1. ATLAS

INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED SCIENCES
July 09-10, 2022
University of Jaén, Spain

PROCEEDINGS BOOK

EDITOR

Prof. As. Dr. Lindita DURMISHI
Merve KIDIRYÜZ

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Prof. As. Dr. Lindita DURMISHI

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CONGRESS ID

CONGRESS TITLE

1. ATLASINTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED SCIENCES

DATE AND PLACE

July 09-10, 2022/ University of Jaén, SPAIN

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University of Jaén

Economic Development and Social Research Institute

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Total Accepted Article: 65

Total Rejected Papers: 7

Accepted Article (Turkey): 26

Accepted Article (Other Countries):39

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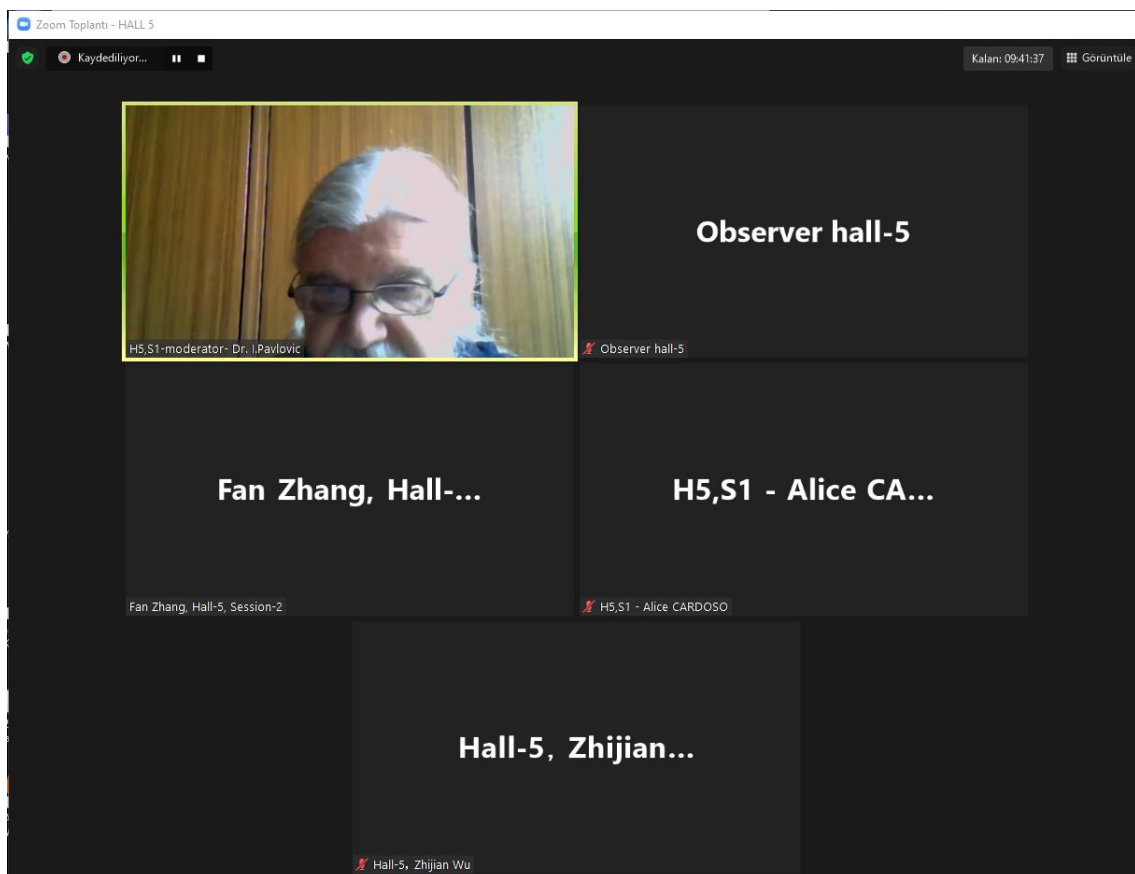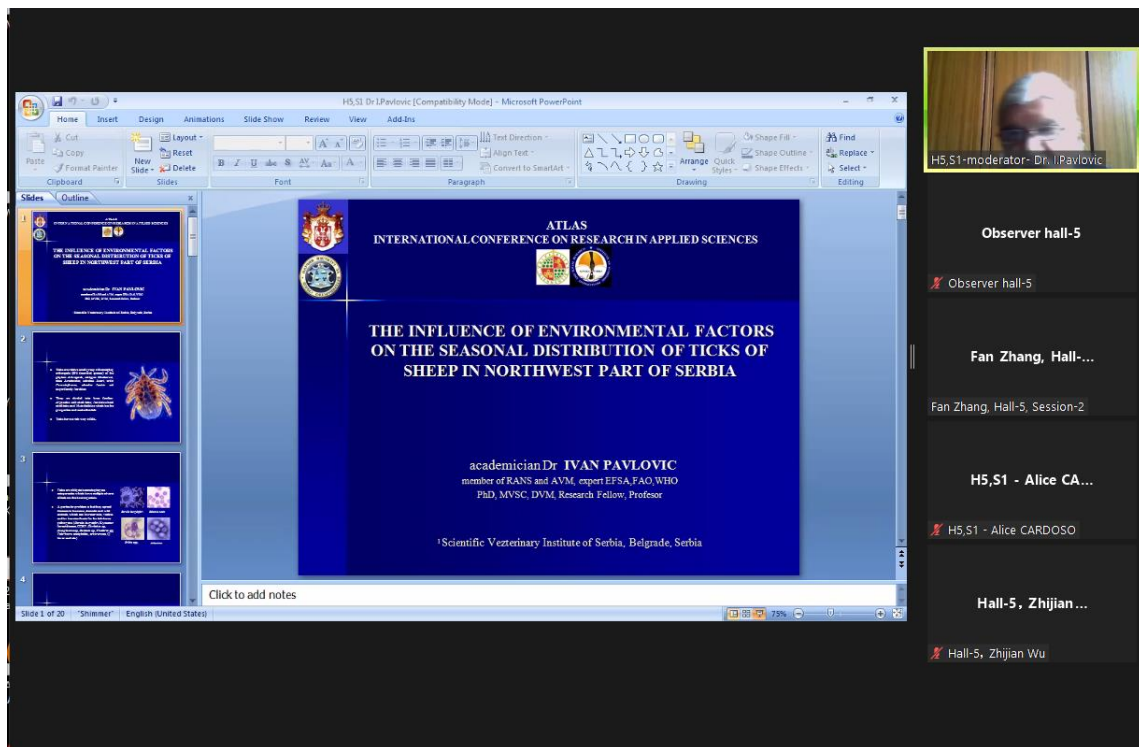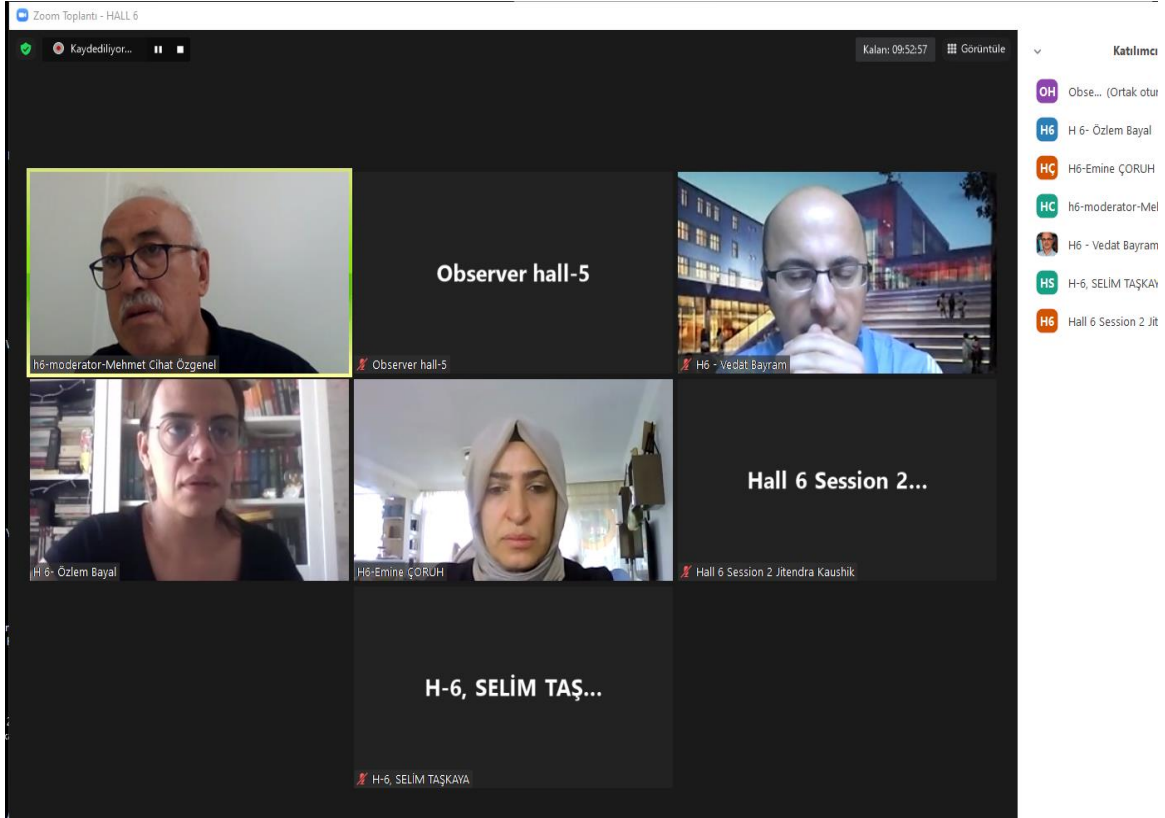*Batumi Shota Rustaveli State University*

Dr. Terane NAGIYEVA
Azerbaijan State Pedagogical University

Dr. Violla MAKHZOUM
Islamic University of Lebanon

Dr. Bashir Ali SALEH
Al-*Jabal Al-Gharbi University, Libya*

Dr. Aysel KEKİLLİOĞLU
Nevsehir Hacıbektas Veli University, Turkey

The torque produced by the motor is given in figure 4.   31%   ripple occurs in the torque. Ripple is found by the expression (2).

$$\Delta_{TE} = \frac{T_{max} - T_{min}}{T_{ort}} \cdot 100 \qquad (2)$$

Figure 4. Torque produced by FDAM

It is seen from Figure 3 that one phase winding of the motor is not used at all times, and from Figure 4 there is ripple in the torque. This is happening with BLDCM drivers currently used in industry.

From here, it is clearly seen that the capacity of the motor is not used fully. In other words, one phase winding (120/180).100=66% is used. In other word, 33% of the capacity of a phase winding is not used.

ATLAS

INTERNATIONAL CONFERENCE ON RESEARCH IN APPLIED SCIENCES

CONFERENCE PROGRAM

July 09-10, 2022 / Gran Hotel Havana, Barcelona, Spain

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Zoom ID: 815 3232 5759
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10.07.2022
Hall-4 / Session-1

Madrid Time:
08:00 : 10:00

Ankara Time:
09:00 : 11:00

ID: 815 3232 5759
Passcode: 091011

HEAD OF SESSION: Assist. Prof. Mashael Ahmad HOBANI

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Oladeji Daniel Oladele Promise Goodness Adeleye Gideon Oluwaseun Olayioye Sunday Blessing Oladipupo Aderemi Timothy Adeleye	Seneca College of Applied Arts and Technology (Canada) University of Ilorin (Nigeria) Nigeria Immigration Services (Nigeria) University of Ilorin (Nigeria) Dalian Institute of Chemical Physics, Chinese Academy of Sciences (China)	REVIEW ON MITIGATION OF GLOBAL GREENHOUSE GAS EMISSIONS VIA WASTE MANAGEMENT APPROACH
Salwa D. Al-Malwi Rahmah H. Al-Ammari	King Abdulaziz University (Saudi Arabia)	INFLUENCE OF SYNTHESIS CONDITIONS ON PHYSICO-CHEMICAL AND PHOTOCATALYTIC PROPERTIES OF SILVER NANOMATERIALS
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Hamza IGHNIH Redouane HAOUNATI Hassan OUACHTAK Naima HAFID Mohamed LAABD Amane JADA Mohamed Labd TAHA Abdallah ALBOURINE Abdelaziz AIT ADDI	Ibn Zohr University (Morocco) Applied Bio-Organic Chemistry Team (Morocco) Ibn Zohr University (Morocco) Center For Education & Training Profession Souss Massa (Morocco) Ibn Zohr University (Morocco) University of Upper Alsace (France)	ELABORATION AND CHARACTIRIZATION OF NEW BIOCOMPOSITE BASED ON POLYANILINE AND ALMOD SHELL FOR EFFECTIVE REMOVAL OF ORANGE G DYE FROM AQUEOUS SOLUTION USING A DYNAMIC ADSORPTION
R. El Brychy M. Rguiti H. Bourzi S. Elissami H. Zejli	Ibn Zohr University (Morocco)	ELECTROCHEMICAL TREATMENT OF ORGANIC WASTE: APPLICATIONS FOR THE ELIMINATION OF SYNTHETIC ORGANIC DYES EXAMPLE OF CRYSTAL VIOLET
Jonė Vitkauskaitė-Ramanauskienė	Kaunas University of Technology (Lithuania)	THEORY-BASED SUSTAINABLE MOBILITY INITIATIVE "MOVE GREEN"
Assist. Prof. Mashael Ahmad HOBANI	King Abdulaziz University (Saudi Arabia)	PATIENT-CENTREDNESS IN GESTATIONAL DIABETES MELLITUS HEALTHCARE SERVICES IN SAUDI ARABIA—AN EXPLORATION
Bochen WANG Weiming GONG	Southeast University (China)	VARIATIONAL ELASTIC SOLUTION FOR AN END BEARING PILE SUBJECTED TO DYNAMIC TORSIONAL LOADING

10.07.2022
Hall-5 / Session-1

Madrid Time:
08⁰⁰ : 10⁰⁰

Ankara Time:
09⁰⁰ : 11⁰⁰

ID: 815 3232 5759
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HEAD OF SESSION: Dr. Ivan PAVLOVIC

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Fatma Mohamed Jabar	*University of Duhok (Iraq)*	EXTRACTIVE CLOUD POINT SPECTROPHOTOMETRIC DETERMINATION OF MESALAZINE USING BRILLIANT GREEN DYE
Dr. Hanane AIT HMEID Prof. Dr. Mustapha AKODAD Prof. Dr. Mourad BAGHOUR Prof. Dr. Abdelmajid MOUMEN Prof. Dr. Ali SKALLI Prof. Dr. Ghizlane AZIZI	*Mohamed First University (Morocco)*	USE OF CLAYS AS INDICATORS OF REGIONAL GEODYNAMIC EVENTS: EXAMPLE OF BENTONITE DEPOSITS AND SURROUNDING AREAS
Arif NAZIR Ali AKBAR Hanadi B. BAGHDADI Shafiq UR REHMAN Eman AL-ABBAD Mahvish FATIMA Munawar IQBAL Nissren TAMAM Norah ALWADAI Mazhar ABBAS	*Imam Abdulrahman Bin Faisal University (Saudi Arabia)*	ZINC OXIDE NANOPARTICLES FABRICATION USING ERIOBOTRYA JAPONICA LEAVES EXTRACT: PHOTOCATALYTIC PERFORMANCE AND ANTIBACTERIAL ACTIVITY EVALUATION
Hanifi KEBIROGLU Serhat KESER Tankut ATES Filiz ERCAN Ismail ERCAN Niyazi BULUT Omer KAYGILI Suleyman KOYTEPE	*Firat University (Türkiye)* *Firat University (Türkiye)* *Malatya Turgut Özal University (Türkiye)* *Imam Abdulrahman Bin Faisal University (Saudi Arabia)* *Imam Abdulrahman Bin Faisal University (Saudi Arabia)* *Firat University (Türkiye)* *Firat University (Türkiye)* *Inonu University (Türkiye)*	X-RAY DIFFRACTION ANALYSIS OF Fe/Ti CO-DOPED BIPHASIC CALCIUM PHOSPHATES
Hanifi KEBİROGLU Sultan ERKAN Niyazi BULUT	*Firat University (Türkiye)* *Sivas Cumhuriyet University (Türkiye)* *Firat University (Türkiye)*	INVESTIGATION OF MIFEPRISTON (RU-486) AND ITS DERIVATIVES, MOLECULAR DOKING AND DOS (DESTINY OF STATES) QUANTUM CHEMICAL METHOD
Yang Wang	*Southeast University (China)*	CYCLIC LATERAL RESPONSES OF MONOPILES CONSIDERING THE INFLUENCE OF PILE–SOIL RELATIVE STIFFNESS IN SANDTHE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE SEASONAL DISTRIBUTION OF TICKS OF SHEEP IN NORTHWEST PART OF SERBIA
Acad. Research Fell. Dr. Ivan PAVLOVIC	*Scientific Vezterinary Institute of Serbia (Serbia)*	THE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE SEASONAL DISTRIBUTION OF TICKS OF SHEEP IN NORTHWEST PART OF SERBIA
DDS Alice CARDOSO PhD Marcelo PALINKAS MSc Thamyres BRANCO MSc Nicole BETTIOL MSc Paulo DE VASCONCELOS MSc. Patricia LIMA PhD Selma SIESSERE PhD Simone REGALO	*University of São Paulo (Brazil)*	INFLUENCE OF BICHECTOMY SURGERY ON MASTICATORY EFFICIENCY: ELECTROMYOGRAPHIC ANALYSIS

10.07.2022
Hall-6 / Session-1

Madrid Time:
08⁰⁰ : 10⁰⁰

Ankara Time:
09⁰⁰ : 11⁰⁰

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HEAD OF SESSION: Prof. Dr. Manana CHUMBURIDZE

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Anil Kumar SHUKLA Joydip DHAR Rajshree MISHRA	*Government P.G. College (India)* *ABV-Indian Institute of Information Technology and Management (India)* *S.M.S. Government Model Science College (India)*	HISTORICAL DEVELOPMENT OF FRACTIONAL CALCULUS AND ITS SIMILARITY WITH ORDINARY CALCULUS
Prof. Dr. Manana CHUMBURIDZE Elza BITSADZE Lia JANADZE	*Akaki Tsereteli State University (Georgia)*	E-DOCUMENTS MANAGEMENT ALGORITHMS AND THEIR APPLICATION
Lect. Dr. Ebru KAYA BAŞAR Assoc. Prof. Dr. Doğan NARİNÇ	*Akdeniz University (Türkiye)*	DETERMINING THE BEST FITTED GROWTH MODEL IN JAPANESE QUAILS: A BAYESIAN APPROACH
Lect. Dr. Ebru KAYA BAŞAR Assoc. Prof. Dr. Doğan NARİNÇ	*Akdeniz University (Türkiye)*	APPLICATION OF CLASSIFICATION TREE METHOD TO DETERMINE FACTORS AFFECTING EMBRYONIC MORTALITY IN POULTRY
Lect. Dr. G Subash CHANDRABOSE Assist. Prof. Dr. R. VINOTH N. SUNDARNATHAN	*Imam Abdulrahman Bin Faisal University (Kingdom of Saudi Arabia)*	EXPECTED TIME TO RECRUITMENT IN AN ORGANIZATION THROUGH DISTRIBUTION
Toufik HOSSAIN Dr. Sudip MISHRA	*Maulana Abul Kalam Azad University of Technology (India)*	DYNAMICAL ANALYSIS OF A DELAYED RATIO-DEPENDENT PREY–PREDATOR MODEL
Assist. Prof. Dr. Elif SOMUNUCU Prof. Dr. Bahtiyar A. MAMEDOV	*Uşak University (Türkiye)* *Gaziosmanpasa University (Türkiye)*	NUMERIC CALCULATION OF THIRD VIRIAL COEFFICIENT OF GAS MIXTURES
Prof. Dr. Bahtiyar A. MAMEDOV Assist. Prof. Dr. Elif SOMUNUCU	*Gaziosmanpasa University (Türkiye)* *Uşak University (Türkiye)*	NUMERIC ANALYSIS OF SPEED OF SOUND USING FOURTH VIRIAL COEFFICIENT AND ITS APPLICATION TO MOLECULE

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AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Eda YILDIZHAN Res. Assist. Fırat AŞIR	*Dicle University (Türkiye)*	A COMPARISON OF THE PROTECTIVE EFFECTS OF COENZYME Q 10 AND NIFEDIPINE ON THE PREVENTION OF NEFROTOXICITY RESULTING FROM ACETOMINOPHEN USE IN RATS
Dr. Eda YILDIZHAN Dr. Süreyya ÖZDEMİR BAŞARAN Dr. Özge KAPLAN	*Dicle University (Türkiye)*	INVESTIGATION OF THE PROTECTIVE EFFECTIVENESS OF ROSEMARINIC ACID IN THE TESTES IN PREVENTION OF DELTAMETRIN DUE TOXICITY IN RATS
Dr. Kadir Serkan YALÇIN	*Lokman Hekim University (Türkiye)*	THE EFFECT OF AGE ON HOMOCYSTEINE LEVEL IN INDIVIDUALS WITH NORMAL B12 AND FOLIC ACID LEVEL
Assist. Prof: Dr. Seçil SOYLU Stj. Dr. Yusuf Erkam ÖZTÜRK Stj. Dr. Hasret TELLİ Stj. Dr. Celal KARA Stj. Dr. İsmail AYAS Stj. Dr. Emre KOTKAY	*Afyonkarahisar University of Health Sciences (Türkiye)*	TRADITIONAL AND COMPLEMENTARY MEDICINE PRACTICES IN SKIN DISEASES AND NON-SKIN DISEASES DURING THE COVID-19 PANDEMIC PERIOD: A QUESTIONNAIRE STUDY
Dr. Elisabeta KAFIA Dr. Silva IBRAHIMI Dr. Dott.Ervin IBRAHIMI	*Albanian University (Albania)* *Responsabile Sanitario Area Vasta 2* *Cooss Marche (Italy)*	A QUALITATIVE ANALYSIS OF EARLY RELOCATIONS AND COPING STRATEGIES USED BY ONCOLOGY PATIENTS
Dorina MINXURI	*Logos University Tirana (Albania)*	PREVALENCE AND RISK FACTORS OF HASHIMOTO'S THYROIDITIS IN ALBANIA
Rabah DELFOUF Nacerdine BOUZIT Labiba CHIOUKH	*University Ferhat Abbas Sétif 1 (Algeria)*	PREDICTION OF THE ELECTROMAGNETIC BEHAVIOR OF TERNARY COMPOSITES USING MIXING LAWS
Prof. Dr. Flavia CECILIO Prof. Dr. Ligia GONÇALVES Prof. Dr. Marcelo PALINKAS Prof. Dr. Wilson MARQUES JUNİOR Prof. Dr. Jaime HALLAK Prof. Dr. Paulo DE VASCONCELOS Prof. Dr. Isabela REGALO Prof. Dr. Selma SIESSERE Prof. Dr. Simone REGALO	*University of São Paulo (Brazil)*	AMYOTROPHIC LATERAL SCLEROSIS: AN ANALYSIS OF THE ELECTROMYOGRAPHIC FATIGUE OF THE MASTICATORY MUSCLES
Dr. Mehmet Ali IKIDAĞ	*SANKO University Hospital (Türkiye*	MUCOEPIDERMOID LUNG CANCER WITH PERITONEAL METASTASES

10.07.2022
Hall-5 / Session-2

Madrid Time:
10³⁰ : 12³⁰

Ankara Time:
11³⁰ : 13³⁰

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HEAD OF SESSION: Prof. Dr. Li GUO

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Fan ZHANG	*Southeast University (China)*	ANALYSIS OF LATERALLY LOADED FLEXIBLE PILES IN VARIOUS SOIL TYPES
Jiming ZHANG Prof. Dr. Li GUO	*Southeast University (China)*	AN IMPROVED ORDINARY STATE-BASED PERIDYNAMIC MODEL AND ITS APPLICATION IN COLD REGION TUNNELS
Zhijian WU Prof. Dr. Li GUO	*Southeast University (China)*	ACCURACY IMPROVEMENT OF FINITE ELEMENT METHOD-IMMERSED BOUNDARY-LATTICE BOLTZMANN FOR FLUID-STRUCTURE INTERACTION
Xiaofeng YAN Prof. Dr. Li GUO	*Southeast University (China)*	AN HYBRID DIGITAL IMAGE CORRELATION AND PERIDYNAMICS APPROACH FOR DETECTING CRACK PROPAGATION AND CORRECTING FULL-FIELD DEFORMATION
Jinwei GUAN	*Southeast University (China)*	CALCULATION OF RIGID BODY ROTATION AND CORRECTION OF BOND FORCE IN BOND-BASED PERIDYNAMICS
Res. Stu. Aishah H.O. Al Shehi Assoc. Prof. Dr. Gul Ahmed Jokhio Prof. Dr. Abid Abu-Tair	*The British University (United Arab Emirates)*	PREVENTIVE MAINTENANCE USING RECYCLED ASPHALT
Dr. Xingzhen HUANG Prof. Dr. Zhaoxia LI	*Southeast University (China)*	MULTI-SCALE FATIGUE DAMAGE ANALYSIS OF FLEXIBLE ELECTRONIC FILM INTERCONNECTS
Dr. Vladimir SAVELJEV	*Konyang University (S. Korea)*	THE MOIRE EFFECT IN 3D LATTICE
Dr. Ao MA Prof. Dr. Zhaoxia LI	*Southeast University (China)*	FRACTURE ANALYSES OF WIRE WITH OFF-CENTER INCLUSION ON MULTI-PASS DRAWING UNDER BACK TENSIONS

10.07.2022
Hall-6 / Session-2

Madrid Time:
$10^{30} : 12^{30}$

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$11^{30} : 13^{30}$

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HEAD OF SESSION: Assoc. Prof. Dr. Mehmet Cihat ÖZGENEL

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Mohamed MILOUDI Houcine MILOUDI Mohamed MANKOUR Abdelkader GOURBI Abdelber BENDAOUD Abdelkader RAMI BENHADDA Nassireddine	*Relizane University (Algeria)* *Universitat de Lleida (Spain)* *Relizane University (Algeria)* *Universitat de Lleida (Spain)*	MODELING AND DESIGN OF ELECTROMAGNETIC COMPATIBILITY FOR POWER ELECTRONIC
Özlem BAYAL	*Gazi University (Türkiye)*	INVESTIGATION OF TEMPERATURE DEFECTIVE STRUCTURE OF Al(In)GaN/ GaN HIGH ELECTRON MOBILITY TRANSISTOR (HEMT) STRUCTURES
Assist. Prof. Dr. Vedat BAYRAM	*TED University (Türkiye)*	STRATEGICALLY LOCATING LAST MILE WAREHOUSES FOR AN ONLINE RETAIL COMPANY
Assoc. Prof. Dr. Mehmet Cihat ÖZGENEL	*Erzincan Binali Yıldırım University (Türkiye)*	SIMULATION OF PHASE CURRENT CONDUCT TIME EXTENSION IN THE BRUSHLESS DIRECT CURRENT MOTORS
Burak KOÇHAN Assist. Prof. Dr. Emine ÇORUH Assoc. Prof. Dr. Metin Mutlu AYDIN	*Gümüşhane University (Türkiye)* *Gümüşhane University (Türkiye)* *Ondokuz Mayıs University (Türkiye)*	A STUDY ON INVESTIGATION OF HIGHWAY TUNNELS IN TERMS OF DRIVING AND TUNNEL OPERATION SAFETY
Lect. Selim TAŞKAYA	*Artvin Coruh University (Türkiye)*	LAYOUT OF RECONSTRUCTION ISLANDS WITH CONVEX TECHNIQUE IN LOCAL DEVELOPMENT PLANS
Assoc. Prof. Dr. Jitendra KAUSHIK Ruchika RAI	*Christ (Deemed to be University) (India)*	AN INVENTORY MODEL FOR DETERIORATING ITEMS FOR LINEAR DEMAND WITH WEIBULL DETERIORATION

10.07.2022
Hall-4 / Session-3

Madrid Time:
13:00 : 15:00

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14:00 : 16:00

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Passcode: 091011

HEAD OF SESSION: Dr. Duygu MERMER DOĞU

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Dr. Süreyya ÖZBEN Dr. Duygu MERMER DOĞU	*Republic Of Türkiye Ministry Of Agriculture And Forestry Directorate Of Plant Protection Central Research Institute (Türkiye)* *Turkey National Botanical Garden (Türkiye)*	GRAPEVINE TRUNK DISEASE
Biyologist Ayşe DOLAR Assoc. Prof. Dr. Murat DAL Prof. Dr. Erol ATAY	*Hatay Mustafa Kemal Universit (Türkiye)* *Munzur University (Türkiye)* *Hatay Mustafa Kemal Universit (Türkiye)*	EFFECTS OF FUNGAL COMMUNITIES ON HISTORIC STONE STRUCTURES
Burak KARACA Assist. Prof. Dr. Zarife PANCAR	*Gaziantep University (Türkiye)*	INVESTIGATION OF VIDEO GAME PLAYING BEHAVIORS AND VISUAL REACTION TIMES OF SCIENCE HIGH SCHOOL STUDENTS
Burak KARACA Assist. Prof. Dr. Zarife PANCAR	*Gaziantep University (Türkiye)*	INVESTIGATION OF DIGITAL GAME PLAYING BEHAVIORS AND AUDITORY REACTION TIMES OF 14-17 AGED STUDENTS
Assist. Prof. Dr. Sümeyye ALTIPARMAK Şeyma KARABULUT BOZAL	*Inonu University (Türkiye)* *Ministry of Health (Türkiye)*	BEING A WOMAN IN PRISON AND APPROACHES TO MIDWIFERY
Assist. Prof. Dr. Sümeyye ALTIPARMAK Şeyma KARABULUT BOZAL	*Inonu University (Türkiye)* *Ministry of Health (Türkiye)*	ETHICAL AND MIDWIFERY APPROACHES IN ASSISTED REPRODUCTIVE TECHNIQUES
Assist. Prof. Dr. Nebi Mustafa GÜMÜŞ Sevinç SUAKITICI	*Istanbul Gelisim University (Türkiye)*	INVESTIGATION OF AUDIOLOGICAL FACTORS AFFECTING HEARING AID SATISFACTION IN HEARING AID USERS
Jaafar Nozad Aakef Aakef Prof. Dr. Zehranur YÜKSEKDAĞ Lect. Dr. Berat Çınar ACAR	*Gazi University (Türkiye)*	DETERMINATION OF VITALITY OF PICHIA KUDRIAVZEII JD2 YEAST STRAIN IN ARTIFICIAL STOMACH AND BILE
Assoc. Prof. Dr. Şenay GORUCU YILMAZ Salam ALMASRI Assoc. Prof. Dr. Yasemin YUYUCU KARABULUT Assist. Prof. Dr. Murat KORKMAZ Öznur BUCAK Prof. Dr. Sibel OĞUZKAN BALCI	*Gaziantep University (Türkiye)* *Gaziantep University (Türkiye)* *Mersin University (Türkiye)* *Gaziantep University (Türkiye)* *Mersin University (Türkiye)* *Gaziantep University (Türkiye)*	EFFECT OF CUCURBITACIN E ON NEUROFIBRILLARY TANGLES AND COGNITIVE FUNCTIONS IN ALZHEIMER'S RAT MODEL

10.07.2022
Hall-5 / Session-3

Madrid Time:
13^{00} : 15^{00}

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HEAD OF SESSION: Dr. Marius - Savu LOLEA

AUTHOR(S)	ORGANISATION	TOPIC TITLE
Youcef BECHEFFAR	*Ibn Khaldoun University (Algeria)*	BINGHAM FLUID FLOW SIMULATION IN A SQUARE CAVITY WITH THE UPPER WALL MOVING
Eng. Andrei-Florin SĂRĂCUȚ-ARDELEAN Dr. Marius - Savu LOLEA Dr. Eva-Maria BARLA	*University of Oradea (Romania)*	SOLUTIONS TO IMPROVE THE EFFICIENCY AND CONTROL OF ENERGY TRANSFORMATIONS INTO THE ELECTRICAL INSTALLATIONS OF AGRICULTURAL BUILDINGS
Eng. Andrei-Florin SĂRĂCUȚ-ARDELEAN Dr. Marius - Savu LOLEA Dr. Eva-Maria BARLA	*University of Oradea (Romania)*	ENERGY OPTIMIZATION OF AIR CONDITIONING FACILITIES INTO THE AGRICULTURAL BUILDINGS AND FARMS. TECHNICAL AND FINANCIAL IMPLICATIONS
Dr. Ardian DURMISHI Prof. As. Dr. Lindita DURMISHI	*Alexander Xhuvani University (Albania)*	CONSUMER ENGAGEMENT IN THE BRAND: PROMOTING CONSUMER DECISION MAKING IN THE NEUROMARKETING PROCESS
Prof. As. Dr. Lindita DURMISHI Silva IBRAHIMI PhD Dott. Ervin Ibrahimi	*A. Xhuvani University (Albania) Albanian University (Albania) COOSS-MARCHE (Italy)*	AN INTRODUCTION TO THE PSYCHODYNAMIC PROTOTYPE AND PSYCHODIAGNOSTIC CHART AS A NEO- PROSPECTS FOR THE PSYCHODYNAMIC ORGANIZATION
Sashreek KRISHNAN Prof. Dr. L.R.K. KRISHNAN	*VIT University (India) VIT Business School (India)*	IMPACT OF AI AND ML IN LEADERSHIP BEHAVIOURS AND DECISION MAKING; DRIVING BUSINESS RESULTS

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REVIEW ON MITIGATION OF GLOBAL GREENHOUSE GAS EMISSIONS VIA WASTE MANAGEMENT APPROACH

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ABSTRACT

Mitigation refers to measures to reduce the amount and speed of future climate change by reducing emissions of greenhouse gases (GHGs) or by increasing their removal from the atmosphere. Emission reduction measures include replacing conventional, CO_2-emitting fossil fuel energy technologies or systems with low- or zero-emissions ones (such as wind, solar, nuclear, biofuels, fossil energy with carbon capture and storage, and energy efficiency measures), as well as changing technologies and practices in order to lower emissions of other GHGs such as methane, nitrous oxide, and hydrofluorocarbons. Measures that enhance the removal of CO_2 from the atmosphere include changing land-use and management practices to store carbon in plants, trees, and soils; increasing ocean carbon storage through biological or chemical means; capturing atmospheric CO_2 through engineered chemical reactions and storing it in geologic reservoirs; or converting terrestrial biomass into energy while capturing and storing the CO_2. The adoption of waste management approach is seen as of the strategic pathways towards reducing greenhouse gas emissions. Therefore, this work reviews the mitigation of global greenhouse gas emission using waste management method as a sustainable approach.

Keywords: Mitigation, Greenhouse gas, Wastes, Management, Energy, Emissions

INFLUENCE OF SYNTHESIS CONDITIONS ON PHYSICO-CHEMICAL AND PHOTOCATALYTIC PROPERTIES OF SILVER NANOMATERIALS

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ABSTRACT

Silver based nanomaterials were successfully synthesized by adopting different synthesis conditions to investigate their influence on physico-chemical and photocatalytic properties of the materials. Different analytical techniques such as X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FT-IR), Scanning electron microscopy (SEM), and the diffuse reflectance UV-vis spectra (DR UV-vis) were used to investigate the physico-chemical properties of synthesized Ag nanomaterials. The silver samples (Ag-1 and Ag-2) synthesized using silver nitrate ($AgNO_3$), sodium bicarbonate ($NaHCO_3$) and polyvinylpyrrolidone (PVP) template produced phase pure silver (Ag) metal nanorods and nanoparticles; the morphology of Ag metal phase is depended on the hydrothermal treatment. However, the sample (Ag-3) prepared without PVP template with simple calcined at 250 oC showed presence of pure silver oxide (Ag_2O) phase. The sample (Ag-4) prepared without PVP template and calcination step showed presence of pure silver carbonate (Ag_2CO_3) phase; interestingly subjecting the sample to hydrothermal treatment (Ag-5) has not resulted any change in crystal structure of the sample except increase of particle size of Ag_2CO_3. All synthesized Ag nanomaterials were used as photocatalysts for degradation of p-nitrophenol (p-NP) under visible light irradiation. The Ag-4 sample showed best photocatalytic activity (86% at pH 10, p-NP conc of 16 mgL-1, 120 min and catalyst mass of 100 mg) than the other synthesized silver nanomaterials; this is possibly due to the presence of pure Ag_2CO_3 crystal structure with nanorod morphology with low band gap energy of 1.96 eV.

Keywords: Silver nanomaterials; Synthesis conditions; Photodegradation; p-nitrophenol; Visible light

BAZI YULAF (*Avena sativa* L.) ÇEŞİTLERİNDE VERİM VE KALİTE ÖZELLİKLERİ ARASINDAKİ İLİŞKİLERİN KORELASYON ANALİZLERİYLE SAPTANMASI

DETERMINATION OF THE RELATIONSHIPS BETWEEN YIELD AND QUALITY TRAITS IN SOME OAT (*Avena sativa* L.) VARIETIES BY CORRELATION ANALYSIS

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ÖZET

Bu çalışma, Tokat-Kazova ve Samsun-Havza koşullarında 15 yulaf çeşidi kullanılarak 2015-2016 yetiştirme döneminde yürütülmüştür. Araştırmada, salkım çıkarma süresi (SÇS), bitki boyu (BB), bin tane ağırlığı (BTA), metrekarede salkım sayısı (MSS), salkımda tane ağırlığı (STA), hektolitre ağırlığı (HA), tane verimi (TV), protein miktarı (PM), hasat indeksi (HI) ve yatma (YT) özellikleri incelenmiş, aralarındaki ilişki korelasyon analizi ile saptanmıştır. Korelasyon analizlerine göre; tane verimi (TV) ile salkımda tane ağırlığı (STA) (r=0.894**) hasat indeksi (HI) (r=0.641*) arasında pozitif ve önemli, salkım çıkarma süresi (SÇS) (r=-0.522*) yatma (YT) (r=-0.520*) ile negatif ve önemli bir ilişki belirlenmiştir. Salkım çıkarma süresi (SÇS) ile yatma (YT) (r=0.576*), salkımda tane ağırlığı (STA) ile hasat indeksi (HI) (r=0.796**) aralarında pozitif ve önemli, yatma (YT) ile salkımda tane ağırlığı (STA) (r=-0.526*) ve hasat indeksi (HI) (r=-0.726**) arasında negatif ve önemli bir ilişki saptanmıştır. Elde edilen verilerin çeşit geliştirme çalışmalarında ıslahçılara yardımcı olabileceği sonucuna varılmıştır.

Anahtar Kelimeler: Çeşit, Kalite, Korelasyon Analizi, Verim, Yulaf

ABSTRACT

This study was carried out in Tokat-Kazova and Samsun-Havza conditions using 15 oat varieties in the 2015-2016 growing season. Trials were set up in a randomized block design with 3 replications. In the research, cluster time (CT), plant height (PH), thousand kernel weight (TKW), cluster number per square meter (CSM), cluster kernel weight (CKW), hectoliter weight (HW), kernel yield (KY), protein content (PC), harvest index (HI), lying (LY) characteristics were examined and the relationship between properties was determined by correlation analysis. According to the correlation analysis; positive and significant between kernel yield (KY) and seed weight per cluster (CKW) (r=0.894**) harvest index (HI) (r=0.641*), cluster time (CT) (r=-0.522*) lying (LY) (r=-0.520*) was found to have a negative and significant relationship. There was a positive and significant difference between cluster time (CT) and lying (LY) (r=0.576*), cluster kernel weight (CKW) and harvest index (HI) (r=0.796**). A negative and significant relationship was found between lying (LY) and grain weight per cluster (CKW) (r=-0.526*) and harvest index (HI) (r=-0.726**). It has been concluded that the obtained data can help breeders in cultivar development researches.

Keywords: Variety, Quality, Correlation Analysis, Yield, Oats

GİRİŞ

Yulaf (*Avena sativa* L.) insan ve hayvan beslenmesinde kullanılan önemli bir tahıl cinsidir (Peterson ve ark., 2005; Naneli ve Sakin, 2017). Dünyada yaklaşık 98 milyon dekar ekim alanı, 25 milyon ton üretim miktarı, 258 kg/da tane verimi ile yulaf önemli bir bitkidir (Anonim, 2020). Ülkemizde ise 1.4 milyon dekar ekim alanında 276 bin ton yulaf üretimi yapılmaktadır, dekara verim 208 kg'dır. (Anonim, 2021). Artan nüfus ile birlikte üretim miktarı ve verimliliğin artırılması çok önemlidir. İnsan beslenmesinde önemli bir yeri olan yulaf yüksek protein miktarına sahip olup antioksidanlar bakımından da zengindir (Dumlupınar, 2010; Naneli ve Sakin, 2017). Yulaf, hayvan beslenmesinde de süt verimini artırması, hazmı kolaylaştırması, avenin proteinlerinin kas gelişimini artırması bakımından bitkisel üretimde tercih edilen bitkidir. Hayvan beslenmesinde düşük maliyetli ve yüksek besin içeriğine sahip olmasının yanı sıra yulafın bitkisel üretimde mısır v.b. bitkilere göre yetiştirme döneminde daha az su ile yetiştirilmesi önemini artırmaktadır.

Korelasyon gibi bazı analizler, tahıllarda verim ve kalite üzerinde etkili olan parametrelerin etki seviyesini ve önem derecesini belirleyerek ıslahçılara çeşit geliştirme aşamasında yüksek verimli ve kaliteli çeşit elde etmeleri hususunda yardımcı olmaktadır. Bu bağlamda birçok araştırıcı korelasyon analizini kullanmaktadır (Güler ve ark., 2001; Yağdı, 2009; Kurt Polat ve ark., 2015; Güngör ve ark., 2017).

Yulafta yapılan çalışmalarda araştırıcılar incelenen verim ve kalite parametreleri arasındaki bağlantıların çok önemli olduğunu saptamışlardır (Benin ve ark., 2003; Kapoor ve ark., 2011; Ahmad ve ark., 2013; Güngör ve ark., 2017; Şahin ve ark., 2019). Güngör ve ark. (2017), Kahramanmaraş koşullarında 25 yulaf genotipiyle gerçekleştirdikleri çalışmada tane verimi ile sap kalınlığı, bayrak yaprak uzunluğu, bayrak yaprak eni, tane dolum periyodu, ekim-olgunlaşma süresi ve biyomas özellikleri arasında pozitif önemli, bitki boyu ile negatif önemli korelasyon saptamışlardır.

Tokat-Kazova ve Samsun-Havza lokasyonlarında yapılan bu araştırmada 15 yulaf (*Avena sativa* L.) çeşidi kullanılmıştır. İncelenen tarımsal özelliklerin korelasyon analiziyle etki ve önem seviyelerinin saptanması amaçlanmıştır.

MATERYAL-YÖNTEM

Farklı kuruluşlardan temin edilen 15 yulaf çeşidiyle yürütülen çalışma (Tablo 1) Tokat-Kazova (yükselti: 608 m) ve Samsun-Havza (yükselti: 675 m) lokasyonlarında yürütülmüştür. Her iki lokasyondan alınan toprak analizleri doğrultusunda 12 kg/da saf N, 6 kg/da saf P_2O_5 olacak şekilde gübreleme yapılmış olup, azotun yarısı ve fosforun tamamı ekim öncesi, kalan azot sapa kalkma dönemi öncesinde verilmiştir. Elde edilen verim ve kalite parametreleri Kün (1996) ve Dumlupınar (2010) kullandığı yöntemler ile tarımsal gözlem ve ölçümler gerçekleştirilmiştir. Yatma bazı araştırıcıların skorlandırmalarına göre gerçekleştirilmiştir (Buerstmayr ve ark., 2007). Protein analizi Kjelhdahl yöntemiyle AACC Metot 46-10'a göre saptanmış olup, 5.83 faktörü doğrultusunda protein oranı belirlenmiştir (Anonim, 1986; AACC, 2000). Her iki lokasyonun deneme yılı ve uzun yıllar iklim parametreleri Tablo 2'de verilmiştir. Korelasyon analizi *SPSS-17* istatistik program doğrultusunda gerçekleştirilmiştir.

Tablo 1. Araştırmada kullanılan çeşitler ve temin edildiği kuruluşlar

No	Çeşitler	Temin Edildiği Kuruluşlar
1	Bc Marta	BC İnstitüt Tar. Ür. Oto San ve Tic. Ltd. Şti.
2	Checota	Geçit Kuşağı Tarımsal Araştırma Ens. Müd.
3	Kahraman	Trakya Tarımsal Araştırma Ens. Müd.
4	Kırklar	Trakya Tarımsal Araştırma Ens. Müd.
5	Gökova	Som Un San. Tic. Ltd. Şti.
6	Kehlibar	Som Un San. Tic. Ltd. Şti.
7	Sebat	Trakya Tarım ve Vet Tic. Ltd. Şti.
8	Fetih	Ege Tarımsal Arş. Ens. Müd.
9	Haskara	Ege Tarımsal Arş. Ens. Müd.
10	Sarı	Ege Tarımsal Arş. Ens. Müd.
11	Arslanbey	KSÜ Ziraat Fakültesi
12	Yeniçeri	Bahri Dağdaş Uluslararası Tar. Arş. Ens. Müd.
13	Seydişehir	Bahri Dağdaş Uluslararası Tar. Arş. Ens. Müd.
14	Faikbey	Bahri Dağdaş Uluslararası Tar. Arş. Ens. Müd.
15	Albatros	Ata Tohumculuk

Tablo 2. Deneme alanları uzun yıllar ve deneme yılı iklim özellikleri*

İklim Par.	Yıllar	Aylar								Top./Ort.
		Kasım	Aralık	Ocak	Şubat	Mart	Nisan	Mayıs	Haziran	
Yağış (mm)	**Samsun**	2.7	34.5	84.0	27.6	78.3	34.1	143.0	90.8	495.0
	U. yıllar	55.1	57.1	38.0	33.4	31.3	50.6	62.6	65.6	393.7
	Tokat	15.8	35.5	104.6	42.6	49.4	23.4	89.5	33.1	393.9
	U. yıllar	44.1	46.6	40.3	34.0	40.7	55.3	58.5	38.3	357.8
Ort. sıcaklık (°C)	**Samsun**	8.3	0.8	1.0	6.9	7.8	12.4	13.5	18.7	8.68
	U. yıllar	6.2	2.5	0.9	1.4	5.0	10.1	13.4	17.0	7.06
	Tokat	8.7	1.0	1.7	7.5	9.6	15.3	16.5	21.4	10.21
	U. yıllar	7.9	3.9	1.8	3.5	7.4	12.5	16.5	19.9	9.18

*: Meteoroloji Genel Müdürlüğü

BULGULAR-TARTIŞMA

Farklı lokasyonlarda bazı yulaf çeşitlerinin verim ve kalite özelliklerinin korelasyon analizi doğrultusunda ilişkilendirilmesi gerçekleştirilmiş olup, önemli sonuçlar elde edilmiştir (Tablo 3). TV'nin STA ile %1, HI ile %5 pozitif korelasyon tespit edilmiş olup, SÇS ve YT ile %5 negatif korelasyon saptanmıştır. Önemli kalite parametrelerinden PM, BTA, HA bakımından incelenen özellikler arasındaki korelasyonlar ise önemsiz bulunmuştur. İncelenen parametrelerden HI ile STA arasında %1 pozitif, YT arasında %1 negatif korelasyon belirlenirken, YT ile SÇS arasında %5 pozitif, STA ile %5 negatif korelasyon saptanmıştır.

Farklı araştırıcılar tane verimine (TV) birçok özelliklerin etkili olup, incelenen parametrelerin negatif veya pozitif korelasyonlarını saptamışlardır (Kapoor ve ark., 2011). Araştırıcılar, yulafta verim komponentlerinden metrekarede salkım sayısı (MSS), salkımda salkımcık sayısı (SSS) ve salkımda tane sayısı (STS) özelliklerinin başlıca etkilerinin olduğunu bildirmişlerdir (Rasmusson ve Chanel, 1970). Kahramanmaraş ekolojik koşullarında 25 yulaf çeşidiyle gerçekleştirilen bir çalışmada araştırıcılar tane verimi (TV) ile sap kalınlığı (SK) ekim-olgunlaşma süresi (EOS) ve biyomas (B) arasında %1 pozitif, bayrak yaprak uzunluğu (BYU) bayrak yaprak eni (BYE) ve tane dolum periyodu (TDP) arasında %5 pozitif, bitki boyu (BB) arasında %1 negatif önemli korelasyon saptamışlar, salkım uzunluğu (SU),

vejetatif periyod (VP), salkımda tane ağırlığı (STA) ve bin tane ağırlığı (BTA) arasında önemsiz korelasyon belirlemişlerdir (Güngör ve ark., 2017).

Tablo 3. Farklı lokasyonlarda bazı yulaf çeşitlerinin verim ve kalite parametrelerinin korelasyon analizi
*: %5, **: %1 seviyesinde istatistiki olarak önemlidir.

Salkım çıkarma süresi	SÇS	Hektolitre ağırlığı	HA
Bitki boyu	BB	Tane verimi	TV
Bin tane ağırlığı	BTA	Protein miktarı	PM
Metrekarede salkım sayısı	MSS	Hasat indeksi	HI
Salkımda tane ağırlığı	STA	Yatma	YT

Orta Anadolu koşullarında 328 yulaf genotipiyle gerçekleştirilen farklı bir çalışmada ise tane verimi (TV) ile NDF ve selüloz (SE) arasında %1 pozitif, protein miktarı (PM) yağ oranı (YO) hektolitre (HA) ve ADF arasında %1 negatif, bin tane ağırlığı (BTA) ve beta glukan (BG) arasında önemsiz korelasyon belirlenmiştir. Aynı çalışmada araştırıcılar protein miktar (PM) ile hektolitre ağırlığı (HA) ve ADF arasında %1 pozitif, beta glukan (BG) arasında %5 pozitif, NDF, selüloz (SE), tane verimi (TV) ve bin tane ağırlığı (BTA) arasında %1 negatif korelasyon saptamışlardır (Şahin ve ark., 2019). Konuyla ilgili başka bir çalışmada araştırıcılar tane verimi (TV) ile salkımda tane sayısı (STS) arasında pozitif bir korelasyon saptamışlardır (Lorencetti ve ark., 2006).

SONUÇ

	SÇS	BB	BTA	MSS	STA	HA	TV	PM	HI
BB	,212								
	,449								
BTA	-,154	-,007							
	,582	,981							
MSS	-,040	-,108	,409						
	,887	,702	,130						
STA	-,452	,038	,070	,073					
	,091	,894	,804	,796					
HA	,245	-,055	,017	,262	-,112				
	,379	,844	,953	,346	,692				
TV	-,522*	,140	,266	,308	,894**	-,168			
	,046	,620	,337	,264	,000	,550			
PM	-,337	-,288	-,095	-,209	-,307	-,121	-,332		
	,219	,299	,735	,455	,266	,667	,226		
HI	-,507	-,339	,122	,061	,796**	,050	,641*	,053	
	,054	,217	,666	,829	,000	,858	,010	,852	
YT	,576*	,509	-,234	-,197	-,526*	-,025	-,520*	-,379	-,726**
	,025	,053	,402	,482	,044	,929	,047	,163	,002

Tokat-Kazova ve Samsun-Havza lokasyonlarında bazı yulaf çeşitleriyle yapılan çalışmada incelenen verim ve kalite özellikleri arasında önemli korelasyonlar belirlenmiştir. Salkım çıkarma süresi (SÇS), bitki boyu (BB), bin tane ağırlığı (BTA), metrekarede salkım sayısı (MSS), salkımda tane ağırlığı (STA), hektolitre ağırlığı (HA), tane verimi (TV), protein miktarı (PM), hasat indeksi (HI), yatma (YT) gibi

önemli özellikler incelenmiştir. TV ile STA arasında %1 pozitif, SÇS arasında %5 negatif, HI arasında %5 pozitif, YT arasında %5 negatif korelasyon belirlenmiş olup, HI ile STA arasında %1 pozitif, YT arasında %1 negatif korelasyon, YT ile SÇS arasında %5 pozitif, STA arasında %5 negatif korelasyon saptanmıştır. Elde edilen sonuçlar özellikle çeşit geliştirme çalışmalarında kullanılacak ebeveyn yulaf materyallerinin belirlenmesinde ıslahçılara yardımcı olabilecektir.

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ADSORPTION OF PHENOL POLLUTANTS FROM AQUEOUS SOLUTION USING

Ca-bentonite/ Na-bentonite

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ABSTRACT

Phenolic compounds are poisonous and carcinogenic organic pollutants. The presence of phenol in the environment can have a negative impact on humans and the environmental system. A successful method for reducing phenol is adsorption. This study investigated the adsorption of phenol into an aqueous solution using two types of Ca-bentonite/chitosan bentonite compounds. Characterization of the Ca-bentonite/Na-bentonite composite was carried out using Fourier Transform Infrared (FTIR) and Energy Dispersion X-ray Scanning-Spectroscopy Electron Microscopy (SEM-EDX). The results of the physico-chemical analyses showed that the effluents of the oil mills showed that they are highly polluted, particularly in terms of the total suspended solids (TSS), chemical oxygen demand (COD), and iron content of around 154.82 (mg/L), and copper content of 31.72 (mg/L). The mineralogy of bentonites studied by X-ray diffraction (XRD) reveals the existence of two types of montmorillonite; theoretically, the diffraction peak (001) of the montmorillonite appears at 15 Å, with a basal spacing that corresponds

to a calcium pole, and the diffraction peak (001) appears at 12Å, with a basal spacing that corresponds to a sodium pole. The specific surface area of the bentonite used is characterized by a large specific surface area, varying between 127.62 m2•g-1 and 693.04 m2•g-1, which is due to the presence of hydrated interleaved cations. This surface is likely to increase in aqueous solution depending on the solid/liquid ratio that modulates the degree of hydration. With a high cation exchange capacity (CEC) (146.54 meq/100 g), samples of margin mixed with raw bentonites at different percentages vary between 5% and 100%. The potential of Moroccan bentonite for the phenol adsorption of 9.17 (g/L) from aqueous solutions was investigated. Adsorption tests have confirmed the effectiveness of these natural minerals in reducing phenolic compounds ranging from 8.72% to 76.23% contained in the margin and the efficiency of heavy metal retention through microelements on raw bentonites.

Keywords: Ca-bentonites; Na-bentonites; retention; adsorption; phenolic compounds ; organic pollutants.

ELABORATION AND CHARACTIRIZATION OF NEW BIOCOMPOSITE BASED ON POLYANILINE AND ALMOD SHELL FOR EFFECTIVE REMOVAL OF ORANGE G DYE FROM AQUEOUS SOLUTION USING A DYNAMIC ADSORPTION

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ABSTRACT

In this work, we studied the adsorption process in dynamic regime for the elimination of a synthetic dye using a new granulated PANI@AS bio-composite, synthesized by oxidative chemical polymerization method. The synthesized adsorbent was characterized by various analytical techniques such as Fourier Transform Infrared Spectroscopy (FTIR), X-ray Energy Dispersive Spectroscopy (EDX) and Scanning Electron Microscopy (SEM). The continuous adsorption test was applied to study the ability of the adsorbent to remove Orange G (OG) dye from aqueous solution. The obtained results revealed that the adsorption process was highly dependent on physicochemical parameters such as the mass of adsorbent, flow rate, concentration and pH of the solution. The adsorption process of OG dye by granular PANI@AS adsorbent was described by the kinetic model pseudo-second order and Langmuir isothermal model. The calculated of the maximum adsorption capacity was found to be 8,945 mg/g. Thus, these results show that the PANI@AS bio-composite can be used as a superb adsorbent of hazardous dyes in wastewater.

Keywords: Adsorption, bio-composite, orange G, PANI@AS, kinetics, isotherm, column, dynamics

ELECTROCHEMICAL TREATMENT OF ORGANIC WASTE: APPLICATIONS FOR THE ELIMINATION OF SYNTHETIC ORGANIC DYES EXAMPLE OF CRYSTAL VIOLET

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ABSTRACT

Environmental protection has always been the starting point for the development of new technologies that make it possible to control the presence of highly toxic substances in wastewater from multiple industries that cannot be eliminated by traditional methods. Today, organic wastes (paints, pigments, etc.) are considered to be a major problem in the pollution of the water environment. Therefore, it is important to find new ways to solve this problem. This research was conducted to study the electrochemical processes to remove organic pollutants (e.g., crystal violet (CV)) from aqueous solutions. The electrolysis of CV was carried out galvanostatically by using SnO_2 anode, was conducted in an electrochemical cell with 100 mL of solution using Na_2SO_4 and NaCl as supporting electrolyte, the effect of the electrochemical parameters: current density (20–60 mA/cm^2), CV concentration (10–50 mg/L), sodium chloride concentration (0.01–0.1g/L) and initial pH (2, 4, 7, 8, 10) was evaluated and optimised .the degradation of crystal violet (CV) was monitored by the UV-visible spectrometry and the chemical oxygen demand (COD). After 120 min, in a 0.01 mol/L NaCl solution with a current density of 50 mA/cm2, a pH value of 7, and a CV of 10 mg/L, the removal rate of CV can reach 100%, and the removal rate of COD can reach 100% 80%. This process can be considered as a suitable process for CV removal from colored wastewater in the textile industry.

Keywords: electrochemical oxidation, decolourisation, COD, water treatment, crystal violet

THEORY-BASED SUSTAINABLE MOBILITY INITIATIVE "MOVE GREEN"

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ABSTRACT

Traveling by car makes a significant contribution to climate change. Most of the measures aimed at minimising pollution of the transport sector in Lithuanian are focused on the improvement of infrastructure, little attention is paid to the travel behaviour of individuals. There is also a lack of solution-oriented scientific research that develops and tests interventions to promote sustainable travel modes.

In response to the lack of measures targeting the travel behaviour of the Lithuanian population and decision-oriented research, and in response to criticism directed at the social sciences for their limited impact, a sustainable mobility initiative "Move Green" has been developed. The initiative aims to encourage sustainable commuting among people working in Kaunas city. In order to achieve the climate change goals in the transport sector, it is appropriate to focus on commuting, as it is the main activity generating demand for cars.

The initiative encompasses a variety of techniques targeting socio-psychological constructs that determine travel behaviour, which, in theory, should be particularly effective in encouraging sustainable commuting among participants. But it is no secret that there is a certain gap between theory and practice. A study is currently being carried out to scientifically substantiate, test and evaluate the techniques used in the "Move Green" initiative.

The presentation concerns the socio-psychological factors influencing travel behaviour, the behaviour change techniques targeting these factors and the initiative "Move Green" currently taking place in Kaunas city.

