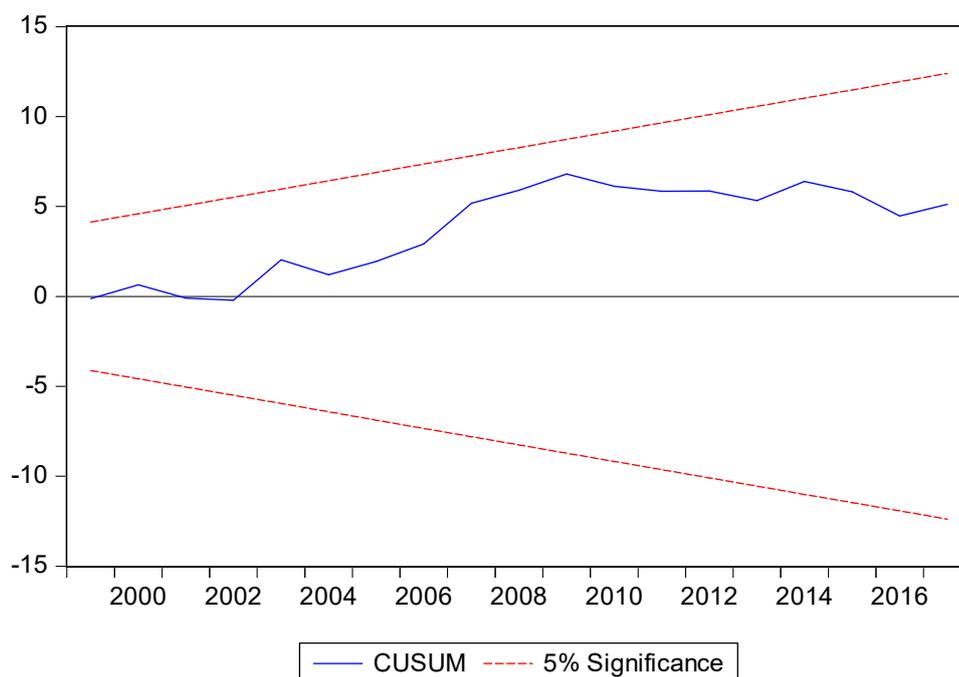
Diagnostics tests are used to examine the problem of serial correlation, normality, heteroscedasticity. Lagrange multiplier test show that there is no serial correlation among the model variables. Residuals are normally distributed based on a test of skewness and kurtosis of residual. The residuals are homoscedastic as the Breusch and Pagan – Godfrey test show. Since the estimated model fulfill all the requirement of good regression model, we can used it for forecasting. Table (7).

Table (7): Diagnostic Tests

Test Statistics	value	P – value
1.Serial Correlation	2.7550	0.1019
2.normality	0.7014	0.7042
3.heteroscedasticity	4.23152	0.9789
1.Lagrange Multiplier test of serial correlation. 2.Based on a test of skewness and kurtosis of residual. 3.Breusch and Pagan – Godfrey test.		

The cumulative sum of square of recursive residual CUSUM test is conducted to examine the parameters constancy. Because the misspecification of the model may give bias results which influence the explanation of the model. Hansen (1996). The plot of CUSUM in the figure (1) reveal that the parameters are constancy since the test is within the critical bounds at 5% significant level.

Figure (1): Cumulative Sum of Square of Recursive Residual



CONCLUSIONS

This study is to validate the impact of development in socioeconomic factors on fertility transition.

- Life expectancy at birth and per capita income have a positive and significant impact on TFR in long run. this result support that Saudi Arabia is in the first stage of the demographic transition which say that increasing in life expectancy will increase fertility rate.
- Increase in the percentage of females in the labor force will lead to a decline in TFR in Saudi Arabia; so, empowerment of women in the labor market is playing an important role in decreasing TFR. This result support the neoclassical theory that emphasis investment in human capital formation enhances the women participation in the labor market and in the long run the fertility behavior will change and women will prefer few children.

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