Keywords: travel behaviour, sustainable commuting, intervention

PATIENT-CENTREDNESS IN GESTATIONAL DIABETES MELLITUS HEALTHCARE SERVICES IN SAUDI ARABIA—AN EXPLORATION

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SUMMARY

The purpose of this study was to explore the quality of GDM healthcare services in KSA and suggest evidence-based recommendations for improvement. Therefore, the study analyzed and discussed the qualitative data obtained from interviews undertaken with a convenience sample of female GDM patients, all of whom had received their GDM diagnosis within the past 6 months and had accessed maternity healthcare services from a rural or urban public hospital. After analyzing the textual interview data using Braun and Clarke's (2006) six-phase thematic analysis procedure, a variety of themes and sub-themes were synthesized from the dataset, each highlighting a factor that was found to influence the quality of the GDM care provided to the patients. In this study, these factors were the following: access to care factors, communication factors, health provider factors, and patient factors.

In the subsequent discussion of each of these broad themes, along with each of their sub-themes, fine-grained insights were obtained into the experiences of the women, consistent with the interpretive phenomenological approach and the strengths of thematic analysis (Ryan, 2018). This enabled this study's overarching research objectives to be addressed, including the objective of exploring the views and experiences of Saudi GDM patients compared to the experiences of patients in other countries. In addition, by discussing the four identified themes, barriers to access and use of maternity healthcare services in the Large City in Saudi Arabia, along with possible improvements to GDM services in Saudi Arabia, were highlighted.

Thematic analysis revealed four sub-themes for access to care factors that influenced the quality of the GDM care provided to the female patients, as well as their experiences. These were long waiting times and short consultation times, long travel distances to health facilities, administrative problems for patients accessing the appointment system, and lack of proper registry services and electronic health record systems. On the whole, access to care for the study's GDM patients was substantially limited in each area, especially in the rural setting. However, due to the existence of similar problems in other countries, as well as the possibilities for policy-borrowing (Meng et al., 2019), various solutions were identified that could be introduced in the Saudi context. Adequate solutions, however, must seek to reform different levels of the healthcare infrastructure simultaneously, given the complexity of the factors that

influence access to care (e.g., ranging from retraining administrative staff to designing new software systems for electronic health records).

The three sub-themes identified as communication factors affecting GDM quality of care in the participants were the following: lack of provision of clear written and verbal information to women, poor communication and coordination within secondary care, and lack of communication between primary and secondary care. In this study's sample, communication was reported as a fundamental consideration in the context of maternity healthcare services, but it also reappears as a constant across all contexts, influencing clinical effectiveness, patient safety, and the patient experience (Lippke et al., 2019). For this reason, as the data indicate, solving problems at the level of communication in all healthcare settings, including Saudi hospitals for GDM patients, is a rich area for policymakers to focus on in order to make substantial gains in improving patient experience, patient safety, and other outcomes.

The last two themes identified in the thematic analysis were health provider factors and patient factors, each representing the main human agents that form the front-line of the healthcare system. The third main theme, health provider factors, consisted of the following three sub-themes: firstly, lack of expertise among doctors with respect to gestational diabetes, secondly, lack of respect, empathy, and support, and finally, lack of practical proficiency in nurses. Along with the final theme (patient factors), which consisted of sociocultural factors, low trust in medical staff and government hospitals, and negative perceptions or feelings, the study painted a rich picture of the variegated factors influencing the participants' experiences of care.

ABSTRACT

Introduction: Gestational diabetes mellitus (GDM) is one of the most prevalent complications of pregnancy and an important risk factor for type II diabetes mellitus (T2DM) (McIntyre and Moses, 2020). Prevalence of GDM in Kingdom of Saudi Arabia (KSA) is substantially higher than the global average and is increased. Despite this, there is limited information on quality of care for GDM in KSA, in particular women's experiences of services.

Aims: To explore the quality of GDM healthcare services in KSA and suggest evidence-based recommendations for improvement.

Method: A qualitative method approach using semi-structured interviews with patients with GDM (16 from an urban setting and 11 from a rural setting).

Findings: The qualitative interviews identified four themes relating to barriers for GDM patients emerged: access to care, communication, health provider factors and patient factors. Not every participant experienced problems with each factor.

Conclusion: This study identifed potential ways to improve the quality of GDM healthcare services in Saudi Arabia. Recommendations are suggested to improve the quality of GDM healthcare, ranging from new training programs to greater investment in facility scheduling systems.

Keywords: Patient centred, patient experience, Gestational diabetes, Healthcare, Qualitative method, Interviews, Saudi Arabia.

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VARIATIONAL ELASTIC SOLUTION FOR AN END BEARING PILE SUBJECTED TO DYNAMIC TORSIONAL LOADING

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ABSTRACT

A new efficient solution is proposed for investigating the steady-state response of an end bearing pile embedded in a homogeneous and isotropic soil and subjected to time-harmonic torsional loads at the pile head. In the present model, the soil properties are considered to be those of a linear viscoelastic continuum with the assumption that the radial and vertical displacements are ignored. Then, the function form of the torsional displacement for the soil-pile system is obtained. The Hamilton's principle and variational approach are applied to analytically solve the pile and soil displacement equations by utilizing an iterative algorithm. The method validation is carried out by comparing the results obtained by the proposed method with those reported in the literature The results agree well with those solved by some existing solutions; in addition, the present method has an advantage in terms of the calculation efficiency. Then, the effects of the pile slenderness ratio and the pile-soil modulus ratio on the torsional dynamic response of the pile are investigated. In the low frequency range, the real part of the complex dynamic impedance decreases, while the imaginary part increases as the dimensionless frequency increases. When the pile slenderness ratio is a certain value, there is a decrease in the cut-off frequency as the pile slenderness ratio increases. When the pile-soil modulus ratio is less than 500, the dimensionless frequency ($a_0 < 2.0$) shows little influence on the real stiffness.

Keywords: Torsional vibration, End-bearing pile, Variational calculus, Complex impedance

EXTRACTIVE CLOUD POINT SPECTROPHOTOMETRIC DETERMINATION OF MESALAZINE USING BRILLIANT GREEN DYE

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ABSTRACT

A simple and accurate cloud point-spectrophotometric method for determination of Mesalazine(MEZ) in pure form and pharmaceutical formulation is proposed.The procedure is based on the reaction of Mesalazine with brilliant greendye(B.G) forming a yellow ion- pair complex which is extracted with Triton X-114 and measured at 361 nm.The experimental condition for the phase separation were optimized. Beer's law was obeyed in the range 0.3-3.5 $\mu g.ml^{-1}$ with molar absorptivity of $3.91 \times 10^4 \, L.mol^{-1}.cm^{-1}$,average recovery% of 100.82 and precision (RSD) is ≤ 1.26. The method was applied successfully for determination of MEZ in its pharmaceutical formulation .

Keywords: Mesalazıne, Brilliant, Greeen

USE OF CLAYS AS INDICATORS OF REGIONAL GEODYNAMIC EVENTS: EXAMPLE OF BENTONITE DEPOSITS AND SURROUNDING AREAS

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ABSTRACT

In the North-Eastern rif of Morocco, the clay fraction (less than two micrometers) of the calcic and sodium bentonites presents a heterogeneous evolution. Several samples were taken from the zone of Tidiennit, the various samples taken were the subject of the study with the DRX in the form of powder of the total rock and of oriented aggregate of the clayey fraction. the total rock and of oriented aggregate of the clayey fraction. In particular The studied bentonites delimited to the south by perlite and to the north by rhyolite. It is to be underlined that the clayey procession of the bentonite deposit studied, is composed mainly of the smectitic complex of montmorillonite type and associated interlayers, whose proportions reach in certain samples 99%, of a ubiquitous component does not exceed 5%, the kaolinite remains in trace (<1%) and the chlorite appears locally with contents not reaching 8%. In fact, the total rock explored in the form of powder, shows the association of the essential minerals essential minerals: swelling minerals (montmorillonite, interstratified), siliceous minerals (quartz, cristobalite), feldspars and hematites whose total percentage exceeds 85% in all the studied samples. In addition, there are other minerals (zeolite, sanidne, xenotime) whose total proportion varies from 0,73 to 1,08%. We have also

identified in rhyolites and perlites the presence of clay minerals (2 to 4%) dominated by montmorillonites. This seems to testify to the alteration of primary minerals of the rock into clayey product (montmorillonites, chlorites, illites). Indeed, markers of synsedimentary tectonics are abundant (normal faults, dislocations, fractures). The relatively high abundance of smectite in the bentonite probably reflects the activity of hydrothermal alteration.

Keywords: North-Eastern rif, montmorillonite, heterogeneous evolution, hydrothermal alteration, clay fraction.

ZINC OXIDE NANOPARTICLES FABRICATION USING ERIOBOTRYA JAPONICA LEAVES EXTRACT: PHOTOCATALYTIC PERFORMANCE AND ANTIBACTERIAL ACTIVITY EVALUATION

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ABSTRACT

In the present investigation, ZnO NPs was fabricated using Eriobotrya japonica leaves extract. The E. Japonica leaves powder was extracted and mixed with 0.2 M zinc nitrate in 2:4 ratio and pH was adjusted using ammonia solution. Different techniques including UV–Visible spectroscopy (U.V-Vis), X-ray diffraction (XRD), Energy dispersive X-ray (EDX), Fourier transform infrared (FTIR) and Scanning electron microscope (SEM) techniques were employed to characterize the synthesized ZnO NPs. The peak at 375 nm was observed for ZnO NPs, while the average particle size was 13.0 nm. The elemental composition analysis revealed the NPs was highly pure having irregular platelets shape with aggregates tendency. The as-prepared ZnO NPs was analyzed for their photocatalytic, antibacterial and antioxidant properties. The ZnO NPs exhibited a promising DPPH scavenging activity and was highly active against S. aureus, P. multocida, E. coli and B. subtilis strains. The photocatalytic activity (PCA) was appraised against the removal of methylene blue (MB) dye and we found 72% degradation within 160 min of treatment. Since the synthesized NPs have shown promising bioactivity and PCA, the synthesis of these NPs using E. japonica leaves extracts is suggested for different applications.

Keywords: Nanoparticles; Green synthesis; Plant mediated; Photocatalytic; Antibacterial; Antioxidant activity

X-RAY DIFFRACTION ANALYSIS OF Fe/Ti CO-DOPED BIPHASIC CALCIUM PHOSPHATES

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ABSTRACT

The present study aims to give a more detailed investigation report, obtained from X-ray diffraction (XRD) results, about the effects of the co-dopants of iron (Fe) and titanium (Ti) on the crystal structure-related parameters of the biphasic calcium phosphate structure composed of the hydroxyapatite (HAp) and beta-tricalcium phosphate (β-TCP) phases. For this study, the biphasic calcium phosphate samples containing Fe and Ti at various amounts were synthesized by using a wet chemical method, and the effects of these dopants on the crystal structure-related parameters of the as-prepared biphasic calcium phosphate samples were analyzed by using the XRD analysis. The XRD calculation results showed that the increasing amount of Ti caused significant variations in the phase distribution of the biphasic calcium phosphate structure. Namely, the amount of the HAp phase decreased while the β-TCP content increased with the addition of Ti at higher levels. The lattice parameters calculated for both phases were also affected by Ti content. It was found that the parameter of the crystallinity degree was decreased continuously with the addition of Ti. The doping of Ti into the biphasic calcium phosphate structure affected the average value of the crystallite size for these two phases. It was seen that the addition of Ti into the biphasic calcium phosphate structure affected significantly all the as-investigated parameters related to the crystal structure.

Keywords: Biphasic calcium phosphate; X-ray-diffraction (XRD); Crystallinity degree

INVESTIGATION OF MIFEPRISTON (RU-486) AND ITS DERIVATIVES, MOLECULAR DOKING AND DOS (DESTINY OF STATES) QUANTUM CHEMICAL METHOD

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ABSTRACT

Detailed molecular and atomic level properties of the biological evaluation molecule mifepristone (RU-486) were investigated by Molecular Doking and D OS (Destiny of States). Molecular Doking and DOS were investigated for RU-486 and its hypothetical derivatives (CH2CH3, CH3, F, FH, KOH, NO2, OH). In the spectroscopic examination, active sites of the molecule were observed and its effects on breast and ovarian cancer have been investigated

theoretically with molecular insertion studies.

Keywords: Molecular Doking, DOS (Destiny of States), Mifepristone (RU-486)

CYCLIC LATERAL RESPONSES OF MONOPILES CONSIDERING THE INFLUENCE OF PILE−SOIL RELATIVE STIFFNESS IN SAND

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ABSTRACT

Monopiles are currently preferred foundation type for supporting offshore wind turbines. The most significant design concern is the long-term accumulated displacement and the variation in the pile stiffness under cyclic wind and wave loads. In this study, a series of 1g monotonic and cyclic lateral tests were conducted in medium dense sand (with a relative density $D_r = 50\%$) and dense sand ($D_r = 87\%$) at a constant embedment length ($L_m/D=10$). A simple nondimensional framework was proposed to predict the accumulated displacement and pile stiffness under cyclic loading for semirigid piles. The accumulated displacement and stiffness variation were found to depend on the load characteristics and soil relative density. The soil subsidence and grain migration were visually observed to elucidate the mechanism of the pile-soil interaction under cyclic lateral loading. The phenomenon of microscopic grain migration was analyzed in conjunction with the change in the macroscopic displacement of the pile head to interpret the experimental results.

Keywords: monopile, 1-g model test, lateral cyclic loading, sand, pile−soil relative stiffness, prediction model

THE INFLUENCE OF ENVIRONMENTAL FACTORS ON THE SEASONAL DISTRIBUTION OF TICKS OF SHEEP IN NORTHWEST PART OF SERBIA

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ABSTRACT

Ticks are a widespread problem for livestock producers. They also spread a number of serious diseases, the most notable being anaplasmosis, babesiosis and theileriosis. The study about tick fauna and influence of environmental factors on the seasonal distribution of ticks of sheep at northwest part of Serbia was started in March and finished in November 2019. During study we examined a total of 53 flocks of sheep. In total we examined 237 sheeps. The tick species were detected using morphometric characteristic. Ticks infestation we occured at 51.46% sheep. Most abudant were *Ixodes ricinus,* followed by *Dermacentor marginatus, Rhipicephalus sanguineus, R.bursa, Haemaphysalis punctata, Ha.inermis* and *D.pictus.*

Temperature is most often referred to as the basic environmental factor that determines tick activity. Primarily because there are strict temperature ranges within which tick activity is possible, while at temperatures outside the specified range tick activity is not possible regardless of the influence of other significant factors. This means that temperature has a decisive influence on the beginning and end of tick activity. The temperature optimum of activity (the period when the largest number of ticks is looking for a host) is at temperatures of 20-25 ° C when more than 40% are active and 30% are nymphs. The length of the day and night - the photoperiod, is also important for tick activity. The next most important exogenous factors that affect tick activity are relative humidity and precipitation. The correlation of tick activity with the amount of precipitation and wind speed was not determined, while the influence of temperature and relative humidity on tick activity was the most pronounced. This is especially true for the morning values of these environmental factors, which were found to determine from 32% to 39% of the observed variation in different types of ticks.

Keywords: ticks, sheep, northwest Serbia, environmental factors

INFLUENCE OF BICHECTOMY SURGERY ON MASTICATORY EFFICIENCY: ELECTROMYOGRAPHIC ANALYSIS

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ABSTRACT

Bichectomy is a surgical procedure that aims to remove the spherical fat mass located in an anatomical structure called the Bichat adipose body. The aim of this study was to evaluate the masticatory efficiency through surface electromyography of the masseter and temporalis muscles, 30 and 60 days after bichectomy in 10 healthy subjects with normoocclusion and without temporomandibular disorder. This study was approved by the Ethics Committee of the Faculty of Dentistry of Ribeirão Preto, University of São Paulo, Brazil (process # 10589419.0.0000.5419) with financial support from FAPESP. The linear

envelope integral was used to determine masticatory efficiency on the basis of the electromyographic signal of the masseter and temporalis muscles during habitual (soft and hard food) and non-habitual (parafim) chewing. Data were tabulated and submitted to statistical analysis using the repeated-measure test ($p<.05$). No significant differences were observed between the periods analyzed in habitual and non-habitual chewing. In clinical analysis, it was observed that after 30 days of the surgery there was a decrease in electromyographic activity in almost 100% of the muscles evaluated. After 60 days, it was observed that the masticatory system is in a process of functional organization to try to reach the previous values of the bichectomy surgery. The results suggest that there is a link between the surgical process of the stomatognathic system and masticatory functional.

Keywords: Bichectomy, electromyography, chewing ; masseter muscle, temporal muscle.

HISTORICAL DEVELOPMENT OF FRACTIONAL CALCULUS AND ITS SIMILARITY WITH ORDINARY CALCULUS

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ABSTRACT

The history of fractional calculus is as old as much as ordinary calculus. This work has studied the various definitions of fractional calculus and its relationship with ordinary calculus. Grunwald-Letnikov described the definition as a generalized hypergeometric series expansion and Riemann Liouville's generalized the definition of fractional calculus from series form to integration form. Caputo generalized the definition of fractional calculus as an integration which is the most helpful definition. The definition of Caputo is similar to ordinary calculus. Nowadays, lots of researchers are working on Caputo definition and modifying the definition of Caputo as Caputo Fabrizio is the new form of Caputo definition. Fractional calculus is very useful for the application because of the memory approach in fractional calculus, which gives more accurate results than ordinary calculus. Now a days fractional calculus is applicable in almost every field of Science and engineering, there are so many research papers are available on the application of fractional calculus in ecology (like prey predator models, plant-pest models), epidemiology (like corona virus), signal processing (denoising signals), rheology, economics, electronics and in so many other fields. Here, we will discuss some noteworthy recent contributions to fractional calculus.

Keywords: - Fractional calculus, Caputo Fabrizio, Memory.

E-DOCUMENTS MANAGEMENT ALGORITHMS AND THEIR APPLICATION

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ABSTRACT

Recent technological advances show that process management in various fields of science, including business and industrial development, is based on the integration of fundamental and applied research areas, from modeling and creating algorithms to the development and implementation of software platforms.

In the modern world, the issues of modeling optimal E-documents management problems and the development of strategic algorithms for their solution are becoming relevant, ensuring effective software implementation by minimizing temporal and spatial difficulties.

E-documents is a fairly complex and time-consuming process that comes with quite a lot of complexities, but effective time management can reduce problems and increase efficiency.

This work deals of e-document processing problems in banks. Task clustering algorithm of flow of priority documents management has been developed. The corresponding pseudocodes for programing application have been constructed. The tools applied in this development based on the priority queuing approaches and a stacks techniques of   Standard Template Library (STL) of Object Oriented Programming (OOP) in **c++.**

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APPLICATION OF CLASSIFICATION TREE METHOD TO DETERMINE FACTORS AFFECTING EMBRYONIC MORTALITY IN POULTRY

KANATLILARDA EMBRİYONİK MORTALİTEYİ ETKİLEYEN FAKTÖRLERİN BELİRLENMESİ İÇİN SINIFLANDIRMA AĞACI YÖNTEMİNİN UYGULANMASI

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ABSTRACT

Embryo deaths in the poultry industry cause significant economic losses and are largely affected by environmental factors. These factors may be environmental conditions not related to animals such as thermal conditions of the incubator, embryo movements, egg quality, egg storage. In addition, environmental factors such as genotype, age, disease, feed content, breeding system, stocking density, and season, which are directly related to breeders, are also associated with embryonic mortality. The aim of this study is to determine the effects of genotype, season, and stocking density on embryonic mortality in eggs obtained from Japanese quail breeder flocks. In the study, a total of 1602 hatching fertile eggs collected at the same age and in different seasons from a high body weight flock selected to increase body weight for short term, and a randomly mated control flock were used. These quails were housed in homogeneous breeder cages at the stocking density of 160 cm^2/quail, and 240 cm^2/quail. Collected eggs were transferred to the incubator without storage, and embryo deaths were determined by macroscopic examination after incubation. The obtained nominal scale variables were analyzed with the classification tree method, which is widely used in data mining. The classification tree method is a fairly new method in the field of animal science. Unlike other similar discriminant analysis and logistic regression methods, the classification tree method does not have hypothetical disadvantages such as normality, multi-collinearity, constant variance, and linearity. As a result of the analyzes carried out, a total of 7 nodes in factorial structure were obtained in the classification tree, while 20 nodes (2 genotypes, 3 seasons, 2 settlement frequencies) were expected. All three main effects of genotype, season, and stocking density were found to have significant effects on embryonic mortality (P<0.05 for all). While embryo mortality (10.4%) in eggs of quails with high body weight genotype group was higher, embryo mortality (10.5%) in quails raised in summer was higher than in other seasons (P<0.05). The highest embryo mortality (22.4%) was found in quail eggs in the selection group, reared at a stocking density of 160 cm^2/quail in summer. As a result, it can be recommended to use individuals with the appropriate genotype, to optimize the climatic environment, and to produce under a suitable stocking density in order to reduce the embryonic mortality in eggs obtained from breeder flocks.

Keywords: Embryonic mortality, Decision tree, Classification tree, Data mining

ÖZET

Kanatlı hayvan endüstrisinde embriyo ölümleri önemli ekonomik kayıplara açmaktadır ve büyük ölçüde çevresel unsurlardan etkilenmektedir. Bu unsurlar kuluçka makinesinin termal koşulları, embriyo hareketleri, yumurta kalite, yumurta depolama gibi hayvanlarla ilgili olmayan çevresel koşullar olabilir. Bunun yanında doğrudan damızlık hayvanlarla ilgili olan genotip, yaş, hastalık, yem içeriği, yetiştirme sistemi, yerleşim sıklığı, mevsim gibi çevresel unsurlar da embriyo ölümleri ile ilişkilidir. Bu çalışmanın amacı damızlık Japon bıldırcınlarından elde edilen yumurtalarda embriyonik ölümlere genotip, mevsim ve yerleşim sıklığının etkilerinin belirlenmesidir. Çalışmada canlı ağırlığı arttırmak için kısa dönemli seleksiyon uygulanmış yüksek canlı ağırlık sürüsü ve bunun paralelinde şansa bağlı çiftleştirilmiş kontrol sürüsünden aynı yaşlarda farklı mevsimlerde toplanmış toplam 1602 kuluçkalık döllü yumurta kullanılmıştır. Söz konusu bıldırcınlar homojen damızlık kafeslerinde 160 cm^2/bıldırcın ve 240 cm^2/bıldırcın yerleşim sıklıklarında barındırılmışlardır. Toplanan yumurtalar depolama olmadan kuluçka makinesine aktarılmış, inkübasyon sonrasında makroskobik muayene ile embriyo ölümleri belirlenmiştir. Elde edilen nominal ölçekli değişkenler veri madenciliğinde yaygın kullanım alanı olan sınıflandırma ağacı yöntemi ile analiz edilmiştir. Sınıflandırma ağacı yöntemi hayvancılık alanında oldukça yeni bir yöntemdir. Sınıflandırma ağacı yönteminde diğer benzer nitelikteki diskriminant analizi ve lojistik regresyon yöntemlerinin aksine normallik, çoklu bağlantı, sabit varyans ve doğrusallık gibi varsayımsal dezavantajlar bulunmamaktadır. Gerçekleştirilen analizler sonucunda sınıflandırma ağacında faktöriyel yapıda beklenen toplam 20 boğum (2 genotip, 3 mevsim, 2 yerleşim sıklığı) 7 boğuma indirgenmiştir. Genotip, mevsim ve yerleşim sıklığı ana etkilerinin her üçünün de embriyonik mortalite üzerinde önemli etkiye sahip olduğu belirlenmiştir (tümü için P<0.05). Seleksiyon ile canlı ağırlığı artmış bıldırcınların yumurtalarındaki embriyo ölümleri (%10.4) daha yüksek bulunurken, yaz mevsiminde yetiştirilen bıldırcınların embriyo ölümleri (%10.5) diğer mevsimlerden yüksek bulunmuştur (P<0.05). En yüksek embriyo ölümleri (%22.4) ise seleksiyon grubunda yer alan, yaz mevsiminde 160 cm^2/bıldırcın yerleşim sıklığında yetiştirilen bıldırcın yumurtalarında saptanmıştır. Sonuç olarak damızlık sürülerden elde edilen yumurtalardaki mortalite oranını azaltmak için uygun genotipe sahip bireylerin kullanılması, iklimsel çevrenin optimize edilmesi ve uygun bir yerleşim sıklığı altında üretim yapılması tavsiye edilebilir.

Anahtar Kelimeler: Embriyonik mortalite, Karar ağacı, Sınıflandırma ağacı, Veri madenciliği

1. INTRODUCTION

The object or phenomena that is the topic of research in biological sciences is influenced by numerous factors. To explain the biological system, these numerous factors must be investigated. Typically, a large number of independent variables is required by statistical models developed to explain the biological systems. Depending on whether the parametric method's assumptions are met, hypothesis testing can be conducted with general linear models or generalized linear models. In situations where a large number of independent factors are present, however, multivariate statistical methods provide more insightful explanations of the behaviors indicated by the data. Clustering and categorization are among the reasons for which multivariate statistical approaches may be applied. Data can be classified using common approaches such as cluster analysis, discriminant analysis, and factor analysis.

Classification and regression tree (CART) is a data mining approach used to generate decision trees as an alternative to multivariate statistical methods and particularly logistic regression analysis when applied to nominal, ordinal, and continuous variables (Çamdeviren et al., 2007). For big datasets, the tree-based CART algorithm is developed with a categorical dependent variable and both categorical and continuous explanatory variables (Karabağ et al., 2010). However, the algorithm cannot identify any essential assumptions for explanatory variables. The algorithm generates binary nodes by iteratively dividing each node into two subnodes until the tree diagram contains homogenous subgroups. There are branches between the root and the leaves (last nodes).

Along these branches, there are separation rules that maximize the distinction between classes and decrease variation within each class. This method can be used to model both categorical and continuous dependent variables. If the dependent variable is categorical, the method is named classification tree (CTM), and if it is continuous, regression tree (RTM) (Chu et al., 2009; McKenny and Pedlar, 2003; De'ath and Fabricius 2000; Navarrate and Espinosa, 2011; Breiman et al., 1984).

There are many algorithms developed based on decision trees. These algorithms differ from each other in terms of the path they follow in the selection of root, node, and branching criteria. Among these algorithms developed to create a decision tree; CHAID (Chi-Squared Automatic Interaction Detection), C&RT (Classification and Regression Trees), MARS (Multivariate Adaptive Regression Splines), QUEST (Quick, Unbiased, Efficient Statistical Tree), SLIQ (Supervised Learning in Quest), SPRINT (Scalable Parallelizable Induction of Decision Trees) ID3, C4.5, and C5.0.

In contrast to other comparable discriminant analysis and logistic regression approaches, the classification tree method lacks hypothetical disadvantages such as normality, multicollinearity, constant variance, and linearity. Due to these advantages, the classification tree method has been increasingly popular in animal science in recent years. Studies have been conducted on beef cattle (Grzesiak et al., 2014; Kücükonder et al., 2015), dairy cattle (Grzesiak et al., 2010; Grzesiak et al., 2011; Zaborski et al., 2014; Bayram et al., 2015), and fish (Topal et al., 2010). Few research have also applied data mining techniques to poultry science (Karabağ et al., 2010; Kücükönder et al., 2014; Üçkardes et al., 2014; Çelik et al., 2016). Üçkardes et al. (2014) preferred the CHAID data mining algorithm to determine the effects of genotype, season, and cage stocking on fertility in Japanese quails, whereas Kücükonder et al. (2014) used several classification algorithms to explain the effects of season, selection, and cage stocking on fertility in Japanese quails. Using the CART data mining algorithm, Çelik et al. (2016) examined the effect of some egg quality factors on fertility in Japanese quail eggs. The aim of this study is to determine the effects of genotype, season and stocking density factors on embryonic mortality in Japanese quails by classification tree method using CHAID algorithm.

2. RESEARCH AND RESULTS

The care and management of the animals used in this investigation were conducted in line with applicable Turkish laws and regulations. In line with section 8 (8/k/2) of the applicable regulation, the Akdeniz University Animal Experiments Local Ethics Committee issued a decision of approval for the study, which was conducted with the authorization of the Ministry of Agriculture and Forestry. Animal material was collected from Japanese quail (Coturnix coturnix japonica) in the Animal Husbandry Facilities of Akdeniz University's Faculty of Agriculture, Department of Animal Science. Animal material for the study consisted of eggs collected from two parent flock (selection and control flocks).

In the study, a total of 1602 hatching fertile eggs collected at the same age and in different seasons from a high body weight flock selected to increase body weight for short term, and a randomly mated control flock were used. These quails were housed in homogeneous breeder cages at the stocking density of 160 cm^2/quail, and 240 cm^2/quail. Collected eggs were transferred to the incubator without storage, and embryo deaths were determined by macroscopic examination after incubation.

In the study, once the dependent and independent variable data sets were established, the data were analyzed using a generalized linear model, and a classification tree application was developed using the CHAID method.

Table 1. Generalized linear model analysis results for mortality rates

Genotype	Season	Stocking Density	Mortality, %
Control	Spring	160cm²	3.85^{ef}
		240cm²	3.16^{f}
	Summer	160cm²	7.53^{d}
		240cm²	4.73^{ef}
	Autumn	160cm²	4.91^{ef}
		240cm²	5.95^{e}
Selection	Spring	160cm²	11.21^{c}
		240cm²	10.00^{c}
	Summer	160cm²	25.88^{a}
		240cm²	14.29^{b}
	Autumn	160cm²	10.58^{c}
		240cm²	10.32^{c}
SEM			0.18
Variation Sources			
Genotype			0.000
Season			0.001
StockingDensity			0.064
…			…
Genotype * Season * Stocking Density			0.428

Mortality

Node 0		
Category	%	n
■ 0.000	93.9	1505
■ 1.000	6.1	97
Total	100.0	1602

Legend:
■ 0.000
■ 1.000

Genotype
Adj. P-value=0.000, Chi-square=35.
460, df=1

Control

Node 1		
Category	%	n
■ 0.000	96.9	926
■ 1.000	3.1	30
Total	59.7	956

Selection

Node 2		
Category	%	n
■ 0.000	89.6	579
■ 1.000	10.4	67
Total	40.3	646

Season
Adj. P-value=0.004, Chi-square=10.
231, df=1

Spring, Autumn

Node 3		
Category	%	n
■ 0.000	92.1	420
■ 1.000	7.9	36
Total	28.5	456

Summer

Node 4		
Category	%	n
■ 0.000	83.7	159
■ 1.000	16.3	31
Total	11.9	190

StockingDensity
Adj. P-value=0.043, Chi-square=4.
106, df=1

160cm2

Node 5		
Category	%	n
■ 0.000	77.6	66
■ 1.000	22.4	19
Total	5.3	85

240cm2

Node 6		
Category	%	n
■ 0.000	88.6	93
■ 1.000	11.4	12
Total	6.6	105

Figure 1. Classification tree diagram for mortality data

Generalized linear model analysis results are presented in Table 1. The diagram for the classification tree method is shown in Figure 1.

3. CONCLUSION

According to the generalized linear model analysis, the genotype selection, the summer season, and the 160 cm^2 stocking density group had the highest mortality rate (25.88 %). The subgroups were classified into the six groups a, b, c, d, e, and f in accordance with the results of the post - hoc test. As a result of the study of the generalized linear model, the sum of all interactions comprised 20 units (subgroups), whereas the classification tree method generated a total of 6 nodes, excluding the root node. The CHAID method's chi-square statistics are also displayed in the diagram. In consequence, the findings of the generalized linear model and the classification tree were comparable. However, the classification tree method is more effective due to its ease of use, visual nature, and absence of hypothetical assumptions.

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DETERMINING THE BEST FITTED GROWTH MODEL IN JAPANESE QUAILS: A BAYESIAN APPROACH

JAPON BILDIRCINLARINDA EN UYGUN BÜYÜME EĞRİSİ MODELİNİN BELİRLENMESİ: BAYESIAN YAKLAŞIMI

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ABSTRACT

For many years, numerous mathematical functions have been employed to model the growth of poultry. The majority of these are asymptotic-mechanistic models. Depending on the biological growth phenomenon of the animal, these models are functions that assume the dependent variable has an approximated asymptotic value while the independent variable is at infinity. The majority of specific growth models are nonlinear regression equations with a sigmoidal structure. The studies conducted on poultry using growth models may be categorized into three groups: "finding of the most fit model", "comparison of various scientific application results using growth models", and "genetic structure of the growth curve". The aim of this study is to determine the most suitable growth model for Japanese quail. In similar studies conducted to determine the most suitable growth curve model for Japanese quails, the frequentist approach was widely employed. However, there has been a recent surge of interest in the use of the Bayesian methodology to modeling studies. In this study, the Bayesian approach was applied as an alternative to the frequentist method for analyzing growth curve data. Richards, Gompertz, Negative Exponential, Broody, and Logistic functions, which are commonly used to model growth in poultry, were used in this study. Normal distribution was assigned as prior distribution for all growth curve parameters. Jeffrey's non-informative prior was allocated to the prior distribution of the variance of the residuals. Bayesian analyzes were performed using the MCMC procedure in SAS 9.4 software. After evaluating the trace plots for each parameter in all models, a chain length of 120000 was assumed. The initial 10,000 samples were removed as the burn-in period. The thinning interval was set to 20, and 5,500 samples were utilized to determine the descriptive statistics of the marginal posterior distributions. The models were compared using the deviance information criterion (DIC), which is a typically used Bayesian approach goodness-of-fit criterion. Based on this criterion, the Richards model with the smallest DIC value was determined to be the most appropriate model for Japanese quail growth samples. The posterior mean value of the parameter β_0 defined as the asymptotic weight parameter of the Richards model was found to be 270.0. The other model parameters, β_1, β_2, and β_3, were estimated to be 0.81, 0.046, and 19.30, respectively. On the basis of the fit criterion, the Richards function was followed by the Gompertz and Broody growth models, respectively.

Keywords: Nonlinear models, Bayesian analysis, Growth curve

ÖZET

Kanatlı hayvanlarda büyümenin modellenmesi amacıyla uzun yıllardır pek çok matematiksel model kullanılmıştır. Bunların çoğunluğu asimptotik-mekanistik modellerdir. Bu modeller hayvanın biyolojik büyüme fenomenine bağlı olarak bağımsız değişken sonsuzdayken bağımlı değişkenin tahmin edilen bir asimtotik değeri olduğunu kabul eden fonksiyonlardır. Bu büyüme modelleri doğrusal olmayan

regresyon eşitlikleri olup çoğunluğu sigmoidal yapıdadır. Büyüme modelleri kullanılarak kanatlı hayvanlarda gerçekleştirilen çalışmaları "en uyumlu modelin belirlenmesi", "çeşitli uygulama sonuçlarının büyüme modelleri ile karşılaştırılması" ve "büyüme eğrisinin genetik yapısı" şeklinde üç kategori altında incelemek mümkündür. Bu çalışmanın amacı Japon bıldırcınları için en uygun büyüme modelinin belirlenmesidir. Japon bıldırcınlarında en uygun büyüme eğrisi modelinin belirlenmesi amacıyla yapılan benzer çalışmalarda genellikle frequentist yaklaşım kullanılmıştır. Oysa son dönemde modelleme çalışmalarında Bayesian yaklaşımın kullanımına büyük ilgi vardır. Bu çalışmada büyüme eğrisi verileri için kullanılan frekansçı yaklaşıma alternatif olarak Bayesian yaklaşım kullanılmıştır. Çalışmada kanatlı hayvanlarda büyümenin modellenmesi amacıyla sıklıkla uygulanan Richards, Gompertz, Negative Exponential, Brody ve Logistic fonksiyonları kullanılmıştır. Tüm büyüme eğrisi parametreleri için prior dağılım olarak normal dağılım atanmıştır. Artıkların varyansına ait prior dağılımı için Jeffrey'in bilgi içermeyen prioru atanmıştır. Bayesian analizler SAS 9.4 yazılımında MCMC prosedürü kullanılarak yapılmıştır. Tüm modellerde her bir parametre için iz grafikleri incelendikten sonra tek zincir uzunluğu 120000 kabul edilmiştir. Yakma peryodu olarak ilk 10000 örnek uzaklaştırılmıştır. Zayıflatma aralığı 20 olarak belirlenmiş ve her zincirdeki marjinal sonsal dağılımların betimleyici istatistiklerini tahmin etmek için toplam 5500 örnek kullanılmıştır. Modeller, Bayesian yaklaşımında sıklıkla kullanılan uyum iyiliği kriteri olan sapma bilgi kriteri (DIC) ile karşılaştırılmıştır. Bu kritere göre en küçük DIC değerine sahip Richards modelinin Japon bıldırcınlarının büyüme örnekleri için en uyumlu model olduğu belirlenmiştir. Richards modelinin asimptotik ağırlık parametresi olarak tanımlanan β_0 parametre sonsal ortalamasının 270.0 olduğu bulunmuştur. Modelin diğer parametreleri olan β_1, β_2 ve β_3 değerleri ise sırasıyla 0.816, 0.046 ve 19.30 olarak tahmin edilmiştir. Uyum iyiliği kriterlerine göre Richards fonksiyonunu sırasıyla Gompertz ve Brody büyüme modelleri takip etmiştir.

Anahtar Kelimeler: Doğrusal olmayan modeller, Bayesian analizi, Büyüme eğrileri

1. INTRODUCTION

For many years, numerous mathematical functions have been employed to model the growth of poultry. Depending on the biological growth phenomenon of the animal, these models are functions that assume the dependent variable has an approximated asymptotic value while the independent variable is at infinity. The majority of specific growth models are nonlinear regression equations with a sigmoidal structure. The studies conducted on poultry using growth models may be categorized into three groups: "finding of the most fit model", "comparison of various scientific application results using growth models", and "genetic structure of the growth curve".

Most studies have successfully fitted the Gompertz, Richards, and Logistic functions to Japanese quail data (Marks, 1978; Anthony et al., 1991; Narinc et al., 2010). Also, several other studies have used the growth of other species of poultry (Emmans, 1995; Akbas and Oğuz, 1998; Aggrey 2002; Ahmadi and Golian, 2008).

Recently, Bayesian method of estimation of growth model parameters has gained a great deal of interest among animal scientists (Blasco et al., 2003; Zhang et al., 2007). In this approach, the model parameters are assumed as random variables with some prior knowledge about their distribution and this prior distribution is combined with the likelihood of the existing data to build the posterior distribution.

The aim of this study is to determine the most suitable growth model for Japanese quail. In similar studies conducted to determine the most suitable growth curve model for Japanese quails, the frequentist approach was widely employed. However, there has been a recent surge of interest in the use of the Bayesian methodology to modeling studies. In this study, the Bayesian approach was applied as an alternative to the frequentist method for analyzing growth curve data.

2. RESEARCH AND RESULTS

The study was conducted at the Poultry Breeding Unit, Animal Science Department, Faculty of Agriculture, Akdeniz University, Turkey. Averages of weekly recorded body weight measurements belonging to 60 Japanese quail were used in model fitting.

A growth model for a single experimental unit was assumed as:

$$y_j = f(t_j, \boldsymbol{\theta}) + \varepsilon_j \quad j = 1,2,\dots,n$$

where y_j is the observed weight, n is total number of observations; $\boldsymbol{\theta}$ is a vector of unknown parameters, t_j is the time of which the jth observation was taken, $\varepsilon_j \sim N(0, \sigma^2)$ is independent random error of y_j, and $f(t_j, \boldsymbol{\theta})$ is one of the different types of growth curves.

For the analysis of our data set, the following five nonlinear functions, which are frequently used for the description of growth curves of Japanese quail, were considered:

Richards Model:

$$f_1(t_j, \boldsymbol{\theta_1}) = \beta_0 / \left(1 + \beta_1 exp(-\beta_2 t_j)\right)^{1-\beta_3}$$

where $\boldsymbol{\theta'_1} = (\beta_0, \beta_1, \beta_2, \beta_3)$.

Gompertz Model:

$$f_2(t_j, \boldsymbol{\theta_2}) = \beta_0 exp\left[-\beta_1 exp(-\beta_2 t_j)\right]$$

where $\boldsymbol{\theta'_2} = (\beta_0, \beta_1, \beta_2)$.

Negative Exponential Model:

$$f_3(t_j, \boldsymbol{\theta_3}) = \beta_0 - \left[\beta_0 exp(-\beta_2 t_j)\right]$$

where $\boldsymbol{\theta'_3} = (\beta_0, \beta_2)$.

Brody Model:

$$f_4(t_j, \boldsymbol{\theta_4}) = \beta_0 \left(1 - \beta_1 exp(-\beta_2 t_j)\right)$$

where $\boldsymbol{\theta'_4} = (\beta_0, \beta_1, \beta_2)$.

Logistic Model:

$$f_5(t_j, \boldsymbol{\theta_5}) = \beta_0 / \left(1 + \beta_1 exp(-\beta_2 t_j)\right)$$

where $\boldsymbol{\theta'_5} = (\beta_0, \beta_1, \beta_2)$.

In these models, β_0 stands for the asymptotic weight, β_1 is a constant without biological meaning, β_2 is the maturity index as an expression of the growth rate relative to mature weight, and β_3 is the shape parameter defining the position of the point of inflection (Aggrey, 2002; Kizilkaya et al., 2006).

Now, $f_l(t_j, \boldsymbol{\theta_l})$ *l=1,2,…,5* were substituted in the growth model and denoted $y = \{y_j, j = 1,2,\dots,n\}$ and $t = \{t_j, j = 1,2,\dots,n\}$, their likelihood functions were obtained, as follows:

$$L(y|\theta_l, t, \sigma^2) = \frac{1}{(2\pi)^{n/2}\sigma^n} exp\left[-\frac{1}{2\sigma^2}\sum_{j=1}^{n}\{y_j - f_j(t_j, \theta_l)\}^2\right]$$

where $f_l(t_j, \theta_l) = E_{\theta_l}(y_j)$, *l=1,2,…,5.*

We used a normal distribution with mean 0 and variance 10,000, N(0, 10,000), as the prior distribution for the growth curve parameters of models $(\beta_0, \beta_1, \beta_2, \beta_3)$ and a inverse gamma distribution IG(0.01,0.01) as prior for the precision parameter. These priors are considered "vague" priors. The distribution IG(0.01, 0.01) (a proper distribution) is very close to the commonly used Jeffrey's prior for the precision parameter.

Table 1. Posterior summary statistics for the five growth functions

Models	Parameters	Mean	SD	HPD Interval	
Richards	β_0	270.000	3.186	263.500	276.000
	β_1	0.816	0.146	0.552	1.111
	β_2	0.046	0.004	0.038	0.055
	β_3	19.307	1.867	15.652	23.093
	σ_e^2	15.585	22.734	1.528	44.700
	DIC	38.116			
Gompertz	β_0	266.900	6.910	253.300	280.100
	β_1	3.077	0.151	2.792	3.389
	β_2	0.052	0.002	0.047	0.006
	σ_e^2	20.342	23.186	2.568	52.658
	DIC	41.127			
Negative Exponential	β_0	471.100	0.235	470.600	471.600
	β_2	0.011	0.000	0.011	0.012
	σ_e^2	45.217	83.951	8.785	111.700
	DIC	45.880			
Broody	β_0	474.300	0.229	473.900	474.700
	β_1	1.006	0.000	1.006	1.007
	β_2	0.011	0.000	0.010	0.012
	σ_e^2	37.180	38.571	6.076	90.869
	DIC	44.830			
Logistic	β_0	263.600	7.260	249.300	277.100
	β_1	12.079	1.868	8.650	15.878
	β_2	0.085	0.006	0.073	0.098
	σ_e^2	125.100	120.500	20.836	320.400
	DIC	53.661			

Parameter estimates of the five non-linear models were obtained by Bayesian analysis. Bayesian analyzes were performed using the MCMC procedure in SAS 9.4 software. After evaluating the trace plots for each parameter in all models, a chain length of 120.000 was assumed. The initial 10.000 samples were removed as the burn-in period. The thinning interval was set to 20, and 5.500 samples were utilized to determine the descriptive statistics of the marginal posterior distributions. The models were compared using the deviance information criterion (DIC), which is a typically used Bayesian approach goodness-of-fit criterion. In model comparison, the smaller the DIC model fits better to the data set (Spiegelhalter et al., 2002).

Table 1 provides the summary statistics of Bayesian analysis for the fitted non-linear models. Based on deviance information criterion, the Richards model with the smallest DIC value was determined to be

the most appropriate model for Japanese quail growth samples. The posterior mean value of the parameter β_0 defined as the asymptotic weight parameter of the Richards model was found to be 270.0. The other model parameters, β_1, β_2, and β_3, were estimated to be 0.81, 0.046, and 19.30, respectively. On the basis of the fit criterion, the Richards function was followed by the Gompertz and Broody growth models, respectively.

3. CONCLUSION

In this paper, we considered the estimation of the growth curve parameters for nonlinear models using Bayesian methods. Similar to the findings of their study, Kaplan and Gürcan (2018) reported that the Richards growth function was the most fitting model for Japanese quails. Also, our results are in contrast some previous reports that the Gompertz model is the best fitting model for galliforms (Akbaş and Oğuz, 1998; Narinc et al., 2010). Growth is a phenomenon influenced by both genetic and environmental factors; consequently, it is independent of species, lineage, origin, and family (Üçkardeş and Narinç, 2014). Consequently, it is necessary to determine the optimum model for each evaluated flock.

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EXPECTED TIME TO RECRUITMENT IN AN ORGANIZATION THROUGH DISTRIBUTION

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ABSTRACT

In this article, we will describe a model of the survival function. Under this model a The system is subjected to shocks controlled by Burr Type X damage distribution. Additives accumulate and the system fails if the total damage exceeds a Certain criteria, in many cases, the extent of impact damage is defined. varies with time Expected time to reach the admissions status of Organization and variance were found in the Burr Type X distribution. The results of the analysis are shown numerically, assuming Burr Type X. real-world usage pattern distribution

Key word: distribution, Burr Type X, survival function

DYNAMICAL ANALYSIS OF A DELAYED RATIO-DEPENDENT PREY–PREDATOR MODEL

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ABSTRACT

In this work we introduce the concept of differential equations with delay terms. These equations depend on past history, and are therefore used in various types of models because they are more realistic than models independent of past history. Here, we discuss the solution of delay differential equation and it's application in population dynamics on prey-predator models with three types of Holling functional responses. For the analytical solutions of the delay differential equations we usually use the variation of constants formula and method of steps. To study the behavior of the ecological models we first construct autonomous system and then we take the delay terms to make the model feasible.

To analyze the model we first consider the ecologically relevant sub-region and to begin qualitative analysis of the system, we intend to study its critical or equilibrium points in that sub-region. For this, we need to determine the nullcline corresponding to each axis. We find the critical points at the intersection of all nullclines. We, next, determine the eigenvalues of the Jacobian matrix at the critical points. To analtze hyperbolic critical points we use Hartman-Grobman theorem and for non-hyperbolic critical points we perform numerical analysis.

Keywords: Delay differential equation, Holling functional response, Prey-predator ecological model, Autonomous system, Critical Points.

GAZ KARIŞIMLARI İÇİN ÜÇÜNCÜ VİRİAL KATSAYILARININ NÜMERİK HESAPLANMASI

NUMERIC CALCULATION OF THIRD VIRIAL COEFFICIENT OF GAS MIXTURES

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ÖZET

Gaz karışımlarının termodinamik özelliklerini hesaplamak için birçok durum denklemi önerilmiştir. Bir durum denklemi, viral katsayılardan (ikinci, üçüncü, dördüncü viral katsayı…) oluşan virial durum denklemidir. Bu çalışmada gaz karışımlarının hesaplanması için önceki çalışmalarda önerilen üçüncü virial katsayı için basit ve verimli bir sayısal yöntem kullanılmıştır. Bu sayısal yöntemin, farklı sıcaklık aralıkları için gaz karışımlarının doğru sonuçlarını verdiği gösterilmiştir. Bazı gaz karışımlarının hesaplama sonuçları literatür verileri ile karşılaştırılmıştır. Elde edilen sonuçlar mevcut literatür verileriyle uyumludur.

Anahtar Kelimeler: çüncüvirial katsayısı, Lennard-Jones (12-6) potansiyeli, Gaz karışımları

ABSTRACT

Many equation of state to calculate thermodynamic properties of gas mixtures have been proposed. One equation of state is the virial equation of state that is consisting of virial coefficient (second, third, fourth virial coefficient…). A simple and efficient numeric method for third virial coefficient proposed in previous studies has used to calculate of gas mixtures in this work. It has been shown that this numeric method gives accurate results of gas mixtures for different range temperature. The calculation results of some gas mixtures have been compared with literature data. The obtained results are in agreement with available literature data.

Keywords: Third virial coefficient; Lennard-Jones (12-6) potential; Gas mixtures

DÖRDÜNCÜ VİRİAL KATSAYISI KULLANILARAK SES HIZININ NÜMERİK HESAPLANMASI VE MOLEKÜLLERE UYGULAMALARI

NUMERIC ANALYSIS OF SPEED OF SOUND USING FOURTH VIRIAL COEFFICIENT AND ITS APPLICATION TO MOLECULE

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ÖZET

Bu çalışmada, kusurlu gazların ses hızını belirlemek için yeni bir sayısal yöntem sunulmuştur. Yöntemimiz, Kihara potansiyeline göre dördüncü virial katsayıya dayanmaktadır. Bildiğimiz kadarıyla, ilk olarak ses hızının Kihara potansiyeli üzerinden dördüncü virial katsayılı hesaplanması için sayısal bir yöntem önerilmiştir. Hesaplama sonuçları, önerilen sayısal yöntemin kusurlu gazlar için doğru ve hassas ses hızı sonuçları verdiğini göstermiştir. Ses kusurlu gazların hızı için hesaplama sonuçları deneysel ve teorik verilerle karşılaştırılmış ve literatür verileriyle uyumlu olduğu gösterilmiştir.

Anahtar Kelimeler: Dördüncü virial katsayısı, Kihara potansiyeli, Ses hızı

ABSTRACT

A new numeric method has presented to determine for the speed of sound of imperfect gases, in this work. Our method is based on fourth virial coefficient over Kihara potential. As far as we know, numeric method for the calculation of the speed of sound with fourth virial coefficient over Kihara potential is proposed first. The results of the calculation have shown that proposed numeric method gives accurate and sensitive results speed of sound for imperfect gases. The results of the calculation for speed of sound imperfect gases have been compared with experimental and theoretical data and shown that it is in agreement literature data.

Keywords: Fourth virial coefficient, Kihara potential, speed of sound

B12 VE FOLİK ASİT DÜZEYİ NORMAL OLAN BİREYLERDE YAŞIN HOMOSİSTEİN DÜZEYİ ÜZERİNE OLAN ETKİSİ
THE EFFECT OF AGE ON HOMOCYSTEINE LEVEL IN INDIVIDUALS WITH NORMAL B12 AND FOLIC ACID LEVEL

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ÖZET

Homosistein dışarıdan diyetle alınmayan metiyoninden sentezlenen non-esansiyel bir aminoasittir. Homosistein seviyesinin serumda yükselmesi vasküler inflamasyona ve endotel bağımlı vazodilatasyonun bozulmasına neden olur. Bu nedenle özellikle koroner arter hastalığı, serebrovasküler olaylar, arterial trombotik olaylar ile yüksek homosistein seviyesini araştıran çalışmalar yapılmış ve anlamlı sonuçlara ulaşılmıştır. Kan homosistein yüksekliği daha çok Metilen Tetrahidro Folat Redüktaz (MTHFR) enzim aktivitesinde genetik olarak azalma, B12 ve Folat eksikliği ile ilişkilendirilir. Bu çalışmanın amacı B12 ve Folat kan düzeyi normal olan hastalarda artan yaş ile birlikte kan homosistein düzeyleri arasındaki ilişkiyi değerlendirmektir.

Bu çalışma Ocak 2019 ile Ocak 2021 tarihleri arasında Ankara'da üniveriste hastanesi iç hastalıkları polikliniğinde tekrarlayan düşükler, derin ven trombozu, varis ya da pulmoner emboli gibi nedenlerle takipli ve kan homositein düzeyi bakılmış olan kişilerin dosyaları geriye doğru taranarak retrospektif olarak yapıldı. 18 yaş altında olan kişiler, B12 ya da Folat eksikliği olan hastalar, aktif enfeksiyonu ya da malignitesi olan hastalar çalışmaya dahil edilmedi. Çalışmaya 104 erkek (%43,5), 135 kadın (%56,5) toplam 239 hasta alınmıştır. Çalışmaya alınan hastaların ortalama yaşı 52 ± 15 idi. Yaş ile homosistein arasındaki korelasyona bakıldığında anlamlı pozitif korelasyon saptandı (r= 0,220 P=0.001). Regresyon analizi ile bakıldığında da yaş homosistein yüksekliği için bağımsız bir risk faktörü olarak saptandı (P=0.001).

Homositein vasküler patolojiler ile birlikteliği gösterilmiş bir aminoasittir. Özellikle yaşlı bireylerde daha yüksek homositein düzeyleri saptanması bu kişilerde özellikle arterial vasküler patolojilerin daha sık olmasına katkıda bulunuyor olabilir.

Anahtar kelimer: Homosistein, Yaşlanma, Arteriyel embolizm

ABSTRACT

Homocysteine is a non-essential amino acid synthesized from methionine and could not taken from the diet. Elevated serum homocysteine levels cause vascular inflammation and weakening of endothelium-dependent vasodilation. For this reason, studies investigating especially coronary artery disease, cerebrovascular events, arterial thrombotic events and high homocysteine levels have been performed and significant results have been reached. High blood homocysteine levels are mostly associated with a genetic decreased Methylene Tetrahydro Folate Reductase (MTHFR) enzyme activity and B12, Folate deficiency. The aim of this study was to investigate the relationship between increasing age and blood homocysteine levels in patients with normal B12 and Folate blood levels.

This retrospective study was carried out with patients who admitted internal medicine outpatient clinic of a university hospital in Ankara between January 2019 and January 2021. Patients who were followed up for such as miscarriages, deep vein thrombosis, varicose veins or pulmonary embolism and whose blood homocytein level was checked was enrolled the study. Patients under the 18 years, patients with B12 or Folate deficiency, patients with active infection or malignancy were not included in the study. 104 male (43.5%) and 135 females (56.5%) totally 239 patients were enrolled the study. The mean age of the included patients in was 52 ± 15.

Significant positive correlation was found between age and homocysteine levels. (r= 0.220 P=0.001). Age was also found to be an independent risk factor for elevated homocysteine when analyzed by regression analysis (P=0.001).

Homocytein is an amino acid that has been shown to be associated with vascular pathologies. Especially in elderly individuals, higher homocysteine levels may contribute the higher arterial embolic diseases.

Key Words: Homocystein, Aging, Arterial embolism

COVID-19 PANDEMİ DÖNEMİ'NDE DERİ HASTALIKLARI VE DERİ DIŞINDAKİ HASTALIKLARDA GELENEKSEL VE TAMAMLAYICI TIP UYGULAMALARI: ANKET ÇALIŞMASI

TRADITIONAL AND COMPLEMENTARY MEDICINE PRACTICES IN SKIN DISEASES AND NON-SKIN DISEASES DURING THE COVID-19 PANDEMIC PERIOD:

A QUESTIONNAIRE STUDY

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ABSTRACT

INTRODUCTION

The number of people who apply to traditional and complementary medicine (TCM) practices tends to increase in dermatology as in every field of medicine. There are publications in the literature on the use of TCM methods in skin diseases, complaints and/or systemic diseases from around the world and Turkey, but no study has been seen regarding their use during the pandemic period. Our aim in this study is to determine the use and experience of the TCM method in patients during the COVID-19 pandemic process.

MATERIAL AND METHOD

Our study was carried out by randomly including the 3rd year students of our Faculty of Medicine and their relatives with skin-related problems, definite-diagnosed skin diseases and systemic diseases between December 2021 and February 2022. Our study was shaped as a single-center, survey study. In

the survey; The demographic information of the patients, whether they used TCM for these diseases before and after the pandemic, which patients preferred which method, whether they saw benefits and side effects, as well as whether they went to the doctor and used drugs and how they heard were questioned.

RESULTS

A total of 331 people (M: 152, F: 179) between the ages of 18-79 were included in our study. The most common 80% of the participants were undergraduate and above educated, 81.9% of them were unemployed; It was found that 25.7% of them had a monthly household income of 0-3500 TL. Acne (27.2%), contact dermatitis (10.6%), gastrointestinal diseases (3.3%) are the most common for 0-5 years, in which 1 out of every 2 people has used TCM at least once in their lifetime. found to be used. 50.5% of the participants used TCM at least once in their lifetime; 31.7% of users and 30% of non-users during the pandemic period; It was determined that 39.0% of those who benefited and 19.6% of those who did not. When the most frequently used and beneficial TCM methods in all diseases and complaints during the pandemic are questioned; it was found that there are topical and systemic herbal methods. 5.7% of the patients experienced the side effects of the TCM methods, while 48.9% of patients did not; 29.9% stated that they continued the treatment recommended by the physician together with TCM; 28.4% of them rarely reached the doctor due to the same disease during the pandemic period; 24.8% stated that the frequency of using TCM did not increase compared to the pre-pandemic period, 16.3% used it with the same frequency; 32.3% of them stated that the most important source of information about TCM is "relatives, friends, neighbors"; also stated that the reason for preferring, in order of frequency, is to think that it is useful, to recommend, to find the method safe.

DISCUSSION

In studies on the use of TCM methods in dermatological diseases, which are rare in our country, this rate has been reported as 12.6% - 33.5%. In our study, it was found that, similar to the literature, gender and income did not affect the use of TCM, it was more preferred in those with a higher education level, and herbal treatments were the most widely used method. During the pandemic period, we would have expected 'inability to access health services' to be more frequent due to the limited access to hospitals or physicians. We think that the results may be different with multicenter studies on this subject.

Keywords: traditional and complementary medicine, skin disease, non-skin disease, systemic disease, covid-19, pandemi

A QUALITATIVE ANALYSIS OF EARLY RECOLLECTIONS AND COPING STRATEGIES USED BY ONCOLOGY PATIENTS

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ABSTRACT

The aim of the present study is to present and explore topics among Early Recollections in oncological patients who respond to the disease in an optimistic and pessimistic manner.

The method implied in the current study include the Clinical interviews and the Early Recollections Questionnaire by Rule (1972), Altman (1973) and Zarsk i (1978). The sample of the current study is composed of 10 (No=10) patients diagnosed with stage 2-3 cancer in palliative ward of Mother Teresa Hospital Center, Tirana. Analysis of Early Recollections was interpreted by classifying and using the types of themes and personality typologies of Mosak & Di Pietro (2006). From the clinical interview, the classification in the category of disease response style was performed, dividing them into optimistic and pessimistic categories.

Results: Qualitative analysis revealed that cancer-diagnosed people with optimistic reactions were more cooperative, optimistic about the future, seeking changes that would improve their health and psychological state, accompanied by feelings of happiness, joy, pleasure that you display typology personality such as: Satisfaction, Type of social interest, Conformist, Passive-conformist. On the contrary, patients with pessimistic reactions had resistance personality reactions, infantile like ways, martyr, accompanied by low self-esteem, feelings of fear, shyness, strange, with personality typologies such as: Submissive, Infancy, Confusion, Resistant, Martyr, etc.

Conclusion: Confirming the main hypothesis of this research. In conclusion, defining the personality typology as a projective instrument helps to determine the personality and reactions to current situations. It is therefore recommended that it be achieved to provide a foundation on which to build the clinical utility of the Early Recollections of these patients during the therapeutic process.

Keywords: early relocations, oncological patients, psycho-oncology, coping strategies, lifestyle.

INTRODUCTION

Early recollections (ER) represent an understudied field of study in psychology, although it has sparked interest in the scientific community since the early days of the science. Information collected by ER reflects a person's current view of others, the world, and themselves. The purpose of the ER is not to explain a person's childhood, nor are they intended to derive causal explanations. ER does not suggest that because something happened in childhood, an individual should act in a particular way in his adult life. The approach accepts the ability that each person has in choosing his/her actions and reactions.

Early relocations give us an idea about an individual's current perceptions. It is important to understand that the content of the memorial is a projection; therefore, it makes no difference whether the memory is real or imagined. Early memories are characterized as projective techniques. Researchers have attempted to develop quantitative methods for establishing a relationship between ER and lifestyle or coping strategies with a given current situation. In the specific, oncological patients, who are the sample of the current study, are characterized by an impairment in their quality of life and mental health. Over time, many cancer patients adjust to their illness and report positive mental health status, while others have greater difficulty coping with the illness. Cancer involves psychosocial impact, including emotional consequences, support care needs, and quality of life for cancer patients and their families. Cancer is not only a series of very different diseases that need complex and multidisciplinary treatment but, also a very stressful event with significant psychosocial implications regarding the physical, emotional, spiritual and interpersonal dimensions. All aspects of life, including time (the past, the present, and the future), space (individual room, home, and world context), and existence are altered by the diagnosis and treatment, recovery and long survival, recurrence, or transition to palliative and end-of-life care (Grassi et al., 2007). Recent data have examined the psychological consequences of cancer, showing that, at the physical level, cancer and cancer treatment have visible consequences for body image, with differences between "visible cancers". The type of therapy, including surgery, chemotherapy, radiotherapy, immune therapy, and hormone therapy, also has important effects because of the potential physical changes that may result (amputations, stoma, and hair loss) and symptoms (pain, nausea and vomiting, and fatigue) (Grassi et al, 2007).

A wide range of psychological interventions can be implemented to improve psychological distress and adjustment to being a cancer patient, subsequently increasing their quality of life (Badr & Krebs, 2013; Preyde & Synnott, 2009; Rehse & Pukrop, 2003). A unique and fascinating adaptation to understanding how people perceive and interpret the world and individuals around them is the assessment by interpreting childhood memories. These early memories are defined as vivid memories of specific events that occur before the age of eight. These kinds of memories are not to be confused with the report of simple events that are established by continuous or repeated episodes or by stories with parents or others (Dreikurs, 1967). The ER must have a visual image for the individual and is often associated with sensorial features. It is not an accidental memory, but a memory that is selectively chosen from early life experiences. The purpose of the present study is to explore the relation between early memories and optimistic or pessimistic oncology patients.

Research on palliative care patients and psychological coping
Declines in performance and functional activity, problems in performing daily activities, poor concentration, memory impairment or altered sexuality are significant in defining the psychological

response of cancer patients (Caruso, et al, 2017). Loss of security, instability of one's emotional status (e.g., fear, anxiety, worry, and sadness), the need to depend on others, decreased self-esteem, altered outlook on the future, and the threat of possible death are some of the multitudes of emotional effects and experiences that cancer patients must deal with during the disease trajectory. Spiritually, the totality of personal values, the meaning given to one's life and existence, and the changing perception of time and being our important attendants of cancer. The social and interpersonal dimension is also affected by cancer and its treatment. A sense of belonging and communication in the family, in the micro-organization of close relationships and in the macro-organization of wider work, social and community inclusion are also threatened or impaired from cancer. Feelings of loneliness and abandonment, issues in returning to work, marginalization, or even stigmatization are common situation with which cancer patients have to cope with (Grassi, et al.,2017).

All these aspects may be evident at different stages of the disease curve from diagnosis to survival or palliative care and the course of cancer (remission, recurrence, progression and end of life). Some of the stages of cancer that pose a risk for psychological distress from the National Comprehensive Cancer Network include:

- Finding a suspicious symptom,
- Being informed about the diagnosis
- Waiting for treatment
- Changing or ending treatment
- Leaving the hospital
- Surviving cancer
- Treatment failure
- Disease recurrence or progression
- Advanced disease stage
- Approaching the end of life

Research have facilitated the birth of psycho-oncology as an interdisciplinary discipline with the following elements: the de-stigmatization of cancer and mental illness, changes in the relationship between health care provider and patient, a shift in focus from increasing survival and longevity to improving quality of life, and the development of palliative care (Isabelle Lang-Rollin & Götz Berberich, 2018). The development and progressive acceptance of the biopsychosocial model are in a line with the growing awareness that some previously underestimated factors such as psychosocial stress and lifestyle can have a heavy impact on health: they contribute substantially to morbidity and mortality due to cardiovascular disease, cancer, accidents and other major causes of death in industrialized countries. As can be easily imagined, the consequences of this new approach are manifold, and affect

all fields of medical and psychological activity. The interaction of all the different factors should always be considered in the diagnosis to assess the state of mental health and prescribe the most appropriate treatment. In this way the patient becomes an active part of the therapeutic process. While on the one hand the expert has the duty to take into consideration the values, desires and beliefs of the patient, on the other the patient himself is urged to collaborate with the psychologist in a constructive way, both cognitively and behaviorally, towards the choice of therapeutic responses aimed at prolonging life and protecting its well-being. In addition to theoretical considerations, this new approach to the dyadic psychologist-patient relationship derives above all from practical reasons: given that today the most common pathologies are chronic-degenerative ones, which often require long-term care, on the part of the patient it becomes fundamental. a continuous adherence to the prescriptions and mental health advices and an attitude as collaborative as possible, considering his full involvement in the therapeutic alliance. Considering psychosocial factors then allows, unlike what happens with the biomedical model, to make a new contribution to the line of prevention, which can tend to reduce the incidence of chronic diseases through the modification of beliefs, attitudes and all those behaviors. which we now know are relevant to health. Retrospective research shows a statistically significant correlation between major life events and cancer incidence (Kruk,2012; Lillberg et al., 2003) but memory bias can distort the results in a retrospective model. Prospective research has shown no correlation, or only a very small one, between depression, personality traits, life events, and the development of cancer (Schoemaker et al, 2016). There is some evidence that psychological distress, especially depression, leads to poorer prognosis in cancer (Eskelinen et al. 2017; Satin et al. 2009). However, the causal nature of this correlation is not proven. Concepts such as the "*cancer personality*" have had deleterious effects leading, for example, to dysfunctional self-attribution of guilt in cancer patients. Response styles of cancer patients Cancer patients may adopt several emotional, cognitive and behavioral response styles to the illness. Some coping style, such as having a fighting spirit (i.e., the tendency to actively confront and cope with illness), appear to favor adaptation to illness, while others, such as hopelessness (i.e., the tendency to adopt a pessimistic attitude to the illness), anxiety (i.e., the tendency to constantly perceive the impact of the illness on one's life), and denial, tend to be associated with poorer adjustment to the illness and a higher risk of distress (Knipp et al, 2016). Suffering is, in fact, quite common in cancer patients and has been particularly studied over the past 20 years. It is broadly defined as "*a multifactorial, unpleasant, emotional experience of a psychological* (cognitive, behavioral, emotional), *social and/or spiritual nature that may interfere with the ability to cope effectively with cancer, its physical symptoms and its treatment and that lies along a continuum, ranging from the usual normal feelings of vulnerability, sadness and fear to problems that can become disabling, such as depression, anxiety, panic, social isolation and existential and spiritual crises*" (McFarland& Holland , 2016). Many cancer patients have adjustment problems during the disease trajectory, with "normal" psychological

responses as sadness and anxiety. One of the coping strategies is habitual or temporary optimism, a personality trait that describes the degree to which a person generally expects positive outcomes (Carver & Scheier 2014- 2010; Maik et al.2017). Successful cancer treatment is no longer determined solely by a cancer-free status, but also by the impact on psychological well-being and quality of life. Over the past two decades, the construct of hope and optimism have begun to receive increasing attention in oncology (Maik et al. 2017). Studies have shown that hope is associated with positive features of coping with cancer, increased well-being, and lower symptoms of anxiety and depression (Ebright et al. 2002; Herth, 1989). In optimism, the general expectation of a positive outcome is the main determinant of continued efforts to achieve the desired positive goal (Rand,2009; Scheier et al.1994; Rajandram et al. 2011). In their research Burgess et al. (1988) studied the relation between lymphoma and cognitive responses to the breast- cancer diagnosed patients. Analysis of cognitive responses and other combined psychological variables, however, revealed four coping 'styles': 'positive/confrontational', 'fatalistic', 'hopeless-helpless' and 'denial-avoidance' were conducted. Lower psychological morbidity was associated with a positive and confrontational response to the diagnosis and a high internal locus of control, whereas higher anxiety and depression scores were associated with a hopeless-helpless response to the diagnosis and a higher locus of control. In regard to the relation between optimism and quality of life, studies have found that there is an independent effect between optimism on mental health and quality of life (Lynch et al. 2008; Zenger et al. 2011), while others see the relation as a pure (Gustavsson-Lilius et al. 2007; Hartl et al. 2010). Two other studies (Gustavsson-Lilius et al. 2012) revealed a significant influence of optimism with anxiety but not depression in cancer patients. Another study with breast cancer patients (Schou et al.2005) proved a significant effect on emotional functioning but not on overall quality of life.

Types of Early Relocations

Some of the personality traits are based on ER (Mosak & Di Pietro 2006). People with the *receiving style of personality* will often remember that they receive something that can be material (such as toys, gifts, money, etc.) or intangible (such as attention, recognition, education, applause, and service). Those who want to be *in the center of attention* can inform about their goal through ER. Birthdays and Christmas are memories that often appear with these types of receiving. The *controlling type of personality* shows "*how sweet it is"* when his or her life is in control and how disastrous life can be when his or her life is not in control. The *personality type of a leader* can be identified more often through reports than through memories. Examples of these reports are statements such as: "*Even when I was very young, I had a lot of work*", "*People always said about me that I was always busy*" *I never sat down, not for a minute* ". In order to have *a management style,* the individual usually has to deal with sequential activities, and a single memory generally fails to reflect such multiple activities. People *who believe they must be entitled* to have a place focus their EA's on (1) rewards for being or doing the right thing; (2) how right they are; (3) how wrong others are; and (4) the negative consequences or bad

feelings (especially feelings of guilt) that accrue when one makes a mistake. These are the types of people one most likely doesn't like getting into an argument with because they refuse to admit when they're wrong. People who must be superior can express their purpose by being the first, the unique and the best. Memories will reflect this goal or "tragedies" when the goal is not achieved. The *pleasure type* represents people who want to please. They must please everyone. Their attempts to please are also a way of keeping things under control. If one's satisfied, he will not distance himself from them. We've all tried to please someone at one point or another. When we please them, we often don't take a stand for fear of offending, or disappointing, or alienating someone. *Agineri types* are usually seen as oppositional: as overt and covert rebels. They are not necessarily "bad." They may be idealistic fighters for principles, opponents of status quo and conventional wisdom. Jesus, Socrates, and Gandhi may have fallen into this group. *Victim* type represent the people who tell us how life treats them badly or how they unwittingly beat themselves up. They may go out of their way to show you how unfair life is to them. *Testimony type* that is important to keep the difference between a victim and a martyr. They focus on smallness, incompetence, immaturity, need for help, education and height. *The confused type* confuses life and is confused by life. The type of feeling of Avoidance at whatever happens. People with this kind of personality adopt the attitude of an observer. Often, they act like automatons or computers. Thrill seekers who represent the personality who either seek excitement regularly or when life becomes too dull, routine or boring. The latter are often referred to in psychology as troublemakers. *Excitement* personality that often produce many sexual memories. While a single memory may help classify a patient as a thrill seeker, most people who are classified as thrill seekers have a sequence of exciting ER. Farley (1986) argues that people have a psychologically optimal level of arousal that they try to maintain, either by increasing or decreasing activity. *The social interest Type* which is the ideal type according to Adler (Adler, 1932a). Their memories are loaded with instances of contribution, cooperation, compassion and caring, and belonging (Mosak, 1977).

METHOD

The objectives of the present study include:

1. To analyze the topics of early memories for each oncology patient with pessimistic reactions to the disease;
2. To analyze the topics of early memories for oncology patients with optimistic reactions to the disease;

Hypothesis:

To meet the analysis of the study objectives the following hypothesis was raised:

H= The topic of early memories can differentiate optimistic oncological patients from pessimistic ones.

Materials and procedures

Method

For the purpose of the current study, a qualitative case study approach was used as an inductive and exploratory (Creswell, 2003). It has used case study and empirical experiences to describe the ER strategy and impact in the patient's life (Soy ,1997; Ghauri & Gronhaug, 2005).

The independent variable was the approach created for analyzing the early memories and the dependent variable were the participants and the different topics that were extracted from their early memories.

Data analysis

Data in the current study were analyzed using different approaches such as interpretive phenomenological analysis, text interpretation, thematic coding for personality typologies, etc.). All these approaches use predefined categories in the analysis and are ideographic. They are related to the use of the procedure of collecting early memories. This process is adapted from the procedure of Mosak (1977), Mosak and Di Pietro (2006).

- *First:* Organizing memories. Each memory will contain a. Age b. Description of the memory c. Strongest moment of the memory d. Feelings about the memory e. Most important part of the memory.

- *Second:* Data Unit. This stage deals with data reduction and re-arrangement. Descriptive presentation of participants' early memories was done for the qualitative data. It has been emphasized by Miles and Huberman (1994), that the use of the data constitutes a significant aid for their analysis and drawing conclusions. This allows the researcher to display reduced or selected data extracted from the extended text.

- *Third:* Recognizing relationships and developing memory categories. This stage involves using data screens to re-organize memory title categories.

- *Fourth:* Development and verification of findings that is the stage that takes place after presenting and analyzing the themes of the memories categorizing patients with optimistic and depressed approach.

Sample

The selection of participants involved a total of 10 patients of the palliative ward of the Mother Teresa Oncology hospital, diagnosed with terminal diseases. For the purpose of the current study, 10 (Nr=10) patients of stages 2-3 of the disease were selected. Participants were randomly selected, not all of whom had previously received counseling sessions. Patients selected randomly in the palliative ward of the Mother Teresa Oncology Hospital, were 10 (nr=10) selected randomly, where 4 (nr=4) were men and 6 (Nr=6) were women of the age group 50-76 and one individual who belonged to the age of 29. Patients were randomly selected in the palliative ward for a period of 4 weeks. Subjects were given the purpose and instructions for completing the questionnaire. As researchers we made ourselves available to answer any questions and a number of participants asked for clarification on some of the points in the

instructions. A number of subjects commented to the researchers after completing the questionnaire that they found the experience quite satisfying and requested additional information about these early memories.

Ethical issues

For conducing the current study with students' subjects, the working group took care of the strict observance of ethical aspects such as:

- **Approved information and allowance of subjects**. Through the platform in which the questionnaires were completed, a detailed description was presented regarding the purpose, conditions and method of the study that would be used, as well as where their assistance consisted. Participants were made aware of the nature of participating in the study and the possibility of withdrawing from the study if they did not wish to participate.

- The permission for conducing the present research was granted by the **Ethical Committee** of Albanian University, Tirana, Albania.

- **Maintaining the confidentiality and anonymity of subjects** under which subjects were informed about the treatment of personal data of juveniles and that the data collected would be used only for research purposes respecting the principle of anonymity and confidentiality under the European Data Privacy Protection Act and European Data Protection for Patient's and Patient's Rights 2022.

Instruments

The following instruments were used to conduct this study:

1- *Personal data questionnaire* which includes questions related to personal data (e.g., age, course, gender) that helped us mapping an overall social profile of respondents.

2- *Semi-Structured Clinical Interview*. The semi-structured interview is suitable for finding previously unknown qualitative data and in exploring issues in new areas of research interest and in phenomenon-graphic studies (Partridge et al.2010). The semi-structured interview is part of the qualitative data collection technique (Mohammad, 2019; Jamshed, 2014). The clinical interview was used to enable the categorization of patients with optimistic and pessimistic reactions. Based on the patients' statements, the division into categories was carried out. The clinical interview with open questions focused on statements related to: demographic data, medical diagnosis, how long have they been informed about the disease, how has their life changed since they were informed about the diagnosis of the disease, etc.

3- The "*Early Recollection Questionnaire*" that aims to explore what first memories can be brought to mind from childhood. This ER questionnaire was an adaption of the instrument developed by Zarski (1978). For a suitable use of the questionnaire the first memories must be before the age of

8 and must be a special moment, an event, an occurrence that sticks in the mind. Memories that describe situations that happened day after day are not specific memories of a moment. Then, the patient participant wrote down the memory that comes to mind, even if they were not sure if it actually happened or not. It was necessary to write down every first memory in the order that it came to the patient's mind. At least 3 first memories were requested. For each memory, the following were defined: a) Approximate age when this thing happened ,b) Description of the first memory with details: for example, the place where it happened, the people who are in this memory, the objects, the emotion you experienced (this is very important; c) Which scene or part of the memory is clearest (hits immediately) ;d) Which part of the first memory seems most important Which part of the first memory seems most important Interpretation Procedure Early memories were interpreted classifying and using Mosak & Di Pietro (2006) topic types. The data from this study consisted of writing the titles of the memoirs as well as identifying the main themes for each memoir and subject. The results were also evaluated comparing personality typologies of patients.

RESULTS

The clinical interview that was conducted with each participant in this study, with the goal of determining the reactions they had to the disease they were experiencing. The clinical interview was administered to 10 (Nr=10) patients, in order to achieve the same division of the two categories of optimistic and pessimistic reactions in equal parts of five (Nr=4) patients who were diagnosed with different typologies of the disease. The patients were in the second and third stages of the disease. Ten patients were determined, achieving an equal distribution of 5 (nr=5) patients with optimistic reactions and 5 (nr=5) with pessimistic reactions. The division of reactions to coping with the disease was also based on some patient statements. Patients' participants with optimistic reactions said: "*I will have a good time, I am strong*", "*The doctor told me that it is temporary*", while those with pessimistic reactions expressed: "*I didn't think this would happen to me*", "*I was very well before*", "*I feel broken and I don't know why*", "*My health problems have lasted longer than I thought*". Both reactions were characterized by a communication of low tones, distinct bending of the body, searching for the truths of family members. More prominent intensity of these characteristics was observed in people with pessimistic reactions. An individual's early memories tend to show repeated responses to certain themes and these provide an indication of how the person responds to life in different situations. Answers to this topic may indicate which issues the patient is currently concerned to. The answers given in the current paper were based on Shulman and Mosak's (1988) Handbook.

Based on the division of topics of early memories for the category of people who react optimistically, the fulfillment of the second objective of the study is observed: "To analyze the topics of early memories of patients with optimistic reactions to the disease".

Tab 1: Division of ER topics according to the optimistic and pessimistic view toward disease

	Optimistic reactions	%	Pessimistic Reactions	%
Topics of Early Recollections	- Pleasure - Social interest type - Conformed type - Conformed passive type	- 54% - 19% - 15% - 12%	- Submissive - Confused - Infantile - Resistant - Martyr	-48% - 19% - 13% - 11% -9%

Tab 2: Pearson Correlations between Optimistic and Pessimistic Reactions

		Optimistic	M	SD
Pleasure	Pearson rho	**.620**[**]	.613	.43
	Sig. (2-tailed)	********	*********	*******
Social Interest	Pearson rho	.345[**]	.291	.023
	Sig. (2-tailed)	********	*****	*****
Conformism	Pearson rho	.156	.113	.031
	Sig. (2-tailed)	********	******	******
Conformist-passive	Pearson rho	.064	.0591	.069
	Sig. (2-tailed)	********	******	******
		Pessimistic		
Submissive	Pearson rho	**.801**	.710	.4675
	Sig. (2-tailed)		******	******
Confused	Pearson rho	.4002	.239	.304
	Sig. (2-tailed)			
Infantile	Pearson rho	.154	.037	.002
	Sig. (2-tailed)			
Resistant	Pearson rho	.208	.198	.94
	Sig. (2-tailed)			
Martyr	Pearson rho	.035	.089	.0764
	Sig. (2-tailed)			

By dividing the topics of the early memories of people diagnosed with stage 2-3 cancer, a significant difference in the types of reaction to the disease can be observed. People who had optimistic reactions in facing the disease were mostly characterized by the personality typology of the pleased type (54%)

(Sig.= .602; M = .613; SD = .43) who tries to satisfy themselves but also others, the type of social interest that shows cooperation (19%) (Sig.= .345; M=.291; SD=.023), self-care for the achievement of coping with pain. The conforming type (15%) which expresses the acceptance of the situation and the effort to keep the real self under control has a moderate influence on the all typologies (Sig.= .156; M=.113; SD= .031). The conforming passive type (12%) (Sig.= .064; M= .0591; SD= .061), the least assessed by the participants, shows a line of connection between moderate optimistic and pessimistic reactions, accepting the reality of the situation, but demanding that others act to change life activities. This mean that an optimistic view patient is characterized by the memories of the pleasure to live and shows social interest toward life and others. Compared to people with pessimistic reactions in the face of the disease, it was characterized by depressive features, low self-esteem, submission to authoritative figures, empty feelings, loneliness, with the personality typology of being submissive to others (Sig.=.801; M= .710; SD=.4675) and by illness, in the search for security and characterized by an infantile absence personality organization. Personality type who is confused about life is relatively found within the respondents (19%) (Sig.= .4002; M=.239; SD=.304) as well as the type of martyr personality (9%) (Sig.= .035; M=.089; SD=.0764) for the achievement of a certain goal. This mean that when in a pessimistic state, terminally ill patients tend to be submissive to their destiny and their early recollections are confused and not bright. They are not martyrs nor victims but tend to let themselves to their "bad luck". We can imply that there is a significant difference in topics of early memories of optimistic and pessimistic terminally ill patients.

Discussion

The current qualitative study, was based on the topic analysis of the first memories in patients diagnosed with tumors of typologies such as: breast, pancreas, stomach, etc. Patients selected randomly in the palliative ward of the Mother Teresa Oncology Hospital, were 10 (nr=10) selected randomly, where 4 (nr=4) were men and 6 (Nr=6) were women of the age group 50-76 and one individual who belonged to the age of 29. From the clinical interview, it was possible to identify and classify the category of reaction style to the disease, dividing them into two categories with the same number of patients (nr=5) optimistic and (n=5) pessimistic. By differentiating the two categories and analyzing the themes of early memories, it was found that optimistic people were more cooperative, optimistic about the future, looking for changes that would improve their health and psychological state, accompanied by feelings of happiness, joy, satisfaction etc. In contrast to the category of pessimistic patients, where there was a submissive sense toward life and others, early memories were confused and associated with low self-esteem, feelings of fear, shyness, strange sensations, etc. Thus, proving the main hypothesis of this research. In the pessimistic category of patients, from the analysis of three memories for each person, personality typologies were classified as submissive personality type that expresses conformity to easily obey others regardless of personal needs. In the category of optimistic patients, the most significant index on

personality types was pleasure and satisfaction. In the memories of this typology, emotional states of happiness and joy are emphasized, showing that during the illness they manage to show the desire to change and to think positively about the future. The type of social personality was displayed by individuals who presented themselves as cooperative and polite. The conforming personality type displayed adaptive and affirming behavior from others and the engagement to change their condition by interacting with doctors, caregivers to achieve improvement. The passive-conforming personality type could be classified in an intermediate category. These patients show the need to have guardians in order to feel optimistic about the future, but does not undertake essential initiatives by himself but by accepting from others.

CONCLUSIONS

Through the literature review, theories, topics, personality typologies and numerous studies (Teo et al. 2019), (Rooji et al.2018), (Torre-Luque et al.,2016), (Rosemary et al. 2009), (Burgess et al.,1988), it was shown the significance of analyzing early memories in the personality of the individual, in the lifestyle but also in the way of reaction to situations. Theoretical and statistical indices proved that the analysis of the topics of personality typology of oncological persons defined in two categories of reactions determine their coping style to the disease. A strong and optimistic view is of course the best way of interaction in the coping mechanism system and therapy and clinical research should be focused more on the inner resources of the oncology patients and their empowerment. Further research is needed assessed and identified in more detail elements of personality and personality organization. More research should be useful to determine which characteristics can be significant and effective to be introduced to psychotherapy and individual or group treatment sessions.

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PREVALENCE AND RISK FACTORS OF HASHIMOTO'S THYROIDITIS IN ALBANIA

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ABSTRACT

Chronic Hashimoto's thyroiditis is the most common autoimmune pathology of the thyroid, characterized by gradual destruction of the thyroid gland. The main biochemical feature is the presence of antibodies against thyroid peroxidase (TPO) and thyroglobulin (TG) in the sera of patients.

This study aims to assess the prevalence of Hashimoto's thyroiditis in Albania, risk factors, distribution by geographical areas and the role of diagnostic tests used in clinical practice.

The study included 847 patients (30% males and 70% females). Blood samples were taken and analyzed by ECLIA method with the Cobas 6000 Roche Diagnostics system for thyroid hormones TSH, FT4, FT3, Anti TPO and anti TG antibodies. Ultrasound evaluation was done with Siemens Acuson NX2. A questionnaire was completed for each patient on demographic characteristics, level of education, inheritance and geographical area. Data were transferred to SPSS 25 and analyzed.

The prevalence of positive TPO antibodies was 21% with a frequency of 25% in females and 11% in males. TPO antibodies were present in 15% of subjects with normal thyroid function. TSH above the normal range >4.5 uUI/mL suggesting for hypothyroidism was present in 11.3% The presence of TPO antibodies was the main cause of hypothyroidism in population. It was found a positive correlation of thyroid antibodies and female sex, age and genetic factor but we found no link between Hashimoto's disease and geographical region or education level.

Keywords: Hashimoto's thyroiditis, TPO antibodies, hypothyroidism

1. INTRODUCTION

Hashimoto's thyroiditis is the most frequent autoimmune pathology of the thyroid gland and is characterized by lymphocytic infiltration, gradual destruction and replacement of normal thyroid tissue with fibrotic tissue. The main biochemical characteristic is the presence of antibodies against the thyroid gland in the patients' serum, specifically anti TPO (thyroid peroxidase) and anti TG (thyroglobulin).

Hashimoto's thyroiditis is the main cause of hypothyroidism in geographical areas with high levels of iodine. The annual incidence is calculated to be 0.3-1.5 cases per 1000 people. The incidence of Hashimoto thyroiditis is estimated to be 10-15 times higher in females and the most frequent age group affected is 30-50 years old. (Canaris el al. 2000) (McGrogan et al. 2008)

The beginning of the autoimmune process is not clear, but it is known that genetic, immunological and environmental factors contribute in the initiation of this pathology. (Duntas, L. H. 2008) (Hadj-Kacem, H et al. 2009) Studies have shown significant correlations between the presence of anti-TPO and female sex, heredity, lack of selenium and vitamin D, viral infections and exposure to some chemicals. (Kostiukow et al. 2018) Iodine intake is thought to also trigger an autoimmune process. Studies have shown an increase in the prevalence of autoimmune thyroid diseases due to iodization of the population in areas with iodine deficiency. Furthermore in areas where there is sufficient iodine, the prevalence of anti-TPO is 3-5 times higher than in areas with iodine deficiency.(Pedersen et al. 2011)

Albania has been considered as a country with iodine deficiency and the prevalence of endemic goiter among school children in 2003 was 32% in urban areas and 95% in rural areas. (Zimmermann et al. 2006) Since 2008, a salt iodization program has been implemented. In 2020, from the measurements carried out for the level of iodine in urine, Albania is no longer classified as an area with iodine deficiency by the Global Iodine Network Report. Meanwhile, there are no studies for autoimmune thyroid pathologies in our country and Hashimoto's thyroiditis in particular. (Zimmermann et al. 2021)

2.MATERIALS AND METHODS

The aim of our study was to evaluate the prevalence of chronic Hashimoto's thyroiditis in Albania and the risk factors associated with it. This was a cross-sectional study that included 847 patients aged 18-75 years old who had not been diagnosed or treated before for thyroid problems.

The objectives of this study were to evaluate:

- To assess the prevalence of Hashimoto's chronic thyroiditis in our country and the distribution according to gender, age group, place of residence and level of education
- The correlation between Hashimoto's thyroiditis and the above factors
- To evaluate the correlation between anti TPO and thyroid dysfunction
- The role of anti TPO and ultrasound in the diagnosis of Hashimoto's thyroiditis valuable screening tests for the early diagnosis of Hashimoto's thyroiditis groups at risk that should be included in the screening

Venous blood samples were collected for the measurement of thyroid function tests TSH (Thyroid Sytimulating Hormone), FT4 (Free Thyroxine) and FT3 (Free three iodothyronine) as well as anti TPO and anti TG antibodies against the thyroid gland.

The structure of the thyroid gland was evaluated sonographically with Siemens Acuson NX2 for typical changes characteristic of chronic Hashimoto's thyroiditis such as heterogeneous structure, hypoechogenicity, micronodularity. Vascular flow was determined by color Doppler and categorized as normal, decreased or increased.

For each patient, a questionnaire was completed on demographic data, family history of thyroid pathology, level of education and place of residence.

The data were transferred to SPSS 25 to perform statistical analysis. Determination of the significance between two groups was done using χ^2 test and analysis of variance (ANOVA). The Pearson correlation coefficient was calculated to see the relationships between different variables.

The laboratory reference values for the analyzed parameters are presented as follows:

- TSH (0.2–4.5uUI/mL),
- FT3 (2–4.4 pg/mL),
- FT4 (0.9–1.7 ng/dL),
- anti TPO (<34 IU/mL),
- anti TG(<115 IU/mL).

Thyroid function was defined as follows:

- Euthyroid TSH within the normal range of 0.2-4.5 uUI/mL

- Subclinical hypothyroidism TSH > 4.5 uUI/mL while FT4 and FT3 are within normal range
- Hypothyroidism when TSH > 4.5 uUI/mL and FT4 <0.9 ng/dL
- Subclinical hyperthyroidism when TSH < 0.2 uUI/mL and FT4, FT3 within normal range
- Overt hyperthyroidism when TSH < 0.2 uUI/mL and FT4 > 1.7 ng/dL

3.RESULTS

The study included 847 individuals who had not been examined or treated before for thyroid problems between the ages of 18 and 75 with an average age of 42 ± 11.3 years old with a female/male ratio of 70/30 (584 females and 251 males). The distribution according to age groups is presented in figure 1.

Age distribution

Age group	Count
18-25	132
26-35	199
36-45	166
46-55	147
56-65	180
66-75	19
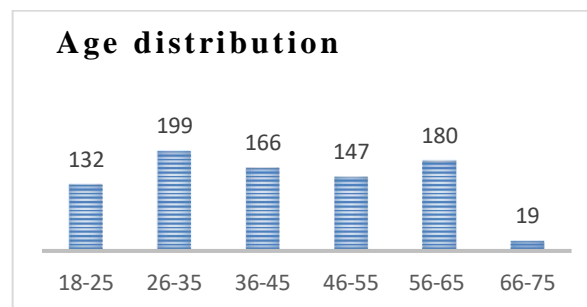
Figure 1: Age distribution of the studied population

Figure 2 shows the distribution by place of residence, where 68% of the examined patients belong to the largest city in the country, Tirana.

Distribution by residence

- Tirana (capital): 68%
- Other cities: 32%
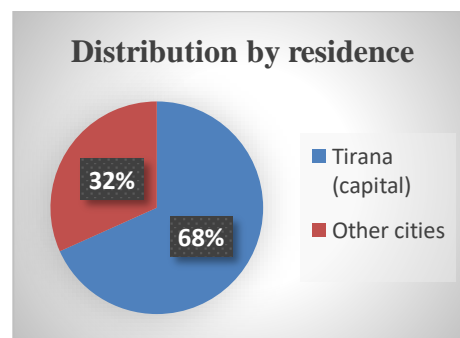
Figure 2: Distribution of the studied population according to residence

Regarding the level of education, about 62% belong to tertiary education and 35% to secondary education.
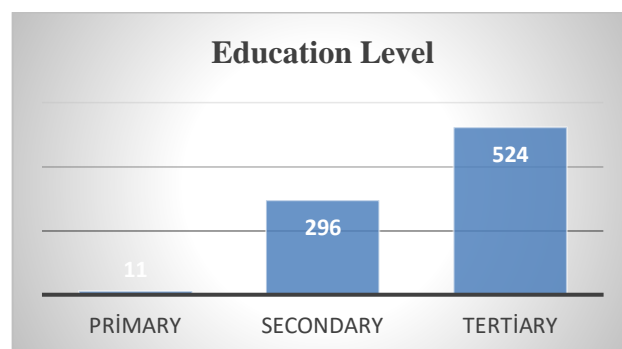
Figure 3: Distribution according to the level of education

Regarding the function of the thyroid gland, 728 out of 847 individuals (86%) were euthyroid, i.e. with normal function. The average value of TSH in the population was 3.2 ± 7.9 (0-67.4 uUI/mL).

Table 1 shows the distribution according to the function of the thyroid gland. TSH above the normal range of 4.5 uUI/mL was observed in 11.2% of the population (96/847). In 57% of them (55/96) they have anti TPO positive, which means that autoimmunity is the most frequent cause of thyroid function alteration. A low prevalence of overt hypothyroidism and overt hyperthyroidism is observed, while there is a significant prevalence of subclinical hypothyroidism 8.3%

Table 1: Thyroid function in population examined

Euthyroid n (%)	728 (86 %)
Hyperthyroidism TSH <0.2 uUI/mL	23 (2.7%)
Overt hyperthyroidism n (%)	9 (1.0 %)
Subclinical hyperthyroidism n (%)	14 (1.7%)
Hypothyroidism TSH> 4.5uUI/mL	96 (11.3%)
Overt hypothyroidism n (%)	26 (3.0 %)
Subclinical hypothyroidism n (%)	70 (8.3 %)

The prevalence of positive thyroid antibodies, at least one of them was 21% in the studied population, with a significant difference in males and females, respectively 25% in females and 11% in males. In individuals with a family history of autoimmune thyroid disease, TPO antibodies were present in 78%, while in individuals without such a history, the prevalence of positive antibodies was found in 23%. The average age in the group of patients with positive Anti TPO was higher than in the group of those with negative antibodies, respectively 43.5 years old versus 41.3 years old.

A significant statistical difference was observed between gender and the presence of anti-TPO, family history and anti-TPO and age and the presence of anti-TPO. While no significant relationship was seen between the presence of TPO antibodies and residence and positive TPO antibodies and level of education.

Table 2: Prevalence of positive anti thyroid antibodies

Prevalence of positive antibodies in population examined (%)	**21.2%**
Anti TPO or anti TG positive in females (%)	**25.0%**
Anti TPO or anti TG positive in males (%)	**11.3%**
Prevalence of anti TPO in euthyroid individuals (%)	**15.0 %**
Prevalence of anti TPO in hypothyroid population (%)	**57.0%**

The ultrasound evaluation was possible for 649 patients from 847 involved in the study. It resulted that 60% of the patients had normal ultrasound parameters and 21% of them showed ultrasound data for chronic thyroiditis. Results for thyroid disorders evaluated by ultrasound are shown in figure 4.
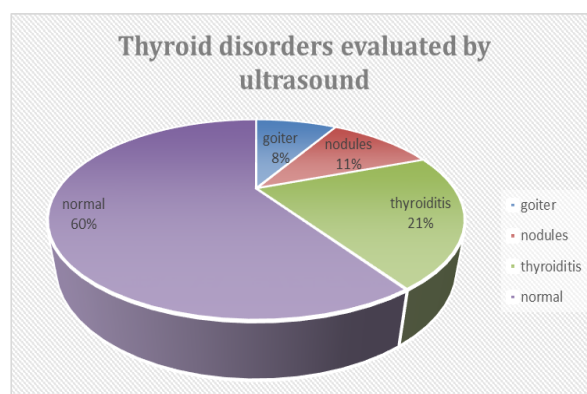
Figure 4: Thyroid disorders on ultrasound examination

Regarding the relationship between positive anti-TPO and ultrasound changes, a statistically significant relationship was observed between the presence of anti-TPO and the hypoechoic structure and anti-TPO and micronodularity p<0.001 as are shown in Tables 3 and 4.

Table 3: Correaltion between hypoechoic structure in ultrasound and positive anti TPO antibodies

			Hypoechoic structure on ultrasound		Total
			Yes	**No**	
ANTI-TPO POSITIVE	**No**	N	474	14	488
		%	97.1%	2.9%	100.0%
	Yes	N	28	133	161
		%	17.4%	82.6%	100.0%
Total		N	502	147	649
		%	77.3%	22.7%	100.0%

	Value	df	p
Pearson Chi-Square	439.360	1	.000

Table 4: Correlation between micronodularity in ultrasound and positive anti TPO antibodies

			Micronodularity in utrasound		Total
			No	Yes	
ANTI-TPO POSITIVE	**No**	n	484	4	488
		%	99.2%	.8%	100.0%
	Yes	n	76	84	160
		%	47.5%	52.5%	100.0%
Total		n	560	88	648
		%	86.4%	13.6%	100.0%

	Value	df	p
Pearson Chi-Square	274.217	1	.000

Hypo echogenicity had a sensitivity 92% and 79% specificity. Micro nodularity was the most specific parameter with a specificity 98%.

4.DISCUSSIONS

In our study, it was observed that 11.3% of the population had a TSH above the rate of 4.5uUI/ml and 57% of this population had anti TPO positive. Regardless of the fact that Albania is considered an endemic country of iodine deficiency and goiter, it currently results that autoimmunity is the most frequent cause of hypothyroidism in the population, especially in the middle-aged group. One of the reasons may be the implementation of the salt iodization program since 2008. From 2020, according to the Iodine Global Network Report, our country is no longer reported in the list of countries with iodine deficiency. The addition of iodine to the diet may be one of the reasons for the appearance of autoimmunity against the thyroid. Another reason could be the opportunity offered by the health system to measure thyroid hormones and antibodies, therefore the identification of these cases is more frequent.

It should be emphasized the high prevalence of anti-TPO in the euthyroid population, that is, with normal thyroid gland function. These individuals are candidates for worsening thyroid function in the future. This results are comparable to that of the literature. Wiersinga and colleagues report a prevalence of anti TPO in the euthyroid population of 12-26%. (Prummel & Wiersinga 2005)

Based on this fact, TSH is not enough as the only screening test for thyroid pathologies, and individuals at risk should also perform anti-TPO as an additional test. (Hollowell et al. 2002) These categories include pregnant women, people who have relatives with autoimmune thyroid pathology, people with other autoimmune diseases, individuals taking medications that affect the thyroid such as amiodarone, and individuals who have changes in thyroid ultrasound characteristic of Hashimoto's such as hypoechogenicity, micronodularity etc. regardless of TSH.

Bearing in mind that abnormalities of the thyroid function can be accompanied by a series of complications for the body such as dyslipidemia, osteoporosis, arrhythmia and cardiovascular problems, decreased concentration, etc., it is important to screen the population for the function of the thyroid gland. (Flynn et al. 2004)

Ultrasound appears to be a non-invasive, easily accessible test that can identify Hashimoto's thyroiditis in its early stages. In the present study, it was observed that the heterogeneous, hypoechogenic structure and the micronodular appearance correlated well with the presence of anti-TPO, regardless of the TSH level.

Echographic changes in Hashimoto's thyroiditis are a reflection of physiopathological changes that occur in the thyroid gland in this disease, such as lymphocytic infiltration of the thyroid gland, gradual destruction and replacement with fibrotic tissue. (Vejbjerg et al. 2006) This means that anti-TPO in the patients' serum and ultrasound changes appear much earlier than the changes of TSH level. Therefore, ultrasound and anti TPO are early tests that should be performed for the evaluation of thyroid dysfunction, especially in the risk groups mentioned above. (Rago et al. 2001)

5.CONCLUSIONS

Taking into account the results of our study and those of the literature, it seems that the dysfunction of the thyroid gland is frequent in the population, therefore we suggest that the test for the thyroid gland be performed alongside other general checkup tests. The most frequent cause of hypothyroidism in countries with an adequate level of iodine remains Hashimoto's thyroiditis, which is confirmed by anti-TPO and anti-TG antibodies, which is the main biochemical characteristic. The study showed that an anti TPO is present in a significant part of the population. 25% in famels and. 11 % in males. They are more frequent in women, middle-aged individuals, people who have relatives with thyroid pathology, individuals with other autoimmune diseases, as well as individuals who have characteristic echographic changes such as hypoechoic or micronodular structure. In addition, euthyroid subjects with positive TPO antibodies have higher TSH levels near the upper reference range compared to those with negative antibodies. Therefore, anti-TPO should be used as a test alongside TSH to distinguish individuals at risk for decreased thyroid function in the future. The ultrasound examination can give a lot of information on the risk for developing thyroid dysfunction especially findings characteristic for Hashimoto's thyroiditis like hypoechogenicity or micronodular pattern. These findings have a good correlation with TPO antibodies levels and appear much earlier than the change in TSH in the blood.Studies in larger populations are needed to evaluate the tests to be used for early diagnosis of thyroid disorders. Other factors such as smoke, medication and nutrition habits may influence thyroid function and should be analized. Our scope for future research is continuous monitoring of thyroid function and the follow up of euthyroid subjects with positive TPO antibodies included in this study for deterioration of thyroid function. The aim is to estimate the number of subjects that develop hypothyroidism, the average time of onset of hypothyroidism and the factors associated with it. This would help us build models to predict individuals at risk for thyroid pathology, early diagnosis and improve the quality of life of individuals with thyroid dysfunction.

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PREDICTION OF THE ELECTROMAGNETIC BEHAVIOR OF TERNARY COMPOSITES USING MIXING LAWS

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ABSTRACT

The main aim of a composite material is to combine two or more ma-terials while creating a synergy between them so that the result is a more effi-cient composite. The study and modeling of the behavior of heterogeneous dielectric materials in a wide frequency band brings together the study of the relationships between the micro-scopic and macroscopic properties of composites as well as the laws of mixing. The electromagnetic properties (permittivity, electrical conductivity) of composites depend on the properties of the constituents and their volume concentrations. A modi-fication of the concentrations then leads to a modification of the mixing properties, which makes it possible to adjust them on demand. In this work we have opted for ternary composites which are made up of epoxy resin, titanate, and oxide.In this context, a modeling is carried out on the basis of the experimental results obtained to confirm their agreement with the mixing laws, in order to minimize systematic errors. It is also used to predict the electromagnetic behavior of ternary composites quantitatively. The evaluation of the complex dielectric constant of heterogeneous mixtures presents difficulties in modeling and in experimentation. For this reason, studies have been established on the validity of the various laws of mixture used as models, these laws are all based on the assumption of the effective medium which assumes that the dielectric properties of a heterogeneous body can be represented by a constant effective dielectric of a fictitious material. In our case, Lichtenecker's law and modified Lichtenecker law are used where these laws seem very general because they satisfactorily translate the dielectric behavior of composite materials.In order to meet the stated objectives, we use a characterization technique known as "TDS" time domain spectroscoy. In fact, this technique is intended to be used for microwave measurements. This technique consists in propagating in a line, a very short rise time voltage step and studying the characteristics of the reflection emanating from the inter-action of the aforementioned signal with the sample to be characterized. Hopefully, these results will help to produce new materials for potential usage in microelectronics field.

Keywords: Electromagnetic behavior, epoxy resin, oxide, titanate, time domain spectroscopy.

AMYOTROPHIC LATERAL SCLEROSIS: AN ANALYSIS OF THE ELECTROMYOGRAPHIC FATIGUE OF THE MASTICATORY MUSCLES

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ABSTRACT

Amyotrophic lateral sclerosis is a chronic degenerative disease that affects motor neurons, thereby promoting functional changes in the human body. The study evaluated the electromyographic fatigue threshold of the masseter and temporalis muscles of subjects with amyotrophic lateral sclerosis. This study was approved by the Ethics Committee of the Faculty of Dentistry of Ribeirão Preto, University of São Paulo, Brazil (process # 13071913.3.3001.5419) with financial support from FAPESP. A total of eighteen subjects were divided into two groups: amyotrophic lateral sclerosis (n = 9) and disease-free control (n = 9). The groups were equally divided according to gender (7 male, 2 female). The fatigue

threshold was analyzed using median frequencies obtained during the 5-second window (initial (IP), mid (MP), and final (FP) periods) of electromyographic signaling of the masseter and temporalis muscles bilaterally, with reduction in muscle force during maximal voluntary dental clenching. Significant difference ($p < .05$) in the left temporal muscle: IP ($p = .05$) and MP ($p = .05$) periods was demonstrated. The amyotrophic lateral sclerosis group showed a decrease in median frequency of the electromyographic signal of the masseter and temporalis muscles compared to the control group. The authors suggest that the amyotrophic lateral sclerosis promotes functional impairment of the stomatognathic system, especially at the electromyographic fatigue threshold of the masticatory muscles.

Keywords: Amyotrophic lateral sclerosis, electromyographic fatigue, median frequency, masseter muscle, temporal muscle

MUCOEPIDERMOID LUNG CANCER WITH PERITONEAL METASTASES

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ABSTRACT

Purpose: Mucoepidermoid cancer is a very rare lung cancer type. We present a case that admitted to hospital with abdominal pain due to peritoneal metastasis originating from high grade mucoepidermoid lung cancer.

Material-Methods: A 51-year-old male admitted to our emergency department with abdominal pain. His medical history was unremarkable except for smoking. Physical examination and laboratory findings were normal. The patient was referred to our radiology department for further investigation.

Results: Abdominal CT revealed peritoneal metastatic lesions. Subsequent Thorax CT showed left lung mass, and thoracic vertebrae involvement. Wedge resection was performed to the lung mass. Pathological study showed high grade mucoepidermoid carcinoma. Patient underwent chemotherapy and radiotherapy, but he died in the fourth month of diagnosis.

Conclusion: This is the first case in the literature with mucoepidermoid lung cancer who presented with abdominal pain. Also, we have not been able to find any other case in the literature with lung mucoepidermoid carcinoma that metastasized to periton. Lungs should be evaluated in cases with peritoneal involvement.

Key words: Lung, mucoepidermoid carcinoma, periton, metastasis

ANALYSIS OF LATERALLY LOADED FLEXIBLE PILES IN VARIOUS SOIL TYPES

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ABSTRACT

The research establishes an approximate circular cone strain wedge model and proposes an analytical method that can effectively connect practice with theory for the behavior of laterally loaded flexible piles with both free head and fixed head conditions in various types of soil based on the real shape of the strain wedge. The analytical method of the curved strain wedge model, in which the Duncan-Chang model is used to describe the stress-strain relationship of the soil and the relationship between the shear strain and the horizontal strain is improved on the basis of the Mohr circle of strain, is applicable to clay and sand as well as c-φ soil. A method of calculating the shear stress along the pile is proposed for circular piles according to the friction direction between the pile and the surrounding soil. The modulus of the soil foundation reaction is calculated along the whole pile length based on the finite difference method, without calculating the height of the strain wedge, which can truly reflect the nonlinear deformation characteristics of the pile foundation under lateral loading. The proposed method is verified by six case studies, including five field measurement experiments for various types of soil and one finite element analysis. Comparisons show that the agreement between the results from the curved strain wedge method and those from the field tests and the finite element analysis is generally satisfactory.

Keywords: Curved strain wedge; Lateral load; Flexible pile; Different soil types

AN IMPROVED ORDINARY STATE-BASED PERIDYNAMIC MODEL AND ITS APPLICATION IN COLD REGION TUNNELS

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ABSTRACT

This study developed an improved ordinary state-based peridynamic (OSBPD) model to investigate the frost heave behavior of surrounding rock and damage evolution of lining structure subjected to freeze-thaw cycles (FTCs) in cold region tunnels. An equivalent term of frost heave pressure was incorporated into the PD constitutive model to describe the ice-induced frost heave effect. The failure criterion of the PD bond was also modified by introducing a freeze-thaw damage function and considering the different fracture features of brittle materials, i.e., rock and shotcrete, under tension and compression. Combined with the material point dormancy method, a PD model was constructed to simulate the tunnel excavation process in cold regions. Simultaneously, a global convergence criterion was adopted in the numerical implementation to evaluate the solution convergence. The accuracy and robustness of the proposed model were verified by several numerical examples, including frost heave of fractured rock mass, finite element model (FEM) of tunnel excavation and finite difference model (FDM) of lining support. It shows that the improved OSBPD model is consistent with the experimental, FEM and FDM results, and the established PD model has higher computational accuracy and efficiency. With the proposed model, some influence factors, such as frost heave pressure, tunnel buried depth, rock elastic modulus and section shape, on damage characteristics of the surrounding rock and lining structure are originally investigated. The results reveal that the vertical displacement of surrounding rock increases and the horizontal displacement decreases under frost heave. When the tunnel is excavated in a deeply buried rock mass or soft rock stratum, the accumulated freeze-thaw damage at the arch foot of the lining structure is more severe.

Keywords: Ordinary state-based peridynamics; Crack propagation; Freeze-thaw cycles; Frost heave pressure; Cold region tunnels.

ACCURACY IMPROVEMENT OF FINITE ELEMENT METHOD-IMMERSED BOUNDARY-LATTICE BOLTZMANN FOR FLUID-STRUCTURE INTERACTION

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ABSTRACT

Fluid-structure interaction (FSI) is a common problem in ocean science and technology. Base on the nonlinear finite element (FEM), the immersed boundary (IB), and lattice Boltzmann methods (LBM), a numerical framework is presented for simulating the nonlinear FSI of moving deformable objects in incompressible fluid flow. In the conventional IB-LBM, the non-slip boundary condition at solid walls cannot be well satisfied, which results in fluid flow penetrating into solid boundary. In order to improve the interpolation accuracy, an iterative velocity correction procedure for the IB-LBM coupling scheme is proposed by introducing a modified velocity operator. The deformation of a flexible structure is discretized with the FEM and integrated in time with the explicit Newmark scheme. Fluid motion is obtained by solving the discrete lattice Boltzmann equation. The two numerical methods are coupled with the improved iterative velocity correction in a staggered way. The flexible bar dam-break test using the improved IB-LBM based on velocity correction is studied to compare with the traditional IB-LBM. The simulation results indicate that the proposed FEM-IB-LBM simulation framework satisfies the non-slip boundary condition well at the solid walls. A well-known FSI benchmark is adopted to analyze and validate the proposed FEM-IB-LBM coupling method. The results agree well with the previous experimental and numerical investigations, which indicate that the used numerical scheme proposed in this work is an efficient and reliable fluid-structure interaction numerical simulation method.

Keywords: Finite element method, Lattice Boltzmann method, Immersed boundary method, Fluid-structure interaction, Accuracy improvement

AN HYBRID DIGITAL IMAGE CORRELATION AND PERIDYNAMICS APPROACH FOR DETECTING CRACK PROPAGATION AND CORRECTING FULL-FIELD DEFORMATION

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ABSTRACT

This study develops a hybrid digital image correlation (DIC) and peridynamics (PD) approach to acquire mechanical parameters such as rigid body rotation, strain and damage. In view of the fact that the discrete process of DIC and PD exists tremendous similarity, a PD model can be constructed with the displacement data measured by DIC technique to calculate the damage of UHPC. The full-field damage of structural member can be obtained through inputting full-field displacement data into the DIC-based PD model. Moreover, the calculation formulas for rigid body rotation and strain are derived in the framework of PD and the calculations of rotation and strain are mutually insensitive and independent. Therefore, without any additional reference information, the rigid body rotation and strain information can be obtained in the presence of simultaneous rigid body rotation and deformation. Different rigid body rotations in various regions of an object, whether large or small rotations, can be calculated by this method. Correspondingly, this method is effective for calculating the local rigid body rotations of objects undergoing local fracture. Numerical simulations and experimental tests were performed to verify the effectiveness of the proposed method for calculating rigid body rotation, strain and damage. The calculation results show that the proposed method owns the ability to accurately calculate the rotation and strain. Furthermore, the crack initiation and propagation of mixed-mode fracture in ultrahigh performance concrete can be captured efficiently with the developed approach. The predicted fracture process of ultrahigh performance concrete matches well with experimental observations.

Keywords: Peridynamics; Digital image correlation; Rigid body rotation; Mixed-mode fracture; Full-field measurement.

CALCULATION OF RIGID BODY ROTATION AND CORRECTION OF BOND FORCE IN BOND-BASED PERIDYNAMICS

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ABSTRACT

As a non-local theory, mechanical behaviors such as deformation, damage, and fracture in peridynamics (PD) ultimately depend on the accuracy of displacement calculations. The key to obtain accurate displacement distribution lies in the precise calculation of bond force. It is difficult for bond-based peridynamics to distinguish between the actual shear deformation of the bond and the false shear deformation caused by the rigid body rotation. In models that take into account the tangential stiffness of the bond, this defect results in the models performing poorly in numerical simulations of finite rigid body rotation problems. Especially in problems involving fractures, rigid body rotation is generated on both sides of the crack tip. The rigid body rotation at the crack tip cannot be ignored for the actual shear deformation. Therefore, the rigid body rotation has a huge interference on the local bond force distribution. Inaccurate bond force distribution can cause abnormal crack tip displacements and even eventually lead to incorrect crack path. To fundamentally eliminate the interference of the false shear deformation caused by the rigid body rotation to the bond force distribution, based on the principle of energy minimum and the non-locality of peridynamics, a method for calculating rigid body rotation based on displacement is developed. By subtracting the false shear deformation caused by the rigid body rotation from the apparent shear deformation of the bond, the interference caused by the rigid body rotation is completely removed. The results of deformation and fracture examples with finite rigid body rotation illustrate the necessity of removing the effects of rigid body rotation. It is demonstrated that eliminating the effects of rigid body rotation leads to higher accuracy in displacement calculation and crack prediction.

Keywords: peridynamics; rigid body rotation; crack propagation.

PREVENTIVE MAINTENANCE USING RECYCLED ASPHALT

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ABSTRACT

Roadways are one of the significant important elements in infrastructure because they are characterized simply as the point of interaction between societies and people. Any country in the world needs to create roadways so that citizens and visitors can travel easily and smoothly. Mainly roadways have been the main source by which whole economies and societies have emerged and developed over the years. They also made a positive contribution to the distribution of ideas, cultures, languages, discoveries, goods, and services of having better and safer roadways.

This study seeks to assess the application of recycled asphalt in roadways maintenance by comparing it to the current roadway maintenance procedures in terms of technical parameters in construction procedures, timelines …etc. Furthermore, the environmental and economical requirements are highlighted and explored. This will enable the study to identify the possible benefits of using recycled asphalt pavement in roadway maintenance.

One of the benefits of using this construction material includes the economic benefits of saving on cost in material consumption, energy conservation in the processes, and environmental protection, which are imperative attributes in the development of sustainable human activities. However, other studies have indicated that asphalt has numerous disadvantages that should be considered before it can be fully adopted. Some of the challenges regard the technical aspects, mechanical considerations, and other quality concerns. . This implies that while recycled asphalt can be used as a sustainable material, there is a need to conduct an in-depth analysis to verify and quantify the effectiveness of the material, where the information is limited in the current literature. This study addresses the importance of using recycled asphalt with the integration of road maintenance procedures in the road network. This element is considered the main element of any national infrastructure development plan. The research aims to study and highlight the using recycled asphalt as a suggested sustainable method for road maintenance procedures. Therefore, the study elaborates on the historical use of recycled asphalt, its advantages, and disadvantages. Besides that, the maintenances process categories to ensure the suitable type that ensures the best quality of the network. Since roadway pavement assessment is based on quality as well as different characteristics parameters such as rutting, cracking, pavement quality Index, and roughness

Keywords: Recycled asphalt, Roadway maintenance, Pavement Parameter, Condition Index

MULTI-SCALE FATIGUE DAMAGE ANALYSIS OF FLEXIBLE ELECTRONIC FILM INTERCONNECTS

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ABSTRACT

Because of its deformable characteristics, flexible electronics have broad application prospects in various fields, such as flexible display, energy storage, and sensing. In flexible electronic devices, functional components are usually placed on "islands" with high stiffness and strength to avoid damage to functional components during device deformation. So the interconnect is the central deformation part of the whole flexible electronic device system. Since flexible electronics will inevitably be subjected to cyclic load during service, the fatigue of thin-film interconnecting wires is an important factor affecting the reliability of flexible electronic devices. Numerous experimental researches show that because the thickness of the thin film is much smaller than its length and width, its mechanical properties are usually different from their bulk counterparts. Therefore, the influence of the thickness effect should be considered in the fatigue analysis of thin films.

The previous studies on the fatigue reliability of thin-film interconnects mainly focused on experimental characterization, and few studies were conducted on the prediction model of the film's fatigue. Because the fatigue damage of metal film is the degradation process of material macroscopical properties caused by the evolution of microcosmic defects, the fatigue damage of metal film is a multi-scale problem. In this research, based on the theory of continuum damage mechanics and the evolution of micro defects number density, a multi-scale damage model is proposed to predict the fatigue of thin films. Based on the established fatigue damage model, the damage evolution law of copper films with different thicknesses and load ranges was analyzed and verified with the experimental results. For film interconnects of the coplanar mesh structure flexible electronics, the fatigue life and size effect are further analyzed. The results show that: with the increase of thickness and strain amplitude, the fatigue life decreases; the thinner the film, the more significant the thickness effect on the fatigue life. While with the increase of the film thickness, the thickness effect of the film will gradually be weakened.

Keywords: flexible electronics, multi-scale damage model, film interconnects, thickness effect

THE MOIRÉ EFFECT IN 3D LATTICE

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ABSTRACT

The moiré effect is the optical interaction between the superposed layers. The effect is mostly considered in 2D, i.e., in two or three coplanar layers [Amidror]. Sometimes, the volumetric structures are considered [Saveljev]. In this paper, we investigated the moiré effect in a 3D volumetric object. The visible voxels (spheres) lie at the lattice points of the simple cubic lattice. Such a 3D structure can be considered as aggregated multiple layers.

We described the picture of the visual moiré effect in such a multi-layered structure for a frontal camera with its axis perpendicular to the face of the cube. Particularly, there were multiple rays ("corridors") of different visual density in the picture; averaging produces the moiré effect. The distinctive angles of these radial corridors appeared to be the rational angles on the square grid; perpendiculars to them were also observed. The independence of the distinctive angles on the pitch of the lattice points and on the distance to the camera was confirmed.

The computer simulation and physical experiments were made. The simulation and author's photographs proved the angles of these rays comprising the picture of the moiré patterns in the cubic lattice. The correlations between the cubic lattice and the Euclid's orchard, between the distinctive angles and the maxima of Thomae's function were validated.

Keywords: Moiré Effect, Cubic Lattice, Multiple Layers, Moiré Effect in 3D

1. INTRODUCTION

We describe the picture of the visual moiré effect in a multi-layered structure for a frontal camera with its axis perpendicular to the face of the cube. The structure of the cube is shown in Fig. 1.
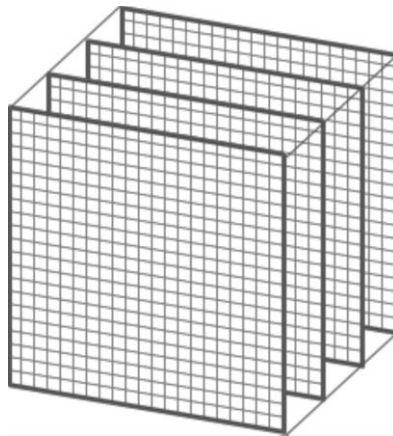
Figure 1. Multi-layered cube.

The origin of the Cartesian system is on the axis of the camera. Alternatively, the spherical coordinates (r, ϕ, θ) with the center at the camera can be used. Both are shown in Fig 2.
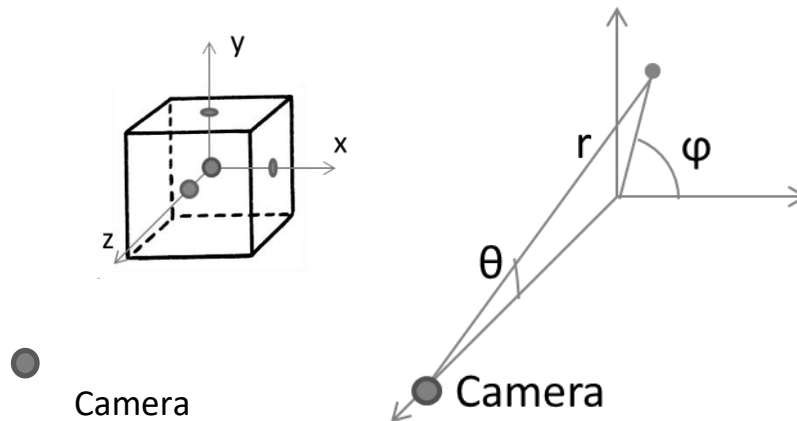
Figure 2. Coordinate systems.

We performed the computer simulation of the cube made of voxels [vpython] and took photographs of the physical object (Light sculpture Pure Water) [Yuseong News], see Fig. 3. The size of the former was 20x20x20 voxels; the size of latter was about 6.3x6.3x10.5m (18x18x30 LEDs).

(a) (b)
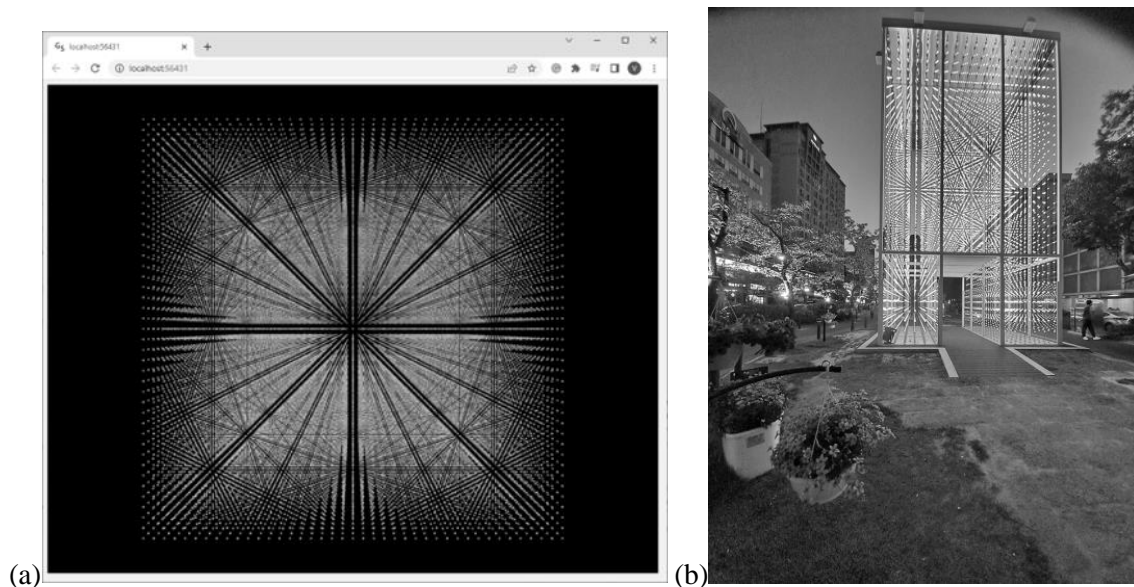
Figure 3. (a) Screenshot of computer simulation. (b) Photograph of the physical object LED cube.

The layers are effectively projected onto the image plane of the light sensor of the camera (CCD matrix), each layer from its own distance. Therefore, in general, they do not overlap each other exactly; rather each is slightly "re-scaled". Thus, although the layers are identical, they visually appear differently. The visible period of voxels is different for each layer along the z-axis. (The rear layer looks smaller than the front.)

Nevertheless, these overlapped layers comprise a certain visual structure. Multiple rays ("corridors") of different visual density can be observed in multiple overlapped layers, see Fig. 1; averaging produces the moiré effect containing various patterns. The corridors are arranged at distinctive angles and can be classified into the radial ones (the rays from the origin) and the perpendiculars to them, see Fig. 4.
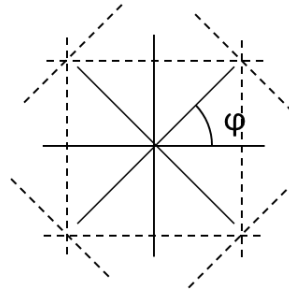
Figure 4. Visual corridors: radial (solid lines) and perpendicular (dashed lines).

Particularly, the distinctive angles ϕ of the radial corridors appeared to be the rational angles on the square grid, i.e., the angles whose arctangents are the rational numbers p/q,

$$\varphi = \tan^{-1}\frac{p}{q}, \ p, \ q \text{ integers } (0, 1, 2, \dots) \tag{1}$$

Typically, the integer numbers are small $p, q \leq 3$.

2. RADIAL RAYS

In the cube, each layer parallel to the *xy*-plane is the square grid. Observed from the origin, the planar layer can be treated as Euclid's orchard [Euclid]. These distinctive angles of the square grid are the rational angles and can be described by Thomae's function [Thomae],

$$f(x) = \begin{cases} \frac{1}{q}, if \ x = \frac{p}{q} \ \ (x \text{ is rational}), \text{with } p \text{ and } q \text{ coprime} \\ 0, \text{if } x \text{ is irrational} \end{cases} \tag{2}$$

For visual perception of patterns, the tightly connected spacing function [Saveljev and Kim 2015] is important. Since the above function is defined through the ratio, these angles do not depend on the size of the grid, on the distance *z*, or on the (physical or visible) interval between the points in the cubic lattice. The distinctive radial corridors cross the origin, see Fig. 5(a).
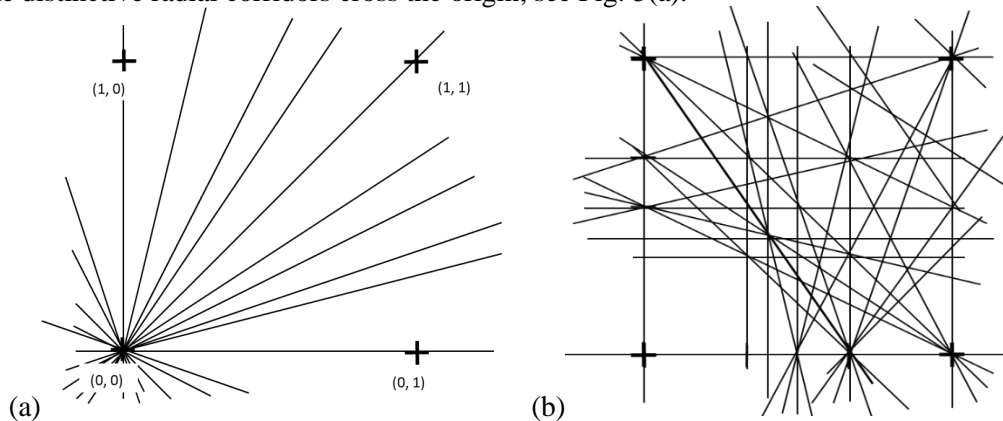
Figure 5. (a) Radial corridors. (b) Perpendicular corridors.

Because of their independence on the visual pitch, the corridors at the rational angles visually penetrate into the multilayered cube as shown in Fig. 1.

The cross-section of the cube along the horizontal plane $\phi = 0$ is the square grid with the aspect ratio 1. The distinctive angles θ are also the rational angles. The cross-section of the cube along the inclined

plane ɸ = 45° is the rectangular grid (aspect ratio = √2). The distinctive angles θ are also built similarly to the rational angles, i.e., they cross the same numbers of voxels by both sides of the non-square cross-section. Therefore effectively, the arctangents of these angles are multiplied by the aspect ratio. Other angles ɸ can be considered in the similar manner.

3. PERPENDICULAR CORRIDORS

According to the linear pair perpendicular theorem, the perpendiculars to the rational rays from the origin represent the same rational angles ɸ at other nodes see Fig. 5(b). The radial corridors together with perpendiculars are shown in Fig. 6.

(a)   (b)
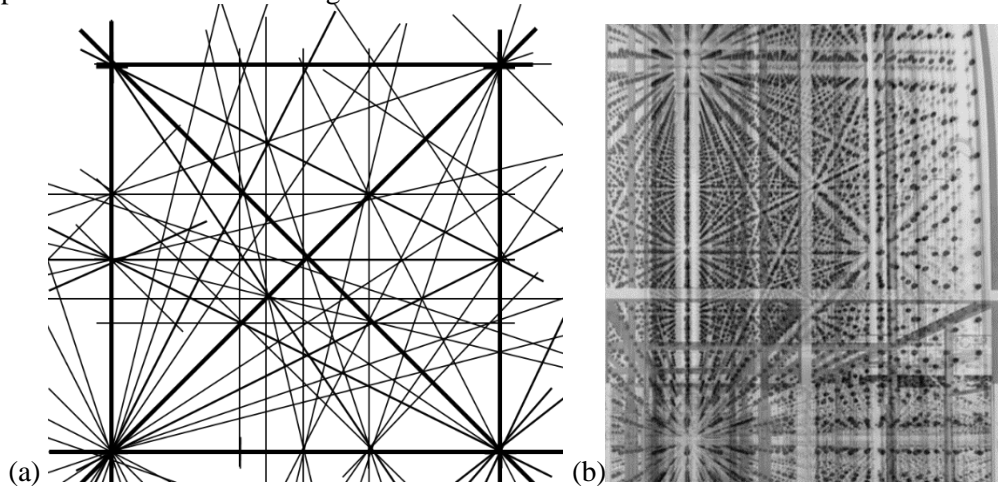
Figure 6. One quadrant of overall picture of corridors: (a) calculated, (b) photographed.

Compare the simultion Fig. 6(a) with the photograph Fig. 6(b) and with one quadrant of the screenshot of the computer simulation in Fig. 1 to find similarities between them.

4. CONCLUSION

The computer simulation and physical experiments (photos) on the moiré effect in the cube were made with the frontal camera. The independence of the distinctive angles on the pitch of the lattice points and on the distance to the camera was explained. The connection between the cubic lattice and the Euclid's orchard, between the distinctive angles and the maxima of Thomae's function were validated. Particularly, we determined that the distinctive patterns of the moiré effect in the 3D cube (radial and perpendicular) are based on the rational angles in the spherical system.

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FRACTURE ANALYSES OF WIRE WITH OFF-CENTER INCLUSION ON MULTI-PASS DRAWING UNDER BACK TENSIONS

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ABSTRACT

The occurrence of fracture during wire drawing seriously reduced the quality of steel wire. A clear grasp of the formation mechanism of drawing fracture can help to reduce the wire breakage rate and improve production efficiency. Therefore, the morphology of necking fracture and microstructure of wire are observed by SEM. It is found that there is large off-center inclusion on the surface of some fractures. Meanwhile, void defects appear near the inclusions, especially along the drawing direction. Based on the above observation results, the physical models of wire with and without consideration of off-center inclusion are established, and the FEM is employed to simulate multi-pass variable speed drawing under different back tensions. The damage threshold is introduced into the calculation to realize the process of crack propagation caused by damage, and then occurring failure fracture. The numerical results show that with the increase of back tension, the damage in the core of wire without consideration of inclusion gradually accumulates, and the growth trend of the maximum damage changes from logarithm to linearity, reflecting the continuous increase of the damage growth rate. When the damage exceeds the critical value, cracks occur preferentially in the wire core and propagate uniformly to the surface of wire, thus forming as necking fracture. When the wire contains inclusion, cracks will first occur at both ends of inclusion along the drawing direction due to stress concentration, and its drawing fracture is formed earlier than the wire without inclusion.

Keywords: Multi-pass drawing, Damage evolution, Drawing fracture, Back tensions, Off-center inclusion

MODELING AND DESIGN OF ELECTROMAGNETIC COMPATIBILITY FOR POWER ELECTRONIC

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ABSTRACT

The design of electronic energy systems should also take into account electromagnetic compatibility (EMC) and electric, thermal and mechanical issues. This article presents an electromagnetic interference characterization approach (EMI) in a power supply switching mode. This study provides a method for characterization. However, when these devices have been badly planned and/or built up, considerable electromagnetic interference will occur, causing issues both within and around the grid. Advances in computer-aided software and device design have enabled the correct imitation of waveforms in the switched-mode power supply. As a result, simulation methods may be used to estimate the accomplished Forward interference levels. Thus, a comparison of the EMI tests was performed with the two unique switching topologies, and mitigation is thus incorporated to reduce these electromagnetic emissions and sensitivity of Switch-Mode Power Supplies (SMPs). This study presents an efficient method for forecasting the EMI of a forward converter utilizing a microelectronics switch. This paper outlines a way of predicting both components (CM and DM noise). EMI is an issue and it is generally recognized that it is worth paying attention to, but it is not always apparent why EMI is thus a problem. In EMI testing two distinct switching topologies have been performed; the parasite elements have a major part in the production of EMI noise. This simulation approach may be useful for designers in many ways, including filter design and external SMPS filter optimization, filter suppression quantification.

Keywords: Swıtchmode Power Supplıes, Electromagnetic Compatibility, High-Frequency, Switch.

INVESTIGATION OF TEMPERATURE DEFECTIVE STRUCTURE OF Al(In)GaN/ GaN HIGH ELECTRON MOBILITY TRANSISTOR (HEMT) STRUCTURES

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ÖZET

Bu çalışmamızda öncelikle Bilkent Üniversitesi Nano Teknoloji Araştırma Merkezi'nde (NANOTAM) üretilen yüksek kaliteli farklı bariyerli AlGaN/AlN/GaN ile AlInN/AlN/GaN HEMT yapıların iletim özelliklerinin sıcaklığa bağlı Hall ölçümleri karşılaştırmayı planlıyoruz. Çalışmanın ikinci aşamasında ise Gazi Üniversitesinde üretilen, AlInN/GaN HEMT yapıları daha detaylı araştırmak için heteroeklem arayüzeyine farklı kalınlıklarda AlN ara tabaka büyütülmüş ve 4 örnek incelenecektir. Çalışmanın üçüncü aşamasında ise Vilnius Üniversitesinde, farklı bariyer ve kanallı AlInN/AlN/InGaN, AlGaN/AlN/GaN HEMT yapılar üretilecek ve iletim üzerine etkilerini araştırılacaktır. III-nitrat grubu yarıiletkenlerin optiksel özelliklerinin ve buna bağlı geliştirilen optoelektronik uygulamalarının yanısıra, son zamanlarda elektronik teknolojisi için de yoğun olarak araştırılan malzeme gruplarından birisidir. Al(In)GaN/(In)GaN yüksek elektron mobiliteli transistör (HEMT) yapıların yüksek frekanslı ve yüksek güçlü mikrodalga uygulamalar için aranan geniş bant aralığına, iyi bir ısıl iletkenliğe, kendiliğinden ve piezoelektrik polarizasyon alanına sahip olması, HEMT yapıların askeri ve ticari alanda (elektronik gözetimlerde, yüksek hızlı iletişimlerde, gemi ve uçak radarlarında, uydu iletişimlerinde, telsiz üslerinde ve elektronik savaşlarda karıştırıcı olarak) kullanılmasına olanak sağlamaktadır. Fakat bu alandaki mevcut teknolojinin rekabetinden dolayı GaN tabanlı elektronik aygıtların gelişimi, optoelektronik uygulamalar kadar hızlı gerçekleşmemektedir. Buna rağmen, son zamanlardaki gelişmeler oldukça etkileyicidir. GaN ve GaAs temelli transistörlerin potansiyel kullanım alanları frekans ve güç aralıklarına faklılık gösterir.

Anahtar Kelimeler: HEMT, III-Nitrür, GaN/AlGaN.

ABSTRACT

In this study, we first plan to compare the temperature-dependent Hall measurements of the conduction properties of high quality different barrier AlGaN/AlN/GaN and AlInN/AlN/GaN HEMT structures produced at Bilkent University Nano Technology Research Center (NANOTAM). In the second phase of the study, in order to investigate the AlInN/GaN HEMT structures produced at Gazi University in more detail, AlN interlayer of different thicknesses will be grown at the heterojunction interface and 4 samples will be examined. In the third phase of the study, AlInN/AlN/InGaN, AlGaN/AlN/GaN HEMT structures with different barriers and channels will be produced at Vilnius University and their effects on transmission will be investigated. In addition to the optical properties of III-nitrate semiconductors and the optoelectronic applications developed accordingly, it is one of the material groups that has been intensively researched for electronic technology recently. Al(In)GaN/(In)GaN high electron mobility transistor (HEMT) structures have a wide band gap, good thermal conductivity, spontaneous and piezoelectric polarization field sought for high frequency and high power microwave applications, HEMT structures are used in military and commercial applications. (as a jammer in electronic surveillance, high-speed communications, ship and aircraft radars, satellite communications, radio bases and electronic warfare). However, due to the competition of current technology in this field, the development of GaN-based electronic devices is not as fast as optoelectronic applications. Despite this, recent developments are quite impressive. The potential usage areas of GaN and GaAs based transistors differ in frequency and power ranges.

Keywords: HEMT, III-Nitride, GaN/AlGaN

STRATEGICALLY LOCATING LAST MILE WAREHOUSES FOR AN ONLINE RETAIL COMPANY

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ÖZET

As world population and percentage of this population living in urban areas grow, the challenges for city logistics increase, as well. Also known as last mile logistics, city logistics aims to achieve an efficient and effective transportation of goods within urban areas. Considering the recent increasing trend in customer preferences for online shopping and with the growing success of e-retail commerce, business-to-consumer e-commerce sales continue to increase. In this setting, few and large customer orders with large delivery times are being replaced by bigger number of small-size orders with tighter delivery times. Online e-retail companies are trying to achieve same-day-delivery or even one-hour or half-an-hour delivery options to meet customer demand. One solution to such a challenging problem is to consider use of small satellite facilities, which are also called as last mile warehouses within the city, which is the focus of this study. We propose a 2-echelon model and a mixed integer programming formulation for it, where products are consolidated in larger size urban distribution centers at the border of the city and from there distributed to last mile warehouses where a small amount of safety stock for the orders is kept and then transported to customers guaranteeing to achieve one hour or 30-minute delivery time. The proposed model aims to minimize fixed cost of opening and operating last mile warehouses, inventory holding costs and the transportation costs. We test the model using realistic data of an online retail company in Istanbul Turkey and solve the problem using a commercial solver to derive managerial insights.

Anahtar Kelimeler: City Logistics, Last Mile Warehousing, Facility Location Optimization, Inventory Optimization, Mixed Integer Programming

SIMULATION OF PHASE CURRENT CONDUCT TIME EXTENSION IN BRUSHLESS DIRECT CURRENT MOTORS

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ABSTRACT

Today, three-phase brushless direct current motor drivers whose use is widespread in every field unfortunately energize only two phases of the motor at the same time. One of the three phase windings is temporarily for 60 electrical degrees de-energized. The non-energized winding does not contribute to the torque and speed production of the motor. Thus, while the brushless direct current motor will actually produce more speed and higher power, it produces less power and speed. With the drivers used today, it works with less capacity than its real capacity. Because the duration of the current passing through the phase windings of the motor is 120 degrees. If the conduction time of the phase current is made greater than 120 degrees, the three phases of the motor can be used at the same time and the speed and torque capacity of the motor will increase. In this simulation study, the performance of a brushless direct current motor operating with a driver that passes current through each phase winding of the motor for 165 degrees was investigated.

Keywords: Brushless direct current motor, simulation BLDC motor, 120-degree inverter, 165-degree inverter, conduction angle.

1. INTRODUCTION

Due to the brushless direct current motors (BLDCMs) have superior features, they are used in industrial, military and aerospace applications, servo and robotic applications, medical applications, electric vehicles, and home devices are increasing day by day [1]. The shape of back electromotive force and phase currents in BLDCMs are the trapezoidal waveform Rotor position information is required for the operation of BLDC motors. Rotor position information is obtained from 3 Hall-effect sensors placed 120 degrees apart on the stator as three bits as the most economical solution [2]. With the rotation of the rotor, the Hall effect position sensors change their signal with every 60 electrical degrees. According to the 3-bit position information received from the position sensors, the control signal of the transistors in the inverter is generated by the commutation circuit. Thus, the magnetic field created by the current passing through the phase windings and the magnetic field of the rotor magnet interact with each other and the rotor starts to rotate. As the rotor rotates, the 3-bit position signals produced by the Hall-effect rotor position sensors change and the inverter transistors are switched on or off according to these signals. Turning on or off of the transistors in the inverter occurs every 60 electrical degrees [3]. These drivers are also called 6-step drivers because this change occurs 6 times during a full period (360-degree). These drivers are also called conventional 6-step or 120-degree conduction mode drivers, which are currently powered by BLDC motors [4]. Because in BLDC motors controlled by these drivers, the phase current passes through the phase winding for 120 degrees in a half period. But a half period is 180 electrical degrees. Thus, in a half-period of 180 degrees, current flows through a phase winding for 120 degrees [5]. Thus, 66% of one phase winding of the motor is utilized in inverters with 120 degree transmission mode. In other words, 33% of the capacity of a phase winding of the motor is not used. [6]. If the duration of the current passing through the phase windings of the motor is increased, the dynamic performance of the motor and inverter performance will increase compared to the operating mode with 120 degrees conduction mode [7].

It is possible to utilize more by increasing the duration of the current passing through the phase windings of the motor without making any changes on the motor. In this simulation study, the duration of the

current passing through the phase winding was increased to 165 electrical degrees and the performance of the BLDC motor was examined. PSIM package program was used in the simulation study [8].

2. 120 and 165-DEGREE CONDUCTION MODE

2.1. 120 Degrees Conduction Mode

In BLDC motor drivers, the duration of the current passing through each phase is 120 degrees in one half period, and the shape of the phase current passing through is in the form of a trapezoidal wave. In each half-period, the phase winding remains de-energized for 60 electrical degrees and the direction of the current passing through the winding changes during this time. That is, commutation occurs during this time as it seen in Figure 1.
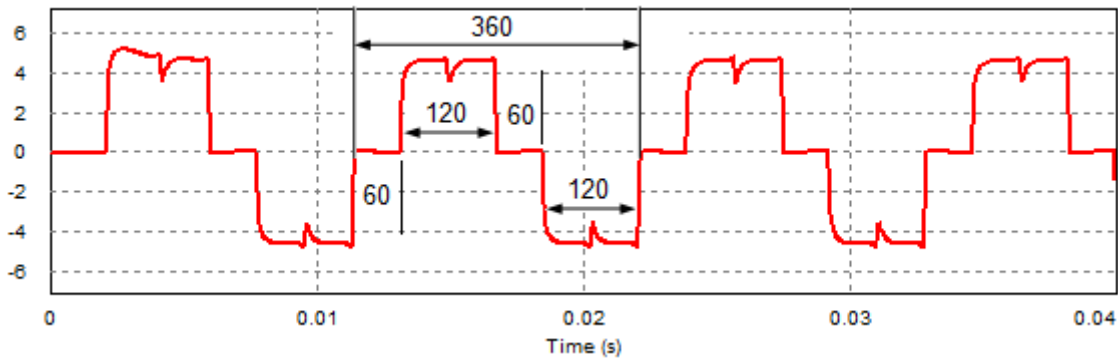
Figure 1. One phase current in 120 degrees conduction mode in BLDC motors

As it seen in Figure 1, the duration of the current passing through the phase winding in a period is 240 degrees. The phase winding contributes to the speed and torque production only 66% of the time. At the remaining 120 degrees, the phase winding is de-energized. Therefore, the phase winding does not contribute to the speed and torque production. Figure 2 shows that the changes in the currents passing through the phase windings during one period. Two phases are active and one phase is not active in the time intervals indicated by the numbers 1, 2, 3, 4, 5, 6 in Figure 2. Thus, two phase windings are energized and one phase winding is de-energized. The energizing of the phase windings of the inverter according to the situation shown in Figure 2 is shown in Figure 3. In Figure 2, phases B and C are energized and phase A is de-energized in the time interval (1). In Figure 3, this situation is shown with the number (1). In the case indicated with (1) in Figure 3, phase B is connected to the positive terminal of the DC source and phase C is connected to the negative terminal of the DC source.

Phase A is idle. In the case indicated by (2) in Figure 3, phase B continued to be connected to the positive terminal of the source, but phase C was disconnected from the negative terminal of the source and was de-energized. This time, phase A is energized by connecting to the negative terminal of the source. Each time interval from (1) to (6) in Figure 2 occurs at 60 electrical degrees. Thus, as the rotor rotates, the phase windings are energized sequentially as shown in Figure 3, according to the 3-bit rotor position information received from the rotor position sensors. The commutation is performed according to the rotor position information. As can be seen from Figures 2 and 3, in 120-degree conduction mode (120-DCM), one phase is always de-energized for 60 degrees, two phases are always energized.
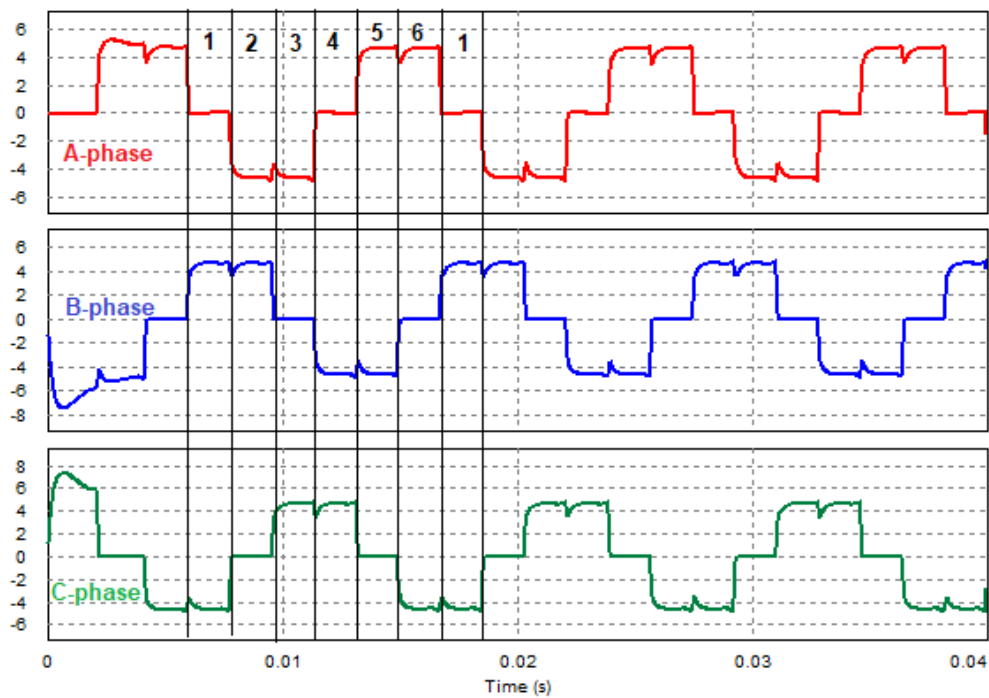
Figure 2. Change of phase currents in three-phase BLDCM
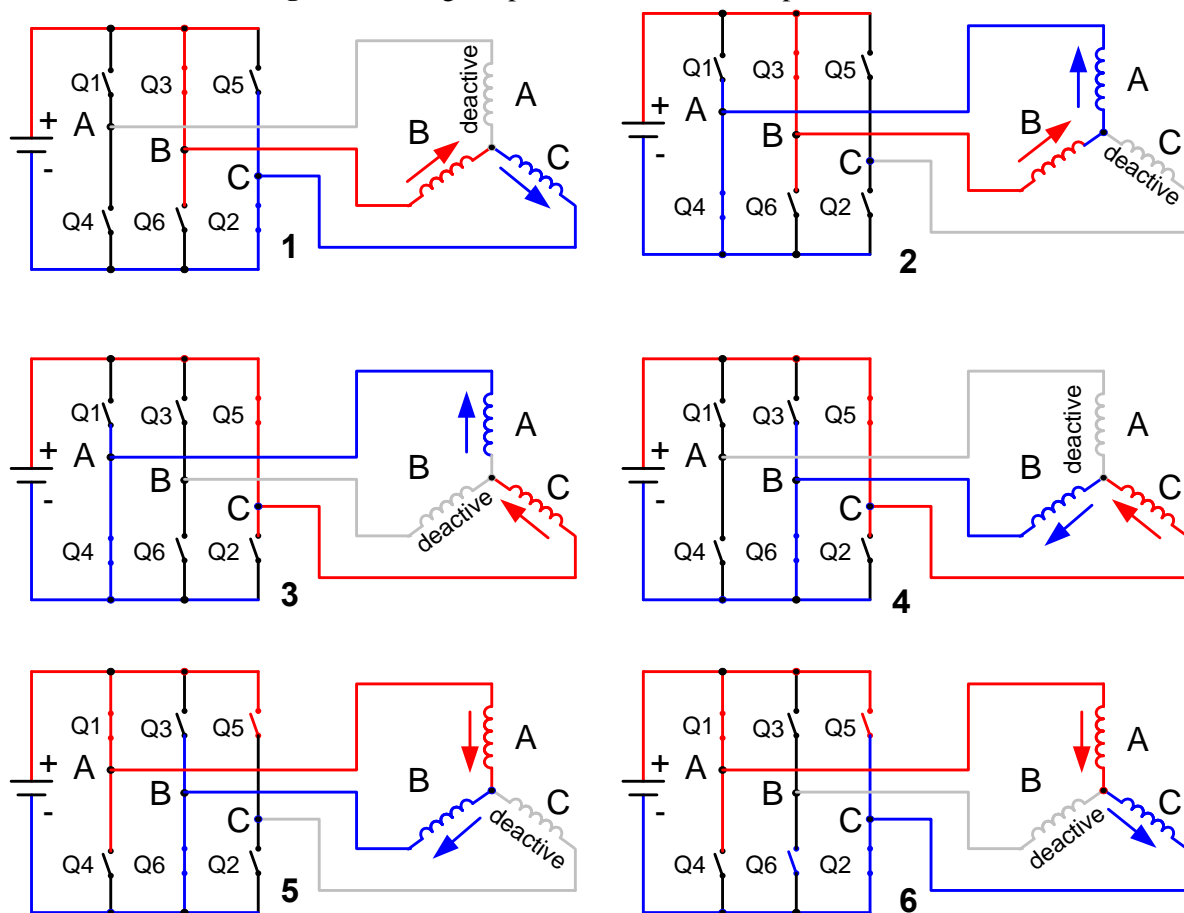
Figure 3. Phase currents according to the switching state of the transistors

The energized and de-energized windings are determined according to the rotor position information and the inverter performs this process. In Figure 3, the de-energized phase windings are shown in gray color. As it is clearly seen from Figure 3, since two phase windings are connected in series at every 60 degrees in 120 degree conduction mode, the voltage at the terminals of one phase winding becomes half of the VDC source voltage (Vf=Vdc/2).

In this simulation study, instead of keeping the phases in conduction for 120 degrees, it is aimed to increase this duration to 165 degrees. Thus, the speed and power performance of the BLDC motor was increased by using the phase that was de-energized for 60 degrees.

2.2. 165 Degrees Conduction Mode (165-DCM)

If the duration of the current passing in the phase windings of the BLDC motor is made 165 degrees, the current will flow through the three phase windings of the motor at the same time. Thus, all phase windings of the motor will be used for speed and power generation. In order to increase the phase conduction angle to 165 degrees, the rotor position must be detected more precisely by each 15 degrees.
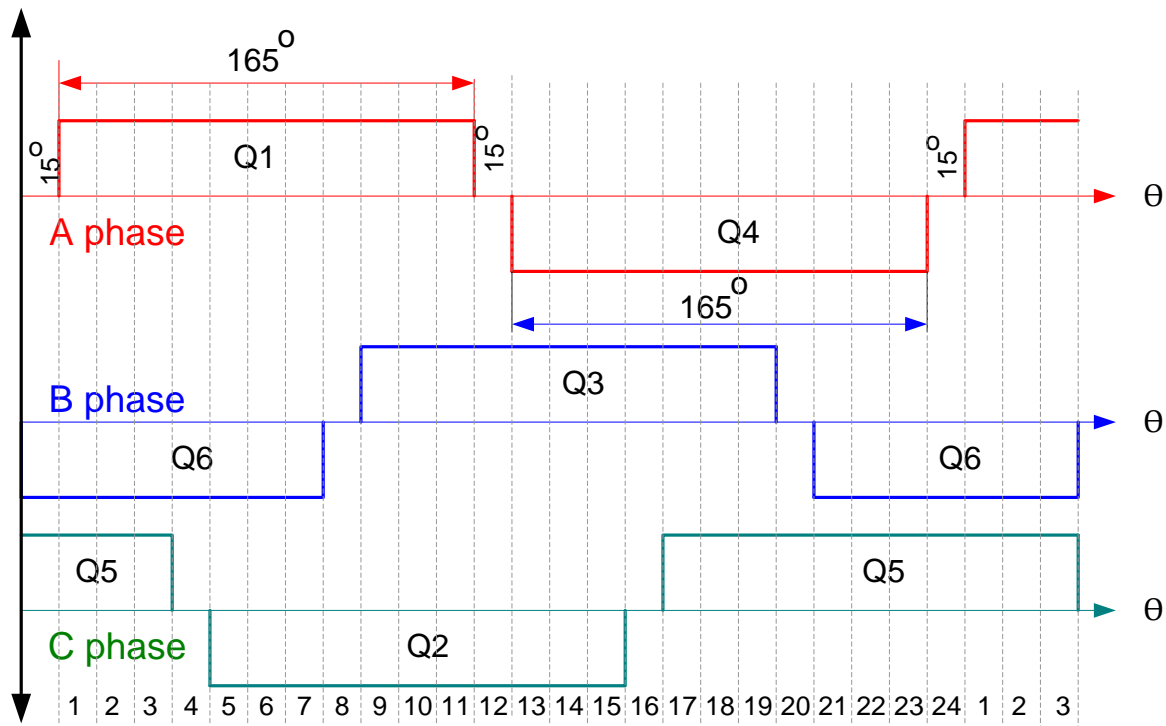
Figure 4. Energizing the phases in the proposed 165 degrees conduction mode

As it seen in Figure 4, the de-energized time of the phase winding has been reduced from 60 degrees to 15 degrees and the duration of the current passing through the phase winding has been increased to 165 degrees. Switching of inverter transistors is carried out taking into account Figure 4. According to Figure 4, the voltage required in the windings according to the energizing order in the windings is given in Table 1.

In Figure 4, in state 1, 2 and 3 switches Q1, Q6 and Q5 are on. In this case, the A and C phase windings are parallel to each other, and the C phase winding is connected in series with them. Thus, the value of the voltages at the terminals of the phase windings becomes Van=Vdc/3, Vbn=Vdc/3 and Vcn=-2Vdc/3. In the 4th case, the energy of phase C is cut off and current flows through phases A and B. In this case, since the A and B phase windings are connected in series to each other the voltage at their terminals becomes Vdc/2. In cases 5, 6, 7 since the switches Q1, Q6 and Q2 are in conduction, the voltages at the

terminals of the phase windings are; They take the values Van=2Vdc/3, Vbn=-Vdc/3 and Vcn=-Vdc/3. As the rotor rotates, commutation occurs and the voltages at the terminals of the phase windings change to 0,

steps	closed switches	phase voltages		
		Van	Vbn	Vcn
1, 2, 3	Q1, Q6, Q5	Vdc/3	-2Vdc/3	Vdc/3
4	Q1, Q6	Vdc/2	-Vdc/2	free
5, 6, 7	Q1, Q6, Q2	2Vdc/3	-Vdc/3	-Vdc/3
8	Q1, Q2	Vdc/2	free	-Vdc/2
9, 10, 11	Q1, Q3, Q2	Vdc/3	Vdc/3	-2Vdc/3
12	Q3, Q2	free	Vdc/2	-Vdc/2
13, 14, 15	Q3, Q4, Q2	-Vdc/3	2Vdc/3	-Vdc/3
16	Q3, Q4	-Vdc/2	Vdc/2	free
17. 18, 19	Q3, Q4, Q5	-2Vdc/3	Vdc/3	Vdc/3
20	Q5, Q4	-Vdc/2	free	Vdc/2
21, 22, 23	Q5, Q4, Q6	-Vdc/3	-Vdc/3	2Vdc/3
24	Q5, Q6	free	-Vdc/2	Vdc/2

Vdc/3, Vdc/2, 2Vdc/3, Vdc/2, Vdc/3 and 0 Volts.

Table 1. Phase voltages in BLDC motor drives in 165-DCM

As can be seen from Table 1, the voltages at the terminal ends of the phase windings change as the rotor rotates. Phase voltages change in the form of square sinusoidal. However, at 120 degrees conduction, the phase voltages are only half of the source voltage (Vdc/2). In Figure 5, the energizing order of the phase windings is given according Figure 4.
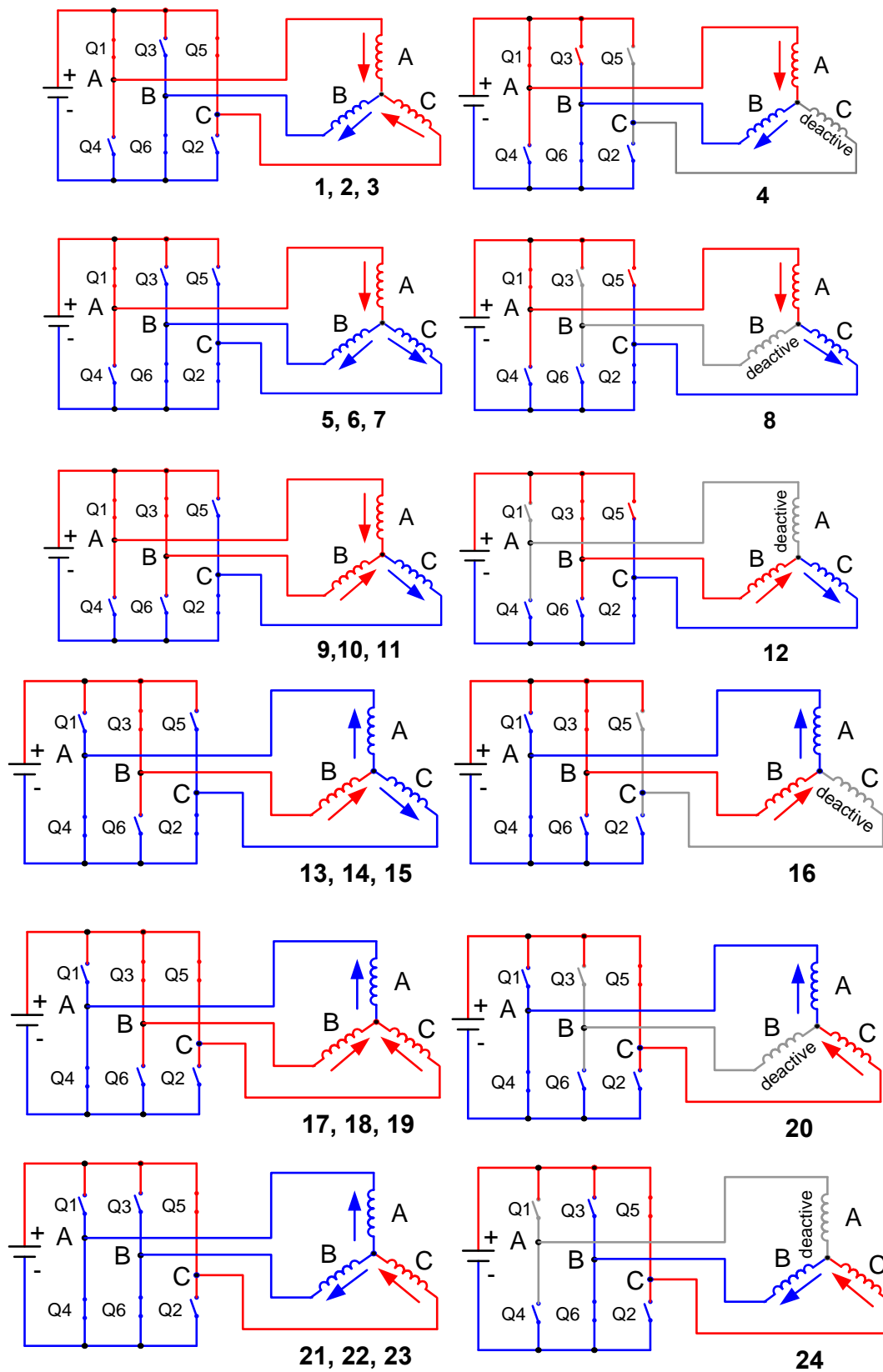
Figure 5. Energizing phase windings in 165 degrees conduction mode

As it seen in Figure 5, current flows through all three phase windings of the motor in the same time. The current of the commutated phase winding is interrupted for a short time and then the current changes its direction. The commutation winding remains de-energized only at 15 electrical degrees. However, at 120-DCM, the commutation winding is de-energized at 60 degrees.

3. SPEED, POWER and TORQUE ın BLDC MOTORS

In BLDC motors, the speed depends on the voltage applied to the phase windings and the magnetic flux of the poles, as in brushed DC motors. Since the poles are permanent magnets, the magnetic flux of the poles is constant, the speed of the motor depends only on the voltage applied to the phase windings and is expressed by equation (1).

$$n = \frac{V_p - R_p . I_p}{K.\Phi} \tag{1}$$

Here, Vp is the phase voltage, Ip is the phase current, K is the motor constant, and Φ is the magnetic flux of the poles. The power of the motor is the sum of the product of the back electromotive force produced by the phase windings and the current passing through the same phase winding. The power produced by the BLDCM is expressed by equation (2).

$$P = E_{ab} . I_a + E_{bb} . I_b + E_{cb} . I_c \tag{2}$$

Eab, Ebb and Ecb are the back emf produced by phases A, B and C, respectively, and Ia, Ib and Ic are the phase currents.

The torque produced by the BLDC motor is found by dividing the angular velocity of the power produced by the motor;

$$T = \frac{E_{ab} . I_a + E_{bb} . I_b + E_{bc} . I_c}{w_r} = \frac{P}{w_r} \tag{3}$$

In the power expression equation of the motor, since only two phases are active of the BLDC motor in the 120-DCM, the instantaneous power expression of the motor is the sum of the power produced by only the two phases. Thus, if the motor's power expression is rearranged in 120-DCM;

$$P = E_{xb} . I_x + E_{yb} . I_y \tag{4}$$

The x and y indices Show that the active phases of the motor since the same phases are not active all the time.

4. SIMULATION 165-DEGREE CONDUCTION MODE

PSIM package program is a very easy to use, powerful power electronics simulation program. Therefore, this simulation study was carried out in this program. Changing the Conduction Pulse Width parameter from the parameters of the BLDC motor in the program is sufficient to change the conduction angle of the inverter transistors. Normally, in BLDC motor drivers, the 3-bit position information received from the position sensors is decoded in a decoder circuit to obtain the control signal of the transistors, and the control signal (gate signals) of the transistors is obtained. But the control signal is taken directly from the motor in PSIM. Unlike the real application, in PSIM the position signal has a negative value. This negative pulse indicates that it will be used for transistors connected to the negative source voltage in the inverter. For this, this negative pulse is multiplied by the negative block and a positive gate signal is obtained.

In order to better see the effect of the 165-degree conduction mode, the BLDCM was operated as open loop in the simulation.
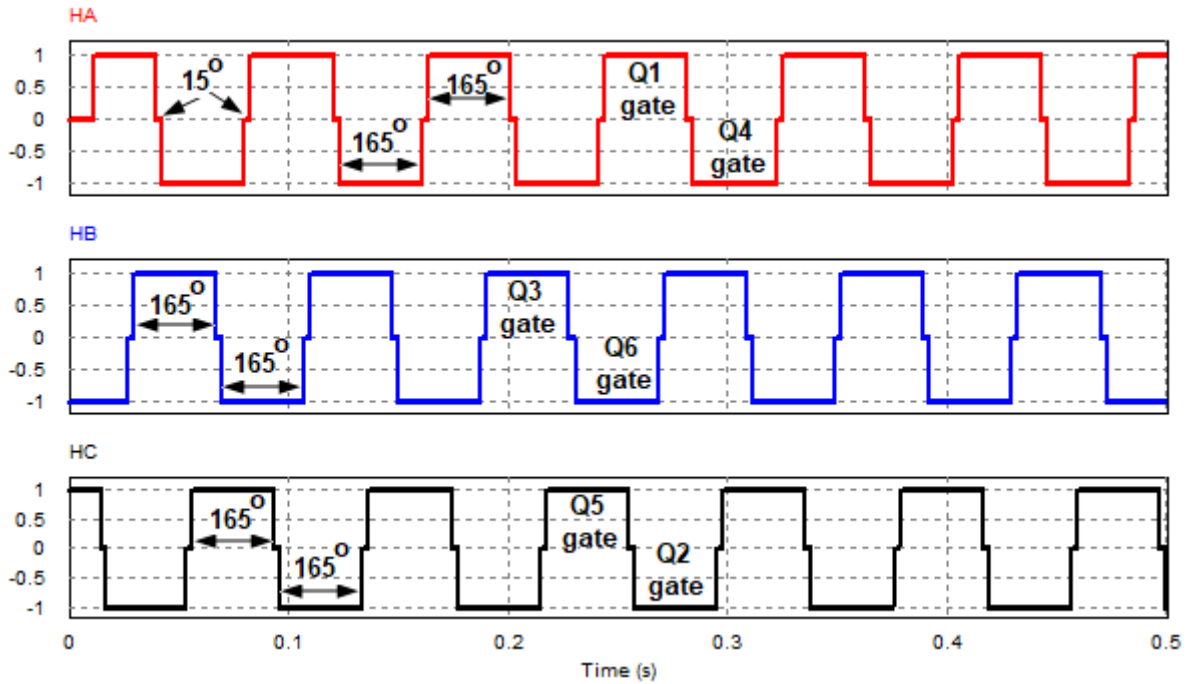
Figure 6. Rotor position and gate signals in PSIM for 165-DCM

As it seen in Figure 6, the rotor position signal has a negative part. But in real practice, Hall-effect position sensors do not produce negative parts. Hall-effect sensors signals are 120 degrees apart from each other in 120-DCM applications. The rotor position signals in PSIM perform two functions, one is the control signal of the transistors and the other is the rotor position signal. Thus, the simulation circuit becomes very easy and uncomplicated. The PSIM application used in the simulation is given in Figure 7.
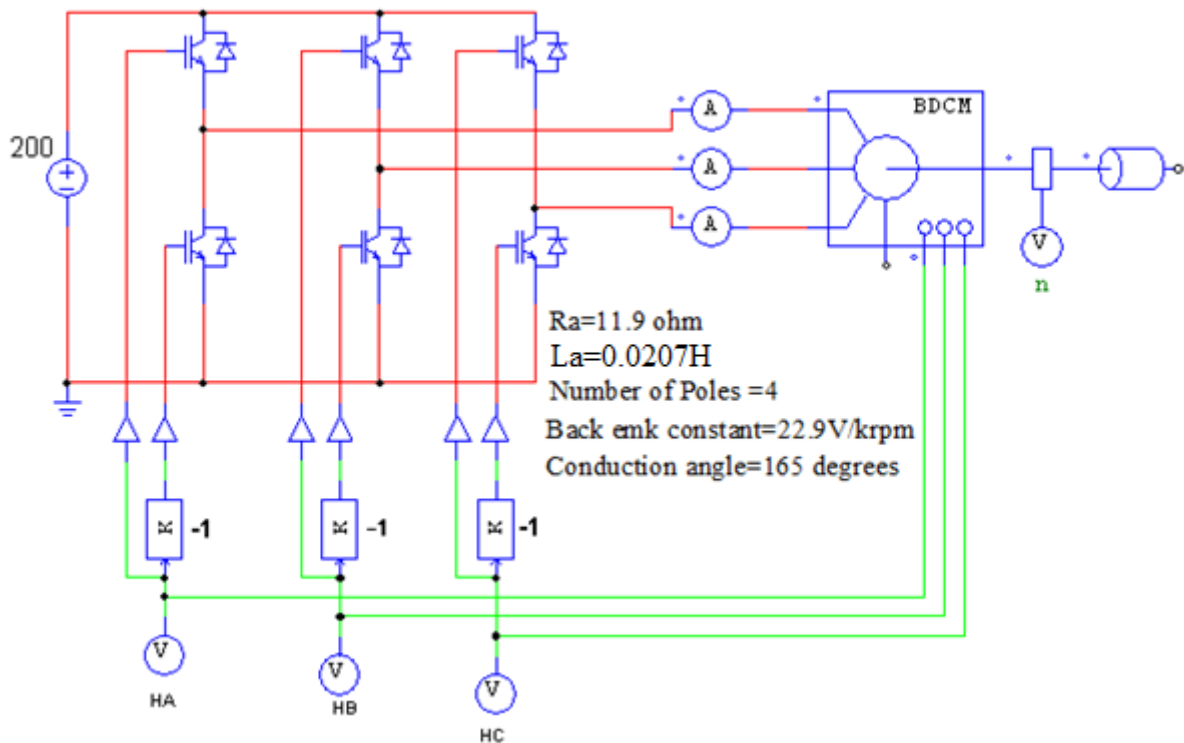
Figure 7. 165-degree conduction mode simulation circuit of BLDC motor

Three phase currents of the motor are given in Figure 8. As it seen from the currents, the currents are continuous and very close to the sinusoidal form.
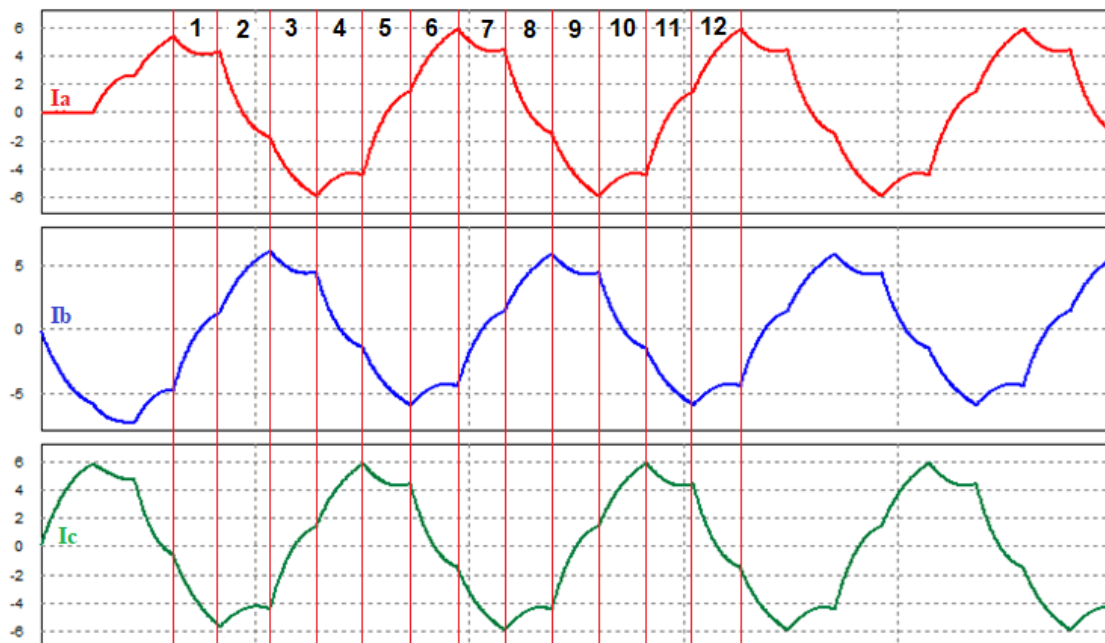
Figure 8. Three-phase currents in 165-DCM

Torque responses of the BLDC motor in both 120 and 165-DCM are given in Figure 9.
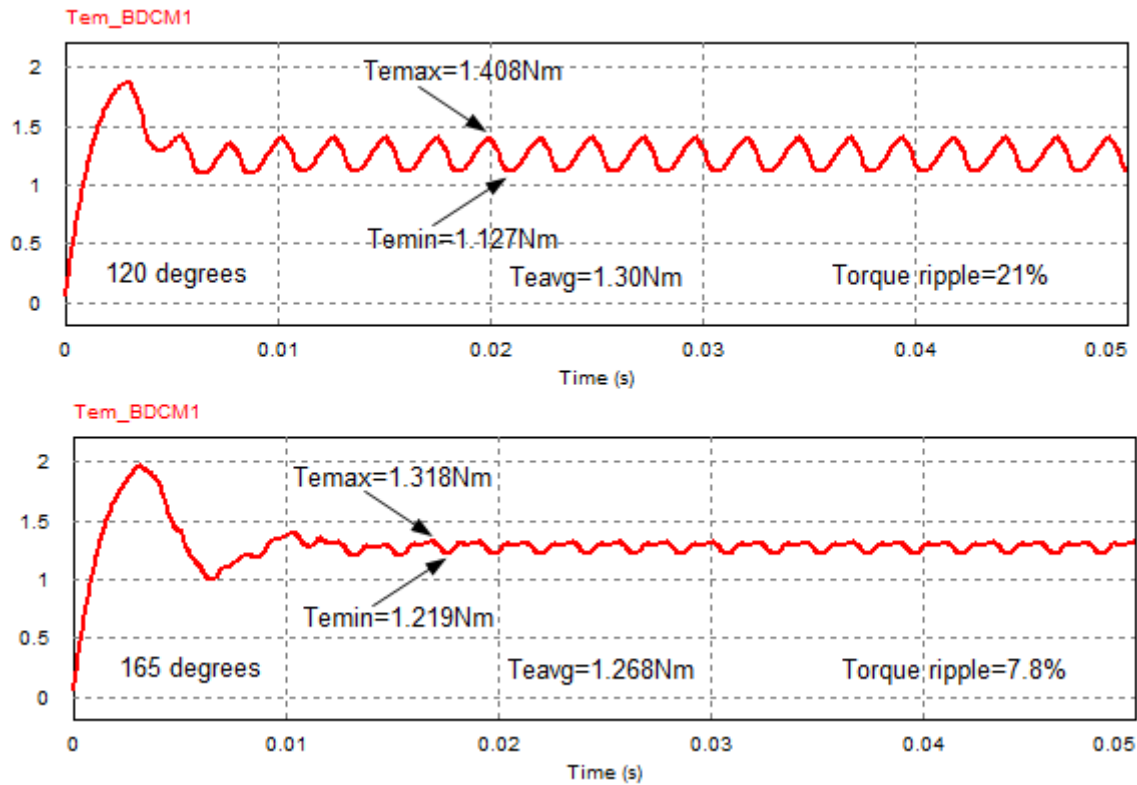
Figure 9. Torque response of the motor at both 120 degrees and 165 degrees

The speed response of the BLDC motor in both conduction modes is also investigated. The speed responses of the motor are given in Figure 10.
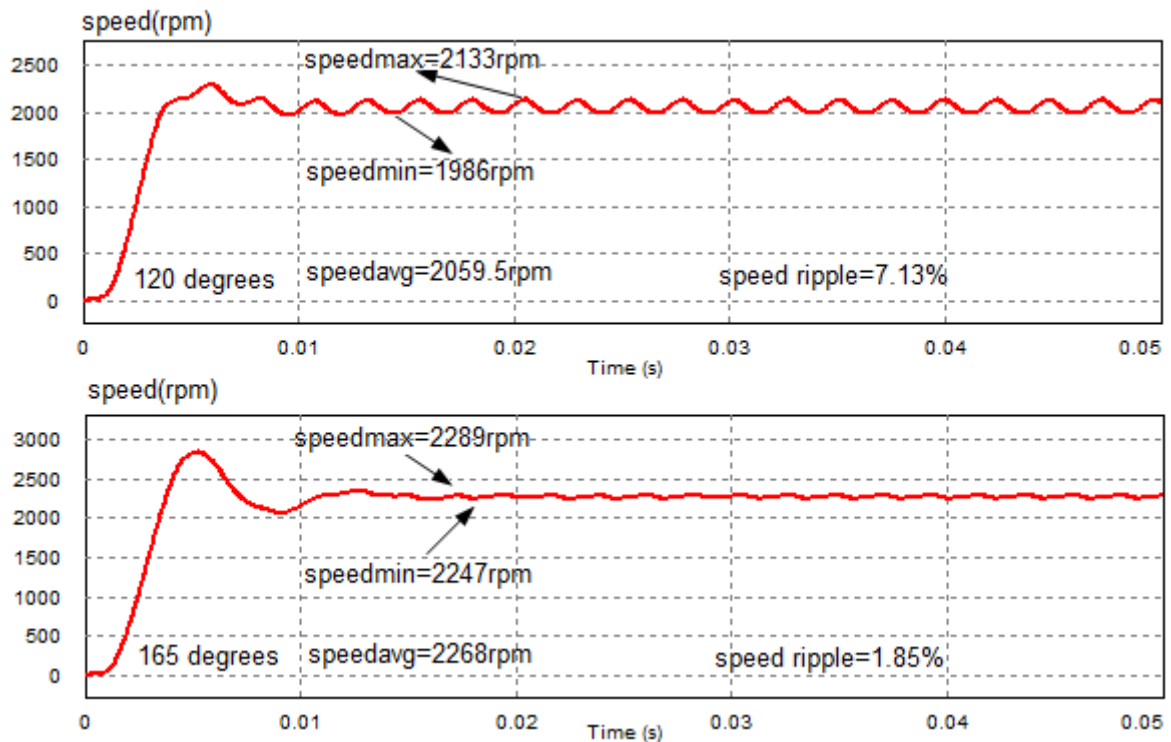
Figure 10. Speed response of the motor in both conduction modes

5. CONCLUSION

In this simulation study, BLDC motor was operated with both conventional driver (120 degrees) and 165 degrees conduction mode inverter and the difference between both drivers was compared. 165-DCM inverter has increased the performance of BLDC motor. The features that the 165-DCM inverter brings to the motor are reviewed below;

Phase Current: In the 165-DCM, the phase currents were found to be very close to the sinusoidal form. The fact that the current is sinusoidal helps the motor to produce more quiet and smoother speed and torque.

Speed: At the 165-DCM, it is seen that the BLDC motor has produced more speed and smoother speed than in the 120-DCM as it is seen in Figure 10. The BLDC motor produced 2059.5 rpm while operating at 120-DCM, while it produced 2268 rpm at 165-DCM. When the BLDC motor was running at 165-DCM, it produced 208.5 rpm more speed. In order to get 2059.5 rpm from BLDC motor in 165-DCM, inverter DC bus bar voltage must be reduced from 200 Volts to 184 Volts. This indicates that less DC voltage should be used at the 165-DCM for the same speed. Thus, it is possible to produce the same speed with less voltage in this new transmission mode.

In addition, the ripple in the speed of the motor when operating in both conduction modes has been calculated. Accordingly, when the BLDC motor is running at 120-DCM, the fluctuation in speed is calculated as 7.13%, and when running at 165-DCM, the fluctuation in speed is calculated as 1.85%. Thus, it is clearly seen that the ripple in the speed produced by the BLDC motor was much less in the 165-DCM than 120-DCM.

Torque: As it seen in Figure 9, the BLDC motor produced smoother torque when running at 165-DCM than 120-DCM. In Figure 9, the average torque at 120-DCM is 1.30Nm, while the average torque is 1.268Nm at 165-DCM. Average torque is low on the 165-DCM, because the speed is high. While torque ripple on the 120-DCM is 21% the torque ripple on the 165-DCM is 7.8%. In the 165-DCM, the BLDC motor has produced smoother torque. The ripple in speed and torque is calculated using equation (5) below.

$$\Delta X = \frac{X_{max} - X_{min}}{X_{avg}} . 100 \qquad (5)$$

Here, X can be speed or torque.

It is seen that the 165-DCM gives superior characteristics to the BLDC motor. It has been revealed that the dynamic performance of the motor increases without making any physical changes on the BLDC Motor. The same speed is produced with less voltage in the new conduction mode. Torque and speed were found to be smoother in the new conduction mode.

This simulation study should also be done experimentally and the results should be compared.

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KARAYOLU TÜNELLERİNİN SÜRÜŞ VE TÜNEL İŞLETİM GÜVENLİĞİ AÇISINDAN İRDELENMESİ ÜZERİNE BİR ARAŞTIRMA

A STUDY ON INVESTIGATION OF HIGHWAY TUNNELS IN TERMS OF DRIVING AND TUNNEL OPERATION SAFETY

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ÖZET

Yol ağlarının engebeli coğrafi kesimleri bünyesinde barındırması ve elverişsiz iklim koşullarında yaşanan olumsuzluklar, karayolu tünellerinin önemini gün geçtikçe daha da artırmıştır. Tünellerin her türlü iklim koşulunda sağladıkları avantaj ve gerek şehir içinde gerekse şehirlerarası yollarda hız, zaman vb. üzerindeki olumlu etkileri, tünelleri karayollarının önemli bir tamamlayıcısı haline dönüştürmüştür. Dünya genelinde karayolu tünel yapım teknolojisinin gelişmesi ve ve bu konudaki karayolu geometrik standartlarının artmasıyla birlikte Dünya'da ve Türkiye'de karayolu tünel sayısında ciddi bir artış meydana gelmiştir. Türkiye özelinde 2003-2018 yılları arasında, toplam uzunluğu 410 km olan 274 adet karayolu tüneli ulaşıma açılmış, 2023 yılına kadar ise karayolu ağı üzerinde toplam uzunluğu 700 km olan 470 adet tünelin ulaşıma kazandırılması planlanmaktadır. Gerek şehir içi gerekse şehirlerarası bu tür yeraltı yol sistemlerinin daha da yaygın hale gelmesiyle birlikte sürücülerin, sürüş sürelerinin büyük bir bölümünü karayolu tünellerinde geçirmeye başlayacağı öngörülmektedir. Dolayısı ile sürücülerin tünellerde konforlu ve güvenli bir şekilde taşıt kullanabilmelerini sağlamanın öneminin gün geçtikçe artacağı yadsınamaz bir gerçektir. Tünel sayısının ve kilometresinin hızla artmasıyla ne yazık ki karayolu tünellerinde ölümlü, yaralanmalı ve maddi hasarlı kazaların sayısında da oldukça belirgin bir artış gözlemlenmeye başlamıştır. Yaşanan bu kazalar sonucu, yüksek ölüm oranlı kazaların meydana gelebileceği göz önünde bulundurularak; karayolu tünel güvenliğini ve bu güvenliği etkileyen faktörleri ele alıp değerlendirmek oldukça önemli ve gereklidir. Bu amaçla, bu çalışma kapsamında tünel güvenliğine etki eden faktörler, ilgili mevcut standartlar ile detaylı olarak incelenmiş; güncel gelişmelerle birlikte tünel güvenliğini etkileyen faktörler ve literatürde çok rastlanılmayan karayolu tünellerinde doğru davranış biçimlerini gösteren genel yazılı tavsiyeler bir araya getirilerek paylaşılmıştır. Böylece, tünel güvenliği ve işletmesi konusunda paydaş olan araştırmacılar, karar vericiler, planlama ve uygulamacılara altlık olacak bir doküman oluşturulmuştur.

Anahtar Kelimeler: Karayolu tünelleri, tünel işletmesi, tünel güvenliği, sürücü davranışı.

ABSTRACT

Road networks include rugged geographical sections and unfavorable climatic conditions have increased the importance of road tunnels day by day. The advantage of the tunnels in all climatic conditions and the speed, time etc. both in the city and on the intercity Roads, the positive effects on the roads have turned the tunnels into an important complement to the highways. With the development of road tunnel construction technology and the increase in road geometric standards, there has been a serious increase in the number of road tunnels in the world and Turkey. In Turkey, between 2003 and 2018, 274 road tunnels with a total length of 410 km were opened for Transportation. It is also planned to bring 470 tunnels with a total length of 700 km on the road network until 2023. It is anticipated that drivers will start to spend a large part of their driving time in road tunnels such as underground road systems, both urban and intercity, become more common. Therefore, it is an undeniable fact that the importance of enabling drivers to drive comfortably and safely in tunnels will increase day by day. With the rapid increase in the number and kilometers of tunnels, unfortunately, there has been a significant increase in the number of fatal, injury and property damage accidents in road tunnels. It is very important and necessary to consider and evaluate road tunnel safety and the factors affecting this safety considering that accidents with high death rates may occur as a result of these accidents. For this purpose, within the scope of this study, the factors affecting tunnel safety and the relevant existing standards were examined in detail by evaluating with current developments, factors affecting tunnel safety and general written recommendations showing correct behavior in road tunnels. Thus, a document that will be a base for researchers, decision makers, planning and practitioners who are stakeholders in tunnel safety and operation has been created.

Keywords: Road tunnels, tunnel operation, tunnel safety, driver behavior.

1. GİRİŞ

Gelişen ve artan dünya nüfusu, ülke içi ve ülkeler arası ticaret ilişkilerini artırmış, bu da karayolu ağında çok hızlı bir artışa neden olmuştur. Yol ağlarının engebeli coğrafi kesimleri bünyesinde barındırması ve elverişsiz iklim koşullarında yaşanan olumsuzluklar, karayolu tünellerinin önemini gittikçe artırmıştır. Her türlü iklim koşulunda sağladıkları avantaj ve gerek şehir içinde gerekse şehirlerarası yollarda hız, zaman vb. kolaylıkları ile tüneller, karayollarının önemli bir tamamlayıcısı haline gelmiştirler (Koçhan, 2021). Karayolu tünel yapım teknolojisinin gelişmesi ve karayolu geometrik standartlarının artmasıyla birlikte Türkiye'de ve dünyada karayolu tünel sayısında ciddi bir artış meydana gelmiştir. Örneğin Avusturya'da 2004 yılından 2010 yılına kadar karayolu tünel uzunluğu %29,41 oranında artmıştır. Aynı dönemde Fransa'nın %4,10, Almanya'nın %44,24, Yunanistan'ın %213,24, İtalya'nın %31,59 ve Hollanda'nın %18,79 oranında artışa sahip olduğu görülmektedir. İtalya'nın son on yıl içinde tünel uzunluğunun %59,38 oranında artış göstereceği ve yaklaşık 1,3 milyona (metre olarak) ulaşacağı ve Avrupa Birliği (AB) içinde ilk sırada yer alacağı tahmin edilmektedir. Yakın zamanda tünel uzunluklarında Avusturya'nın %39,91, Almanya' nın %72,18, Yunanistan'ının %92,87 ve Fransa' nın ise %42,50 oranında artış göstermesi beklenmektedir (Ntzeremes ve Kirytopoulos 2019). Türkiye'de tüm dünyadaki eğilime benzer şekile hem teknolojik imkânların artması hem de Kuzey-Güney aksında yaşanan gelişmelerden dolayı tünelli geçiş sayısını ve kilometresini şehir içi ve şehirlerarası yol ağında hızla artırmıştır. 2003-2018 yılları arasında, toplam uzunluğu 410 km olan 274 adet karayolu tüneli

ulaşıma açılmıştır. Karayolları Genel Müdürlüğü (KGM) 2019 yılı tünel envanterine göre, Türkiye genelinde 216 adet tek tüplü, 101 adet çift tüplü olmak üzere 356,8 km uzunluğunda toplam 317 adet tünel bulunmaktadır (Koçhan, 2021). 2023 yılına kadar ise karayolu ağı üzerinde toplam uzunluğu 700 km olan 470 adet tünelin, ulaşıma kazandırılması planlanmaktadır (URL-1). Ülkede bölünmüş yollar politikası ve Karadeniz sahil yolu projesiyle ulaşıma kazandırılan birçok tünel, Avrupa Birliği (AB) tünel güvenlik standardına göre yapılmıştır (Koçhan, 2021). Gerek şehir içi gerekse şehirlerarası yeraltı yol sistemleri daha yaygın hale geldikçe, sürücüler sürüş sürelerinin büyük bir bölümünü karayolu tünellerinde geçirmeye başlayacaktırlar. Dolayısı ile sürücülerin tünellerde konforlu ve güvenli bir şekilde taşıt kullanabilmelerini sağlamak giderek daha da önemli hale gelmektedir (Koçhan, 2021).

Tünel sayısının ve kilometresinin hızla artmasıyla, karayolu tünellerinde ölümlü, yaralanmalı ve maddi hasarlı kazalar, daha fazla meydana gelmeye başlamıştır. Yaşanan bu kazalar sonucu, yüksek ölüm oranlı kazaların meydana gelebileceği göz önünde bulundurularak karayolu tünel güvenliğini ve bu güvenliği etkileyen faktörleri ele alıp değerlendirmek gerekmektedir. Türkiye'de KGM'nin tüneller konusunda iki önemli rapor çalışması bulunmaktadır. Bu çalışmalardan ilki, 'Tünel İşletme ve Bakımı Tasarısı' diğeri ise 'Tünellerin Asgari Güvenlik Gereksinimlerine İlişkin Proje Kriterlerin Belirlenmesi' konusunda sunulan rapordur (Ünal, 2015). KGM'nin 2005 tarihli genelgesi, dünya çapında birçok kaynağı referans alarak oluşturulmuştur (Koçhan, 2021). Bu alanda 2015 yılında KGM, resmî gazetede 'Tünel İşletme Yönetmeliği'ni yayımlamıştır (URL-2). AB üyesi ülkelerin ulaşım, telekomünikasyon ve enerji altyapılarını birbirine bağlayacak bir Trans-Avrupa Şebekesinin (Trans-European Network-TEN) geliştirilmesi ile açık ve rekabet edebilir bir pazar sisteminin oluşturulması amaç edinilmiştir. Ulusal ve bölgesel altyapı şebekelerinin birbirlerine bağlanması, karşılıklı işletilebilir hale getirilmesi, kopuk bağlantıların tamamlanması, tıkanıklıkların giderilmesi, adaların ve kara ile kuşatılmış alan bölgelerin merkezi bölgelere bağlanması temel hedefler oalarak açıklanmıştır (URL-3). Avrupa'da tünel güvenliği üzerine yaşanan talihsiz olaylar yeni politikalar geliştirme ihtiyacı doğurmuştur. Bu çalışmalar sonucunda optimum güvenlik kriterleri belirlenerek; içerisinde Türkiye'nin de yer aldığı Trans-Avrupa karayolu tünel güvenliği artırılmaya çalışılmıştır. AB'de yapılan çalışmalarda, ülkelerin benimsedikleri tünel güvenlik standartları farklılık göstermektedir. Bazı Avrupa ülkelerinde tünel güvenliği üzerine oluşturulmuş standartlar bulunmasına karşın, bazı ülkelerde yüzeysel bazı ülkelerde ise hiçbir standart bulunmamaktadır. Avrupa Birliği, tünel güvenliğini artırmak için teknik ve işletim konularında tüm üye ülkelere yardımcı olmayı taahhüt etmiştir. Dolayısı ile Avrupa yol ağı güvenlik gereksinimlerini karşılayacak ortak bir standart ihtiyacı doğmuştur (URL-4).

Mevcut durum tüm dünyada yaygınlaşan tünelli geçişler ile trafik akımında özellikle ağır taşıt trafiğindeki artış, olası kazaların meydana gelme riskini ve trafik güvenliğini daha sık gündeme getirmeye başlamıştır. Türkiye'de diğer ülkelerdeki gibi yüksek ölüm oranlı, karayolu tünel kazaları çok fazla meydana gelmesede ciddi sonuçları olan kazalar mevcuttur (Öneğin 2003 yılında Erzincan'da meydana gelen tünel kazası, 27 ölü) (Çubuk vd., 2007). Dünyada da artan birçok tünel inşası ile birlikte, tünel sistemlerinin uzunluğu ve karmaşıklığı giderek artmıştır (Beard, 2010). Yol Kongrelerinin Daimi Uluslararası Birliği'nin (PIARC, 1995) yaptığı çalışmaya göre, birçok ülkede sürücü belgesi alma sınavlarında tünel güvenliğine yer verilmediği yine birçok ülkede tünellerde doğru davranış biçimlerini gösteren genel yazılı tavsiyelerin bulunmadığı açıklanmıştır. Ayrıca ağır yük taşıyan taşıtlar açısından trafik kontrolü ve yaptırımlar konusunda hukuki düzenlemelerin hemen hemen her ülkede bulunduğu

ancak sürücü eğitimi ve sınavlarında tünellerde doğru davranışlara ilişkin düzenlemelerin olmadığı belirlenmiştir (Sinoplu, 2007). Bu çalışma ile son yıllarda tüm dünyada artan tünelli geçişler nedeniyle sürücülerin daha çok deneyimlediği tünelli geçişlerde olması gereken sürücü davranışları kısaca belirtilerek; bu konudaki boşluk doldurulmaya çalışılacaktır. Böylece hem sürücü güvenliği hem de oluşacak bir kazada tünel altyapısında meydana gelecek yüksek maliyetli hasarlar hakkında farkındalık oluşturulması hedeflenmektedir. Bu amaçla çalışmada tünel kazaları, kaza yönetimi ve tünel güvenliğini etkileyen faktörler detaylı olarak irdelenmiştir.

2. TÜNEL KAZALARI

Kar veya gizli buzlanma, şiddetli yağmur, sis, rüzgâr veya görüşü etkileyecek güneş ışığı gibi tehlikeli iklim etkilerinin, tünellerde çok sık görülmemesi kaza riskini açık yollara göre azaltmaktadır (Haack, 2002). Ancak özellikle tünelde yangın olması durumunda sonuçlar son derece yıkıcı ve tehlikeli olabilir, çünkü kapalı alan ısı ve dumanın dağılmasını engeller (Mashimo, 2002). Ayrıca, yangınla mücadele ve kurtarma operasyonu için erişim sınırlamaları ve tünel kullanıcıları için kapalı bir alandan güvenli kaçış yolunun sağlanmasındaki zorluklar, kaza şiddetini ciddi şekilde artırmaktadır (Mashimo, 2002).

Karayolu tünellerinde, güvenliği sağlamak için iki önemli konu üzerinde durulur. İlki; kaza olasılığının azaltılması için yapılan çalışmalar ve ikincisi ise meydana gelen kaza ve yangınların sonuçlarını azaltmak için yapılan çalışmalardır (Koçhan, 2021). Birincisinin kapsamını; tünel tasarımı, trafik düzenlemeleri, tünele kurulan havalandırma sistemleri, aydınlatma sistemleri, iç kaplama ve bakım oluşturur. İkincisini ise; karayolu tünellerine kurulan acil durum tesisleri ve yangına dayanıklı tünel yapıları oluşturmaktadır (Mashimo, 2002). Dolayısı ile kaza riskini azaltmak için tünel tasarımlarının, trafik düzenlemelerinin ve uygun tesislerin (havalandırma, aydınlatma vb.) çok özenli şekilde planlanması, yangın vb. durumlar için ise en uygun acil durum tesislerinin ve yangına dayanıklı korunma-kaçma yapılarının tasarlanması gerekir (Mashimo, 2002). Şekil 1'de tünel güvenlik ekipmanları ile donatılmış örnek bir tünel görseli verilmiştir.
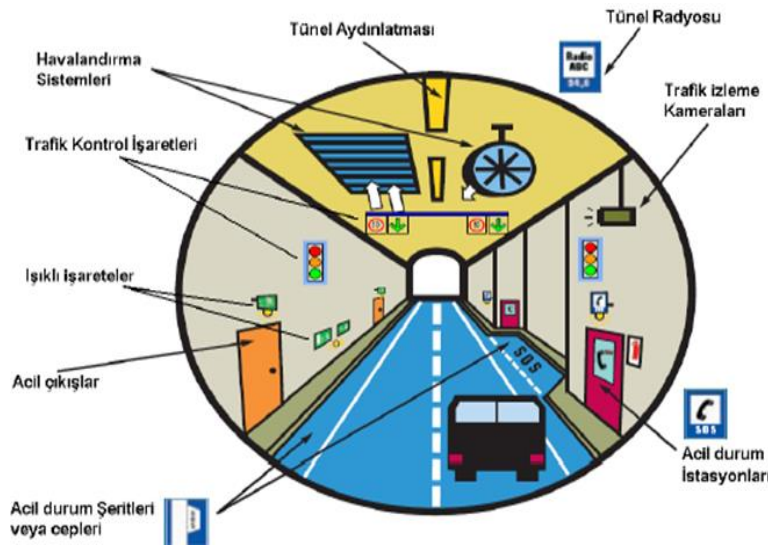
Şekil 1. Karayolu tünellerinde kullanılan güvenlik sistemleri ve ekipmanlara ait örnek görsel (URL-5).

AB standartlarında trafik yönetim ekipmanları ile ilgili olarak tünel kapatma ekipmanları için tavsiyelere, işaret ve sinyallere yer verilmektedir. Sinyaller aracılığıyla, tünel kullanıcılarına tıkanıklık,

arıza, kaza, yangın vb. diğer tehlikeler hakkında bilgilendirme yapılarak, güvenliği sağlayacak ve/veya artırcak yönlendirilmeler sağlanmaktadır (Koçhan, 2021). Bu kapsamda trafik yönetiminde kullanılan ekipmanlar genel olarak üç sınıfta gruplandırılmaktadır. Bunlar;

- *Minimum Donanım*; bir olay anında tünel girişi kapatılarak sağlanabilir,
- *Temel Donanım*; bir olay anında tüneli kapatmak ve tünele yaklaşma hızını azaltarak sağlanabilir,
- *Genişletilmiş Donanım*; çeşitli ekipmanlarla, tünel kapatma, şerit kapatma, duruma bağlı hız azaltma, genel olarak olaylara karşı uyarı, tıkanıklık, inşaat işleri, iki yönlü trafik ve zorunluluk halinde bir tüpte tek yönlü trafiği çift yönlü trafik haline dönüştürme gibi olanaklar işletimciye sunulur (URL-6).

3. KAZA YÖNETİMİ VE TÜNEL GÜVENLİĞİ

Tünel güvenliğinin teşkil edilmesinde kaza olasılığı ve şiddeti göz önüne alınmalıdır. Bu nedenle; proje ve inşa aşamasında kesit özellikleri, yatay-düşey yönde ve erişim yolları üzerinde önemle durulması gerekmektedir (URL-7; 2004/54/EC, 2009). Bu kapsamda karayolu tünelinde yaşanacak acil olaylar karşısında aşağıdaki adımların takip edilmesi tünel yönetimi ve güvenliği açısından oldukça önemlidir;

- Karayolu tünellerinde yaşanabilecek acil durum olaylarında ilgili tünel trafiğe kapatılmalıdır. Yaşanan acil bir olay karşısında tünel iç ve dış trafik akımının zaman kaybetmeksizin durdurulması gerekmektedir,
- Kullanıcıları uyarmak için gerekli ekipmanlar tünel içerisinde gerekli olduğu takdirde değişken mesaj işaretleri ve mekanik bariyerler koordineli olarak kullanılmalıdır,
- Kısıtlanan trafik akımı iç olaydan etkilenmeyen taşıtların tüneli terk edecek biçimde yönlendirilmesi yapılmalıdır,
- Karayolu tünellerinde acil bir olayının yaşanması halinde acil hizmetlerin erişimi olabildiğince hızlı gerçekleşmelidir,
- Tüm tünellerde yaşanabilecek kaza, yangın, duran araç vb. durumlarının tespit edilebilmesi için bir kontrol merkezinde izleme sistemleri teşkil edilmelidir,
- Çift tüplü tünelde bir olay yaşanması durumunda trafik durdurulmalı ve her iki tüpte de aktarılmalıdır. Böylece kazasız tüp, kaçış ve kurtarma yolu olarak kullanılabilir,
- Yaşanan olayların veya periyodik tatbikatların gerçekleşme süreleri ölçülebilmelidir (2004/54/EC, 2009; Teke, 2012),
- Karayolu tünellerinde meydana gelen kaza ve yangınlar, tünelden sorumlu emniyet yetkilileri tarafından kayıt altına alınmalı ve değerlendirmeler yapılarak yetkili makamlara sunulmalıdır (2004/54/EC, 2009; Teke, 2012).

3.1. Tünel İçerisinde Araçlar Arasındaki Mesafe, Hız Ve Sollamanın Düzenlenmesi

Karayolu tünellerinde taşıt hız ve takip mesafeleri güvenlik açısından oldukça önemlidir ve takip altına alınmalıdır (Koçhan, 2021). Güvenlik nedeniyle yol kullanıcıları normal şartlar altında ve bir arıza, kaza, tıkanıklık veya bir tünelde yangın olması durumunda önlerindeki araçla yeterli mesafeyi korumalıdır. Trafik yönetmelikleri yeterli mesafenin korunmasını vurgulamaktadır. Böylece öndeki aracın aniden fren yapması durumunda takipte olan araç için güvenli duruş mesafesi sağlanmış olacaktır. Bu mesafe, araçlar tünel içerisinde hareket halinde iken genellikle 20 ile 50 metre arası öngörülmektedir. Tıkanıklık

vb. sebeplerden ötürü trafik dursa bile, araçlar arası gerekli mesafe her zaman bir tünelde korunmalıdır (TRANS/AC.7/9, 2001).

- Hız ve takip mesafesi limitleri, tünel kullanıcılarına bildirilip, kurallara uyulmaması durumunda gerekli yaptırımlar uygulanmalıdır,
- Hız limitlerinde seyreden bir aracın iki saniyede alabileceği yol takip mesafesinde esas alınmalıdır, ağır tonajlı araçlarda bu mesafe iki kat üzeri olarak kabul edilmelidir,
- Herhangi bir sebeple trafiğin tünel içinde sıkışması veya tamamen durması durumunda takip mesafesinin 5 m' den az olmaması sağlanmalıdır (2004/54/EC, 2009; Teke, 2012).

Mevcut trafik düzenlemelerine göre birçok yolda kamyonlar için azami bir hız sınırı bulunmaktadır. Bu sınır, tünellerde sistematik olarak 60 km/s'lik hıza düşürülecek olsa (her yönde sadece bir şeridi olan bir tünelde) tüm araçlar hızlarını yavaş kamyonun hızına ayarlamak zorunda kalacaklar ve bu da tıkanıklık riskini artıracaktır. Dolayısıyla tünellerde kamyonlar için hız sınırlaması çok uygun görülmemektedir. Ancak maksimum kamyon hızı sınırlaması yapılacaksa, bu hız 60 km/s olarak önerilmektedir (TRANS/AC.7/9, 2001).

Her yönde sadece bir şeridin olduğu tünellerde tüm araçlar için sollama zaten yasaklanmıştır. Bazı durumlarda ise kamyonların her yönde birden fazla şeridi olan tünellerde de sollamalarını yasaklamak mümkün olmalıdır. Kamyonlar için sollama yasağı özellikle %3'ün üzerinde bir eğime sahip tünellerde yol güvenliğinde önemli bir iyileşmeye yol açabilecektir. Bu önlem, gerekli tüm trafik ve değişken mesaj işaretlerini uygun yerlere yerleştirerek gerçekleştirilmelidir (TRANS/AC.7/9, 2001).

3.2. Tehlikeli Madde Taşımacılığı İçin Düzenlemeler Yapılması

Tehlikeli maddelerin taşınmasını düzenleyen düzenlemeler uluslararası düzeyde netleştirilmelidir. Ekonomik İş Birliği ve Kalkınma Teşkilatı (OECD) ve PIARC bu doğrultuda hazırladıkları öneriyi sunmuşlardır (TRANS/AC.7/9, 2001). Bu öneriye göre;

- Uluslararası düzeyde kabul edilen ve tehlikeli malların karayolu tünellerinde taşınmasına izin verilmesini düzenlemek için kullanılması gereken beş sınıfa ayrılmış tehlikeli kargo grubu oluşturulmalı,
- Tehlikeli maddelerin tamamının veya bir kısmının taşınmasının kararı alınmadan önce tünel dâhil hem tüm güzergâh hem de alternatif güzergâhlar dikkate alınarak nicel bir risk analizi yapılmalıdır. Bu analiz sonucunda göre de bir karar destek modelinin uygulanması önerilmelidir (TRANS/AC.7/9, 2001).

3.3. Tünel İçerisinde Uyulması Gereken Kuralların Belirlenmesi

Genel olarak karayolunun açık kısımlarında uyulması gereken kurallar karayolu tünellerinde de uyulması gereken kurallardır. Bu doğrultuda tünel içerisinde uyulması gereken genel kurallar aşağıdaki gibi özetlenebilmektedir:

- Güvenli mesafeyi korumak,
- Hız limitlerini dikkate almak,
- Arıza ve tıkanıklık durumlarında diğer sürücüleri uyarmak,
- Hatalı sollama ve dikkat edilmesi gereken kurallar gibidir (Sinoplu, 2007).

Karayolu tünellerinde bu genel kuralların yanı sıra ayrıca;

- Sürüş yönünde tek şerit mevcut ise sollama yasaktır,
- Tünel sorumlusu tarafından talep olmadığı sürece, dönüş yapılmasına izin verilmemelidir,
- Tünel içerisinde aydınlatma gözetmeksizin girişlerde farlar aktif hale getirilmelidir,
- Acil durumlar haricinde tünel içinde durmak yasaktır (Sinoplu, 2007), acil durumlarda araç durdurulduğunda motor kapatılmalıdır (Haack, 2002).

Tünel içerisinde araçla sürüş halinde iken trafiğin sıkışması, trafik kazası veya meydana gelen bir yangın durumunda sürücüler için belirlenmiş bazı doğru davranış biçimleri ise aşağıda kısaca özetlenmiştir (Koçhan, 2021; Sinoplu, 2007; Haack, 2002).

3.3.1. Karayolu Tünelinden Geçiş Anında Uyulması Gereken Davranışlar

- Farlar aktif hale getirilmelidir,
- Görüş kısıtlılığı yaşamamak için güneş gözlüğü takılmamalıdır,
- Yönlendirici ve uyarıcı trafik işaret ve sinyalizasyonlarına uyulmalıdır,
- Radyo açılarak belirtilen frekans kanalı ayarlanmalıdır,
- Hız kısıtlamasına uyulduğundan emin olunulmalıdır,
- Telefon ile konuşulmamalıdır,
- Takip edilen araçla aradaki mesafe güvenli duruş mesafesi olarak korunmalıdır,
- İki yönlü trafiğe sahip karayolu tünellerinde, kesinlikle sollama yapılmamalı ve mümkün oldukça sağa doğru sürüş yapılmalıdır (Sinoplu, 2007), özellikle düz ve uzun tünellerde artan dikkat ile sürüş yapılmalıdır (Haack, 2002).

3.3.2. Karayolu Tüneli İçerisinde Trafik Sıkışıklığı Yaşanması Halinde Uyulması Gereken Davranışlar

- Uyarıcı ışıklar açılmalıdır,
- Trafiğin aşırı yavaşlaması veya tamamen durması halinde önerilen takip mesafesi korunmalıdır (tampon tampona durmayın),
- Trafiğin durduğu durumlarda araç motoru kapalı tutulmalıdır,
- Araçtan dışarı çıkılmamalı,
- Radyo kanalı ile yapılan bilgilendirmeler dikkate alınmalıdır,
- Tünel işletim sorumlusu veya sinyalizasyon araçları ile iletilen talimatlar uygulanmalıdır (Sinoplu, 2007),
- Araç kesinlikle geldiği yöne döndürülmemelidir (Haack, 2002).

3.3.3. Karayolu Tünelinde Taşıtın Arıza Veya Kaza Yapması Halinde Uyulması Gereken Davranışlar

- Mümkün olduğunca araç sağa doğru sürülmeli, sığınma cebi mevcutsa sığınma cebine yönlenmeli aksi takdirde acil yaya yollarına doğru araç sürülmelidir,
- Uyarıcı ışıklar açılmalıdır,
- Araç motoru kapatılmalıdır,
- Araç emniyete alınarak (ikaz flaşörü, ikaz üçgeni) uzaklaşılmalıdır,
- Kaza sonucu yaralı insan varsa ve mümkünse yaralılara yardım edilmelidir,
- Acil yardım istasyonlarına ulaşılmalı ve yardım talebinde bulunulmalıdır (Haack, 2002).

3.3.4. Karayolu Tüneli İçerisinde Kullanılan Taşıtta Yangın Çıkması Halinde Yapılması Gerekenler

- Öndeki araçla mesafe korunmalı (tampon tampona sürüş olmamalı),
- Kuyruktaki herkes arka 4'lü uyarı flaşörünü açmalı, derhal arabadan dışarı çıkılmalı ancak arabanın kapısı kilitlenmemelidir,
- Duman yönünden aksi yöne doğru uzaklaşarak kaçılmalı,
- Asla araç geri döndürülmemeli,
- Yangının şiddeti düşük ve mümkünse araç tünel dışına doğru sürülmeli,
- Yangın şiddetinin düşük olmadığı durumlarda araç mümkünse sığınma cebine, değilse kenara çekilip motor durdurulmalıdır. Araç veya tünel içinden temin edilen yangın söndürücü ile yangına müdahale edilmelidir. Yangının söndürülmesi mümkün gözükmüyorsa acil çıkış güzergâhına yönenilmelidir. Acil durum istasyonlarından yardım talebinde bulunulmalıdır (Sinoplu, 2007).

3.3.5. Karayolu Tünelinde Yangın Meydana Gelmesi Durumunda Yapılması Gerekenler

- Uyarıcı ışıklar açılmalıdır,
- Araç kenara çekilmeli ve motor kapatılmalıdır,
- Araç bırakılarak uzaklaşılmalıdır,
- Kaza sonucu yaralı insan varsa ve mümkünse yaralılara yardım edilmelidir,
- Araç ekipmanında bulunan veya tünelden temin edilen söndürücü ile yangına müdahale edilmelidir,
- Yangının sönmesi mümkün gözükmüyor ise zaman kaybetmeksizin acil çıkış güzergâhına doğru harekete geçilmelidir (Sinoplu, 2007).

4. SONUÇ VE ÖNERİLER

Son yıllarda artan kentleşme, nüfus, uluslararası ticaret ve araç teknolojisinde yaşanan gelişmelerle insanlar daha hareketli hale gelmeye başlamıştır. Artan hareketlilikle beraber insanlar daha hızlı daha konforlu sürüşler yapmak istemektedir. Tünel inşa teknolojilerinde yakalanan hız ve kolaylıklar da bu amaçla her ülkede kara ulaşımının, daha hızlı ve konforlu olması için tünelli geçişlerin sık tercih edilen bir uygulama olmasına neden olmuştur. Özellikle her türlü iklim şartlarında sağladıkları avantajlar nedeniyle Türkiye'de, hızla tamamlanmaya çalışılan Kuzey-Güney aksında çok sayıda tünelli geçiş ile yol standartları artırılmıştır. Böylece özellikle dağlık ve engebeli bölgelerin zorlu coğrafyasına rağmen 12 ay kesintisiz ve güvenli sürüşe imkân doğmuştur.

Ancak tünel sayısının ve kilometresinin artışıyla beraber karayolu tünellerinde ölümlü, yaralanmalı ve maddi hasarlı kazalar daha fazla meydana gelmeye başlamıştır. Açık yollara nazaran daha az kaza meydana gelmesine rağmen, tünellerde gerçekleşen kazaların açık yollardakilerine kıyasla daha şiddetli ve ölüm oranlarının yüksek olduğu bilinmektedir. Avrupa'da yaşanan çok ölümlü tünel kazaları sonucu AB tünel güvenliğine özel bir önem vermiş ve Trans-Avrupa Şebekesi dâhilindeki tüm tünellerde uygulanmak üzere standart ve yönetmelikler yayımlamıştır. Bu uluslararası yol ağının önemli bir kısmı, ülke sınırları içerisinde kaldığı için Türkiye'de yapılan tüneller bu yönetmelik ve şartnamelere uygun olarak yapılmaktadır.

Tünel işletim ve yönetiminde güvenlik ekipmanları ve sürücü davranışları çok önemlidir. Bu çalışmada bu amaçla bir karayolu tünelinde olası bir kaza anında vakit kaybetmeden yapılması gerekenler kısaca

açıklanmıştır. Özellikle kazanın olduğu tünelin derhal trafiğe kapatılması ve akımın derhal durdurulması hayati önem taşımaktadır. Doğru şekilde yapılacak bir trafik akımının durdurulması için ilgili ekipmanlar, konunun uzmanı/uzmanları tarafından uygun ve gerekli her yere yerleştirilmelidir. Böylelikle hem tünel içi güvenlik sağlanmış hem de tünele yaklaşım kolu üzerinde başka bir istenmeyen olaya fırsat verilmemiş olacaktır. Tünel içerisinde açık yollardaki kurallar geçerli olmakla beraber takip mesafesi, hız ve sollama manevraları için ayrıca dikkat edilmeli ve ilgili kurallara uyulması hayati önem taşımaktadır. Özellikle akaryakıt, kimyasal ve tıbbi atık gibi tehlikeli maddelerin taşımacılığında hangi tünellerin kullanılıp kullanılmayacağı, ilgili yönetmeliklerle belirlenmeli ve öncesinde her tünel için risk analizi yapılmalıdır. Tünel içerisinde kaza anında veya kazadan sonra yapılması gerekenler, her sürücü tarafından bilinmeli bunun için de özellikle sürücü belgesi alma eğitimlerinde, teorik ve uygulamalı sınavlarda tünel güvenliği konusu dikkatlice ele alınmalıdır. Tünel güvenliği ve güvenli sürüş için literatürde güncel gelişmeler ışığında hazırlanmış yazılı tavsiyelerin olduğu bir dökümana rastlanmadığı için çalışmanın bu anlamda önemli bir katkı sunacağı düşünülmektedir.

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LAYOUT OF RECONSTRUCTION ISLANDS WITH CONVEX TECHNIQUE IN LOCAL DEVELOPMENT PLANS
MEVZİ İMAR PLANLARINDA İMAR ADALARININ KONVEKS TEKNİK İLE YERLEŞİMİ

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ABSTRACT

Local zoning plan is one of the types of implementation zoning plan. Implementation zoning plans are 1/1000 scaled plans, with more detailed representations. The local zoning plan is a unique local plan created for the settlement of areas such as production facilities outside the existing zoning and adjacent area boundaries. The aim of our study is to examine how the zoning islands can be placed in the area determined in this way with convex area closures as a method, while determining the island locations related to the precedent for which building or facility will be placed in the local zoning plans, or which height coefficients will be created. . In particular, road width and connections and how to place the islands in the most appropriate way were discussed.

Keywords: Site Zoning Plan, Reconstruction Island, Konveks Technical

Özet

Mevzi imar planı uygulama imar planı türlerinden birisidir. Uygulama imar planları 1/1000 ölçekli planlar olup, detay gösterimleri daha fazladır. Mevzi imar planı mevcut imar ve mücavir alan sınırları dışarısında özellikle üretim tesisleri gibi alanların yerleşim için meydan getirilen kendine has lokal plandır. Çalışmamızdaki amaç, mevzi imar planları içerisinde hangi amaçlı bina ya da tesis yerleştirilecekse emsal ya da hangi yükseklik katsayılarının meydana getirileceği ile ilgili ada yerleri tayin edilirken yöntem olarak konveks alan kapatmalar ile sınırları bu şekilde belirlenen alan içerisine nasıl imar adalarının yerleştirilebileceği irdelenmeye çalışıldı. Özellikle yol genişliği ve bağlantılar ile adaların en uygun nasıl yerleştirileceği irdelendi.

Anahtar Kelimeler: Mevzi İmar Planı, İmar Adası, Konveks Teknik

1. Introduction

Considering the conditions of the region and the general characteristics of the planning area, the purpose and need of use of the building, accessibility, sustainability and its impact on the environment, in accordance with the principles and principles of the implementation zoning plan, master zoning plan; building blocks related to construction, their uses, building order, building height, floor area coefficient, floor area floor number or precedent, building approach distance, front facade line, subdivision line, step line, island separation line, vehicle, pedestrian and bicycle paths, transportation relations, parks, squares, urban, social and technical infrastructure areas, when necessary; A cadastral site, if any, showing in detail the decisions regarding the construction and implementation such as parcel sizes, parcel front and depth, rear facade line, road level and the number of floors below this level, the number of independent sections, the implementation stages that will be the basis for the zoning implementation programs required for implementation, and other information. The situation is described in the form of a plan prepared as a whole with plan notes and detailed report on the approved maps at 1/1.000 scale (Yılmaz, 2021). In the regulation, it is seen that there are other plan definitions as well. These include conservation plan, environmental plan, spatial strategy plan, integrated coastal areas plan, action plan, transportation master plan and long-term development plan. However, although these plans are adjacent to the concept of a zoning plan, they do not fall within the scope of the aforementioned concept, except for the

conservation zoning plan, which is a special-purpose zoning plan type. Therefore, it should be noted that not every plan mentioned in the legislation in this regard, as well as in the zoning legislation, corresponds to the concept of a zoning plan, even if it is related. In this respect, taking into account that the concept, which is only expressed with the term "zoning plan" in the current legislation on zoning planning and consisting of master zoning plan and implementation zoning plan types/stages, is included in the scope of our thesis, it is determined by keeping a projection to the positive law appearance of this concept; As a result, by exemplary with the basic legislation provisions on the subject, it is determined that the concept of zoning plan is not defined independently in our current legislation, but only the definitions of master and implementation zoning plan concepts, which are the components of the concept, mainly focusing only on physical qualities (Yılmaz, 2021).

The distinctive features of the strategic planning approach are as follows; being both long-term and short-term for action, taking into account the opportunities and threats in the external environment and the strong and weak features in the internal environment, political, economic, social, cultural power levels, uncertainties. , creating strategies in line with existing and potential competitors, etc. are features (Karaca, 2022). This approach emphasizes how the planning process will be organized. Planning is seen as an interactive, communicative activity (public sector, private sector, different interest groups, different experts, non-governmental organizations) in which horizontal relations are established. Accordingly, the cooperation of stakeholders; It is emphasized that planning should include all stages of decision-making, implementation, monitoring-evaluation (Gedikli, 2012; Karaca, 2022). In general terms, planning is the actions and documents that determine the order and methods to be followed in order to achieve a determined goal. The purpose of planning activities with the Zoning Law; to ensure that settlements are built in accordance with science, health and environmental conditions (Çubukçu, 2022).

2.Material and Method

The theory of inequalities is in a process of continuous development and inequalities have become very effective and powerful tools for studying a wide variety of problems in various branches of mathematics. The theory of inequalities has been recognized as one of the central areas of mathematical analysis in the last century and has become a rapidly growing discipline with increasing applications in many scientific fields. This growth led to the emergence of the theory of inequalities as an independent field of mathematical analysis. Over the past decade, rapid development in the theory of inequalities has yielded unexpected results and provided new and simple evidence for current results. It is generally accepted that some special inequalities are a useful and important tool in the development of different branches of mathematics. In recent years, this subject has attracted great interest from many mathematicians and many new results have been obtained in the literature (Pachpatte, 2005;Demirel, 2019).
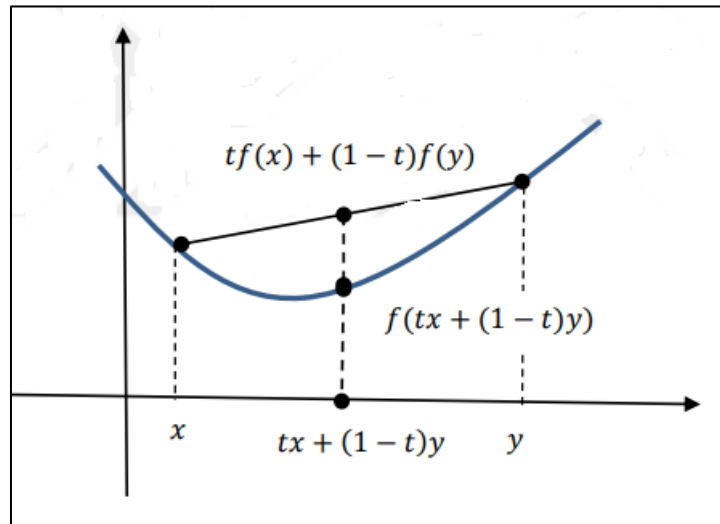
Figure 1. Convex Functions (Toigombaeva, 2021).

A strong convex function always has a local minimum. Therefore, it is always important in processes such as gradual reduction or gradient. Gradient descent in optimization is a popular method in machine learning. Strong convex does not require the function to be differentiable, and the gradient is replaced by a sub-gradient when it is not smooth. When analyzing optimization algorithms, it is sometimes easier to work with strong convex functions that generalize the definition of convexity. Strong convexity is a somewhat symmetrical concept. Strong convexity is part of the concept of convexity, which allows for better lower bounds for convex functions. With the use of lower gradients, a quadratic lower bound will be formed instead of a linear lower bound (Toigombaeva, 2021).
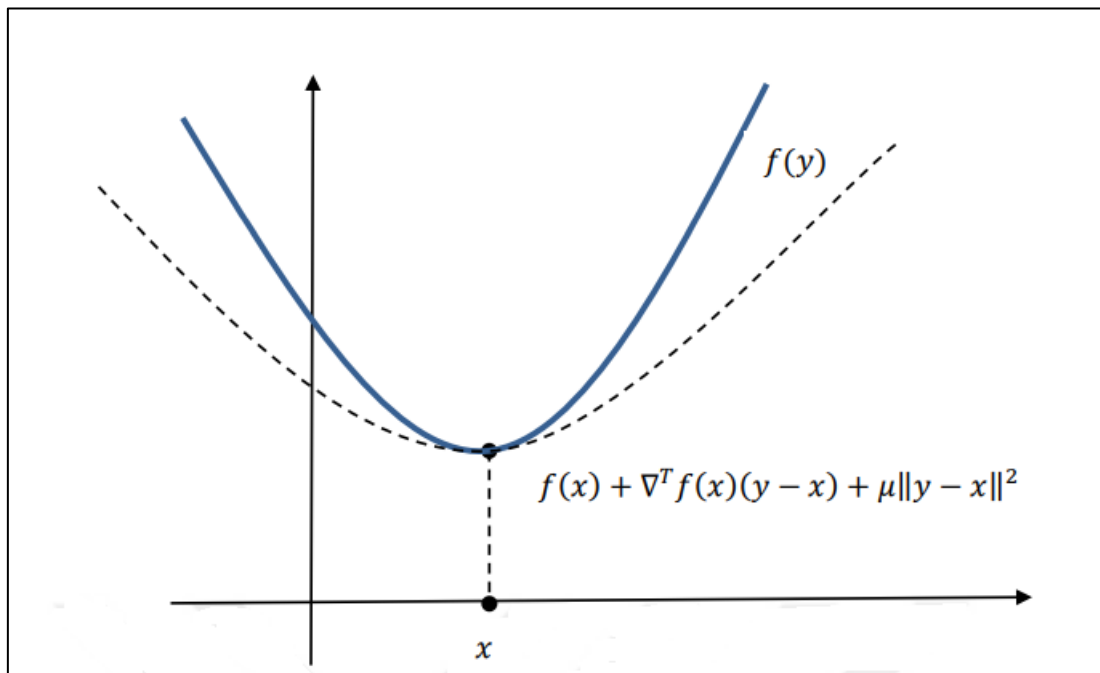
Figure 2. Strong Convex Functions (Toigombaeva, 2021).

Here we show that the strong convex function has a quadratic lower bound. This is reminiscent of the case where the Taylor formula is $n = 2$. This indicates that the strongly convex function is strictly convex. Because a quadratic lower bound growth is definitely greater than linear growth (Toigombaeva, 2021).
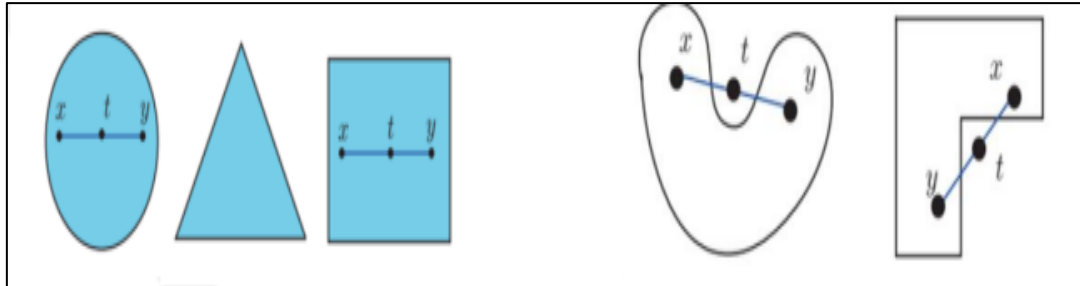
Figure 3. Convex and Concave Cluster (Gülsu, 2022).

Geometrically, the set B is a line segment with endpoints x and y. In this case, intuitively, the convex set is the set that is not empty and contains the line segment connecting its two points Bayraktar, 2000; Gulsu, 2022).

3. Findings and Discussion

Local zoning plan is only one of the 1/1000 scaled implementation zoning plan types. The most important difference that distinguishes the local zoning plan from revision and addition is that it has no connection with the existing zoning plan. Local zoning plans mostly mean the planning of the areas where the facilities will be built. In other words, it is the local-based planning of all kinds of non-residential areas located far from the city center.
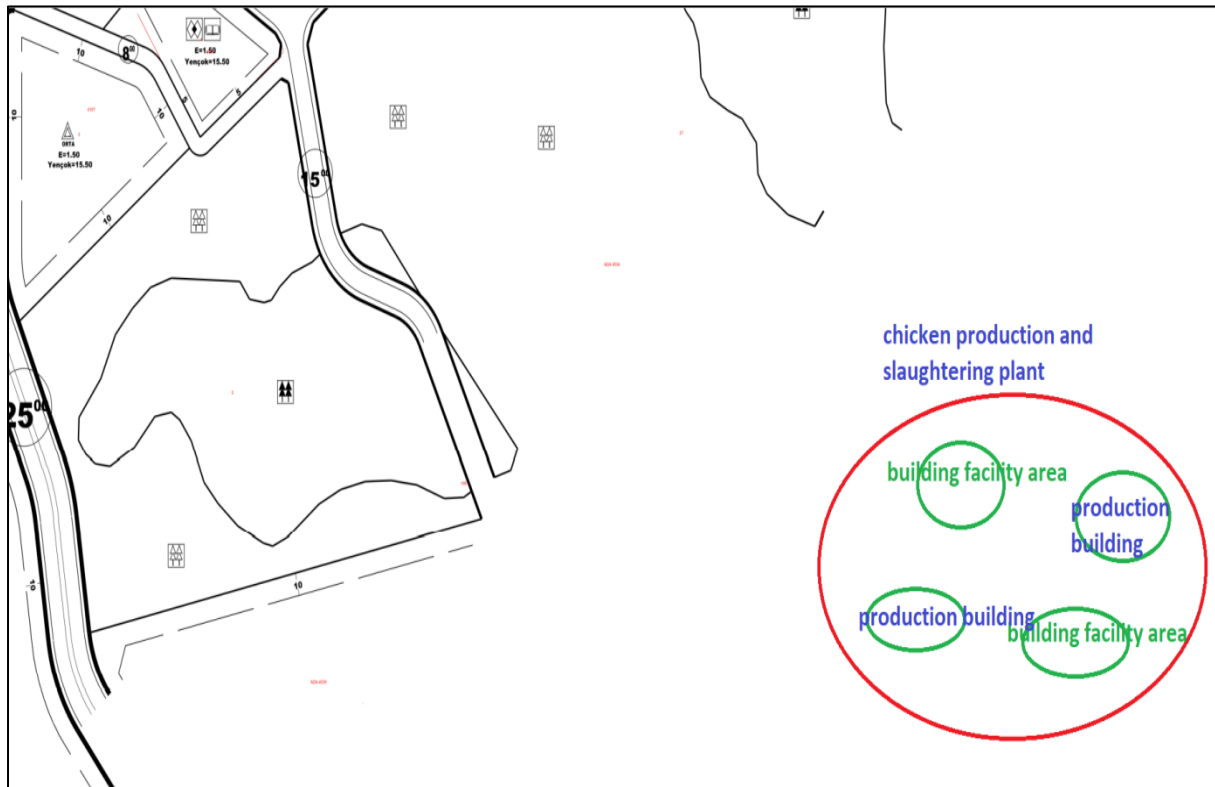
Figure 4. Image of Chicken Production and Slaughter Farm Site Zoning Plan

In Figure 4, the construction of the site zoning plan for the settlement of the buildings in the area determined for the purpose of establishing a chicken production and slaughter farm in the area located in the adjacent area close to the zoning boundaries is shown. While determining this area here, the building facilities were passed circularly with the convex closure method in the light of the road network.
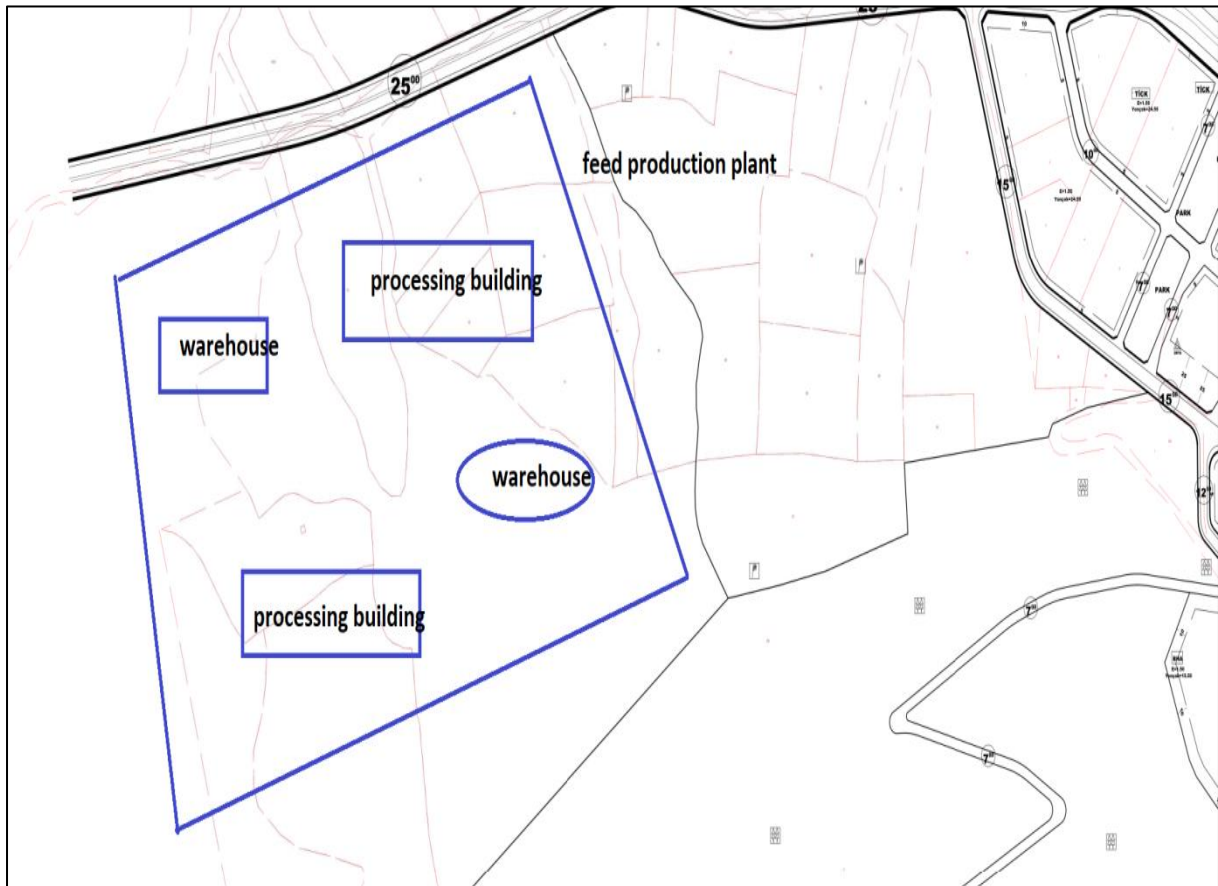
Figure 5. Livestock Production Farm Site Zoning Plan View

In Figure 5., a location zoning plan was made in the region announced for the settlement of warehouse and production buildings in a region with cadastral bases. Again, in a convex way, the y and x coordinates were determined in the local system, and the location zoning plan was determined by designating it as a circle at some points and as a rectangle at some points.
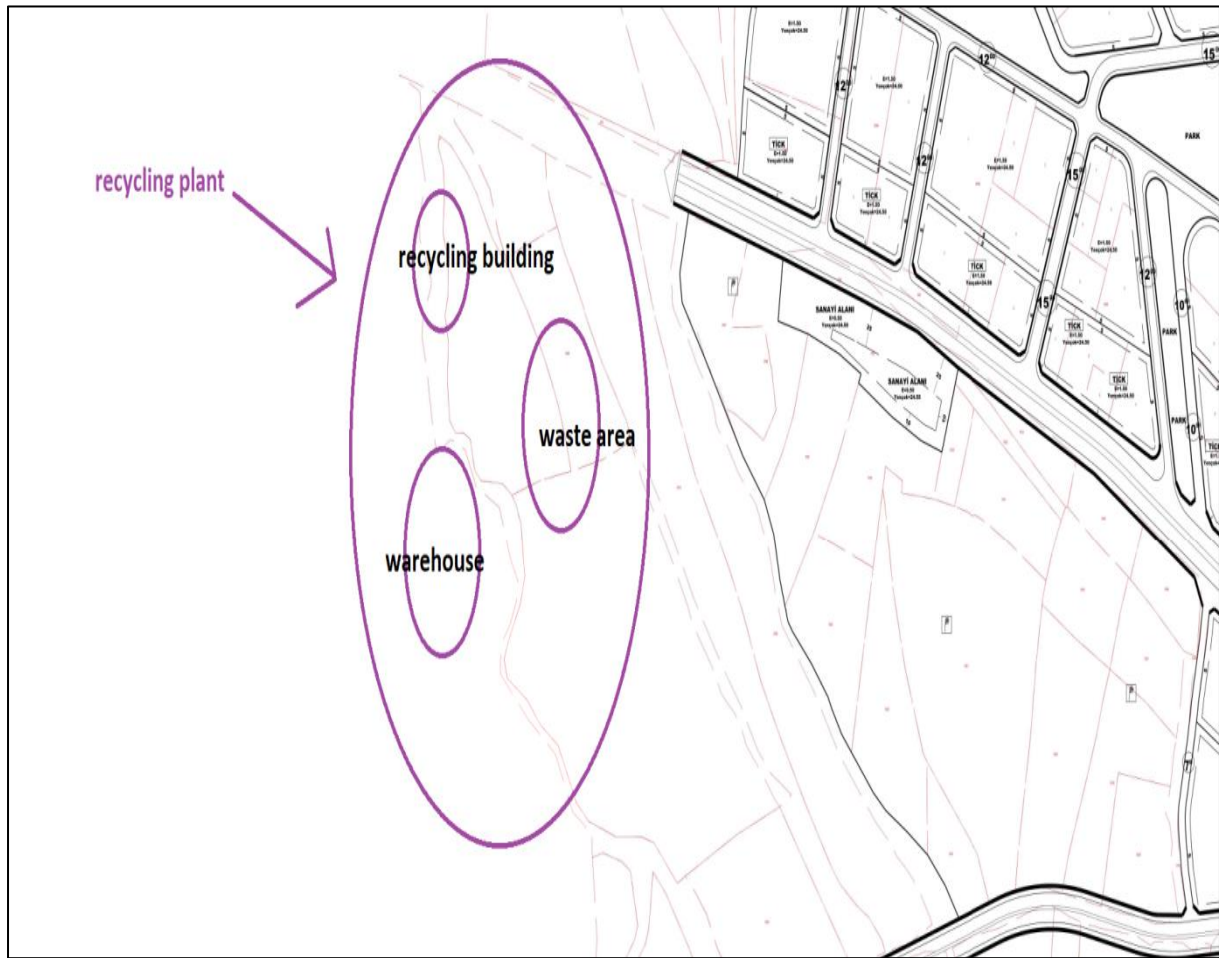
Figure 6. Recycling Facility Zoning Plan Image

In Figure 6, a 1000 scale local zoning plan is created for the establishment of recycling buildings and the creation of garbage collection areas in the region announced within the boundaries of the adjacent area, outside the zoning boundaries, in the process of recycling waste garbage.
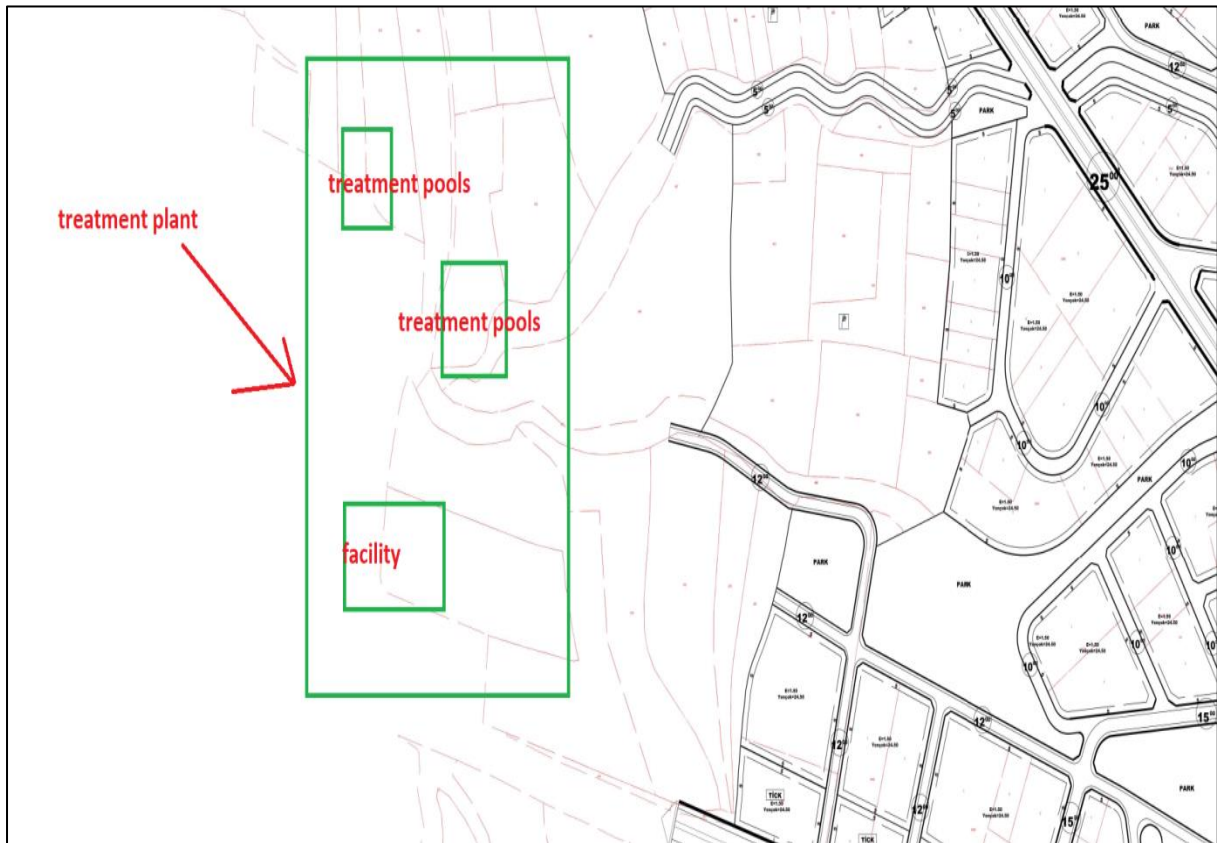
Figure 7. View of the Site Zoning Plan of the Treatment Plant Area

In Figure 7., a local zoning plan was made in order to have the treatment pools, buildings and pump facilities in a certain region by creating the collection point of the sewer lines of the city in the area declared as a cadastral base in an area far from the boundaries of the zoning plan.
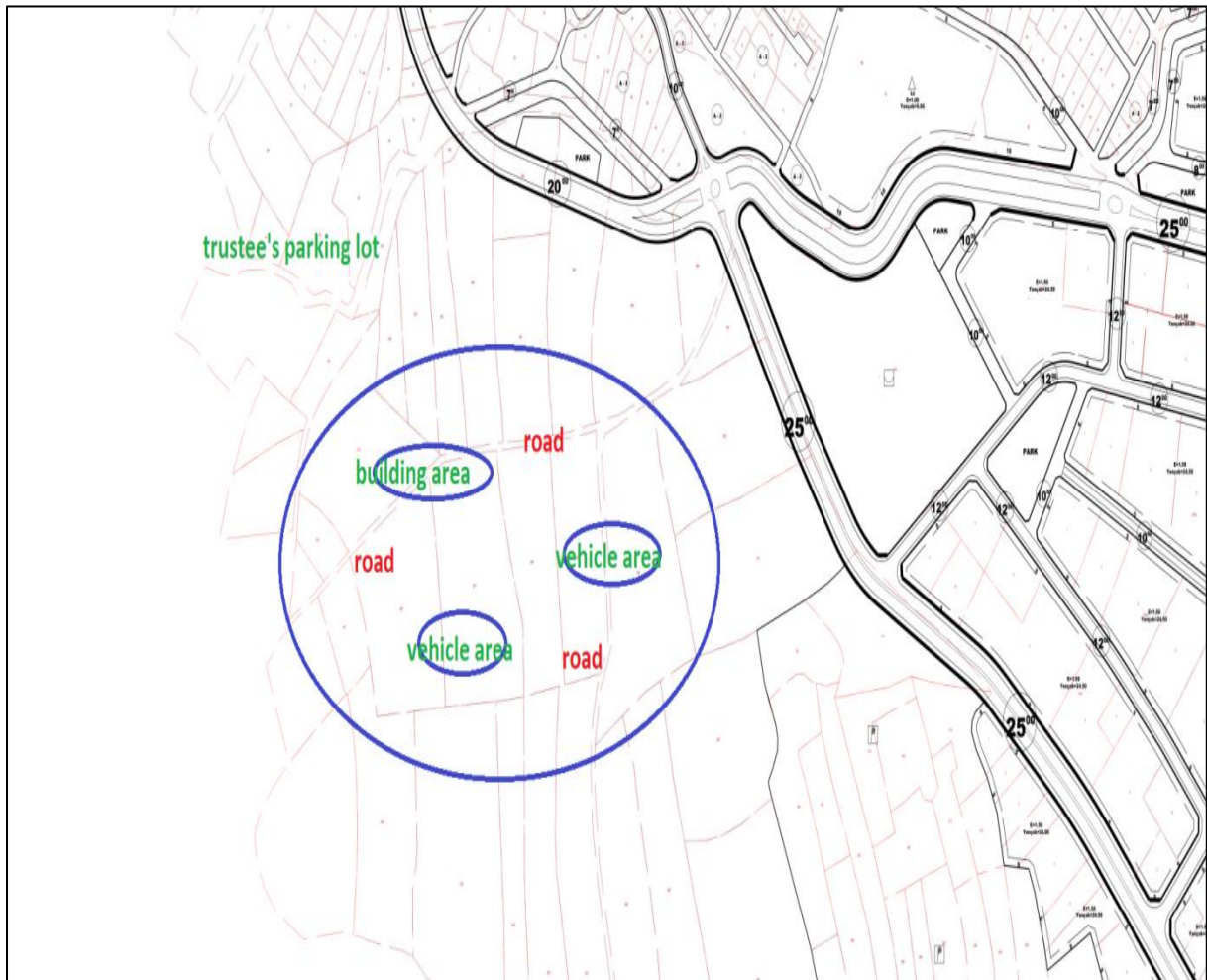
Figure 8. Trustee Car Park Formation Site Zoning Plan

In Figure 8., the zoning plan will be in the form of financial lands, especially on the cadastral bases, by determining an area outside the zoning limits of the trustee's car park, the area where the scrapped end-of-life vehicles are collected.
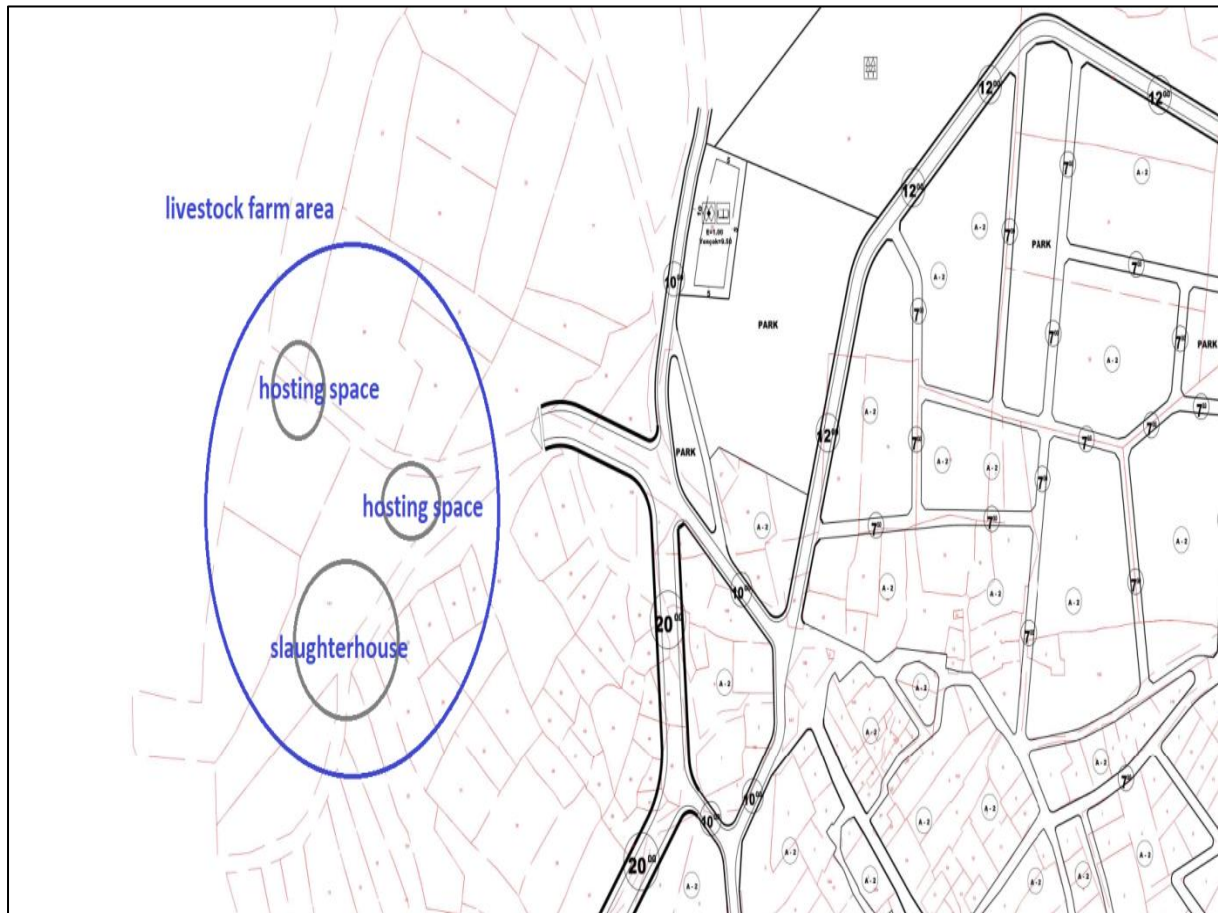
Figure 9. Animal Production and Slaughter Facility Site Zoning Plan Display

In Figure 9., for the purpose of the formation of the cattle production and slaughter facility, the convex planning in the non-zoning area with cadastral bases is called the location zoning plan. It is announced with a certain region and the production facility road networks and the desired building constructions are created together.

Figure 10. Cement Production Plant Site Zoning Plan View

In the region shown in Figure 10, a cement production facility location zoning plan is prepared by creating convex shapes by assigning an area away from the city center, as the owners of the immovables, which are located far from the zoning boundaries and even outside the boundaries of the adjacent area, are also the treasury.

4.Conclusion and Recommendation

Local zoning plans are the plans that are created on an existing area for any purpose, outside the zoning boundaries for a certain establishment, without any connection to the existing zoning plan. Local zoning plans are definitely not a type of plan created to meet the needs of existing people for residential or commercial purposes. Local zoning plans are made as a type of implementation zoning plans. Areas with cadastral bases far from the city center, which are mostly non-citizens, should be determined and a local zoning plan should be made. While creating all the areas in the local development plans, the desired facility areas together with the road network should be determined with a convex closure.

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AN INVENTORY MODEL FOR DETERIORATING ITEMS FOR LINEAR DEMAND WITH WEIBULL DETERIORATION

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ABSTRACT

The Deacy in any product is a natural process; therefore, the quality of the product gets worse to final consumption. Hence, retailers get affected due to deterioration. There are several types of demand patterns exist for deteriorating items. We present an Inventory model for the linear demand function of time for deteriorating items like fruit, vegetables, and seafood with a partial backlog shortage. We adopted the Weibull deterioration rate for fruit and vegetable, where deterioration starts immediately after receiving inventory. Notation and assumption are clearly defined in section 3 then the analysis approach is applied to find the optimum solution in section 4. The concavity proved theoretically, and numerical examples support our study. We compare the model on different deterioration rates and accumulated in the tables. The comparison of our research with other researchers is available as particular cases. Hence we can take candor decisions with a comparison of other researchers. Then, we applied sensitivity analysis to find the optimum solution when demand parameters and variables changed. Finally, we concluded the study with future remarks. Our study will be helpful to keenly observe the effects of deterioration on the perishable items, which elucidate managerial insights. Consequently, our study paly a vital role for retailers in enhancing their profit through the keen observation of deterioration.

Keywords: Linear Demand, Deteriorating Items, Weibull Deterioration

ASMA GÖVDE HASTALIĞI

GRAPEVINE TRUNK DISEASE

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ÖZET

Asma, dünyadaki en önemli meyve ürünlerinden biridir. Yaklaşık 6000 asma çeşidinin kültüre alındığı bildirilmekte olup, bunlardan 400'ü sofralık, şaraplık ve kurutmalık çeşitler olarak ekonomik öneme sahiptir. Asmalar çok çeşitli iklimlerde yetiştirilebilir ve bu da çok farklı çeşitlerin oluşmasına yardımcı olmaktadır. Türkiye'de zengin gen çeşitliliğine sahip bir bölgedir. *Vitis vinifera* cinsi meyve özellikleri bakımından en çok yetiştirilen asma türüdür. Ancak hastalıklara karşı daha az dirençlidir. Fungal hastalıklar, özellikle de "gövde hastalıkları" asma hastalıkları içerisinde önemli bir yere sahiptir. Asma Gövde Hastalıkları, son yıllarda dünyada bağları tehdit eden en önemli hastalıklar haline gelmiştir. Bunlar arasında Esca (*Phaeoacremonium* spp), Petri (*Phaemoniella chlamydospora*, *Phaeoacremonium* spp., *Cadophora luteo-olivacea*) ve kara bacak (*Cylindrocarpon* spp. *Cylindrocladiella* spp., *Cylindrodendrum* spp., *Pleiocarpon* sp.), *Botryosphaeria* kanseri (*Botryosphaeria* spp.) tüm dünyada bağlarda görülen en önemli odun dokusu hastalıkları arasında sayılabilmektedir. Bu hastalıklara neden olan etmenler, tüm dünyada ve ülkemizde yaygınlığını arttıran, asmalarda verim kayıplarına, geriye doğru ölüme ve ani kurumaya neden olan ve kimyasal mücadelelerinin olmamalarından dolayı yeniden dikim maliyetleri nedeniyle ciddi ekonomik kayıplara neden olan en yıkıcı hastalık etmenleri arasındadır. Bu derlemede, asma önemli gövde hastalıklarının fungal biyoçeşitliliği, Türkiye'de saptanan etmenleri, mücadele uygulamaları ve sonuç ve öneriler verilmiştir.

Anahtar Kelimeler: Asma, Vitis, Fungal Biyoçeşitlilik, Gövde Hastalıkları.

ABSTRACT

Vine is one of the most important fruit crops in the world. Approximately 6000 grapevine varieties are reported as cultivated, and 400 of them are economically important as table, wine and drying varieties. The vines can be grown in a wide range of climates and this helps to create a wide variety of varieties. It is a region with rich gene diversity in Türkiye. The genus *Vitis vinifera* is the most cultivated type of vine in terms of fruit characteristics. However, it is less resistant to diseases. Fungal diseases specially 'trunk diseases' have an important place in vitis diseases. The Grapevine Trunk Disease (GTD) have become the most important diseases threatening the vineyards in the world in recent years. Among them, Esca, Petri (*Phaemoniella chlamydospora*, *Phaeoacremonium* spp., *Cadophora luteo-olivacea*) and black foot (*Cylindrocarpon* sp. *Cylindrocladiella* spp., *Cylindrodendrum* sp., *Pleiocarpon* sp.), *Botryosphaeria* cancer (*Botryosphaeria* spp.) diseases are among the most important wood tissue diseases seen in vineyards all over the world. The agents that cause these diseases are among the most destructive disease agents that increase their prevalence all over the world and in our country, cause yield losses, dieback and sudden drying in grapevines, and cause serious economic losses due to replanting costs due to the lack of chemical control. In this review, fungal biodiversity of grapevine important trunk diseases, GTD detected in Türkiye, Management Practices and conclusion and recommendations were given.

Keywords: Grapevine, Vitis, Fungal Biodiversity, Trunk disease.

TARİHİ TAŞ YAPILAR ÜZERİNDE GÖRÜLEN MANTAR TOPLULUKLARININ ETKİLERİ
EFFECTS OF FUNGAL COMMUNITIES ON HISTORIC STONE STRUCTURES

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ÖZET

Kültürel mirasımız, doğa tarafından üretilen ve insanlar tarafından inorganik ve organik maddeleri bir arada tutan karmaşık yapılardan çeşitli türde eserleri inşa etmek için kullanılan her tür malzemeden yapılmıştır. İnsanın sanatsal ifadesinin en eski kanıtlarından biri olan taş, mikroorganizmaların biyolojik bozunma potansiyelleri nedeniyle kültürel mirasın korunmasında sorunlara neden olmaktadır. Birçok biyolojik büyüme iyi huyludur ve taş yüzeye zarar vermeden yerleşebilir, hatta rüzgar ve yağmura karşı koruyucu bir bariyer görevi görebilir. Bununla birlikte, bazı büyümeler alttaki taş ve harca zarar verebilir. Biyobozunma, binaların yüzeyinde mikrobiyal kolonizasyonun neden olduğu geri dönüşü olmayan bir hasardır. Metaller ve taşlar gibi inorganik malzemelerden oluşan kültürel miras nesneleri mikrobiyal yaşamı destekler. Mikroorganizmalar, yüksek metabolik çeşitlilikleri ve tarihi anıtların yanı sıra doğal kayaları kolonize etmek için yüksek adaptasyon kabiliyetleri nedeniyle tarihi miras alanlarının korunmasında ve muhafazasında zorluklar ortaya koyabilmektedir.

En sık görülen taş kolonize edici ajanlar algler, siyanobakteriler, bakteriler, zararlı böcekler, mantarlar ve likenlerdir. Ayrıca tarihi binaların, arkeolojik alanların, taş ve metal heykellerin, kaya sanatı alanlarının, mağaraların, yeraltı mezarlıklarının yüzeylerini kolonize eder. Kolonizasyonları, gelişmelerine ve sonuç olarak taşın alt tabakasının doğası ve çevredeki ortamın karakteristiği ile yakından ilgilidir. Temel olarak yağış, sıcaklık ve bağıl nem, hava kirliliği ve biyolojik aktivite gibi iklim faktörleri, taş bozunma süreçlerini etkiler. Mikroorganizmalar, göze çarpmasalar da, taş yüzey kolonizasyonu ve penetrasyonunun kilit oyuncularıdır.

Mantarlar tarihi eserlere ciddi zararlar verebilir. Mantarlar, hem modern hem de tarihi binaların/anıtların başlıca biyodeteriojenleri olarak geniş çapta kabul edilmektedir. Mantarlar yüksek bir metabolik çok yönlülüğe sahiptirler, bu nedenle görünümlerinde ve içsel özelliklerinde geri dönüşü olmayan değişikliklere neden olan birçok organik ve hatta inorganik yüzeyleri kolonize edebilirler. Mantarlar; kumtaşı, granit, kireçtaşı, mermer ve alçıtaşı da dahil olmak üzere çok çeşitli habitatlara sahiptir ve kültürel miras anıtlarının ve binalarının biyolojik olarak bozunmasında önemli bir rol oynamaktadır. Mantarlar biyokimyasal eylemleri ile çukurlaşma ve çözünme yoluyla taşın yapısında değişikliklere yol açabilir. Ayrıca asidik ve metal şelatlayıcı bileşikler içeren hücre dışı müsilajlı maddelerle ilişkilidirler.

Asidik metabolitler (oksalik, asetik, sitrik ve diğer karbonik asitler), çözündürücü ve şelatlayıcı bir etki ile taş minerallerini bozar.

Bu çalışma ile tarihi taş yapılarda bozunmaya sebep olan mantarların ekosistemde oluşan iklim değişikliğinin etkilerini de vurgulayarak taş ve yapı malzemeleri, kaleler, kiliseler, taş köprüler, taş mezarlar vb. farklı yapılar üzerinde gözlemsel olarak mantar yayılışının bir incelemesini sunmaktadır.

Anahtar Kelimeler: Biyobozunma, mantarlar, iklim değişikliği, kültürel miras, taş

ABSTRACT

Our cultural heritage is made of all kinds of materials produced by nature and used by humans to build various kinds of artifacts, from complex structures that hold together inorganic and organic materials. Due to the biological degrading potential of microorganisms, stone, one of the earliest evidences of human artistic expression, causes problems in the protection of cultural heritage protection. Many biological growths are benign and can settle on the stone surface without damaging it, and can even act as a protective barrier against wind and rain. Some growths, though, can harm the underlying stone and mortar. Biodegradation is irreversible damage caused by microbial colonization on the surface of buildings. Inorganic elements such as metals and stones, found in cultural heritage artefacts, support microbial life. Due to their enormous metabolic diversity and adaptation to colonize natural rocks as well as historical monuments, microorganisms might pose a threat to the conservation and preservation of historical cultural sites.

Algae, cyanobacteria, bacteria, pests, fungus, and lichens are the most frequent stone colonizers. It also colonizes the surfaces of historical buildings, archaeological sites, stone and metal sculptures, rock art sites, caves, catacombs. Their colonization is closely related to their development and, consequently, to the nature of the substrate of the stone and the characteristic of the surrounding environment. Basically, climatic factors such as precipitation, temperature and relative humidity, air pollution and biological activity affect stone degradation processes. Microorganisms have an important role in the colonization and penetration of stone surfaces, despite their invisibility.

Historical artifacts can be severely damaged by fungi. Fungi are widely recognized as major biodeterigens of both modern and historical buildings/monuments. Fungi have a wide metabolic range, so they can colonize many organic and even inorganic surfaces causing irreversible changes in their appearance and intrinsic properties. Fungi have a wide variety of habitats including sandstone, granite, limestone, marble and gypsum and play an important role in the biodegradation of cultural heritage monuments and buildings. With their metabolic activity, fungi can affect the structure of the stone by pitting and dissolving it. They are also associated with extracellular mucilage substances containing acidic and metal chelating compounds. Acidic metabolites (oxalic, acetic, citric, and other carbonic acids) have a solubilizing and chelating impact on stone minerals. Climate change, on the other hand, has the potential to alter the frequency and severity of catastrophic phenomena such as drought, flood, and landslides, all of which have unavoidable consequences for cultural property.

This study presents an observational examination of fungal distribution on different structures (stone and building materials, castles, churches, stone bridges, stone tombs, etc.), emphasizing the effects of climate change in the ecosystem of fungi that cause degradation in historical stone structures.

Keywords: Biodegradation, fungi, climate change, cultural heritage, stone

1. GİRİŞ

Antik çağlardan beri taş; yapıların, heykellerin ve anıtların inşa edilmesinde kullanılmıştır. Dünya yüzeyinde taş hem bol bulunabilir hem de erişilebilir bir üründür. Büyük taş blokların uzun mesafelere taşınmasındaki zorluklar nedeniyle, doğal taş mostraları (yer yüzüne çıkmış kaya), genellikle yerleşim yerlerine ve nüfus merkezlerine yakın bulunduklarından, çoğunlukla yerel bir mimari miras kaynak olarak kullanılmıştır. Bu nedenle her zaman en iyi kalitede veya uygun taş malzemeler inşaat veya yapı malzemesi olarak kullanılmamıştır. Dış çevre koşullarına maruz kaldıklarında, kolayca çıkarılıp yontulabildikleri için bazı uygun olmayan taş malzemeler kullanılmıştır (Fort, 2009; García de Miguel, 2009; Doehne ve Price, 2010; Snethlage, 2011). Taşın düşük mukavemeti ve sertliği, sert atmosferik ortamda hızla bozunmasına neden olur (Vazquez-Calvo ve ark., 2007).

Anıtlar açık havada sergilendiğinde, kültürel mirasın korunması konusu son derece önem taşımaktadır (Sazanova ve ark., 2022). Taş yapı yüzeyleri, hava koşulları (yağış, rüzgar, güneş ışığı ve sıcaklık), havadaki siyah karbon, toz ve diğer organik ve inorganik partiküllerden kaynaklanan kirlenme ve mikrobiyolojik gelişim gibi çeşitli nedenlerle bozunabilir (Sleiman ve ark., 2014). Islak cepheler ototrofik organizmaların büyümesini teşvik ettiğinden, yağmurlu yerlerde ve yoğun yağmur mevsimi boyunca biyolojik kirlenmeye karşı daha yüksek bir hassasiyet gelişir (Tran ve ark., 2014). Ancak yüksek sıcaklıklar malzemelerin ısınmasına, bu da suyun buharlaşmasına neden olur. Belirli bir iklim bölgesinde yer alan her yapı veya anıt, benzersiz bir habitat olarak kabul edilebilir. Biyolojik büyümeyi etkileyen birincil çevresel unsur olan mikro iklimi oluşturan cephedeki nem ve ışık koşulları, konumun coğrafyasına bağlı olarak bu iklimsel değişkenler tarafından belirlenir (Ariño, ve ark., 1997).

Bakteriler, mantarlar, arkeler, algler ve likenler gibi mikroorganizmaların büyümesi ve faaliyeti; taş anıtların zarar görmesinin başlıca nedenleridir. Eklembacaklıların yoğunluğu, tarihi yerlerdeki mantar bozunmaları üzerinde doğrudan bir etkiye sahiptir (Tyagi ve ark., 2021). Gözenekler ve yarıklar içinde büyüyen, matrise sıkıca yapışan ve susuz kaldığında stresli koşullarda hayatta kalabilen meristematik melanize mantarlar da dahil olmak üzere endolitik mikroorganizmalar bozunmaya önemli ölçüde katkıda bulunur (Toreno ve ark., 2018). Mantarlar, kültürel miras anıtlarının ve yapılarının biyolojik bozunmasında estetik ve yapısal hasara neden olur ve kumtaşı, granit, kireçtaşı, mermer ve alçıtaşı dahil olmak üzere geniş bir habitat çeşitliliğine sahiptir (Ljaljeviã Grbiã ve Vukojeviã, 2009; Gupta ve Sharma, 2012). Mantarlar, H+ ve organik asit salgılayarak taşın çözülmesini veya metal iyonlarının şelatlanmasını hızlandırabilir (Scheerer ve ark., 2009). Bakterilerin ve fotosentetik organizmaların kalker oluşumunda oynadıkları önemli rollere rağmen, mantarlar belki de karbonat dönüşümünde daha önemli ve baskın olabilir (Li, ve ark., 2018). Yakın zamanda yapılan bir araştırma, mantarların, özellikle de çok yavaş büyüyen bir tür siyah mantar ve maya benzeri mantarların, mermerlerin ve diğer kayaların parçalanmasında önemli bir rol oynadığını göstermiştir (Sert, 2019).

Çoğu durumda, mikrobiyal endolitler taşa yalnızca birkaç mikron ila birkaç milimetre nüfuz eder. Bununla birlikte, gözeneklerin boyutuna bağlı olarak, yosunlar ve mantarlar yüzeyin birçok santimetre altındaki taşlarda yaşayabilir (Hallmann ve ark. 2014a).

2. BİYOLOJİK BOZUNMA

Kültürel mirasın bir parçası olan taş anıtlarda çeşitli canlılar yaşamaktadır. Mantarlar, algler, bakteriler, yosunlar ve likenlerin bir dizi önemli taksonundan organizmalar litobiyotik topluluklara dahildir (Sazanova ve ark., 2022). Taş yüzeylerdeki biyolojik kolonizasyon, büyüme, dağılım ve metabolik

aktivite, taş alt tabakanın biyo-duyarlılığından, çevresel faktörlerden (güneş radyasyonu, sıcaklık, su, nem, pH, rüzgar, atmosferik kirlilik, yüzeyde partikül birikimi, vb) ve belirli mikro iklim parametrelerinden (yönlendirme, gölgeye maruz kalma, vb.) etkilenir (Gorbushina ve Petersen, 2000; Zanardini ve ark., 2000; Herrera ve Videla, 2004; Monori ve Pitzurra, 2008; Scheerer ve ark., 2009; Miller ve ark., 2012a).

Canlıların biyolojik faaliyeti nedeniyle bir malzemenin niteliklerinde meydana gelen istenmeyen değişiklikler biyolojik bozunma olarak bilinir. Guillitte'e (1995) göre, bir malzemenin canlıların kolonizasyonunu destekleme kapasitesi olan biyo-alıcılık özelliği, kimyasal ve mineral bileşiminin yanı sıra gözenek yapısına, hidrik özelliklerine ve pürüzlülük değerlerine bağlıdır. Mikrobiyalkolonizasyon seviyesi iklimden ve taş yüzeyinde organik hava artıklarının birikmesinden etkilenir. Bakteri, mantar ve liken gibi mikroorganizmaların büyümesi ve ardından yosun ve diğer bitkilerin oluşması, genellikle taşın biyolojik bozunmasının başlangıcını işaret eder.

Kayaların üzerinde ve içinde yaşayan mantarlar karnabahar benzeri mikro koloniler oluşturur, son derece kalın, çok katmanlı hücre duvarlarına sahiptir ve melaninle kaplanarak koyu, siyahımsı kahverengi bir görünüm verirler (Wollenzien ve ark., 1995). Mantarlar tarafından üretilen miselyum, yarıklar ve mikro boşluklar yoluyla genişleyerek ve büyüyerek taşın mekanik olarak bozunmasına neden olur. Organik asit salgıları da kimyasal taş bozunmasına neden olur (Salvadori ve Municchia, 2016).

Mantarlar, aşırı sıcaklık, güneş ışınımı ve su kıtlığı gibi streslere maruz kalabilecekleri çöller, kutup bölgeleri ve kirli alanlar da dahil olmak üzere en düşmanca ortamlarda bile hayatta kalabilirler. Bunun nedeni, hem morfolojik hem de fizyolojik olarak uyum sağlama yeteneğine sahip olmalarıdır (Iversson ve ark., 2016).

Mantar sporları hava, atmosferik su, böcekler ve diğer biyotik vektörler tarafından taşınır. Kaya yüzeylerinde çeşitli besin maddeleri bulunabilmesine rağmen (örneğin, havadaki toz partikülleri, endüstriyel ve konut emisyonları ve kirleticiler ve mikroorganizmalar, böcekler ve memelilerden gelen eksudalar), birçok mantar az besin varlığında gelişebilir. Mantarlar yüksek oranda pigmentli olduklarından ve büyümeleri çıplak gözle görülebildiğinden, kültürel miras alanlarının renginin solmasından başlıca sorumludurlar. Fiziksel yaklaşım kullanıldığında lezyonlar tipik olarak yüzeyde görülür. Biyopitting, siyah mantarların bir sonucu olarak taş üzerinde gelişen, çapı ve derinliği 2 cm'ye kadar olan lezyonlar için kullanılan bir terimdir (Grbic ve ark., 2009). Bu mantarların hücre duvarlarındaki yüksek melanizasyon, yaşadıkları taş yüzeylerin yamalı görünmesine ve hatta tamamen siyah katmanlarla kaplanmasına neden olur.

3. KÜLTÜREL MİRAS ÜZERİNDE MANTAR BOZUNMALARI

Günlük hayatımızda mantarlar faydalı veya zararlı olabilir. Hem inorganik taş hem de beton için potansiyel olarak biyolojik bozunmaya neden olabilmeleri, onları mikotoksin sentezleyen patojenler haline getirmektedir (Mitchell ve Gu, 2000; Sabev ve ark., 2006; Meng ve ark., 2017). Yoğun renkleri, asidik salgıları ve malzemelerin içinde hif geliştirmeleri nedeniyle mantarlar, bina yüzeylerinde biyolojik bozunmada rol oynamaktadır (Ferrari ve ark., 2015). Melanotik mantar ve aktinomisetler gibi bazı taksonlar, organizmalarını en kuru koşullardan, kurumadan ve bazı bakteri ve eklembacaklılar tarafından üretilen hidrolitik enzimlerden korumak için koyu renkli pigmentler geliştirir (Gómez-

Alarcón ve ark., 1995; Jacobson, 2000). Hücre duvarlarının melanizasyonu, mimari yüzeylerin estetik biyolojik bozunmasında da önemli bir faktördür (Gaylarde ve Morton, 2002). En yıkıcı organizmalar olan mantarlar, taş anıtların yüzeylerine saldırır ve hatta nüfuz eder. Bu organizmaların faaliyetleri, iklimsel faktörlerin (yüksek ışınım, nem, sıcaklık ve yeraltı suları ile aşırı ıslanma ve kuruma, vb) yanı sıra hava kirliliği ve hava ötrofikasyonu gibi yapı malzemelerinin fiziksel, kimyasal ve mekanik özelliklerinin bozunmasına yol açan diğer çevresel faktörler tarafından kolaylaştırılmaktadır (Hegab ve ark., 2019). Durgun (hareketsiz) mantar sporları, taş yüzeyde bulunan organik kalıntıların zengin besinleriyle birlikte yeterli ışık ve yeterince sıcak bir ortam olduğunda uygun koşullar altında üreyebilir (Hegab ve ark., 2019).

Anıtların tahribatı, mantarın türüne, yüzeyin doğasına ve çevredeki çevresel koşullara göre değişmektedir (Tyagi ve ark., 2021). Yumurta sarısı, kazein, keten tohumu, haşhaş tohumu ve benzeri organik kaynaklar, antik sanat eserlerinin ve binalar için boyaların yapımında kullanılmıştır. Bu organik maddeler, mantarlar da dahil olmak üzere mikroorganizmaları çeker ve büyümeleri için bir substrat sağlar. Oldukça aşındırıcı olmaları ve malzemeleri bozma sürecinde aktif olmaları nedeniyle mantarlar tipik olarak sıva, harç ve yapı taşlarında bulunur (Sterflinger, 2000).

Mantarlar, neden oldukları yapı hasarının türüne göre dört gruba ayrılabilir (Tyagi ve ark., 2021). Birincisi, çoğunlukla nemli tuğlalarda ve binaların sıvalarında bulunan sıva mantarlarıdır, örneğin *Coprinus* spp., *Peziza* spp. ve *Pyronema domesticum*. İkincisi, çoğunlukla taş binalarda bulunan taş mantarlarıdır, örneğin *Botrytis* spp., *Mucor* spp., *Penicillium* spp. ve *Trichoderma* spp. Üçüncü tür ise *Alternaria alternata, Aspergillus* spp., *Aureobasidium pullutans*, *Penicillium* spp., *Cladosporium herbarum*, *Fusarium oxysporum* ve *Phoma violacea* gibi binalarda boyaların renginin solmasına neden olan boya mantarlarıdır. Dördüncü kategori metal, cam ve dolgu macunlarında şekil bozukluğuna neden olan metal ve dolgu macunu mantarlarıdır, örneğin *Cladosporium resinae, Aspergillus niger, Aurebasidium pullulans, Chaetomium globosum, Geotrichum* spp., *Penicillium luteum* ve *Trichoderma viride* (Tyagi ve ark., 2021).

Mantar ve likenlerin neden olduğu siyah renk değişimlerine sahip beyaz Carrara mermerinden yapılmış heykel; Boboli Parkı, Floransa, İtalya (Sterflinger, 2013).

Trabenna antik kentindeki anıtlar üzerinde siyah mantar kolonileri (Sert, 2019).

False-door'un kireç taşında mantar bozunması (Siyah noktalar) (Ghany ve ark., 2019).

Eski Roma yerleşiminden (Doğu Sırbistan) çıkarılan antik bir taş ''Stela'' üzerinde mantar kolonizatörlerinin neden olduğu biyolojik bozunma (Savković, ve ar., 2016).

Ceneviz kalesi (Olympos antik kenti) üzerinde siyah mantar kolonileri (Sert, 2019).

4. ATMOSFERİK AJANLAR

Yapı malzemelerinin gözenekliliği ve geçirgenliğinin yanı sıra çevredeki ortam da biyolojik bozunmayı etkileyen faktörlerdir. Güneş, don, tuzlar, rüzgar, yağmur ve kirlilik gibi abiyotik unsurların tümü anıtların, heykellerin ve açıkta bırakılan diğer sanat eserlerinin yıpranma süreçlerine katkıda bulunur (Toreno ve ark., 2018). Su, taşı etkileyen bozunma süreçlerinin çoğunda yer aldığından, en güçlü ayrışma maddesidir. Çözünebilir tuzların hareketi, çözünmesi ve kristalleşmesi, hidrasyon ve hidroliz reaksiyonları, donma ve nem etkisi, hava kirleticileri ve asit yağmurlarının neden olduğu çürüme, biyolojik bozunma ve küf gelişimi de dahil olmak üzere tüm bu süreçler suyun varlığına ihtiyaç duyar (Riederer, 1988). Su donduğunda %9'a varan hacim artışı nedeniyle, gözenek sistemi içinde mekanik bozunma meydana gelir. Mevcut mikro çatlakların daha derin ve daha büyük hale gelmesine ek olarak, donma basıncı taşın çekiş gücüne yaklaştığında yenileri ortaya çıkar. Su çözüldüğünde, taze mikro çatlaklara doğru hareket ederek süreci yeniden başlatabilir ve her seferinde daha büyük bir bozunmaya neden olabilir (Lienhart, 1988).

Suyun çözünen maddeden daha büyük bir oranda bulunduğu en ağır hidrasyon koşullarında çözünme süreçleri oluşur. Su bir yüzeye adsorbe olduğunda, fiziksel hidrasyon da oluşur. Hacim artışı nedeniyle, kil mineralleri veya bazı tuzlarda olduğu gibi mekanik ayrışma meydana gelir.

Gözenek sisteminin özellikleri suyun nasıl emildiğini, tutulduğunu ve içinden nasıl taşındığını doğrudan etkiler. Su ne kadar çok tutulur ve gözenek sistemi boyunca ilerleyebilirse, taş malzeme o kadar çok bozunur (Fort, 1996). Su, tuz ve buz kristalleşmesi, çözünme, kirletici maddelerin ve nemin adsorpsiyonu ve biyolojik kolonizasyon süreçlerini teşvik ettiğinden, su mevcut olduğunda taşın dayanıklılığı azalır (Benavente, 2006).

Taş malzemeler ısınmanın bir sonucu olarak genleşir ve soğumanın bir sonucu olarak büzülür. Bu koşullara maruz kalan taş veya yakınındaki malzemeler mekanik ayrışma, parçalanma ve gerilime uğrar. Atmosfer ve alt tabaka güneş radyasyonu ile ısınır ve bu da nem değişimine neden olur. Bu sıcaklık ve bağıl nem değişimlerinin bir sonucu olarak taş yüzeyinde yoğuşma/buharlaşma döngüleri oluşur. Bu

döngüler eş zamanlı olarak taşın sıcaklığına, çözünebilir tuzların varlığına ve türüne ve ortam havasının çiğlenme noktasına bağlıdır (Camuffo, 1986, 2014).

Rüzgar, aşındırıcı gücü nedeniyle, özellikle daha önce aşınmış bir yüzeye sahip taş malzemeler üzerinde mekanik ayrışmaya neden olur. Ayrıca kırılgan veya zayıf bölgelerin kaybına neden olma gücüne sahiptir. Taş malzemelerin ayrışma ve bozunma süreçleri sırasında meydana gelen kimyasal reaksiyonlar, ortam havasının kimyasal yapısından da etkilenir (Mingarro, 1996; Brimblecombe, 2014).

5. SONUÇ

Jeokimyasal değişimin önemli biyotik ajanları olarak mantarlar, özellikle atmosfer, hidrosfer, biyosfer ve litosfer arasındaki arayüzde kritik bölgede kaya kaplamaları olarak var olabilirler. Dallanma ve ipliksi büyüme şekilleri, olumsuz ortamlara morfolojik olarak uyum sağlama kapasiteleri, çeşitli jeoaktif metabolitler salgılayan organik karbon bazlı metabolizmaları ve diğer organizmalarla kurdukları simbiyotik ilişkiler sayesinde kaya substratlarındaki (örneğin likenler ve mikorizalar) birçok metal ve mineral dönüşümü üzerinde önemli bir etkiye sahiptirler. Bu türbiyotik değişiklikler, yalnızca abiyotik değişimlerden daha hızlı gerçekleşebilir. Mikrobiyal saldırı, sanat eserinin rengini ve/veya şeklini değiştirmenin yanı sıra, nesnenin yüzeylerinde ve iç bölgelerinde mekanik ve kimyasal hasara yol açarak zamanla bozunmaya neden olur. Gerekli önleyici tedbirlerin alınabilmesi için, her bir anıtın inşasında kullanılan yapı malzemeleri ve duyarlı olduğu mikro iklim hakkında en kapsamlı araştırmaların yapılması gerekmektedir (Choidis ve ark., 2021). Bu tür anıtlar mikrobiyal kirlilik nedeniyle yavaş yavaş tahrip olurken, aynı zamanda orada korunan kültürü de öldürmektedir. Mantarları doğru bir şekilde tanımlamak çok önemlidir çünkü hepsi aynı derecede zararlı değildir. Aspergillus, Fusarium, Cladosporium, Curvularia ve Penicillium, iklim koşullarına ve malzemelere bağlı olarak miras alanlarının bozunma sürecine katkıda bulunan başlıca mantarlardır. Mantar bozunmasının fiziksel, kimyasal ve mekanik olmak üzere üç farklı türü ve iki farklı mekanizması vardır. Bunlardan ilki, mantarların anıt malzemeyi bir besin kaynağı olarak kullanabildiği ve üzerinde büyüyebildiği, özümleyici biyokimyasal bozunma olarak bilinen doğrudan yöntemdir. İkincisi, mantarlar tarafından üretilen metabolitlerin yapı malzemeleriyle reaksiyona girdiği, asimilasyonsuz yöntem olarak da bilinen dolaylı yöntemdir. Tüm bu değişkenler bozunma modelinde (renk değişimi, asit üretimi, korozyon, şelasyon vb.) yer alan türlerin sayısını ve çeşitliliğini etkilemektedir. İklim değişikliğinin, kültürel mirasa sahip taş eserler üzerinde hızlı bozunmaya neden olacağı öngörülmektedir. Mantar bozunmasını erken aşamalarda durdurmak için, tarihi taş yapıların kapsamlı bir şekilde temizlenmesi faydalı olabilir.

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FEN LİSESİ ÖĞRENCİLERİNİN BİLGİSAYAR OYUNU OYNAMA DAVRANIŞLARI İLE GÖRSEL REAKSİYON ZAMANLARININ İNCELENMESİ
INVESTIGATION OF VIDEO GAME PLAYING BEHAVIORS AND VISUAL REACTION TIMES OF SCIENCE HIGH SCHOOL STUDENTS

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ÖZET

Bu çalışmanın amacı; fen lisesinde öğrenim gören 14-17 yaş arasındaki öğrencilerin bilgisayar oyunları oynama davranışları ile görsel reaksiyon zamanları arasındaki ilişkiyi incelemektir. Bu amaçla araştırmaya farklı sınıflarda öğrenim gören kız ve erkek lise öğrencileri dahil edilmiştir. Çalışma öncesinde tüm öğrenciler araştırma süreci hakkında bilgilendirilmiştir. Her bir öğrenciye 10 sorudan oluşan bilgisayar oyunu oynama ile ilgili davranış ve görüşleri içeren anket araştırmacı tarafından uygulanmış sonrasında bilgisayarda program aracılığı ile görsel reaksiyon zamanı testi yapılmıştır. GRZ testi her bireye oturur pozisyonda, çevreden etkilenmemesi için sakin ve boş bir odada uygulanmıştır. Elde edilen veriler ve anket sorularına verilen cevaplar puanlanarak istatistiksel analizler için SPSS 22.0 paket programı kullanılmıştır. Elde edilen veriler değerlendirildiğinde dokuzuncu sınıf öğrencilerinin görsel reaksiyon zamanlarının diğer şubelerdeki öğrencilere göre; oyun oynayan öğrencilerin oynamayan öğrencilere göre, yaşa göre, günlük oyun oynama sürelerine göre ve oyun oynanan platformlara göre istatistiksel olarak anlamlılık bulunmuştur (p<0.05). Sonuç olarak, bilgisayar ve telefon gibi araçlarla oyun oynayan çocukların uygulamada zorluk çekmedikleri ve görsel reaksiyon sürelerinin iyi düzeyde olduğu, ayrıca yaş artıkça görsel reaksiyon sürelerinin uzadığını söyleyebiliriz.

Anahtar Kelimeler: Bilgisayar oyunu, reaksiyon, oyun

ABSTRACT

The aim of this study is to examine the correlation between the behaviors of playing video games and visual reaction times of students aged 14-17 studying at a science high school. For this purpose, male and female high school students studying in different classes were included in the study. Before the study, all students were informed about the research process. A questionnaire consisting of 10 questions for each student, including behaviors and opinions about playing computer games, was administered by the researcher, and then a visual reaction time test was performed via a computer program. The VRT test was applied to each individual in a sitting position, in a quiet and empty room to avoid being affected by the environment. The data obtained and the answers given to the survey questions were scored and the SPSS 22.0 package program was used for statistical analysis. When the data obtained are evaluated, a statistically significant difference was found (p<0.05) between the visual reaction times of the ninth grade students compared to the students in other branches; the students who play games and the students who do not play, according to age, daily game playing times and the platforms where the game is played. As a result, we can say that children who play games with tools such as computers and phones do not have difficulty in practice and their visual reaction times are at a good level, and their visual reaction time increases with age.

Keywords: Video game, reaction, game

1. GİRİŞ

Oyun kavramı; yetenek ve zeka geliştirici, belli kuralları olan, iyi vakit geçirmeye yarayan eğlence olarak tanımlanmaktadır (Türk Dil Kurumu, 2022). Fransız sosyolog Roger Caillois (1957) ise oyunu zorunlu olmayan, yaşamın rutininden ayrı olarak kendi zamanı, mekânı ve kuralları olan, önceden sonuçları belirlenemeyen, eğlenmek için gerçek hayattan farklı olduğu bilinciyle gönüllü olarak yapılan bir etkinlik olarak tanımlamıştır. Dijital oyun kavramı ise bilgisayarlarda, tabletlerde, oyun konsollarında ya da cep telefonlarında oynanan oyunları ifade eder. Dijital oyun kavramı "video oyunları", "mobil oyunlar" ve "bilgisayar oyunları" terimlerini kapsayan bir kavramdır. Çünkü her üç terimde de bulunan ortak özellikler kontrol işleminin klavye, yönetme kolu ya da tuş takımıyla olması ve görüntülenmenin bir ekran aracılığıyla olmasıdır. (Kirriemuir, 2002; Pala ve Erdem, 2011). Bu nedenle bu çalışmada video oyunları, mobil oyunlar ve bilgisayar oyunları terimlerini kapsayan "dijital oyun" kavramı kullanılacaktır.

Reaksiyon zamanı, aniden ortaya çıkan ve öncellenmemiş olan bir sinyalin ulaşmasından, bu sinyale cevaba kadar geçen sürenin miktarıdır (Schmidt, 1988). Uyaranlar işitsel, görsel veya dokunsal olabilir (Ricci, 1967). Dijital oyunlarda görsel reaksiyon süresi büyük önem arz eder. Özellikle rekabetçi oyunlarda ekran karşısında görsel uyaranlara en hızlı tepkiyi vermek oyunu kazanmanın kilit noktalarından biridir. Bu bilgilerden hareketle bu çalışmanın amacını, fen lisesinde öğrenim gören 14-17 yaş arasındaki öğrencilerin bilgisayar oyunları oynama davranışları ile görsel reaksiyon zamanları arasındaki ilişkinin ortaya konulması oluşturur. Literatür taramalarında bulunan olumlu ve olumsuz etkilerin farkındalığıyla çalışmamızda dijital oyunların görsel reaksiyon zamanlarına olan etkilerini incelemeyi amaçladık. Dijital oyun oynayan öğrencilerin oynamayanlara göre görsel reaksiyon sürelerinin daha az çıkacağını bu araştırmanın hipotezi olarak belirledik.

2.MATERYAL VE METOT

Bu çalışmaya 14-17 yaş aralığında fen lisesinde farklı kademlerde öğrenim gören toplam da 76 birey gönüllü olarak dahil edildi. Bilgisayar oyunu oynama ile ilgili görüşler anketinin hazırlanması, daha önce literatür taraması yapılarak oluşturulmuş sorulara, araştırmacı tarafından farklı sorular eklenerek çalışmaya özgü geliştirilmiştir. Bu anketin hazırlanmasında daha önceki bu konuya özgü çalışmalar incelenmiş ve bu araştırmanın amaçlarına uygun sorular üretilerek taslak form oluşturulmuştur. Taslak form hakkında uzman/hakem görüşleri alınmış, anketin kapsamı ve soruların anlaşılırlığı gözden geçirilmiş ve gerekli düzeltmeler yapılarak ankete son hali verilerek uygulanmıştır. Uygulanan anketlerin ardından öğrencilere oturur pozisyonda, çevreden etkilenmemesi için sakin ve boş bir odada görsel reaksiyon zamanı testi (GRZ: www.humanbenchmark.com) dizüstü bilgisayar aracılığı ve bilgisayar programı aracılığı ile uygulanmıştır. Reaksiyon zamanları beşer kez ölçülüp ortalamaları milisaniye cinsinde kaydedilmiştir.

2.1. İSTATİSTİKSEL ANALİZ

Elde edilen verilerin analiz edilmesinde Excel ve SPSS 22.0 paket programları kullanılmıştır. Anketten elde edilen verilerin frekans dağılımları tespit edilerek, oyun türü ve diğer değişkenler ile görsel reaksiyon testleri arasında anlamlı bir farkın olup olmadığını belirlemek için Bağımsız örneklem t testi, varyans analizi (One Way ANOVA) ve LSD testleri yapılmıştır. Analiz sonuçlarının istatistiksel olarak anlamlılık seviyeleri $p < 0.05$ düzeyinde değerlendirilmiştir.

3. BULGULAR

Elde edilen verilerin analizi ve anket sorularına verilen yanıtlar tablolar halinde sunulmuştur.

Tablo 1. Yaş gruplarına göre GRZ değerlerinin analizi

		N	Ort.±S.S	p
GRZ	14 yaş	15	250,26±18,90	14-17 **(,003)**
	15 yaş	13	265,46±49,23	
	16 yaş	21	274,23±46,86	
	17 yaş	27	287,03±28,15	

Tablo 1'de yaşlara göre görsel reaksiyon zamanındaki farklılıklar incelenmiştir. 14 yaşındaki öğrencilerin görsel reaksiyon zamanı ortalaması 250,26±18,9 ve 17 yaşındaki öğrencilerin görsel reaksiyon zamanı ortalaması 287,03±28,15 arasında p<0,05 düzeyinde farklılık bulunmuştur.

Tablo 2. Sınıf düzeylerine göre GRZ değerlerinin analizi

		N	Ort.±S.S	p
GRZ	9. Sınıf	20	249,5±21,89	9-10 **(,047)**
	10. Sınıf	23	271,73±52,34	
	11. Sınıf	33	287,09±28,19	9-11 **(,000)**

Tablo 2'de sınıf düzeylerine göre GRZ değerlerindeki farklılıklar incelenmiştir. 9. 10. Ve 11. Sınıfta okuyan öğrencilerin GRZ ortalamaları 249,5 ± 21,89, 271,73 ± 52,34, 287,09 ± 28,19 şeklindedir. 9. Sınıfta okuyan öğrencilerle 10. Ve 11. Sınıfta okuyan öğrencilerin GRZ ortalamaları arasında anlamlı düzeyde p<0,05 farklılık bulunmuştur.

Tablo 3. Günlük oyun oynama süresine göre GRZ değerlerinin analizi

		N	Ort.±S.S	p
GRZ	Oyun Oynamayanlar	23	291,47±46,77	1-3 saat-Oyun Oynamayanlar **(,002)**
	1 saatten az	21	278,57±28,97	3-5 saat-Oyun Oynamayanlar **(,004)**
	1-3 saat	25	257,64±32,28	
	3-5 saat	7	245,57±21,85	3-5 saat-1 saatten az **(,039)**

Tablo 3'te günlük oyun oynama süresine göre GRZ değerlerindeki farklılıklar incelenmiştir. Oyun oynamayan öğrencilerin GRZ ortalaması 291,47±46,77 ile günde 1-3 saat arası oyun oynayan öğrencilerin 257,64±32,28 ve günde 3-5 saat arası oyun oynayan öğrencilerin 245,57±21,85 GRZ ortalamaları arasında anlamlı derecede p<0,05 farklılık bulunmuştur.

Tablo 4. Oyun oynanan platforma göre GRZ değerlerinin analizi

		N	Ort.±S.S	p
GRZ	Oyun Oynamayanlar	23	291,47±46,77	Cep Telefonunda-Oyun Oynamayanlar **(,004)**
	Cep Telefonunda	35	262,05±34,31	
	Bilgisayarda	15	265,33±26,86	Bilgisayarda-Oyun Oynamayanlar **(,037)**
	Oyun Konsolunda	3	286±19,52	

Tablo 4'te oyun oynanan platformlara göre GRZ değerleri incelenmiştir. Oyun oynamayan öğrencilerin GRZ ortalaması ile 291,47±46,77 cep telefonunda oyun oynayan 262,05±34,31 ve bilgisayarda oyun oynayan 265,33±26,86 öğrencilerin GRZ ortalamaları arasında anlamlı düzeyde p<0.05 farklılık bulunmuştur.

Tablo 5. Oynanan oyun türlerine göre GRZ değerlerinin analizi

		F	p
GRZ	Gruplar Arası	1,389	,232

Tablo 5'te öğrencilerin oynadıkları oyun türlerine göre yapılan varyans analizinin (One Way ANOVA) sonuçları görülmektedir. Öğrencilerin oynadıkları oyun türlerine göre GRZ değerlerinde anlamlı bir farklılık bulunmamıştır. p>0,05

Tablo 6. Cinsiyete göre GRZ değerlerinin analizi

		N	Ort.±S.S	t	p
GRZ	Kız	38	276,95±44,27	,989	,326
	Erkek	38	268,16±32,23		

Tablo 6'da cinsiyet göre uygulanan bağımsız örneklem t testinin sonuçları görülmektedir. Öğrencilerin cinsiyetlerine göre GRZ değerlerinde anlamlı bir farklılık bulunmamıştır. p>0,05

Tablo 7. Öğrencilerin dijital oyun oynayıp oynamamasına göre GRZ değerlerinin analizi

		N	Ort.±S.S	t	p
GRZ	Oyun Oynayan	51	263,14±31,73	-3,21	**,002**
	Oyun Oynamayan	25	291,76±44,88		

Tablo 7'de öğrencilerin dijital oyun oynayıp oynamamasına göre GRZ değerlerindeki farklılıklar incelenmiştir. Dijital oyun oynayan öğrencilerin GRZ ortalamalarıyla 263,14 ± 31,73 dijital oyun oynamayan öğrencilerin GRZ ortalamaları 291,76 ± 44,88 arasında anlamlı düzeyde p<0,05 farklılık bulunmuştur.

4.TARTIŞMA VE SONUÇ

Yapılan bu çalışma, fen lisesinde öğrenim gören 14-17 yaş arasındaki öğrencilerin bilgisayar oyunları oynama davranışları ile görsel reaksiyon zamanları arasındaki ilişkiyi incelemek amacıyla yapılmıştır. Elde edilen bulgulara göre; dokuzuncu sınıf öğrencilerinin görsel reaksiyon zamanlarının diğer şubelerdeki öğrencilere göre; oyun oynayan öğrencilerin oynamayan öğrencilere göre, yaşa göre, günlük oyun oynama sürelerine göre ve oyun oynanan platformlara göre istatistiksel olarak anlamlılık bulunmuştur (p<0.05). Bu bulgular doğrultusunda, bilgisayar ve telefon gibi araçlarla oyun oynayan çocukların uygulamada zorluk çekmedikleri ve görsel reaksiyon sürelerinin iyi düzeyde olduğu, ayrıca yaş artıkça görsel reaksiyon sürelerinin uzadığını söyleyebiliriz. Dijital oyunlar günümüzde teknolojinin de hızla gelişmesiyle birlikte hayatımıza daha fazla girmektedir. Özellikle genç kuşağın daha çok ilgisini çeken dijital oyunlar ülkemizde de önemli bir eğlence aracı haline gelmiştir.

Dijital oyunlar hakkında farklı değişkenler üzerinde çalışmalar yapılmıştır. Bunlar genel olarak dijital oyun bağımlılığı (Dursun & Eraslan Çapan, 2018), fiziksel aktivite ilişkisi (Marufoğlu & Kutlutürk, 2021), oyun oynama süreleri (Gözüm & Kandır, 2020), cinsiyete göre değişiklikler (Gülbetekin vd., 2021), oyun türü tercihleri (Pala & Erdem, 2011), saldırganlık ve zorbalık (Prot vd., 2014), oyun oynama amaçları (Tutkun Ünal vd., 2013), asosyallik ve farkındalık (Can & Tekkurşun Demir, 2020) çalışmalarıdır.

Çalışma bulgularımızda cinsiyet değişkeni açısından görsel reaksiyon sürelerinde anlamlı bir farklılık bulunmazken, yaşa göre, oyun oynama durumlarına göre anlamlı değişiklikler tespit edilmiştir. Yapılan çalışmalar bilgisayar oyunlarının farklı etkilerini ortaya koyarken reaksiyon süreleri üzerine etkisinin incelendiği çalışma kısır bulunmuştur.

Literatür çalışmaları incelendiğinde; interaktif oyunları oynayan bireylerin matematik dersine karşı öğrenme algı ve motivasyonları incelenmiş, bu oyunların matematik dersine ve derse motivasyona olumlu etki ettiği bildirilmiştir (Uluçay ve Çakır, 2014). Üniversite öğrencilerinin oyun alışkanlıkların uzamsal becerileri üzerine yapılan bir çalışmada, birçok beceriyi geliştirmede etkisinin olduğu ve becerileri çok yönlü etkilediği sonucuna ulaşılmıştır (Özcan ve ark. 2016). Bağımlılık üzerine yapılan çalışmalarda ise oyun oynama süreleri, ücret ödeme, şiddet içeren oyunlara duyulan eğilimler ortaya koyulmuştur (Çavuş ve ark. 2016). Oyun oynanan süre, oyun oynanan alan, materyallerin kullanımı fiziksel ve psikolojik etmenler gibi birçok faktör bireylerin bilgisayar ya da telefon başında uzun süreler geçirmesine, olumlu ya da olumsuz davranışlar edinmesine sebebiyet vermektedir.

Yaptığımız bu çalışmada lise öğrencilerinin görsel reaksiyon sürelerinde yaşa bağlı olarak değişimler gözlenmiştir. Bu durumun dokuzuncu sınıf öğrencilerinin bilgisayar veya telefon gibi alanlarda daha çok vakit geçirdiği, gelişim süreci ile bakıldığında reaksiyon sürelerinin yaş arttıkça uzadığını ve algıların yavaşladığını söyleyebilir. Bununla birlikte, yaş ilerledikçe bilgisayar kullanımı süre bakımından artmış olsa da reaksiyon sürelerinde düşüş gözlenmediğini söyleyebiliriz.

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14-17 YAŞ GRUBU ÖĞRENCİLERİNİN DİJİTAL OYUN OYNAMA DAVRANIŞLARI İLE İŞİTSEL REAKSİYON ZAMANLARININ İNCELENMESİ

INVESTIGATION OF DIGITAL GAME PLAYING BEHAVIORS AND AUDITORY REACTION TIMES OF 14-17 AGED STUDENTS

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ÖZET

Bu çalışmanın amacı; 14-17 yaş grubu öğrencilerinin dijital oyunları oynama davranışları ile işitsel reaksiyon zamanları arasındaki ilişkiyi incelemektir. Bu amaçla araştırmaya farklı sınıflarda öğrenim gören kız ve erkek toplam 76 lise öğrencisi dahil edilmiştir. Çalışma öncesinde tüm öğrenciler araştırma süreci hakkında bilgilendirilmiştir. Her bir öğrenciye 10 sorudan oluşan bilgisayar oyunu oynama ile ilgili davranış ve görüşleri içeren anket araştırmacı tarafından hazırlanmış ve uygulanmış sonrasında bilgisayarda program aracılığı ile işitsel reaksiyon zamanı testi yapılmıştır. İRZ testi her bireye oturur pozisyonda, çevreden etkilenmemesi için sakin ve boş bir odada uygulanmıştır. Elde edilen veriler ve anket sorularına verilen cevaplar puanlanıp istatistiksel analizler için SPSS 22.0 paket programı kullanılmıştır. Elde edilen veriler değerlendirildiğinde dokuzuncu sınıf öğrencilerinin on birinci sınıftaki öğrencilere göre, onuncu sınıftaki öğrencilerin on birinci sınıftaki öğrencilere göre ve oyun oynayan öğrencilerin oynamayan öğrencilere göre işitsel reaksiyon zamanlarında istatistiksel açıdan anlamlılık bulunmuştur (p<0.05). Sonuç olarak, bilgisayar ve telefon gibi araçlarla oyun oynayan çocukların uygulamaya daha yatkın olduğu ve işitsel reaksiyon sürelerinin iyi düzeyde olduğunu söyleyebiliriz.

Anahtar Kelimeler: Öğrenci, dijital oyun, reaksiyon, oyun

ABSTRACT

The aim of this study is to examine the correlation between the 14-17 aged students behaviors of playing digital games and their auditory reaction times. For this purpose, a total of 76 high school students, male and female, studying in different classes were included in the study. Before the study, all students were informed about the research process. A questionnaire consisting of 10 questions for each student, including behaviors and opinions about playing computer games, was prepared and applied by the researcher, and then an auditory reaction time test was performed on the computer through the program. The ART test was applied to each individual in a sitting position in a quiet and empty room to avoid being affected by the environment. The data obtained and the answers given to the survey questions were scored and the SPSS 22.0 package program was used for statistical analysis. When the data obtained were evaluated, a statistically significant difference (p<0.05) was found in the auditory reaction times of the ninth grade students compared to the eleventh grade students, the tenth grade students compared to the eleventh grade students, and the students who play games compared to the students who do not play. As a result, we can say that children who play with tools such as computers and phones are more prone to practice and their auditory reaction times are at a good level.

Keywords: Digital game, reaction, game, student

1.GİRİŞ

Dijital oyunlar günümüzde teknolojinin de hızla gelişmesiyle birlikte hayatımıza daha fazla girmektedir. Özellikle genç kuşağın daha çok ilgisini çeken dijital oyunlar ülkemizde de önemli bir eğlence aracı haline gelmiştir. Dijital oyunlar farklı tanımlar ile karşımıza çıkmaktadır. Fakat en genel tanımı ile teknolojik temelli araçlar kullanılarak sunulan, bilişsel, sosyal, davranışsal veya psikolojik boyutlara sahip belirli bir hedefe doğru ilerleyen oyunlar olarak anlatılmıştır. Dijital oyun veya video oyunları alanlarına göre çevrimiçi veya çevrimdışı olarak oynanması mümkün olan oyunlardır. Oyunların kullanım alanları birçok alanda farklılaşmakta, eğitim-öğretim faaliyetlerinde okullarda, şirketlerde, askeri ve ekonomik alanlarda ya da bireylerin tamamen eğlence aracı olarak tercih ettikleri uygulamalardır (Namlı ve Demir, 2020; Bozkurt, Dursun, Arı, 2019).

Yakın döneme kadar daimi ve sürekli oyuncular tarafından oynanan oyunlar, günümüzde gerekli donanım ihtiyaçlarının farklılaşması, çeşitlenmesi ve erişimin kolaylaşması nedeniyle oyuncu kitlesi büyük bir artış göstermiştir. Birçok yaş grubunda, çocuklar, yaşlılar, kadınlar ve sürekli oyuncular bu kitle içerisinde aktif olarak bulunmaya başlamıştır. Bu süreci hızlandıran etmenlerde artan kentleşme, azalan oyun alanlarından dolayı pasif kalan bireyler ve sokaklarda güvenliğin kalmaması korku gibi sebeplerde artışı hızlandırmıştır (Bozkurt, Dursun, Arı, 2019).

Dijital oyunlar, yetenek ve zekâ geliştiren, belirli kuralları olan, iyi ve kaliteli zaman geçirmeyi sağlayan eğlencenin dijital hali, ekran üzerinde elektronik olarak gösterilen oyun türü olarak ifade edilmektedir (Coşkun ve Öztürk, 2016; Yükçü ve Kaplanoğlu, 2018). Gelişen teknolojik araçlarda dijital oyun oynamak bireyler arasında önemli görülmektedir. Genç bireyler akranları arasında anlaşılmak ve varlıklarını ispatlamak amacıyla teknolojik araçlardan yararlanmaktadır (Bal, 2013). Yaşıtları ve sosyal çevrelerine uyum sağlayabilmek amacıyla dijital oyunlar oynanmaktadır. Bireylerin dijital oyun oynama nedenleri arasında gündemi takip etmek, eğlenmek, akran grubuyla yaşadığı olumsuzluklardan sıyrılmak, hoşuna gitmeyen ortamlardan uzaklaşmak gibi nedenler yatmaktadır (Tekkurşun Demir ve Mutlu, 2019).

Literatür taramalarında bulunan olumlu ve olumsuz etkilerin farkındalığıyla çalışmamızda dijital oyunların işitsel reaksiyon zamanlarına olan etkilerini incelemeyi amaçladık. Dijital oyun oynayan öğrencilerin oynamayanlara göre işitsel reaksiyon sürelerinin daha az çıkacağını bu araştırmanın hipotezi olarak belirledik.

2.MATERYAL VE METOT

Bu çalışmaya 14-17 yaş aralığında farklı kademlerde öğrenim gören erkek ve kadın toplam da 76 birey gönüllü olarak dahil edildi. Bilgisayar oyunu oynama ile ilgili görüşler anketinin hazırlanması, daha önce literatür taraması yapılarak oluşturulmuş sorulara, araştırmacı tarafından farklı sorular eklenerek çalışmaya özgü geliştirilmiştir. Çalışmada oyun oynama ile ilgili görüşler anketi, on sorudan ve farklı yanıtlardan oluşan görüşleri alma anketidir. Ankette katılımcıların hangi çeşit oyunları oynamayı tercih ettiklerini, bilgisayar oyunları ile ilgili temel görüşlerini, hangi ortamda oyun oynadıklarını belirlemeyi amaçlayan sorulara yer verilmiştir (Özgün, 2021).

Ardından katılımcılara işitsel reaksiyon zamanlarını belirlemek amacıyla dizüstü bilgisayarda uygulama kolaylığı ile işitsel reaksiyon zamanları (IRZ:new.cognitivefun.net) program aracılığı ile test edilmiştir. Reaksiyon zamanları beşer kez ölçülüp ortalamaları milisaniye cinsinde kaydedilmiştir.

2.1. İSTATİSTİKSEL ANALİZ

Elde edilen verilerin analiz edilmesinde Excel ve SPSS 22.0 paket programları kullanılmıştır. Anketten elde edilen verilerin frekans dağılımları tespit edilerek, oyun türü ve diğer değişkenler ile işitsel reaksiyon testleri arasında anlamlı bir farkın olup olmadığını belirlemek için Bağımsız örneklem t testi, varyans analizi ve LSD testleri yapılmıştır. Analiz sonuçlarının istatistiksel olarak anlamlılık seviyeleri $p<0.05$ düzeyinde değerlendirilmiştir.

3. BULGULAR

Elde edilen verilerin analizi ve anket sorularına verilen yanıtlar tablolar halinde sunulmuştur.

Tablo 1. Katılımcıların betimsel istatistikleri

	N	%
Kız	38	50
Erkek	38	50
Toplam	76	100
14 yaş	15	19,7
15 yaş	13	17,1
16 yaş	21	27,6
17 yaş	27	35,5
Toplam	76	100
9. Sınıf	20	26,3
10. Sınıf	23	30,3
11. Sınıf	33	43,4
Toplam	76	100

Tablo 2. Yaş gruplarına göre İRZ değerlerinin analizi

		F	p
İRZ	Gruplar Arası	2,094	,108

Tablo 2'de öğrencilerin yaş gruplarına göre yapılan varyans analizinin (One Way ANOVA) sonuçları görülmektedir. Öğrencilerin yaşlarının İRZ ortalama değerlerinde anlamlı bir farklılık bulunmamıştır. $p>0,05$

Tablo 3. Sınıf düzeylerine göre İRZ değerlerinin analizi

	Değişkenler	N	Ort.±S.S	p
	9. Sınıf	20	315,4±47,15	9-11 **(,006)**
İRZ	10. Sınıf	23	332,17±49,55	
	11. Sınıf	33	376,72±100,89	10-11 **(,034)**

Tablo 3'te sınıf düzeylerine göre İRZ değerlerindeki farklılıklar incelenmiştir. 9. 10. Ve 11. Sınıfta okuyan öğrencilerin İRZ ortalamaları 315,4 ± 47,15, 332,17 ± 49,55, 376,72 ± 100,89 şeklindedir. 9. Sınıfta okuyan öğrencilerle 11. Sınıfta okuyan öğrencilerin İRZ ortalamaları arasında ve 10. Sınıfta okuyan öğrencilerle 11. Sınıfta okuyan öğrenciler arasında anlamlı düzeyde p<0,05 farklılık bulunmuştur.

Tablo 4. Günlük oyun oynama süresine göre İRZ değerlerinin analizi

		F	p
İRZ	Gruplar Arası	1,722	,170

Tablo 4'de öğrencilerin günlük oyun oynama sürelerine göre yapılan varyans analizinin (One Way ANOVA) sonuçları görülmektedir. Öğrencilerin günlük oyun oynama sürelerinin İRZ ortalama değerlerinde anlamlı bir farklılık bulunmamıştır. p>0,05

Tablo 5. Oyun oynanan platforma göre İRZ değerlerinin analizi

		F	p
İRZ	Gruplar Arası	1,727	,169

Tablo 5'te öğrencilerin oyun oynadıkları platformlara göre yapılan varyans analizinin (One Way ANOVA) sonuçları görülmektedir. Öğrencilerin oyun oynadıkları platformların İRZ ortalama değerlerinde anlamlı bir farklılık bulunmamıştır. p>0,05

Tablo 6. Oynanan oyun türlerine göre İRZ değerlerinin analizi

		F	p
İRZ	Gruplar Arası	1,156	,340

Tablo 6'da öğrencilerin oynadıkları oyun türlerine göre yapılan varyans analizinin (One Way ANOVA) sonuçları görülmektedir. Öğrencilerin oynadıkları oyun türlerine göre İRZ değerlerinde anlamlı bir farklılık bulunmamıştır (p>0,05).

Tablo 7. Cinsiyete göre İRZ değerlerinin analizi

		N	Ort.±S.S	t	p
İRZ	Kız	38	353,23±96,80	,668	,506
	Erkek	38	340,97±58,48		

Tablo 7'de cinsiyet göre uygulanan bağımsız örneklem t testinin sonuçları görülmektedir. Öğrencilerin cinsiyetlerine göre İRZ ortalama değerlerinde anlamlı bir farklılık bulunmamıştır (p>0,05).

Tablo 8. Öğrencilerin dijital oyun oynayıp oynamamasına göre İRZ değerlerinin analizi

		N	Ort.±S.S	t	p

İRZ	Oyun Oynayan	51	333,70±54,52	-2,144	**,035**
	Oyun Oynamayan	25	374,44±111,74		

Tablo 8'de öğrencilerin dijital oyun oynayıp oynamamasına göre İRZ değerlerindeki farklılıklar incelenmiştir. Dijital oyun oynayan öğrencilerin İRZ ortalamalarıyla 333,70 ± 54,52 dijital oyun oynamayan öğrencilerin İRZ ortalamaları 374,44 ± 111,74 arasında anlamlı düzeyde p<0,05 farklılık bulunmuştur.

4.TARTIŞMA VE SONUÇ

Bu çalışmada, 14-17 yaş grubu öğrencilerinin dijital oyunları oynama davranışları ile işitsel reaksiyon zamanları arasındaki ilişki incelenmeye çalışılmıştır. Elde edilen veriler değerlendirildiğinde dokuzuncu sınıf öğrencilerinin on birinci sınıftaki öğrencilere göre, onuncu sınıftaki öğrencilerin on birinci sınıftaki öğrencilere göre ve oyun oynayan öğrencilerin oynamayan öğrencilere göre işitsel reaksiyon zamanlarında istatistiksel açıdan anlamlılık bulunmuştur (p<0.05). Sonuç olarak, bilgisayar ve telefon gibi araçlarla oyun oynayan çocukların uygulamaya daha yatkın olduğu ve işitsel reaksiyon sürelerinin iyi düzeyde olduğunu söyleyebiliriz.

Dijital oyun kavramı "video oyunları", "mobil oyunlar" ve "bilgisayar oyunları" terimlerini kapsayan bir kavramdır. Çünkü her üç terimde de bulunan ortak özellikler kontrol işleminin klavye, joystick ya da tuş takımıyla olması ve görüntülenmenin bir ekran aracılığıyla olmasındandır (Kirriemuir, 2002; Pala & Erdem, 2011). Bu nedenle bu çalışmada video oyunları, mobil oyunlar ve bilgisayar oyunları terimlerini kapsayan "dijital oyun" kavramı kullanılmıştır.

Yapılan bir çalışmada, adolesanların fiziksel aktivite tutumlarının cinsiyet, oyun araçlarını kullanma süreleri ve ilgi duydukları spor dalının olması durumuna göre, dijital oyun bağımlılıklarının bazı değişkenler açısından cinsiyet, yaşanılan yer, dijital araca sahip olma, sürekli oynadıkları bir oyun olma durumu, cihazları kullanma süreleri ve ilgilendikleri herhangi bir spor dalının olma durumuna göre çeşitlilik gösterdiğini vurgulamışlardır (Gülbetekin vd., 2021). Prot ve arkadaşları (2014), dijital oyunların etkilerinin çok karmaşık olduğunu, iyi ya da kötü boyutlarından daha fazla boyutları olduğunu ifade eder. Örneğin saldırganlığı arttıran şiddet içerikli dijital oyunlar aileler tarafından endişe verici olarak kabul edilirken video oyunlarıyla askerleri eğiten silahlı kuvvetler için istendik, arzu edilen bir durum haline gelebilir. Günümüz şartlarına bakıldığında, birçok dış etken olmakla birlikte çocuklar dışarıda, açık alanlarda, oyun parklarında veya spor sahalarında oyunlar oynamaktansa, internet kafelerde, evlerinde, playstation salonlarında dijital oyunlar oynamayı tercih etmekte, bunun sonucu olarak da çocukların fiziksel aktivite seviyeleri gittikçe düşüş göstermektedir (Marufoğlu & Kutlutürk, 2021). Sosyal içerikli dijital oyunlar ana kahramanın diğerlerini öldürdüğü şiddet içerikli oyunlardan daha farklıdır. Diğer oyun karakterlerine yardım etmeyi içeren bu oyunlar saldırgan tavır ve düşünceleri azaltırken empati ve yardım etme davranışlarını arttırdığı belirtilmektedir (Prot vd., 2014).

Konu ile ilgili literatür tarandığında, dijital oyunların farklı bir çok etkilerinden bahsedilmiştir. Ancak işitsel reaksiyon süreleri ile dijital oyun arasındaki ilişkinin olup olmadığına dair bilgiler yetersiz kaldığı düşünülmektedir. Çalışma bulguları bilgisayar ve telefon gibi araçlarla oyun oynayan bireylerin uygulamaya daha yatkın olduğu ve işitsel reaksiyon sürelerinin iyi düzeyde olduğu gözlenmiştir.

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YARDIMCI ÜREME TEKNİKLERİNDE ETİK VE EBELİK YAKLAŞIMLARI

ETHICAL AND MIDWIFERY APPROACHES IN ASSISTED REPRODUCTIVE TECHNIQUES

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112 Acil Sağlık Hizmetleri Kurumu

ÖZET

İnfertilite; en az bir yıl süreyle düzenli korunmasız cinsel ilişkiye rağmen gebelik oluşmaması olarak tanımlanan bir üreme sistemi sorunudur. Halk arasında imkânsızlık olarak algılanan bu duruma günümüzde yardımcı üreme teknolojileriyle (YÜT) çözüm bulunmuş ve infertil her çift çocuk sahibi olmaya aday haline gelebilmiştir. YÜT'ün kullanımının artması ve gelişmeye devam etmesi ile birlikte tıbbi etik, obstetrik, psikosoyal, toplumsal açıdan problemler ortaya çıkmaktadır. Özellikle tedavi sürecine üçüncü kişilerin dâhil olması ile etik problemler daha sık yaşanmaya başlanmıştır. Taşıyıcı annelik, oosit veya sperm bağışı, embriyo bağışı ve/veya çoğul gebelik redüksiyonunun kullanılması ile problemlerin yaşanması kaçınılmazdır. Gebeliğin taşıyıcı annelik yolu ile gerçekleştirilmesi ile birlikte dünyaya gelecek olan bebeğin gerçek annesinin kim olacağı tartışması nedeniyle toplumda yer alan aile birliği sarsılacak ve ailede yer alan bireyler rol karmaşası yaşayacaktır. Bununla birlikte çiftlere sunulan; oosit ve sperm satın alma, implantasyon öncesi veya doğum öncesi tanı, embriyo-fetal seçimi gibi çeşitli teknolojik kombinasyon yöntemlerle insan/embriyo yaşam ve seçim hakkı pazarlığa sunulmakta ve devamında birçok etik problem ve sağlık sorunu ortaya çıkmaktadır. Ayrıca dünya üzerinde YÜT ile ilgili cevaplar aynı olmamakla birlikte, yasalar ahlaka, inançlara ve kanaatlere göre değişiklik göstermektedir. Bu çeşitlilik de evrensel olmayan cevapların değeri hakkında da yeni sorunlar ortaya çıkarmaktadır. Bireylerin anne-baba olma yolculuklarında yaşanan bu gecikmelerle birlikte yaşadıkları bu problemler psikolojileri olumsuz etkilemektedir. Bu açıdan değerlendirildiğinde yardımcı üreme teknolojisinde yaşanan bu etik karmaşıklık yaşanan stresi arttıracak ve tedavi sürecini de etkileyecektir. Ebelerin, bireylerin infertilite tanısı almalarından itibaren yanlarında olmaları, danışmanlık sağlama ve tıbbi desteğin yanı sıra psikolojik destek de sağlamaları önemli bir yaklaşımdır. Hasta mahremiyeti korunarak teknolojik gelişmelerin ışığında tedavi sürecinin en yararlı bir şekilde devam ettirilmesi desteklenmeli ve gerekli görülürse deneyimli bir psikiyatristen yardım alınmalıdır. Bu derlemenin amacı, yardımcı üreme tekniklerinde etik konusuna dikkat çekerek, ebelerin rol ve sorumluluklarına yönelik stratejileri sunmaktır.

Anahtar Kelimeler: Ebe, Etik, İnfertilite, Yardımcı Üreme Teknikleri.

ABSTRACT

Infertility is a reproductive system problem defined as the absence of pregnancy despite regular unprotected sexual intercourse for at least one year. This situation, which is perceived as an impossibility among the public, has been solved with assisted reproductive technologies (ART) and every infertile couple can become a candidate to have a child. As the use of ART increases and continues to develop, problems arise in terms of medical ethics, obstetrics, psychosocial and social aspects. Ethical problems have started to be experienced more frequently, especially with the involvement of third parties in the treatment process. Problems are inevitable with the use of surrogacy, oocyte or sperm donation, embryo donation and/or multiple pregnancy reduction. With the realization of pregnancy through surrogacy, the family unity in the society will be shaken and the individuals in the family will experience role confusion due to the debate over who will be the real mother of the baby who will be born. However, offered to couples; Human/embryo survival and the right to choose are negotiated with various technological combination methods such as oocyte and sperm acquisition, pre-implantation or prenatal diagnosis, embryo-fetal selection, and many ethical problems and health problems arise afterwards. In addition, although the answers about ART are not the same in the world, laws vary according to morals, beliefs and convictions. This diversity also raises new questions about the value of non-universal answers. These problems that individuals experience along with these delays in their journey of becoming a parent adversely affect their psychology. When evaluated from this perspective, this ethical complexity experienced in assisted reproductive technology will increase the stress experienced and affect the treatment process. It is an important approach for midwives to be with individuals since they are diagnosed with infertility, to provide counseling and psychological support as well as medical support. The aim of this review is to draw attention to the ethical issue in assisted reproductive techniques and to present strategies for the roles and responsibilities of midwives.

Keywords: Assisted Reproductive Techniques, Ethics, Infertility, Midwife.

GİRİŞ

İnfertilite; 35 yaşlarının altında bir çiftin bir yıl, 35 yaşlarının üstünde bir çiftin ise altı ay korunmadan, düzenli koitusa rağmen gebelik oluşmamasıdır (Vander, 2018). Halk arasında 'kısır', 'çocuğun olması mümkün olmayan', imkânsızlık sanılan olumsuzluk algısı günümüzde yardımcı üreme teknolojisiyle (YÜT) infertil her çift çocuk sahibi olmaya aday haline gelebilmiştir (Göcen,2015). YÜT'ün gelişmeye devam etmesi tıbbi etik, obstetrik, psikosoyal,toplumsal ve açıdan problemleri ortaya çıkarmaktadır (Bertelli, 2019).

1. YARDIMCI ÜREME TEKNİKLERİ TARİHÇESİ

Dünya'da yardımcı üreme teknikleri (YÜT) 1877 yılında Avustralyalı bilim adamı Shenk tarafından ilk kez, oositin in vitro koşullarda fertilize edilmesi üzerinde çalışmalar yapılmaya başlanmıştır (Meran, 2016). 1930 yılında ABD de Pincus'un ünlü ama tartışmalı bir şekilde tavşan yumurtalarını in vitro dölledikten sonra yeni yavrular üretilebileceğini iddia etmesi, 1951'de Chang (1951) ve Austin (1951) bağımsız olarak başlattıkları çalışmada spermin yumurtayı dölleyebilmeden önce uterusta bir dizi yüzey değişikliğine uğraması gerekliliğini keşfi daha sonra Chang ve ark., 1959'

da tavşandan döllenmemiş olgun yumurtaları çıkararak, başka bir tavşan spermi ile dölleyip, kuluçkaya yatırıp elde edilen canlı embriyoları sağlıklı doğurgan başka bir tavşana aktararak ilk tüp bebek uygulaması kesin başarısını kanıtlamıştır (Johnson, 2019) . Zaman içerisinde ilerleyen YÜT teknolojisi 25 temmuz 1978 yılında Bourn Hall Kliniği'nde (İngiltere'deki dünyanın ilk IVF kliniği) Robert Edwards, Robert Steptoe ve Jean Purdy ekip çalışması ile ilk IVF bebeği Louise Brown dünyaya gelmiştir 2010 yılında Fizyolog Robert G. Edwards, bu tedaviyi geliştirdiği için Nobel Fizyoloji veya Tıp Ödülü kazanmıştır (Meran ,2016). Türkiye'de ise ilk tüp bebek merkezi Refik Çapanoğlu ve arkadaşlarının çalışmaları ile Ege Üniversitesinde 23 Haziran 1988 tarihinde açılmış, Türkiye'nin ilk tüp bebeği 18 Nisan 1989′da bu merkezde doğmuştur (Isikoglu, 2021).

2. YARDIMCI ÜREME TEKNİKLERİ
2.1. İn Vitro Fertilizasyon-Embriyo Transferi (IVF-ET)
İlk tüp bebek yöntemi olarak da bilinen yöntemde çeşitli uyaranlarla ovulasyon indüksiyonundan sonra oositlerin laboratuvar ortamında toplanması ve fertilizasyondan sonra gelişen embriyonun transservikal yolla uterusa yerleştirilmesi işlemi yapılır (Altıparmak, 2018).

2.2. Intrauterin Sperm Inseminasyonu (IUI)
1770 de John Hunter tarafından eşler arasındaki ilk intrauterin inseminasyonu gerçekleştirilmiştir. John Hunter, bir erkeğin seminal sıvısını bir şırınga ile eşinin vajinasına enjekte edip, normal bir gebelik elde etmiştir. Yardımla üreme tekniklerinde IUI tedavisi en sıklıkla kullanılan yöntemdir (Çakir, 2017).

2.3. Intracytoplasmic Sperm İnjection (ICSI)
Intrastoplazmik Sperm Enjeksiyonu İlk defa 1992 yılında uygulanmış yardımcı üreme tekniklerinde fertilizasyon oranını artırmak için kullanılan yöntemdir. İlk işlem aspire edilen oositlerin etrafındaki kümülüs kompleksi temizleyip, sonra çıplak oosit bir destekleyici pipet ile sabitlenirken, enjeksiyon ile canlı bir sperm oositin stoplazmasına (ooplazma) enjekte edilir (Algül, 2015).

2.4. Cerrahi Tedavi
Kadında obstrüksiyonların ve erkekte varikoselin düzeltilmesi amacıyla cerrahi tedavi yapılmaktadır (Altıparmak, 2018).

2.5. Yapay Döllenme (Artifical İnsemination- İn Vivo Fertilization)
Bir erkeğin veya kocanın spermi, yabancı bir kadının yumurtası ile dış ortamda değil de aynı kadının rahminde döllendirilip daha sonra oluşan embriyonun kadının rahmine yerleştirilmesi durumudur (Cemile, 2014).

2.6. Gametlerin Transferi (Gamete İntrafallopation Transfer – GIFT)
Bu yöntemde, kadın ya da erkekten alınan ovum ve spermler aynı anda fallop tüplerine yerleştirilerek normal ortamda döllenmesinin sağlanmasıdır (Karakuş, 2020).

3. YARDIMCI ÜREME TEKNİKLERİNDE ÜÇÜNCÜ KİŞİLER

3.1. Taşıyıcı Annelik

Bir kadının başka bir çift için hamilelik taşıdığı yardımcı üreme teknolojisinin önemli bir yöntemidir. Dünyadaki çiftlerin sayısı, çeşitli nedenlerle taşıyıcı annelik hizmetlerine ihtiyaç duymaktadır. Bu düzenleme ilgili tüm taraflar için faydalı görünse de, bununla ilişkili karmaşık sosyal, etik, ahlaki ve yasal sorunlar vardır (Phillips, 2019).

3.2. Oosit veya Sperm Bağışı (Gamet Bağışı)

Üçüncü kişiler tarafından bağışlanan oosit veya spermleri ile bireylerin kendi oosit veya spermleri kullanılarak döllenmenin sağlanmasıdır (Kırca, 2020).

3.3. Embriyo Bağışı

Embriyo, döllenme anından başlayarak gebeliğin sekizinci haftasına kadar devam eden aşamadaki yeni oluşmuş organizmayı ifade eder. Bu yöntem dondurulan embriyoların, genetik sahipleri tarafından, başkalarının rahmine transfer edilmesi işlemidir (Keskin , 2020).

4. PREİMPLANTASYON GENETİK TANI/CİNSİYET SEÇİMİ

Bu yöntemde amaç implantasyon işleminden önce kromozomal içeriği analiz edebilmektir; ilerleyen yaş, tekrarlayan düşükler, tekrarlayan başarısızlıklar, şiddetli erkek faktörü ya da farklı bir takım sebeplerden dolayı oluşabilecek genetik hastalıkların, erken dönemde tespit edilmesi ve sağlıklı olan embriyoların seçilmesidir (Gardner,2017). Gen incelemesiyle beraber aileler doğacak olan çocuğun cinsiyetini de bu tanı testi sayesinde belirleyebilecek ve cinsiyet seçim konusu gündeme gelecektir (Oğuztürk, 2011).

5. ÇOĞUL GEBELİK REDÜKSİYONU

Çoğul gebelik redüksiyonu, çoğul gebeliklerde ortaya çıkacak komplikasyonların önlenmesi için fetüs sayısının azaltılması işlemidir (Hadımlı, 2010).

FIGO (International Federation of Gynecology and Obstetrics)'nun International Journal of Gynecology and Obstetrics'de 2006'da yayınlanan raporunda "Redüksiyon tıbbi olarak gebeliğin sonlandırılması değil, mevcut gebeliğin güvenliği için uygulanan bir prosedürdür. Gebelikte risk oluştuğunda etik kurallar dâhilinde çok fetüslü gebeliklerde redüksiyon düşünülmelidir" (FIGO, 2008).

6. YARDIMCI ÜREME TEKNİKLERİNDE ETİK SORUN

Tüp bebek sonrası ilk doğumdan bu yana dünyada 5 milyondan fazla tüp bebek bebeği dünyaya geldi (Belaisch-Allart, 2014). İlerlemeler kaydeden bu teknoloji (YÜT) ortaya çıkan kanıtlarda olumsuz obstetrik ve perinatal sonuçları, doğum kusurları, kanser ve büyüme-gelişme bozuklukları riskinde artış (Chen, 2017) çoğul gebeliklerde düşük doğum ağırlığını ve preterm doğum ile bağlantılı sorunları ortaya çıkarıp (Mani, 2020) bununla birlikte çiftlere sunulan; oosit ve sperm satın alma, taşıyıcı annelik, implantasyon öncesi veya doğum öncesi tanı, embriyo/fetal seçimi gibi çeşitli teknolojik kombinasyon yöntemlerle insan/embriyo yaşam ve seçim hakkını pazarlığa sunup (Bertelli, 2019) birçok etik ve sağlık sorunu ortaya çıkarıyor. Soru şu ki, cevaplar tüm dünyada aynı değil, yasalar ahlaka, inançlara ve

kanaatlere dayanıyor. Bu varyasyonlar, evrensel olmayan cevapların değeri hakkında da yeni sorular ortaya çıkarır (Belaisch-Allart,2014).

7. YARDIMCI ÜREME TEKNİKLERİNİN PSİKOSOSYAL ETKİSİ

YTÜ 'nin toplum ve eşler üzerindeki psikososyal etkileri vardır; gebe kalmada daha yaşlı anne yaşına doğru bir kayma, üçüncü şahısların üremesinin karmaşıklıkları ve bakım almanın önündeki psikolojik ve sosyoekonomik engellerin dikkate alınması yer alır. Sağlık personelleri YÜT'nin psikolojik ve sosyal yönleriyle mücadele eden çiftleri belirlemeli ve anlamalıdır (Stanhiser, 2018).

8. İNFERTİLİTE DANIŞMANLIĞI

İnfertilite tedavisi genellikle çiftler üzerindeki stresi arttıran faktördür. Tedavi sürecinde bazı kadınların cinsel sorunlarıyla başa çıkabildiği, bazılarının ise kullanılan ilaçlardan ve yardımcı üreme tekniklerinden çok etkilendiği başa çıkamadığı gözlenmiştir (Gümüşay,2020).

Birey ve/veya çifte infertilite tanı, tedavi sürecinde ve tedavi sonrasında; ruh sağlığı alanında uzman bir kişi tarafından bilgi ve beceri kazandırarak bilinçlendirmek, tedavi ile ilgili karar vermelerine ve infertilitenin yarattığı yıkıcı duygularla başa çıkmalarına yardımcı olmak için danışmanlık verilmelidir (Seymenler,2018).

9. YARDIMCI ÜREME TEKNİKLERİNDE EBENİN SORUMLULUKLARI

- Ebeler kısırlığın tedavisinde önemli bir yer olan tüp bebek (IVF) merkezlerinde görev alırlar, üstlendikleri sorumluluk daha çok danışmanlık, psikolojik destek, hasta hakları savunuculuğu, yöneticilik, eğitmenlik ve araştırmacılık gibi görevlerdir (Yeşil, 2018).

- Ebelerin gizlilik gerektiren veriyi özenle koruyarak bireyin mahremiyet hakkını savunması beklenir (Yeşil, 2018).

Ebeler, teknolojinin getirdiği tıbbi gelişmelerin önceden öngörülemeyecek toplumsal sonuçlarının bilinciyle hareket ederek;

- Onam esansında ebeler, her tür tedavi ve girişim konusunda hastayı bilgilendirir ve verilen bilgileri anlamalarını sağlar (Karadağlı 2016, Özlem, 2018).

- Eleştirel bakış açısından uzak kalmalıdır (Özpulat,2017).

- YÜT talebinde bulunan çiftleri; kullanılacak yöntemin anne ve bebeğe yararları olası zararları, riskleri, alternatif üreme teknikleri, bunların yararları ve tehlikeleri konusunda bilgi vermelidir (Özpulat,2017).

- Yeni üreme tekniklerinin her biri için şekillerle desteklenen bilgilendirme formları hazırlanmalı, başvuran çiftler formu incelemeleri için tanınan sürenin sonunda soru sormaya cesaretlendirilerek bilgilerin anlaşıldığından emin olunmalıdır (Özpulat,2017).

- Başvuruda bulunacak her çifte YÜT kullanılarak oluşturulacak embriyonun sağlıklı gelişmesi, sağlıklı doğması ve sağlıklı büyümesi hakkında danışmanlık sağlanmalıdır.

- Yapılan başvurularda kaynakların adil dağılımı ilkesi dikkate alınmalıdır (Özpulat,2017).

- Sağlık personelinin çiftlerin normal ve anormal davranış arasındaki farkı bilmesi son derece önemlidir. Bütün tehditleri ciddiye almalı ve hastayı yardım için nereye göndereceğini bilmelidir. Hastaların geçici olarak şaşkınlık, kayıp, üzüntü semptomları hissetmelerinin normal olduğunu bilmeye ihtiyaçları vardır. Gerekirse deneyimli bir psikiyatristen yardım alınmalıdır (Dilek,2009).

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CEZAEVİNDE KADIN OLMAK VE EBELİK YAKLAŞIMLARI
BEING A WOMAN IN PRISON AND APPROACHES TO MIDWIFERY

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112 Acil Sağlık Hizmetleri Kurumu

ÖZET

Birey suç işlediği zaman adalet sistemi içerisinde karakol, adliye, cezaevi gibi kurumlarla tanışır. Bireyin suç işlemesine sebep olan çok çeşitli etkenler olması muhtemeldir. Son yıllarda artış gösteren kadın suçluluğunun esas nedenlerinin, kadınların maruz kaldıkları şiddetin bir sonucu olarak geliştiği ve madde kullanımından kaynaklı olduğu vurgulanmaktadır. Suçluluk olgusunda kadının yer almasına neden olan en önemli etken olarak kadınların problem çözme becerilerinde yetersiz kalmaları, çoğu zaman yaşam karşısında güçsüz bırakılmaları ve sorunlar karşısında doğru baş etme stratejilerine sahip olmamaları gösterilebilir. Kadın mağduriyetinin bir sonucu olarak ortaya çıktığı düşünülen suç işleme vakaları kadınların yaşamını derinden etkilemektedir. Bu kadınların genellikle uyuşturucu kullanımı, şiddet, seksüel kötüye kullanım, seks işçiliği ve korunmasız cinsel uygulamalar gibi risk faktörlerine sahip olduğu bildirilmektedir. Cezaevinde kalan kadınların genital hijyene ilişkin bireysel davranışları ve alışkanlıkları geliştirmeleri, bunlarla ilintili olarak üreme sağlığı açısından taşıdıkları risklerin ortaya konması koruyucu sağlık hizmetleri açısından önemlidir. Ayrıca anneleri hükümlü olan, dışarıda korumasına bırakılacak kimsesi bulunmayan sıfır-altı yaş arasındaki çocuklar annelerinin yanında cezaevinde kalma hakkı bulunmaktadır. Cezaevinin annelik sorumluluğunu üstlenmek ve tam zamanlı annelik yapmak için ideal bir yer olmamasına rağmen kadın hükümlülerin çoğu bu sorumluluğu üstlenmek istemektedir. Bu durumun sonucu olarak kadınlar, doğum sonrası hem bebeğinin ihtiyaçları karşılamak hemde kendi bakımını sağlamak konusunda çaresizlik duygusu yaşayabilir ve yalnız kalabilirler. Ayrıca cezaevlerinde anne motivasyonunu olumsuz etkileyecek insan sayısı ve kültürü fazla olması nedeniyle anne her zaman bebeğini emzirmek için anne-bebek özel alanı, sessizlik, mahremiyet oluşturamayabilir. Bu bilgiler ışığında kadınlar için, emzirmeyi destekleyen grupların cezaevi içerisinde de oluşumu sağlanmalı ve doğum sonunda annelerin bu gruplara katılmaları teşvik edilmelidir. Ayrıca kadınların ihtiyaç duyduğu profesyonel bakım desteği sağlanmalı ve cezaevine girdikleri andan itibaren psikolojik ve psikiyatrik müdahaleler uygulanmalıdır. Bu derlemenin amacı, cezaevinde bulunan kadınlara dikkat çekerek annelik yönlerini incelemek, bu konularda önerilen stratejileri sunmak ve bu stratejiler ışığında ebelerin rol ve sorumluluklarına yönelik önerilerde bulunmaktır.

Anahtar Kelimeler: Cezaevi, Kadın, Anne, Ebe, Destek.

ABSTRACT

When a person commits a crime, it will be the moment when he gets acquainted with the police station, courthouse and prison within the legal system. There are probably multiple reasons that lay behind the commitment of a crime. It should be underlined that crimes, committed by women, root also from violence against women and substance abuse. Main aspects of the reasons why women are committing

crimes are factors like having poor issue resolving skills, heaving trouble with menaging life circumstances and not having sufficient strategies to cope with problems . Crimes committed by women, are concerned to caused by women suppression and have a huge impact on theirs lives. It is reported that those women are under a high risk of substance abuse, violence, sexual abuse, sex employment and unprevented sexual intercourse. It is an important part of preventive health care, that those women are educated in concern of devoloping conscious genital hygene routines and that the risks in concern of reproductive health are outlined. Besides there is the given right, that imprisoned mothers can take care of their children between 0-6 ages, if there is no one outside to care of their child. Although the circumstances of prison don't provide the most optimal possibilities to care for a child, most imprisoned women prefer to care for their children themselves. It is likely, that women in these circumstances, could feel helpless when it comes to self care and care of their babies and feel alone. Also it is possible, that breastfeeding women could not have access to spaces with privacy and silence to nurse their infants, due to crowded and multiculturel circumstances. This is why healty nursing environments and breastfeeding education programs should be provided also for women in prison. Imprisoned women should also be supported with necessary Professional medikal and psychological care. The objective of this study is to scope on maternity aspects of imprisoned women, to develop strategies and clarify the midwifes role and responsibilities within these strategies.

Keywords: Midwife, Mother, Prison, Support, Women.

CEZAEVİNDE KADIN OLMAK VE EBELİK YAKLAŞIMLARI

GİRİŞ

Birey suç işlediği zaman adalet sistemi içerisinde karakol, adliye, cezaevi gibi kurumlarla tanışır. Bireyin suç işlemesine sebep olan çok çeşitli etkenler olması muhtemeldir. Bu sebeplerden biri de ruhsal bozukluk sahibi olmalarıdır. Hükümlüler, cezaevine girdikleri andan itibaren çeşitli psikolojik ve psikiyatrik müdahalelere ihtiyaç duymaktadırlar (Aydın, 2010). Suçluluk olgusunda kadının yer almasına neden olan en önemli etken olarak kadınların problem çözme becerilerinde yetersiz kalmaları, çoğu zaman yaşam karşısında güçsüz bırakılmaları ve sorunlar karşısında doğru baş etme stratejilerine sahip olmamaları gösterilebilir (Çiftçi, 2019).

Annelik, hamilelikle başlayan ve biyolojik bir değişimle beraber duygusal bir deneyimi de içeren, doğum sonrasındaysa kültürel olarak belirlenmiş sorumluluklar barındıran bir kimliktir (Avci, 2021). 5275 sayılı Ceza ve Güvenlik Tedbirlerinin İnfazı Hakkında Kanunun 65. maddesi gereğince anneleri hükümlü olan, dışarıda korumasına bırakılacak kimsesi bulunmayan 0-6 yaş arasındaki çocuklar annelerinin yanında cezaevinde kalabilmektedir (Şahinöz, Küçük, Çakır, Uzun, Durualp, 2019). Mevcut çalışmalar hükümlü kadınların sıklıkla anneliklerine değindiklerini gösterir (Nuttbrock, Freudiger, 1991). Mahpus kadınlarının cezaevi rutini içerisinde çocukları yanında olan veya olmayan, eksik anne-bebek bağı kurulmuş ebeveynlerin dile getirdikleri merkezi konu annelik olmaktatır (Merçil, 2020). Bu toplumumuzda anneliğin özel bir statü olmasından kaynaklanmaktadır.

Cezaevinin annelik sorumluluğunu üstlenmek ve tam zamanlı annelik yapmak için ideal bir yer olmamasına rağmen kadın mahpusların çoğu bu sorumluluğu cezaevinden de olsa üstlenmek istermektedirler (Merçil, 2020). Tutuklu anne olmak kadınlara sabır, güç, gelecek planları için motivasyon sağlamaktadır.

Anne-bebek bağlanması gebelik döneminden başlayıp doğum sonu dönemde devam eden bir süreçtir. Ebeveynin fetüse ve yeni doğana bağlılığı birçok faktörden etkilenmektedir (Akarsu, 2017). Anne bebek bağlanması gebelikte başlayıp doğum sonu dönemde de artarak devam eden ve temel bakımını sağlayan kişi arasında gelişen, bebekte güven duygusunun gelişmesini sağlayan, anne ve bebeğin, dokunarak ve göz göze bakışarak iletişim kurduğu bu dönem, çocuk için en değerli beyin gelişiminin gerçekleştiği dönemdir (Şolt, 2011; Çömlek, 2021; Karadeniz, 2022). Dünya Sağlık Örgütü (DSÖ), doğumdan sonra 42. güne kadar geçen dönemin önemini vurgulamaktadır (Can, 2015). Anne ve bebeğin savunmasız olduğu bu dönemde eksik bakım hastalık ve ölüm riskini artırabilmektedir (Fatma, 2021). Cezaevi ortamında kadının doğum sonrası hem bebeğin ihtiyaçları hem de kendi bakımı ile karşı karşıya kalması daha çok çaresizlik duygusuna kapılmasına sebep açabilir (Çapık, 2014). Zayıf anne bebek bağlanmasının duygu durum bozukluğu ve ileriki dönemlerde çocuk istismarı ile, güçlü anne-bebek bağlanmasının ise sağlıklı beslenme, düzenli uyku, yeterli egzersiz, doğum sonrası psikososyal destek ile ilişkili olduğu da bilinmektedir (Akarsu, 2017; Brandon, 2009).

EBELİK YAKLAŞIMLARI

Ebelik bakımı; gebeliğin planlanması aşaması ile başlayıp, sağlıklı sürdürülüp sorunsuz bir şekilde doğumu amaçlayan, gebeye gerekli tıbbi, psikolojik ve sosyal desteği doğru, dikkatli ve akılcı uygulamalarla gerçekleştiren, doğum sonrası da bakıma devam eden, aile planlaması, anne ruh sağlığı, beslenme, temizlik ve bağlanma, emzirme konularında danışmanlığı içermektedir (Pirdal, 2016; WHO, 2013).

Hükümlü annenin doğum sonu sürece adapte olması, laktasyon sürecinin başlaması anne-bebek bağının kurulması ve sağlıklı şekilde sürdürülmesi, anne-bebeğe verilecek kaliteli ebe bakım ve takibi önemlidir (Yaşar, 2022). Emzirme, anne-bebek arasında sevgi dolu bir ilişkinin oluşmasını sağlamaktadır. Bebeğini severek ve isteyerek emziren anne, bebeğine güven duygusu verir ve bu durum anne-bebek arasında ruhsal ve biyolojik olarak sağlıklı bir yakınlık doğmasını sağlar (Şolt, 2011). Kısa sürede emzirmeye başlanılması, anne ile bebeğin aynı odada kalması, kanguru bakımı, anne-bebek masajı, yoga ve meditasyon, sosyal destek gibi kanıta dayalı uygulamalar anne-bebek bağlanması için yararlı olmaktadır (Özkara, 2016).

Anne ve bebeklerin etkileşim sırasında annenin bebeğin hareketlerine odaklanıp karşılık vermesi anne-bebek ilişkisini düzenlemekte ve dengede tutmaktadır (Mucuk, 2018; Ulutaş, Aksoy, 2016). Emzirme öz-yeterlilik algısı bebeğini emzirebilmek için annenin ne kadar çaba göstereceğini, duygusal olarak emzirmeye hazır olup olmadığını ve emzirme ile ilgili düşüncelerini yansıtmaktadır (İnce, Aktaş, 2017). Kişinin psikolojik durumu öz-yeterlilik algısını etkilemektedir. Sakin ve rahat ruh hali öz yeterliliği olumlu yönde etkilerken, depresif ve stresli ruh hali öz yeterliliği olumsuz yönde etkileyecektir (Selvi, 2019).

Kadının hayatının bir amacı olması, bebeğinin kendisine bağlanması için emzirmesi bütünleşmiş düzenleme ile motive olduğunu göstermektedir (Mızrak, 2017). İçsel motivasyonla emziren annelerin zevk aldığı ve tatmin olduğu saptanmıştır. Annenin sevdiği ve eğlenceli bulduğu için emzirmesi içsel motive olduğunu göstermektedir (Şen, 2020). Cezaevlerinde anne motivasyonunu olumsuz etkileyecek insan sayısı ve kültürü fazladır ve anne her zaman bebeğini emzirmek için anne-bebek özel alanı, sessizlik, mahremiyet oluşturamayabilir. Emzirmeyi destekleyen grupların cezaevleri içinde de oluşumu sağlanmalı ve taburcu olan annelerin bu gruplara katılmaları teşvik edilmelidir. Kadınlar, bu profesyonel bakım desteğine de ihtiyaç duymaktadır (Çapık, 2014). Annenin doğum sonrası ortamına uyumu, fiziksel bakımı, bilgi gereksinimlerini karşılamak, anne bebek arasında

etkileşimi başlatmak ve annenin özgüvenini yükseltmek anneye destek olmak ebenin sorumluluklarını oluşturmaktadır (Nuttbrock, 1991; Can, 2015).

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İŞİTME CİHAZI KULLANAN BİREYLERDE İŞİTME CİHAZI MEMNUNİYETİNİ ETKİLEYEN ODYOLOJİK FAKTÖRLERİN ARAŞTIRILMASI

INVESTIGATION OF AUDIOLOGICAL FACTORS AFFECTING HEARING AID SATISFACTION IN HEARING AID USERS

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ÖZET

İşitme kaybı olan bireyler sosyal ve mesleki çevrelerinde kimi zaman rahat bir iletişim kuramadıkları için bulundukları ortamda kendilerini kısıtlamakta veya soyutlamaktadırlar. Bu nedenle bu olumsuzlukları azaltabilmek için işitme kaybına cevap verebilecek nitelikte iyi bir performans ve verim sağlayacak işitme cihazı kullanımına başlamak en sağlıklı yollardan bir tanesidir. Bu çalışmanın amacı bireylerin otoskopik muayenesi yapıldıktan sonra işitme kaybı tespit edilen ve işitme endikasyonu konan hastaların uygun işitme cihazı kullanmalarını takiben 6 ay ve sonrası işitme eşiklerinde, konuşmayı ayırt etme skorlarında ve konuşmayı alma eşikleri gibi odyolojik faktörler üzerindeki etkiyi Gerçek Kulak Ölçümü (Real Ear Mesarument-REM Testi) yaparak İşitme Cihazlı Gerçek Kulak Kazancı (Real Ear Aided Gain-REAG) ile değerlendirmek ve Amplifikasyon Memnuniyeti Anketi (SADL) uygulayarak işitme cihazı kullanım memnuniyetini araştırmaktır. Yöntem olarak çalışmamıza 18-65 yaş arası 45'i kadın, 55' i erkek olan nörodejeneratif hastalığı olmayan, kulak ameliyatı geçirmemiş, anormal kulak bulgusu bulunmayan 100 birey katılmıştır. İşitme cihazı merkezimizde farklı şiddette gönderilen ses uyaranları ile REM Testi yapılarak bu uyaranların farklı frekanslardaki (0.5, 1, 2 ve 4kHz) REAG sonuçları kaydedilerek istatistiksel analizleri yapılmıştır ve SADL uygulanarak VAS Skorları hesaplanmıştır. DSL V5.0 algoritmasında istatistiksel analiz sonuçlarına göre; 50, 70 ve 90 dB şiddetindeki uyaranların 0.5, 1, 2, ve 4 kHz' deki frekanslarda REAG sonuçlarında target (hedef) ile curve (cihaz yanıtı) ölçümü arasında anlamlı $p<0.05$ pozitif korelasyon gözlemlenmiştir. SADL sorularına verilen cevapların VAS Skorları soru bazında değerlendirilme yüzdeleri hesaplanmıştır. Uygun işitme cihazı kullanımlarını takiben 6 ay ve sonrasında yapılan REAG ölçümü ile işitme cihazının kazanç ayarlarının uygun yapıldığında işitme eşiklerinin iyileştiği görülmüş olup gürültülü/sessiz ortamlarda konuşulanları ayırt etmede/anlamada, sesin lokalizasyonunda ve kendi sesinden rahatsız olmama vb. durumlarda amplifikasyondan memnuniyet sağlanmış olacaktır.

Anahtar Kelimeler: İşitme cihazı, SADL, REM Testi, Memnuniyet, gerçek kulak kazancı

ABSTRACT

Individuals with hearing loss sometimes restrict or isolate themselves in the environment they are in because they cannot communicate comfortably in their social and professional environment. For this reason, it is one of the healthiest ways to start using a hearing aid that will provide a good performance and efficiency that can respond to hearing loss in order to reduce these negativities. The aim of this study is hearing loss after otoscopic examination of individuals. Real Ear Mesarument-REM Test with Hearing Aids to determine the effect on audiological factors such as hearing thresholds, speech discrimination scores and speech reception thresholds for 6 months and later following the use of appropriate hearing aids by patients with hearing aids and hearing indications. Real Ear Aided Gain-REAG) and to investigate hearing aid use satisfaction by applying the Amplification Satisfaction Questionnaire (SADL). As a method, in our study, 45 female and 55 male, aged 18-65, without neurodegenerative disease, ear surgery 100 individuals who did not have a history of hearing loss and had no abnormal ear findings participated in the study. The REM test was performed with sound stimuli sent in different intensities in our hearing aid center, and the REAG results of these stimuli at different frequencies (0.5, 1, 2 and 4kHz) were recorded and statistical analyzes were made and VAS Scores were calculated by applying SADL. According to the statistical analysis results in the DSL V5.0 algorithm; A significant $p<0.05$ positive correlation was observed between target (target) and curve (device response) measurement in REAG results of stimuli with 50, 70 and 90 dB intensity at frequencies of 0.5, 1, 2, and 4 kHz. Evaluation percentages of the answers given to the SADL questions on the basis of the VAS Scores were calculated. With the REAG measurement made 6 months and later following the use of appropriate hearing aids, it has been observed that hearing thresholds improve when the gain settings of the hearing aid are made appropriately. In some cases, satisfaction with the amplification will be achieved.

Keywords: Hearing aid, SADL, REM Test, Satisfaction, real ear gain

DETERMINATION OF VITALITY OF *PICHIA KUDRIAVZEII* JD2 YEAST STRAIN IN ARTIFICIAL STOMACH AND BILE

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ABSTRACT

In this study, yeast strains of *Pichia kudriavzeii* JD2 isolated from dates were found at low pH (2.0; 3.0; 4.0, and 6.2-control) and different bile concentrations (0.06%, 0.15, and 0.30). resistance abilities. Viability determination studies were conducted at 0 (control), 60, and 180 min for artificial stomach and 0 (control), 1, and 240 min for artificial bile. In the yeast strain, at pH 3.0, the number of viable cells was higher than pH 2.0 and 4.0. The highest viability was observed at pH 3.0 and 0 minutes (5.82 log CFU/mL), while the lowest viability was observed at pH 2.0 at 180 (3.77 log CFU/mL). The correlation between the pH value and the viability of the strain was determined by regression analysis. Since the multiple R values were higher than 0.75 at the 0th min, a strong and positive correlation was observed, and at the 60th and 180th min, a weak and negative correlation was observed as the multiple R values were less than 0.75. Considering the resistance abilities of the *Pichia kudriavzeii* JD2 strain at different bile concentrations, the highest viability was determined at 0 min and at 0.06% bile concentration (5.95 log CFU/mL) and the best percent viability was found to be 90.25%. It was designated that the per cent viability of yeast strain decreased with increasing bile concentration and time. The lowest viability was observed at 0.30% bile concentration (2.18 log CFU/mL) at the 240th min. 0.15% and 0.30% bile concentrations, the viability at the 240th min was detected to be 70% and 59%, respectively. According to the results obtained, a significant decrease in yeast viability was observed as the bile concentration in the medium increased ($p<0.05$)

Keywords: *Pichia kudriavzevii*, artificial stomach, artificial bile

EFFECT OF CUCURBITACIN E ON NEUROFIBRILLARY TANGLES AND COGNITIVE FUNCTIONS IN ALZHEIMER'S RAT MODEL

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ÖZET

Alzheimer hastalığı (AH) bir beyin hastalığıdır. Tanısı ve tedavisi için kesin yöntemler bulunmamaktadır. Multifaktöriyel doğası sebebiyle tek bir tedavi yöntemi mevcut değildir. AH'nin sıklığının artması ve sinsi ilerlemesi fark edilmeden hafızanın kaybedilmesi ile sonuçlanmaktadır. Fitokimyasallar yüzyıllardır kullanılan fitoterapinin temelidir. Bu çalışmada, Alzheimer sıçan modelinde nöronal iletimi engelleyen ve bellek kaybında etkili olan Tau fibrilleri oluşturuldu. Yüksek antioksidan ve nöroprotektif etkiye sahip Ecballium elaterium bitkisindeki cucurbitacin E (CuE) ile tedavi sonrasında tau fibril oluşumunda azalmanın olup olmadığı ve bilişsel fonksiyonlara etkisi araştırıldı. Bitki seçiminde veri tabanları ve hastalık ilişkileri analiz edildi. Alzheimer modeli için Sprague Dawley dişi ratlar (225-250 gr, dişi) kullanıldı. Stereotaksi (bregmanın 0,8 mm arkası, sagital sütürün 1,5 mm laterali ve beyin yüzeyinin 3,6 mm altı) ile intraserbroventriküler (ICV) olarak uygulanan okadaik asit sonrası tau fibrilleri oluşumu sağlandı. Hayvanlar rastgele her grupta 6 hayvan olmak üzere 5 gruba ayrıldı. 1- Kontrol, 2- Stereotaksi, 3- Stereotaksi+aCSF (artificial cerebrospinal fluid), 4- Stereotaksi+Okadaik asit (OKA), 5- Stereotaksi+OKA+Cucurbitacin E. Daha sonra Rotarod, Morris su labirenti, yükseltilmiş artı labirent testi ile motor aktivite, şartsız anksiyete ve bellek analizleri yapıldı. Son olarak hayvanların hipokampusları alındı, immünohistokimyasal olarak Tau fibrillerinin değişimi, western blot ile MAPK1/3, MAPK14 ve Tau protein düzeyleri, kantitatif Real-Time PCR ile AH patolojisinde etkili MAPK1/3 ve 14'ün gen ekspresyon düzeyleri tespit edildi. İstatistiksel analiz, çoklu karşılaştırmalar için tek yönlü ANOVA ve post-hoc analizleri Tukey testi ile yapıldı. Elde edilen sonuçlar CuE'nin Alzheimer Tau patolojisini düzenleyerek belleğin kazanılmasında etkili olduğunu ve tedavi amaçlı kullanılabileceğini gösterdi.

ABSTRACT

Alzheimer's disease (AD) is a brain disease. There are no definitive methods for its diagnosis and treatment. Due to its multifactorial nature, there is no single treatment method available. The increase in the frequency and insidious progression of AD results in the loss of memory undetected.

Phytochemicals are the basis of phytotherapy, which has been used for centuries. In this study, Tau fibrils, which inhibit neuronal transmission and are effective in memory loss, were formed in a rat model of Alzheimer's. It was investigated whether there was a decrease in tau fibril formation and its effect on cognitive functions after treatment with cucurbitacin E (CuE) in the *Ecballium elaterium* plant, which has a high antioxidant and neuroprotective effect. Databases and disease associations were analyzed in plant selection. Sprague Dawley female rats (225-250 g, female) were used for the Alzheimer's model. Tau fibrils were formed after okadaic acid was applied intracerebroventricularly (ICV) with stereotaxic surgery (bregma coordinates). Animals were randomly divided into 5 groups, with 6 animals in each group. 1- Control, 2- Stereotaxic, 3- Stereotaxic+aCSF (artificial cerebrospinal fluid), 4- Stereotaxic+Ocadaic acid (OKA), 5- Stereotaxic+OKA+CuE. Rotarod, Morris water maze, elevated plus maze test motor activity, unconditional anxiety, and memory analyzes were performed. Finally, the hippocampus of the animals was taken, the changes of Tau fibrils were determined immunohistochemically, MAPK1/3, MAPK14, and Tau protein levels were determined by western blot, and gene expression levels of MAPK1/3 and 14, which are effective in AD pathology, were determined by quantitative Real-Time PCR. Statistical analysis was performed with one-way ANOVA for multiple comparisons and post-hoc analyzes using Tukey's test. The results showed that CuE is effective in the acquisition of memory by regulating Alzheimer's tau pathology and can be used for therapeutic purposes.

Keywords: Alzheimer's, tau fibril, cucurbitacin E, phytochemical, MAPK1, MAPK3, MAPK14

1. INTRODUCTION

Alzheimer's disease (AD) is a neurodegenerative disease with memory deficit and executive dysfunction as characteristic clinical features (Bellenguez, Grenier-Boley, & Lambert, 2020). AD has a strong genetic basis. Studies conducted in the last decade have shown that many genes/loci are associated with the risk of AD. Diagnosis of AD is difficult and interventional treatment options are scarce because of the low efficacy of treatments and the uncertain targets due to the multifactorial nature of the disease. Finding genetic factors that contribute to the development of AD (Reitz, 2014) means having the potential to develop effective strategies to combat this devastating disease, providing new targets for treatment and prevention. Although these studies shed light on the pathogenesis of AD, our genetic information is still not complete and more genetic studies are needed. It is known that rare forms of AD show an autosomal dominant inheritance (Van Cauwenberghe, Van Broeckhoven, & Sleegers, 2016). Amyloid precursor protein (APP), presenilin-1 (PSEN1), and presenilin 2 (PSEN2) genes were found to be responsible for the early-onset hereditary forms (Giau, Bagyinszky, Youn, An, & Kim, 2019). However, the majority of AD cases are late-onset 'sporadic' forms with no obvious familial clustering. The strongest genetic parameter related to AD is the presence of the apolipoprotein e4 (APOE) allele which is a factor in amyloid-β aggregation, which is among the causes of the disease (Kim, Basak, & Holtzman, 2009). Considering the prevalence and incidence of AD, it is seen that more than 50% of dementia (dementia) cases are AD. Worldwide, 24 million people are affected. In addition, more than 5 million new cases of AD are reported each year, and the incidence rises from 1% to 6% between the ages of 60 and 70, to 8% at age 85 or older, and will likely continue to rise (Association, 2019). AD in both early-onset and late-onset forms presents clinically as dementia that begins with a gradual memory decline and then gradually increases in severity until symptoms eventually subside. While the memory of the recent past is impaired in patients, distant memory is relatively preserved. As the disease progresses, deterioration in other cognitive domains (language, abstract reasoning, motor functions, and decision-making) occurs to varying degrees. It is typically associated with difficulty at work and social life or household activities. Neurological symptoms that may occur in the course of the disease include seizures, hypertonia, myoclonus, incontinence, and mutism. Death usually occurs from malnutrition and pneumonia due to loss of cognitive and motor functions.

Clinical diagnosis of AD is based on clinical history, neurological sampling, and neuropsychological testing. To diagnose dementia according to the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition [DSM-IV]) criteria), an individual must have 2 or more loss of memory, language, interpretation, adaptation, and judgment abilities (Kawas, 2003). Another common criterion, NINCDS-ADRDA (National Institute of Neurological and Communicative Disorders and Stroke-Alzheimer's Disease and Related Disorders Association), diagnosis is based on clinical sampling, defects in at least 2 cognitive domains, the presence of other systemic disorders, and progressive memory loss. Mental state sampling (MMSE) testing helps to identify the patient's cognitive abilities In addition, a possible diagnosis of AD, frontotemporal dementia (including frontotemporal dementia with parkinsonism and Pick's disease), Parkinson's disease, diffuse Lewy body disease, Creutzfeldt-Jakob disease, subcortical infarcts and cerebral autosomal dominant with leukoencephalopathy (CADASIL) requires exclusion of other neurodegenerative disorders associated with dementia, such as arteriopathy (Rogan & Lippa, 2002). Differentiating AD from other forms of dementia is usually made through clinical history and neurological examination. In addition, other systemic causes of dementia, especially depressive disorder, chronic drug intoxication, chronic central nervous system infection, thyroid disease, vitamin deficiencies, central nervous system angitis, and treatable types of cognitive impairment such as normal pressure hydrocephalus should be excluded (Bird, 2008). For the definitive diagnosis of AD, two histopathological features must be found in postmortem tissue samples: Neurofibrillary threads and amyloid plaques. Although these features are usually found in cognitively normal elderly individuals, the density of plaques and distribution of neurofibrillary filaments are more severe in patients with AD, according to standardized histological assessments (Braak & Braak, 1997). In addition to amyloid beta pathology, neurons carrying neurofibrillary threads, which we focused on in this study, are another common finding in AD brains, and the temporal and spatial appearance of these tangles containing hyper phosphorylated tau reflect the severity of the disease rather than the presence of amyloid plaques (Braak & Braak, 1991). Neurofibrils are formed by hyper phosphorylation of a microtubule-associated protein known as tau, causing it to aggregate in an insoluble form (Kent, Spires-Jones, & Durrant, 2020). Synapse loss is the strongest pathological cause of the cognitive decline in AD, so protecting these vital structures is a key therapeutic goal. Tau is the prime suspect, where it accumulates at synapses, disrupting key synaptic machinery, and causing spine collapse and synaptic damage. While toxic tau is implicated in AD pathology, this protein may be downregulated at the synapse to contribute to disease. To prevent exacerbation or emergence of synaptic pathology, tau-targeted therapeutics can be designed to reduce potential loss of function at the synapse.

In addition to these mechanisms, oxidative stress, which is also effective in the formation of Tau and amyloid beta protein and an early marker in the progression of AD, has also been extensively investigated (Cheignon et al., 2018). Due to this mechanism, pre-symptomatic AD has been associated with mitochondrial defects (Varghese et al., 2011). Mitochondrial defects (other than reduced ATP formation) result in the overproduction of reactive oxygen species (ROS). ROSs; has been associated with membrane damage, cytoskeletal changes, and cell death (Avery, 2014). Oxidative stress is a condition in which either increased cellular levels of ROS are produced and/or cellular mechanisms have insufficient capacity to reduce the potentially damaging effect of ROS (Pizzino et al., 2017). Reactive nitrogen species (RNS), as well as ROS, have a role in the mechanism of AD. Free radicals can be classified as 2 key signaling molecules, ROS and RNS. These reactive species often act on cells through oxidative and nitrosative signals. These redox modifications are important in the regulation of normal biological and physiological processes (Spiers, Chen, Bourgognon, & Steinert, 2019). Cumulative oxidative stress, disruption of mitochondrial respiration, and mitochondrial damage are associated with AD. The biochemical cascades of apoptosis are mediated marker molecules, including protein kinases and transcription factors. Expressions in pro-apoptotic signaling networks can indeed promote cell death and degeneration in brain cells. Regulation of this protein phosphorylation by kinases and phosphatases emerges as a prerequisite mechanism in the control of the apoptotic cell death program and is associated with AD (Ramalingam & Kim, 2012). Oxidative damage is localized with tau-enriched neurofibrillary tangles (Smith et al., 1998). Various molecules related to the activity of nitric acid

involved in oxidation have been studied. For example; Hippocampal tissue from AD patients was subjected to postmortem analysis investigating the localization of the dimethyl arginine enzyme and it was found that the enzyme regulates the activity of nitric oxide synthase. In many analyzes, it was determined that various metabolic products in the brain tissues of patients with AD were associated with tau due to errors in the activation of enzymes (Zubčić, Hof, Šimić, & Jazvinšćak Jembrek, 2020).

In addition to pharmacological treatments, it is possible to make a direct and effective contribution to the treatment of the disease with approaches such as designing molecules targeting proteins such as tau and beta-amyloid, blocking enzymes involved in protein degradation, and preventing their accumulation. In gene therapy applications, techniques such as correction of the ApoE4 allele with viral vectors, use of CRISPR nanoparticles, and allele deletion have been applied in single-gene diseases and successful results have been obtained. While there is debate about the goals and efficacy of viral vectors, target attainability (such as primer design, and signal sequence queuing) and good manual planning reduce the chance of failure. Phytochemicals can offer an effective approach in that they can be controlled and their results can be demonstrated with clear, measurable parameters (Lin et al., 2011).

While cell culture studies give reliable and effective results, it can be more striking to follow the physiological response and make the treatment applicable as a human model when the studies are transferred to experimental animals. Herbal treatments, which have been used for centuries in countries that attach importance to traditional medicine such as China, Asia, and Japan, have been the subject of much research until today. It continues to be illuminated. Among these plants, cucurbitacins, which are found in the plant called *Ecballium elaterium* (Bitter Melon, Donkey Cucumber, Cırtatan), have antioxidant properties, and are generally used by people in the treatment of sinusitis, contain triterpenoids (Bourebaba, Gilbert-Lopez, Oukil, & Bedjou, 2020). The plant contains a class of triterpenoids known as Cucurbitacins, which are common in all pumpkin species. Cucurbitacins are a group of tetracyclic triterpenoids found in the Cucurbitaceae family. These triterpenoids (available in free or glycosidic form) are often responsible for the bitter taste of plants containing them and are likely produced as a defense mechanism against pests (Ríos, Escandell, & Recio, 2005). These molecules have a wide range of pharmacological activities such as anti-cancer (Jacquot et al. 2014), anti-inflammatory (Attard & Attard, 2008), antioxidant (Pizzino et al., 2017), and antimicrobial activities (Abbassi, Ayari, Mhamdi, & Toumi, 2014). In line with this evidence, we predict that the activity of this protein can be controlled through its anti-inflammatory, apoptotic, and reactive nitrogen species (RNS) activity, which is effective in the pathogenesis of Alzheimer's tau protein.

2. MATERIAL and METHOD

This research was carried out in Gaziantep University Experimental Animals Center with the permission of Gaziantep University Animal Experiments Local Ethics Committee, dated 09.02.2021, and protocol number was 2021/179. Our research was supported by Gaziantep University Research Projects Management Unit with the project code SBF.YLT.21.02.

2.1. Plant selection

Databases for medicinal plants were searched and analyzed along with AD-related metabolic pathways. The plants for the tau fibril formation mechanism of AD were investigated by searching the literature. The research was limited to plants that could be effective in inflammation, apoptosis, and oxidative stress. Finally, the *Ecballium elaterium* plant was chosen. Then, the phytochemical content of the plant was investigated and it was supported by the literature. The plant's cucurbitacin content was rich and almost all had a widespread effect. It was determined that Cucurbitacin E (CuE) could be effective in AD and a study was planned.

2.2. Animals

There were 30 female Sprague Dawley rats (200-250 g) in the study. Rats were housed in standard cages under 12-hour light/dark conditions, housed separately, and fed ad libitum. Experimental AD model was

established with okadaic acid (OKA). Rats were randomly assigned to 5 groups, with 6 animals in each group. The groups were as follows: control, stereotaxic, aCSF, OKA, OKA+CuE.

2.3.   Intracerebroventricular (ICV) OKA injection

To create AD tau pathology under xylazine+ketamine anesthesia, rats were injected with OKA bilaterally as ICV by stereotaxic surgery (according to bregma coordinates).

2.4.   Rotarod performance test

The rotarod performance test was performed on rats for motor coordination. According to the method used by Chen et al. (Chen et al., 2013), the falling rate and duration of the rats were recorded. The interval between trials was determined as 10-15 minutes for each animal.

2.5.   Morris water maze test (MWM)

In the test used to measure spatial memory and memory (Nuñez et al., 2014), animals were trained to find the platform in a water-filled tank for 5 days. Experiments were performed for each animal for 120 seconds. Rats that could not find the platform were gently guided to the platform. It was kept on the platform for 5 seconds. On the sixth day, as a probe trial, the platform was removed and its behavior was recorded. Latency (s), swimming distance (cm), and swimming speed (cm/s) were recorded.

2.6.   Elevated plus maze test (EPM)

In the test, which was conducted to observe the testing of anxiety interaction and learning, a plus maze-shaped setup with 2 open and 2 closed areas was used. The rat was placed in the middle section and allowed to explore. Multiple trials were allowed until rats learned to stay in the open arm for 300 s. The duration and distance of the rats in the open and closed arms were measured.

2.7.   Removal of hippocampus

At the end of the behavioral experiments, the rats were sacrificed by decapitation under anesthesia and the hippocampus was quickly removed on ice and stored at -80°C for RNA and protein analysis in sterile tubes (in RNA save solution).

2.8.   Western blotting

1XRIPA buffer and 1mM PMSF 2X phosphatase inhibitor was added to each sample to obtain protein from 50 mg of hippocampus tissue. Samples homogenized with a tissue homogenizer were centrifuged at 16,000 g at +4 °C for 20 minutes. The supernatant was taken and stored at -80°C. The amount of protein was determined by the Bradford assay. The concentration was set at 20 µ for each sample. Protein samples were loaded onto 10% polyacrylamide gel with a protein ladder using a loading buffer. The samples were run at 120V for 1.5 hours in 1X Tris-Glycine SDS buffer. At the end of the period, the gels were placed in cassettes for blotting. At the end of the period, the gels were removed and placed in blotting cassettes with the sponge, filter paper, and PVDF membrane in transfer solution (1X Tris-Glycine). Overnight blotting was performed at 40 mA. At the end of the period, the PVDF membranes were removed and kept in the blocking solution (1XTris Buffer Saline, Tween 20, non-fat dry milk). In the next step, staining was performed with primary antibodies (overnight). The PVDF membrane was treated with secondary antibody (Anti-rabbit IgG, HRP-linked secondary antibody) and analyzed on the imaging system.

2.9.   Immunohistochemistry

The tissue fixed in formalin was turned into paraffin blocks and 3 micrometer thick sections were taken. stained with primary antibody after deparaffinization. Tau protein was evaluated against B-actin in microscopic analyses.

2.10. Total RNA extraction

Total RNA was obtained with a trisole. 50 mg of tissue was homogenized and trisole was added to it. Chloroform was added as the volume of Trizol. It was centrifuged at 13,000 rpm for 10 minutes at +4C. The supernatant was taken and isopropanol was added to its volume and centrifuged under the same conditions. The pellet was dissolved by washing with 75% ethanol. The amount of RNA was determined by spectrophotometer and samples were calculated as 10 ng/μL.

2.11. cDNA analysis and gene expressions

cDNAs were obtained from total RNA using the kit (Qiagen, 205311). Real-time PCR was used for the analysis of gene expressions (Rotor-Gene Q, Qiagen). 20 microliters of PCR product were prepared (5 microliters of cDNA, 2X SYBR Green Master Mix, Universal primer, 10X assay, and distilled water).

2.12. Statistical analysis

All analyzes were performed in SPSS 22.0. Normality analyzes were performed with the Shapiro Wilk test, the difference between groups using One-Way ANOVA, and post-hoc-tests with Tukey. Results were considered significant when $P > 0.05$.

3. RESULTS

According to the results of the Rotarod test, all groups had motor coordination (Figure 1). There was no significant difference between the groups. This result showed that surgery did not cause changes in motor coordination in rats and we could exclude its effect on cognitive processes.
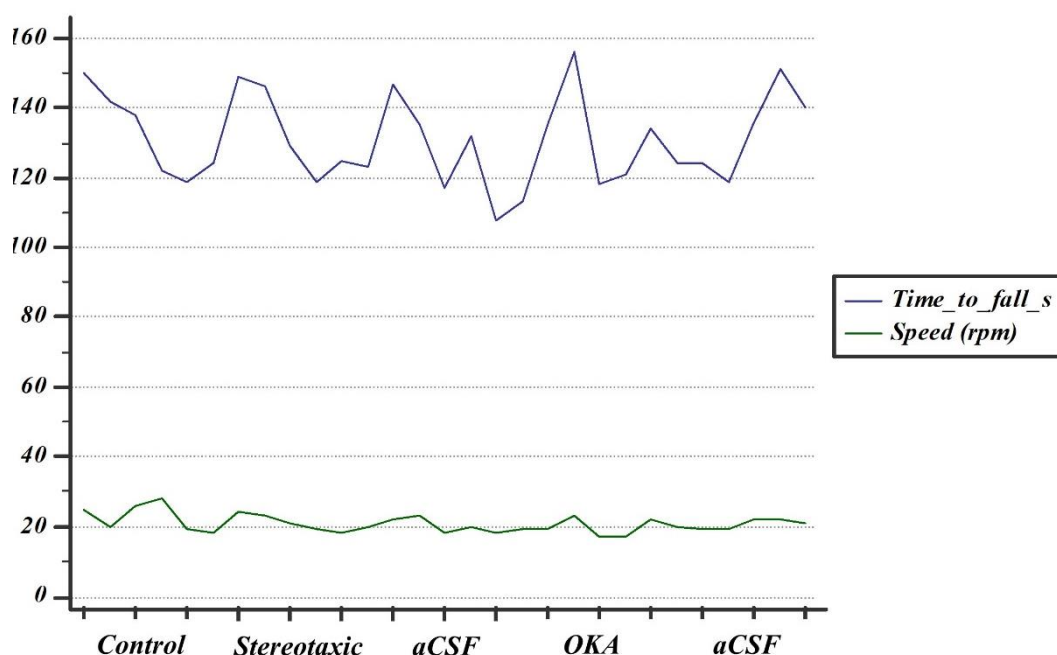
Figure 1. Rotarod performance test.

As a result of MWM, total circulation time was longer in AD groups compared to other groups. Circulation time in the treatment group decreased after CuE application ($P \leq 0.05$). The fact that the rats could not find the platform after the probe trial indicated a cognitive loss, while the shortening of the time to find the platform after CuE treatment and the time they spent around the platform showed cognitive gain (Figure 2).

Distance Moved-Total
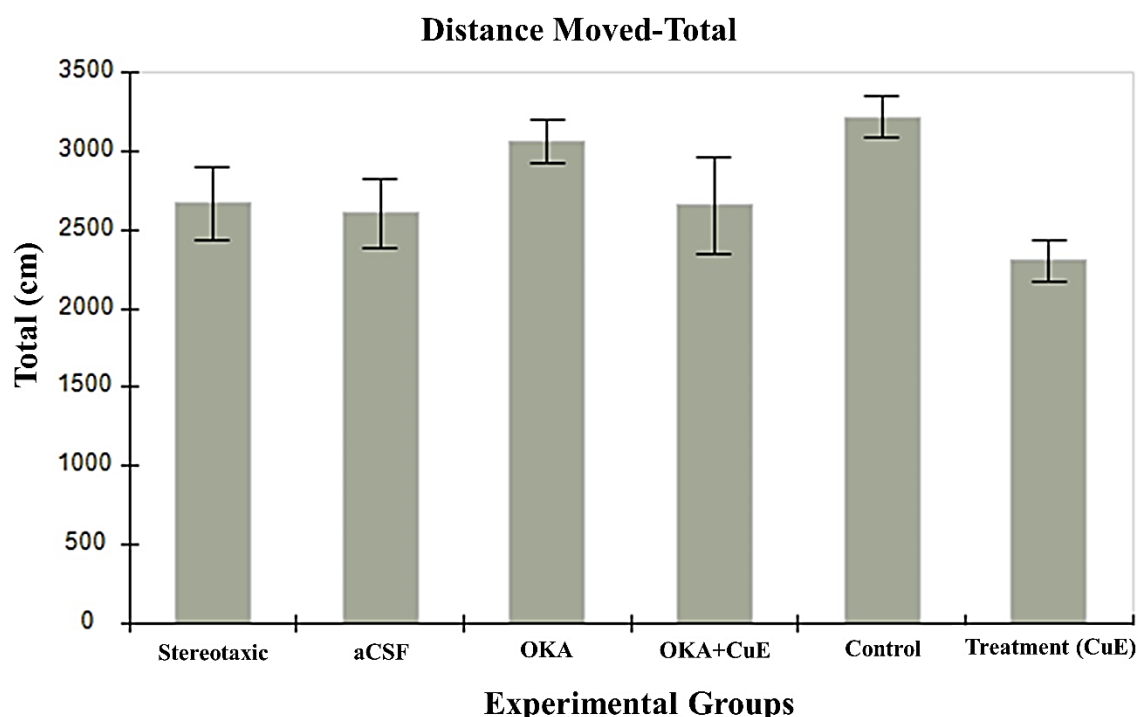
Figure 2. Morris water maze test.

The elevated plus maze test was performed to measure AD and anxiety in treatment. According to the results of the test, the time spent in the closed arm, urination, and defecation was higher and the time spent in the open arm was short in the AD groups. After the treatment, the time spent in the closed arm decreased, the time spent in the open arm increased, and there was no urine or defecation in the group. The elevated plus maze test was performed to measure AD and anxiety in treatment. According to the results of the test, the distance taken in the closed arm, urine, and defecation was higher in the pre-treatment AD groups, and the distance in the open arm was short. After the treatment, the distance covered in the closed arm decreased, the distance traveled in the open arm increased, and there was no urine and defecation in the group. These results showed that treatment with CuE affects reducing anxiety in AD ($P \leq 0.05$).
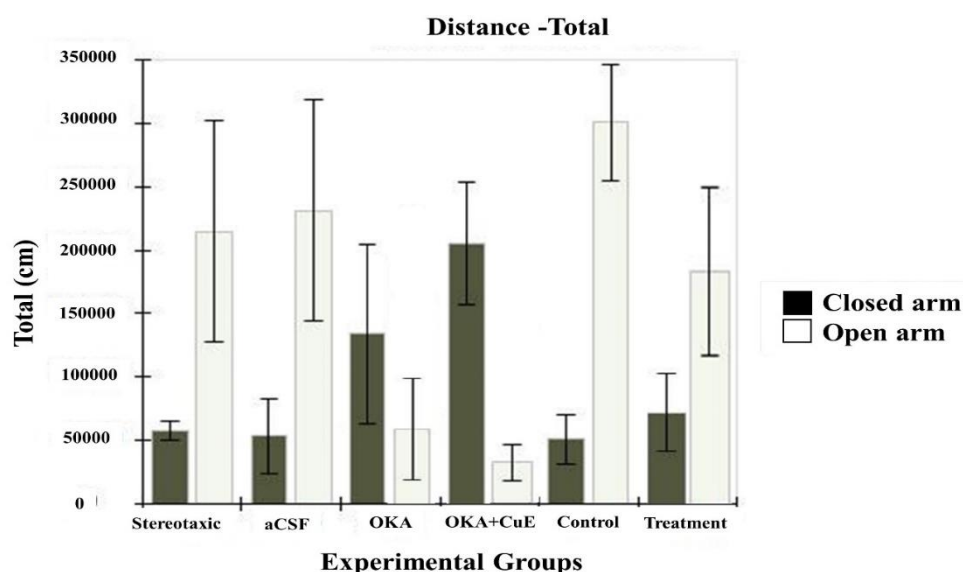
Figure 3. Elevated plus maze test.

In the protein different antibodies, analyses performed for 4 significant differences were found between the AD and OKA groups ($P \leq 0.05$). MAPK1/3 and MAPK14 were expressed high in the OKA group but decreased in the treatment group. While tau protein expression was higher in the OKA group, a significant decrease was found in its expression after treatment ($P \leq 0.05$). The obtained data show that CuE has a positive effect on AD pathology by regulating MAPKs. In immunohistochemically analyzes, it was determined that CuE had a positive effect on the distribution of Tau. While tau accumulation was high in Alzheimer's group, a high decrease was observed after CuE treatment. The decrease in gene expression levels was detected in the OKA group, it was observed that they were upregulated in the CuE group.

4. DISCUSSION AND CONCLUSION

AD is a neurodegenerative disease that causes dementia in individuals over 60 years of age. Neuronal losses are observed in the hippocampus, cerebrum, and cortex symptomatically. The most prominent structures in defining the disease are senile plaques and neurofibrillary tangles. However, the cause of this pathogenesis is not fully understood. Moreover, there is no definitive and effective treatment.

MAPK plays a role in many cellular processes such as oxidative stress signaling pathway, cell proliferation, inflammation, and cell cycle control. MAPKs are regulated by extracellular signaling and manage cellular functions. Gene expression activated by extracellular stimuli and the activity of its product, the enzyme, is a process mediated by many signaling pathways. MAPKs provide signal transduction between membrane and nucleus in these pathways. Their dysregulated activity in AD may result in neuronal death. Although its role in AD is not fully elucidated, its effects are known (Zhu, Lee, Raina, Perry, & Smith, 2002).

MAPKs are effective in synaptic plasticity, learning, and memory. Their inactivation can provide control of these processes. Effective operation of the MAPK signaling pathway can be achieved with CuE. Therefore, it may enable memory acquisition in AD by contributing to the maintenance of hippocampal functions.

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BINGHAM FLUID FLOW SIMULATION IN A SQUARE CAVITY WITH THE UPPER WALL MOVING

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ABSTRACT

Mixed convection, such as that seen in a lid-driven cavity, can be found in various natural settings and a variety of industrial applications, including food processing, electronic device cooling, solar power collector, crystal growth, and drying technologies. The non-Newtonian fluid in the cavity is. Numerical simulations of the two-dimensional incompressible Navier-Stokes and energy equations for a non-Newtonian fluid in the power-law model filled in a square cavity with the upper wall moving, heated from below and cooled by the other walls.

This study looked at the Nusselt number, temperature, pressure distribution, and the streamline velocity; The purpose of this research is to determine how the increased Bingham number affects the Nusselt number and how the increased Reynolds number influences the hydrodynamics of the fluid. This study has been conducted for specific parameters of Reynolds number 100, 400 and 1000, Prandtl number 0.7 and Bingham numbers 1,2 and 5. The grid resolution is based on 61x61 for both directions; in order to solve the governing equations numerically, the finite volume method was used. A second-order upwind scheme was used for the convective terms of the momentum and a central difference scheme for other terms. In addition, the coupled technique was used to solve the pressure-velocity coupling. The residuals of continuity and momentum have been computed using double-precision accuracy and absolute convergence criteria of 10^{-6}.

The emerged results showed that the mixed convection is increased by increasing the Reynolds number conduct to a marked enhancement in the Nusselt number; it should be noted that this improvement is more noticeable as the Bingham number decreased.

Keywords: Bingham number, Mixed convection, Nusselt number, Square cavity.

SOLUTIONS TO IMPROVE THE EFFICIENCY AND CONTROL OF ENERGY TRANSFORMATIONS INTO THE ELECTRICAL INSTALLATIONS OF GRICULTURAL BUILDINGS

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ABSTRACT

Agricultural buildings must house seeds or other crops as well as animals and require special conditions in terms of air conditioning and thus the structure and functions of the existing electrical, thermal and ventilation installations in them. All these installations must be energetically coordinated by means of automatic control systems that allow the remote monitoring of energy transformations of any kind in buildings. Of great importance in ensuring the energy functions of buildings are in the current conditions of progress, electrical installations, where electricity is a refined form of energy that is easily transformed into other forms of energy.

The paper presents at the beginning several solutions for improving the energy efficiency of agricultural buildings and offers variants of automatic control schemes of energy processes in the chain of transformations such as electricity - hydropneumatic energy, electricity - heat, electricity - mechanical energy. The authors propose several methods to increase the energy efficiency of transformations in agricultural buildings based on the energy audit applied to the main consumers in the building contour. The aim is to reduce energy losses due to the increase in the useful effect of the energy entering the building.

The paper also shows the results of financial calculations that demonstrate the usefulness of energy management schemes adopted to control energy transformations in agricultural buildings. The authors make lists of the costs of acquisition and practical realization of the components that are part of the structure of the proposed installations.

The authors propose their own, original schemes for achieving the objectives of the paper. Finally, are presented the conclusions of the study and discussions on the appropriateness of implementing the proposed solutions.

Keywords: Energy efficiency , Energy management, Agricultural buildings

ENERGY OPTIMIZATION OF AIR CONDITIONING FACILITIES INTO THE AGRICULTURAL BUILDINGS AND FARMS.
TECHNICAL AND FINANCIAL IMPLICATIONS

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ABSTRACT

In order to ensure the conditions of indoor climate as required for the storage of crops and to ensure the life of poultry or farm mammals, it is necessary that the energy installations comply with certain conditions. Among these conditions in the paper we refer to the following: the energy demand should not exceed the farm budget, the energy intensity should be reduced, the ventilation systems should have low losses along the air route and the dust filters should ensure the catering of harmful particles, automatic energy processes with the possibility of viewing the interirol of buildings or outdoor spaces where energy receivers are installed, etc.

The authors present in this paper some energy optimization solutions for installations in agricultural buildings for which financial calculations are given that give their profitability and the level of depreciation over time. Air conditioning systems are very important for agricultural farms and they must ensure specific environmental conditions. At the end of the paper are presented some solutions for air conditioning of Romanian farms with the costs involved in their construction and operation. Also at the end are presented the conclusions that resulted from the study and the list of bibliographic references studied for the elaboration of the paper.

As research directions for the future, the authors propose work on the automation of energy processes in air conditioning systems, the creation of software applications that allow remote control of energy processes in the analyzed installations, the introduction of sensors and transducers for automatic control of air conditioning systems, etc.

Keywords: Energy optimization, energy costs, agriculture.

CONSUMER ENGAGEMENT IN THE BRAND: PROMOTING CONSUMER DECISION MAKING IN THE NEUROMARKETING PROCESS

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ABSTRACT

The purpose of the current paper is to highlight the positioning of the concept of "engagement" in marketing and neuromarketing and to clarify the different attitudes of researchers regarding these constructs. Starting from the specific theoretical approach, the concept of engagement towards a certain brand can be defined and interpreted depending on the conceptual and applicative focus in which that cognitive construct is analyzed.

The method of this study is qualitative with factor analysis of engagement process constructs. The study sample consists of 100 researchers and professors of marketing and management sciences of "University of Elbasan" in Albania and "South-West University" in Bulgaria . The data collection method is through semi-structured interview and online administered questionnaire. The criteria of qualitative analysis were performed through the INVIVO program and the psycho-economic interpretation through the THEME program.

The results of this paper showed a strong negative correlation between cognitive development and critical attitudes towards brand dependence ($r = -.98$; $p < 0.05$) which means that the stronger the cognitively the consumer is the more the possibility for an addictive behavior is reduced. The findings also show a strong and positive relationship between emotional development and consumer brand attitudes ($r = .87$; $p < 0.05$) which means that the development of the consumer's emotional construct will develop the strongest link to its decision making towards a certain brand. Other indices of statistical importance included Factor 1 -Cluster 1 (20% of decision-making space and critical thinking about the product) and Factor 2-Cluster (24 % of consumer engagement in the brand).

The conclusions obtained provide a clear picture of the significance of developing medium-term and long-term plans for the development of engagement consumer strategies in the brand selection process and in adding macroeconomic policies to consumer inclusion in selection decisions of brands operating in the market.

Keywords: Neuromarketing, Brand involvement, consumer, social attitude, decision making

INTRODUCTION

Over the past three decades, a powerful line of research has emerged, highlighting the nature and dynamics of specific consumer and brand relationships (Fournier 1998; Aaker et al.,2004). Underlying this observed change is a growing academic recognition of active consumer behavior, role played and behaviors in brand processes (Pagani et al., 2011; Singh & Sonnenburg 2012; Prahalad &Ramaswamy, 2004; Hoffman & Novak, 1996; Ramani & Kumar,2008). In the theory and practice of Strategic Management and Consumer Policies, a widespread orientation towards focusing on the heterogeneity existing among companies as a starting point for understanding the competitive advantage has increasingly established itself (Capaldo,2004). Regarding the dimensional growth of brand-consumer relation, the critical factor is represented by the creation of the most appropriate mix of resources (Rumelt, 1984), by the internal transfer of best practices (Szulanski, 1996), by the integration between new individual and collective knowledge already existing and set for growth (Nelson & Winter, 1982; Kogut & Zander, 1992), as well as the time that the replication of resources can entail (Dierickx & Cool, 1989). Further contributions later highlighted the role of interaction and dynamic integration between resources of different types (Leonard-Barton, 1992; Kogut & Zander, 1992; Grant, 1996; 1999) in the neuropsychological profile of the consumer (Morin,2011; Kenning &Plassman , 2005).

Neuromarketing and branding activities

The optimization of branding strategies, as well as the improvement of the image of a company on the market, represents one of the possible applications of Neuromarketing as a corporate marketing tool (Roth, 2013). By analyzing the brain reactions of individuals to induced stimuli, it is in fact possible to understand which product or which brand of product the consumer prefers, as these reactions differ significantly depending on whether it is a product produced and marketed by a common or unknown brand. compared to a so-called Branded good, produced by a well-known Brand and considered to be preferential (Linzmajer & Kenning, 2011). It should be mentioned that the relationship of trust that is established between Brand and consumer depends to a large extent on the emotions that arise from such a relationship, which heavily intervene in the decision-making process of any human being.

It is therefore plausible to consider the hypothesis that provides for more loyal behavior by consumers towards their favorite company than towards any other brand (Roth, 2013). To prevail over other brands, a brand must therefore be able to emotionally involve consumers. This is because emotions play a crucial role in the consumer's decision-making process and are able to considerably influence their purchasing behavior. The favorite brand will be the only one capable of arousing real emotions in consumers by altering their mood and the only one capable of making any type of decision irrational. This kind of power is referred to in the literature as the "*winner-take-it all*" effect (Bechara & Damasio, 2005). Irrational decisions lead to irrational behaviors, which will favor the preferred Brand unconditionally over any other Brand, even in the face of obvious qualitative or price disadvantages of the product. At

this point it is therefore evident the importance of branding strategies in a company's marketing policies and making them more effective, thanks to the use of Neuromarketing tools such as functional magnetic resonance imaging or electroencephalography that can certainly represent a significant contribution if one wants to improve his or her company's image and perceptions on the market (Roth, 2013). To date, the decision-making process is only partially explained and what influences this type of decision is mysteriously enclosed in the so-called "*consumer black box*" (Kotler & Armstrong, 2011). This complexity is given by the fact that purchasing decisions do not always turn out to be rational, as emotions, through reward and sanction mechanisms, play a key role in the decision-making process of the consumer, ultimately guiding his purchasing behavior (Zurawicki, 2010). Neuromarketing, using tools coming from neuroscience able to observe in real time the brain reactions of an individual to an induced stimulus, allows to study and analyze the purchasing behavior of a subject (Lee et al., 2007), thus managing to open its mysterious black box (Kenning, et al., 2007). The neuroscientific discoveries made are exploited by companies with the aim of improving their marketing activities (Kumar, 2015), with the ultimate aim of increasing sales and thus also profits (Horská & Berčík, 2017). After a careful analysis of the scientific literature regarding the consumer's decision-making process, the role of cognitions and emotions in consumer decisions and Neuromarketing, through an empirical analysis of a qualitative and exploratory nature, we want to investigate the point of view of the Albanian and Bulgarian consumer through some semi-structured interviews and, questionnaires ,to evaluate researchers and experts' consumer attitudes towards their field of study, which is defined as the attitude given by the set of his own previous evaluations (Lavrakas, 2008), in order to respond to the research question. Neuromarketing finds thus, application in each of the "4Ps" of the Marketing Mix and Consumer Black Box, which indicate the product, price, promotion and distribution policies of the brand. Figure 1 below offers a summary of the different marketing variables belonging to each of the four "Ps" mentioned.

Fig.1 Variables of Marketing Mix 4P's Source: Kotler & Keller, Marketing Management, 2012, p. 2

The characteristics of the consumer are multi-dimensional, including cultural, social, personal and psychological (Kotler & Armstrong, 2011):

- **Cultural factors**. Understanding the cultural differences of their target market consumers is of vital importance for companies and brands in order to achieve success (Kotler & Armstrong, 2011)
- **Social factors**. Belonging to a group is a key factor that can significantly influence the behavior of any consumer. Word passing or personal recommendations provided by a member of the group are not perceived by consumers as an advertising message, thus making them more credible and decisive in brand-target decisions. This kind of conversation can take place both offline and online, in physical presence or within social networks. Communities on the web often have at least one opinion leader, that is, an influencer that companies will have to make spokespersons for their Brand in order to create a positive image of themselves on the market. Furthermore, it should be mentioned that a consumer usually decides be engaged in a brand only if it is deemed appropriate with his or her status and role in society (Kotler & Armstrong, 2011).
- Personal factors. Consumers change their tastes and needs over the years based on multiple variables, such as income, lifestyle or stage of the life cycle in which they are. Research has revealed that some important events such as marriage or the birth of the first child etc. - are able to upset a person's consumption habits (Kotler & Armstrong, 2011).
- **Psychological factors**. The needs of the human being can be summarized in five categories, hierarchically ordered as conceived by Abraham Maslow (1954-1987). These categories include physiological needs such as hunger, thirst, etc., safety, social, esteem and self-fulfillment. A need, to become a concrete motivation for the purchase or follow of a brand, must intensely lead the consumer to research and obtain their satisfaction (Kotler & Armstrong, 2011). Once reached, that same need is no longer a good enough reason to induce the consumer to buy. Therefore, man will now try to satisfy a need belonging to another category (idem). Before supporting his own motivations, however, the consumer is confronted with his perceptions that

derive from the five senses, namely sight, hearing, touch, smell and taste (idem). The process of filtering, storing and interpreting these sensory stimuli is very complex (Zurawicki, 2010) and can differ from individual to individual (Kotler & Armstrong, 2011).

■ *Selective attention* (tendency to select the stimuli to pay attention to), *selective bias* (interpreting a stimulus in order to confirm previous beliefs) and *selective retention* (tendency to retain only information regarding what one prefers), can complicate this process: in fact, the same stimulus can be perceived in a different way by different consumers (idem). It should also be mentioned that sensory adaptation leads the human being to perceive only some of the stimuli received, ignoring the stable and constant ones considered to be less relevant (Zurawicki, 2010). The interpretation of information is also subject to lived experiences, learning and memory (idem). This helps the human being to solve a problem (idem) and to react adequately to situations already experienced in the past that recur in a similar way (Rolls, 2005). The ability to use previously acquired information is defined as cognition (Zurawicki, 2010). From learning, the consumer finally develops beliefs and attitudes, thus managing to build an idea about something. It is precisely the consumer's attitude to be responsible for the appreciation or otherwise of a product or brand (Kotler & Armstrong, 2011).

Psychological consumer engagement

From a sociological point of view, engagement has been studied as "*civil commitment*" (Jennings& Stoker, 2004; Mondak et al., 2010), while in the psychological field this concept has taken the connotation of "*social commitment*" (Achterberg et al. al., 2003; Huo et al.,2009). Studies related to educational psychology (Bryson & Hand, 2007; Hu, 2010) have explored "*student involvement*", while political science has examined "*member engagement of the nation*" (Kane, 2008; Resnick, 2001). Furthermore, the terms "*employee involvement*" (Catteeuw et al., 2007; Crawford et al.2010) and "stakeholder involvement" (Greenwood , 2007; Noland & Phillips, 2010). The most recent studies conducted by Hollebeek, Glynn and Brodie (2014) and by Vivek, Beatty, Dalela and Morgan (2014) consolidate the conceptualization of engagement as a multidimensional construct characterized by cognitive, affective and behavioral dimensions. Following this approach, consumer engagement has been defined as a cognitive, emotional and behavioral engagement of an active relationship with the brand (Mollen and Wilson, 2010; Wirtz et al., 2013; Hollebeek & Chen, 2014).

The marketing definitions of engagement can be divided into two large groups: those that focus on the psychological profile and those that define the behavioral aspect (Maslowska et al., 2016). However, there are some definitions that include both aspects. Many studies on engagement describe it as a psychological state (Gambetti et al., 2012), including those by Patterson, Yu, and Ruyter (2006); Brodie et al. (2011); Calder Malthouse, and Schaedel (2009) and Mollen and Wilson (2010). Hollebeek (2011) argues that engagement involves the consumer on a motivational level; Bowden (2009) defines engagement as a psychological process that drives loyalty. Higgins and Scholer (2009) outline engagement as a state of involvement in which the consumer is completely occupied and absorbed in something. Sprott, Czellar, and Spangenberg (2009) developed the Self-Concept Brand Engagement (SCBE) model, which defines the individual's propensity to include the brands with which they interface as part of themselves. The conative aspects of engagement have been made operational in terms of behavioral manifestations towards a brand (Maslowska et al.,2016). Verhoef et al. (2010) describe the commitment as a behavioral manifestation towards the brand or towards the company that goes beyond the transaction. Similarly, Van Doorn et al. (2010) pay attention to the behavioral aspects of the relationship between the consumer and the company that does not include transactions, but which derives from motivational drivers through their brands (Maslowska et al, 2016). However, Kumar et al. (2010) and Van Doorn et al. (2010) argue that purchases should be included in the definition of

engagement as they represent an expression of interest in the company. But the authors also distinguish other engagement behaviors that create value for the company, such as the influence of consumers on other consumers following the sharing of positive or negative opinions (Kumar a el 2010). Bijmolt et al. (2010) specifically describe three main manifestations of engagement behavior: *WOM, co-creation, and dissatisfaction behavior*. The authors argue that such manifestations can occur at different stages of the customer's life cycle such as acquisition, development and retention (Maslowska, et al.2016). Some researchers have tried to combine both perspectives. Vivek et al. (2010) focus on the participation of customers in activities related to the organization, also recognizing the cognitive and affective elements of engagement. Although most research adopts an intra-individual perspective based on consumer psychology (Van Doorn et al., 2010; Verhoef et al., 2010; Goldsmith et al.,2010).

METHODOLOGY

The purpose of the current paper is to highlight the concept of "engagement" in marketing and neuromarketing and to clarify the different attitudes of researchers regarding these constructs.

The method of the current study is qualitative with factor analysis of engagement process constructs.

The sample of the study consists of 100 researchers and professors of marketing and management sciences of "University of Elbasan" in Albania and "South-West University" in Bulgaria. The data collection method is through semi-structured interview and online administered questionnaire. The criteria of qualitative analysis were performed through the INVIVO program and the psycho-economic interpretation through the THEME program.

Research hypotheses:

For the realization and verification of the results of the current study, some hypotheses have been raised as follows:

H_1 = What is the positioning of engagement within marketing theories and more general theories concerning the relationship between brand and consumers?

H_2 = What are the differences and overlaps of CBP compared to other theoretical constructs existing in the marketing literature?

H_3: What are the antecedents and consequences of engagement in the consumer brand-love bond?

Instruments and Procedures

A questionnaire was developed in Albanian a Bulgarian with the help of the online platform "Google Forms" containing a semi-structured interview. The survey presents an inductive approach as a whole, as it first introduces the concept of Neuromarketing mechanisms and Brand Engagement using some concrete examples of a general nature, deepening the subject more and more during the interview and finally noting, specifically, the point of view and attitude of respondents towards him. The questionnaire consists of a total of about 30 questions divided into three distinct parts: the first part introduces the

interviewee to Neuromarketing and has the purpose of measuring whether or not he is already aware of this field of study and the related mechanisms. To do this, some real examples of Neuromarketing as a marketing tool used by Albanian or EU companies are presented at the beginning of the interview. The second part is inherent instead to the detection of his point of view and his attitude towards Brands and represents the heart of the discussion. The questions related to this part of the interview were constructed using the Likert scale, as the most popular methodology for this purpose. However, for each question, there is also a space dedicated to additional observations, thus allowing the respondent to further investigate their answer if they so wish. The statements towards which the participant is called to take a position reveal several aspects: the conduct towards a company that practices Brand marketing, the attitude towards a product developed through Brand marketing, the propensity to purchase such a product, the inclination to positive personal opinion about potential ethical issues such as the invasion of privacy and the danger of manipulation. These aspects were decided on the basis of the methodology used in a scientific study, carried out by Flores, Baruca and Saldivar (2014), which aimed to investigate the judgment of Albanian consumers towards a company that uses Brand-Bond Marketing, as well as the various implications related to it. The third and last part aims to collect some personal information such as the interviewee's gender, age and educational level, useful for a more in-depth analysis of the results obtained from the empirical survey.

Data analysis

Before proceeding with the current administration of the interviews, a "pre-test" was carried out, which contributed to further simplifying the interview outline. In order to reach the degree of significance, 100 interviews were carried out, which lasted about 20 minutes each. They were performed online with selected researchers from the University of Elbasan and South-West University. The qualitative data that emerged during the interviews were transcribed and analyzed using the *text mining method*. The aim of the research is to identify a model capable of rationalizing and systemizing the statements that emerged in the textual data analysis (Feldman & Sanger 2007), through 3 steps: *classification, clustering and associations*. The cluster analysis, in particular, consisted of a procedure that was used to outline the content of the text following significant thematic groupings. Furthermore, the clusters were identified on latent semantic axes, described by lexical units characterizing (in terms of who) from the phrases / messages entered in the THEME software and identified latent macro (semantic axes) and micro (cluster) concepts.

Ethical issues

For conducing the current study with juvenile school subjects, the working group took care of the strict observance of ethical aspects such as:

• **Approved information and allowance of subjects**. Through the platform in which the questionnaires were completed, a detailed description was presented regarding the purpose, conditions and method of

the study that would be used, as well as where their assistance consisted. Participants were made aware of the voluntary nature of participating in the study and the possibility of withdrawing from the study if they did not wish to participate.

• **Maintaining the confidentiality and anonymity of the minors and youth** under which School Directorates and student's parents were informed about the treatment of personal data of juveniles and that the data collected would be used only for research purposes respecting the principle of anonymity and confidentiality under the Privacy Protection Rule.

RESULTS

94% of respondent of the current study revealed they had already encountered Neuromarketing and Brand Engagement mechanisms at the time of the interview. Descriptive data indices tables, not presented in this paper, of the Cluster Assets for Consumer Engagement and Neuromarketing show the scores of the mean distribution and standard deviation from which we can define that Cluster 1 on rational decision to be engaged with the brand ($M = 2, 4001$; $SD = .9006$), Cluster 2 on emotional bonding of the consumer to the brand ($M = 1,62$; $SD = .430$) ; Cluster 3 on brand previous experiences ($M = 5,1$; $SD = 3, 5637$); Cluster 4 on the value and meaning of the brand to the consumer ($M = 1.54$; $SD =, 875$); Cluster 5 on the overlapping brand to its historical background ($M = 1.498$; $SD =, 7991$); Cluster 6 on the relationship of the consumer to the brand ($M = .386$; $SD =, 6546$); Cluster 7 on the positioning of the consumer to marketplace ($M = .187$; $SD =, 031$) and Cluster 8 on the involvement of the consumer to the brand ($M = 2.654$; $SD =1, 87$) provided significant clinical indices. The standard deviation displays sufficient and discrete dispersion indices for all 8 Clusters ($SD = 1.0867$). As it can be revealed, consumers tend to have better positive attitudes if the brand they engage with tends to provide them with a   rational decision and emotional bonding rather than a historical background or marketing position and strength. A moderate influence is linked equally to the previous experiences, brand values and constructs which means that the general consumers not necessarily are prone to be influenced by the brand market meaning, research construct or previous experiences; they tend to be engaged in a brand even without any experience on the condition that it can provide consumers with positive feelings and control decion-making.

T*able 1: Synthesis on the clusters emerged by data mining*

CLUSTER	CULTURAL SPACE%	NEUROMARKETING LABEL
CLUSTER 1	**20**	**Rational decision of someone to be engaged with a brand**
CLUSTER 2	**24**	**Emotional bonding with a brand**
CLUSTER 3	**10**	**Brand experiences & participation**
CLUSTER 4	**10**	**Brand values and meaning**
CLUSTER 5	**10**	**Overlapping in brand theory constructs**
CLUSTER 6	**8**	**Brand Love and consumer brand relationship**
CLUSTER 7	**7**	**Consumer engagement positioning in marketing**
CLUSTER 8	**11**	**Consumer brand involvement**

To assess the development of different Assets Profile relating to the consumer engagement identity and behavioral attitudes toward brand we performed the Mann Whitey test. The indices, not shown here, indicate a higher degree of the emotional bond and rational decision-making expectancies rather than market price or value ($Z = 7.854$; Sig = .876). Degree of emotional belonging and rational decisions are confirmed even by T-test indices (M =1 ,94; SD = .862).

Of clinical importance for the present study was the analysis of the correlation between cognitive development and critical attitudes towards brand dependence which revealed an inverse relation ($r = -.98$; $p < 0.05$). It means that the stronger the cognitively the consumer is, the more the possibility for an addictive behavior is reduced. Pearson correlation findings also confirmed the strong and positive relationship between emotional development and rational consumer brand attitudes ($r = .87$; $p < 0.05$) that means that the development of the consumer's emotional construct would develop a link to it rational decision making towards a certain brand. To analyze whether there is a relationship between these factors, the Pearson correlation test, not shown in this paper, showed a significant degree of 75% making variables significant in statistical values with values of $t = 1.3047$, $P = 0.462$, and cross-variable

correlation ($r = 0.8463$, p <0.5) with positive and strong correlations. This means that the strengthening of Rational and Emotional Constructs in consumers affect their engagement in the brand bond. From the analysis of the overall psychological Clusters in the total Consumer Engagement Profile through Spearman correlations, of all the sample researchers (N=100) the indices showed that the highest scores in the Rational decision-making dimension were in the University of Elbasan (r = .754; p <0.5) and less high in the those in the "South-West University "of Bulgaria (r = .065; p <0.5).

DISCUSSION

The first part of the current research, of a more theoretical nature, aimed to investigate, with the help of scientific literature, the importance of cognitive, emotional and personality assets in the decision-making and brand engagement process of the consumer, as well as the concept of Neuromarketing. Empirically, however, we wanted to detect, through the administration of 100 (N=100) semi-structured interviews, the attitude of the local consumer for the brand engagement with a group or researchers from the University of Elbasan "A. Xhuvani" and the "South-West University" in Bulgaria. Often the scientific community proposes the introduction of new constructs intent on explaining the relationship between consumer and brand, but sometimes, these constructs are not able to favor the advancement of a general theory and do not integrate in a way consistent with the premises of the pre-existing paradigms. Therefore, a reflection appears to be needed by the scientific community aimed at evaluating the coherence of the constructs that emerged in the context of a theoretical model of general synthesis.

The active participation of the consumer on social mediums sometimes also starts with non-customers or former customers of the brand who share some or all of the values (old and new) communicated by the brand. Sometimes, in fact, a consumer goes through all the phases of involvement with the brand, described within the paper without ever having purchased the product or service. This is a particular situation in which, a consumer might love a brand "irrationally" and is strongly involved in the brand and publicly manifests the indissoluble bond with the brand, but he doesn't necessarily own a product of that brand. This bond is very strong and takes on the characteristics of a cult. Therefore, fidelity instead of being defined as the construct that precedes the Consumer Brand Psychological bond (CBP) represents the emotional aspect of the relationship. Brand attachment and brand-love are the premises of CBP and not necessarily of loyalty. Neuromarketing in this case, provide consumer and brand managers a way to find a secure attach that very often involves the consumer in activities aimed at optimizing or improving the offer system, while, rarely, in activities aimed at generating innovative ideas. The CBP, is in this sense a spontaneous, emotional, affective condition, which implies a sentimental involvement of the consumer with the brand. It also implies a conscious decision on the part of the consumer. The customer experience, on the other hand, as highlighted by some of the interviewees, is a temporary situation of customer participation in activities that place a brand at the

center. This construct, therefore, can manifest itself in one or more exchange situations, and unlike the CBP, it is not a condition in which the lasting bond with a brand is explicitly communicated by the customer and publicly declared externally. If the experience has a significant impact on the achievement of the consumer's personal life goals, then the regulatory commitment is a form of experience, and an official declaration of the link between the brand and the consumer, in which the latter self-declares his intention to love-brand. As revealed by the indices of the current study, consumers tend to have better positive attitudes if the brand they engage with tends to provide them with a rational decision and emotional bonding and make the consumer feel he is control of his engagement relation. From the analysis of the overall psychological indices in the sample of the current study (N=100), the highest scores reach in the Rational decision making dimension were in the University of Elbasan (r = .754; p <0.5) and less high in the those in the "South-West University "of Bulgaria(r = .065; p <0.5).Correlations revealed a strong and positive relationship between emotional development and rational consumer brand attitudes (r = .87; p <0.05), which confirms the idea that the strengthening of Rational and Emotional Constructs in consumers affect their engagement in the brand bond. Research has found that some important constructs contemplate the presence of a sentiment on the part of the consumer towards the brand (Park et al. 2010; Park & Priester,2007). The bond created between the consumer and brand, over time, leads to constant consumer trust and loyalty towards the brand and strong emotional involvement which in turn reinforce their rational perception of the utility and usefulness of the brand. The perception of value could lead the consumer, after a certain period of time, to a state of falling in love with the brand. Finally, CBP can be considered as a consequence of brand-love. The CBP then, requires the presence of a further condition: an affective-cognitive mental bond and a clear behavioral externalization of the relationship that the consumer has with the brand. At this point, the link between consumer and brand leads to CBP and develops life cycle between himself and the brand, which emerged from the interpretation of the results of the empirical analysis. The concepts of emotional bonding, attachment, and brand-love describe an affective, cognitive and sentimental mental condition of the consumer in relation to a brand, but this condition is not known outside the relationship, as the consumer does not externalize the feeling towards the brand. The customer, in fact, through the tools made available by new technologies and thanks to the new means of social communication can actively contribute to the creation of values for the brand and the enrichment of its symbolic and cultural meanings. These data are consistent with the studies of various research (Islam et al.2016; Maslowska et el. 2016; Karpen et al.2008; Kim et al., 2008; Keh et al., 2007; Kilger & Romer, 2007).

CONCLUSIONS

The present study can be described as exploratory and analytical. Empirical research was based on a qualitative research method that has highlighted a number of points of discussion: a) the substantial

differences between the theoretical constructs that consider the relationship to be active between the customer and the brand. In particular, the concepts of rational-emotional brand bond, brand-love, brand attachment and brand experience, which have different meanings with respect to the concept of CBP; b) has identified a sequential process that connects the various constructs, along a time horizon that starts from the brand bond psychological constructs, experience, follows with the brand attachment, continues with the brand-love and ends with the brand engagement; c) put in highlights the link between the concept of rational-emotional connection from the CBP perspective and construct, notwithstanding, the nature and characteristics of the involvement in the two concepts of co-creation and engagement different to each-other; d) identified the main point of difference between brand engagement and involvement , which consists in the fact that the former is spontaneous, not stimulated and not designed by the company, on the contrary, the latter is characterized by being a phenomenon induced by corporate conduct aimed at particular consumers (Brodie et al. 2013; Brodie et al. 2011; Van Doorn et al. 2010). In fact, the Consumer Engagement (CE) is a psychological state that is reached as a result of interactive and co-creative experiences lived by the consumer with a brand. Depending on the context conditions in which the interaction occurs, it could lead to different levels of rational and emotional decisions to be involved. Therefore, the CE is a dynamic and iterative process. The CE plays a significant role in the relationships with brands and in particular in function of the other relational concepts (for example, co-creation, fidelity, loyalty) that are antecedents and consequences in the iterative processes of the consumer to the large market (Brodie et al., 2011).

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AN INTRODUCTION TO THE PSYCHODYNAMIC PROTOTYPE AND PSYCHODIAGNOSTIC CHART AS A NEO- PROSPECTS FOR THE PSYCHODYNAMIC ORGANIZATION

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ABSTRACT

Objectives. The present paper explores the situation of a Psychodynamic Personality Behavioral Tendency in the focus group of school leaders and highlights the need of a sustainable change and organizational structures for the classification, prophylaxis and prevention of mental health in schools. We aim to describe the utility of a novel Taxonomy as the Psychodynamic Manual-2 as an overall taxonomy rather than the DSM, ICD or OPD-2 in the Mental Health organization.

Material and methods. The research was conducted in the interaction of literature with the operationalization in context. In its initial phase of the study, we considered a wide range of meta literature and contemporary updates on elements of human personality, maladaptive or behavioral structures and the typologies of leadership. Through a quantitative and qualitative methodology as Q methodology, we reached to fulfill the given aims and goals.

Results. The PDM-2 and PDC-2 aim to reveal that there is not only a strong positive relationship between Pathogenic Beliefs and Personality Organization but also that a Psychodynamic "disturbed" individual display increasing symptoms of "*maladaptive behavioral tendency*". An individual with high levels of Neurotic Personality Organization, who would refer the highest frequency in the factor weight of the mental component have also higher chances for coercive behavior than individuals with Borderline Personality Organization. Results were analyzed with Method software processor.

Conclusions. At the end of the article, we outline some suggestions for the development of a structured assessment of psychological problems supporting individuals in their everyday life coping style, the function, style and leadership in supporting a healthy mental life-style.

Keywords: psychodynamic prototype, personality organization, ego strength, healthy mental life.

Introduction

Any science must have at its start a taxonomy in which the constructs are identified and understood. However, the constructs of personality, mental functions and dysfunctions are complex and hard to pin down. Both the Diagnostic and Statistical Manual-5 (American Psychiatric Association, 2013) and International Classification of Diseases (ICD-10; World Health Organization [WHO], 2019) have a long history of trying to classify mental disorders with varying success. The DSM-5 is a product of the American Psychiatric Association, which tends to be descriptive, categorical, with poor reliability and affected by financial ties to the pharmaceutical industry (Gordon & Gosgrove, 2013). Despite this, the process of a DSM diagnosis requires little to no training, and little insight. The diagnoses are based on descriptive lists of symptoms. The cost of making it relatively easy, leads to leaving out the ideographic mental life of the individual, which requires more insight and training. As Gordon and Gosgrove argue in their article " *Ethical Considerations in the Development and Application of Mental and Behavioral Neologies: Lessons from DSM-5,*" the DSM, as a diagnostic manual involves a number of symptoms from specific categories to achieve a diagnosis which is hardly scientific. Some controversies raised with DSM-5 for its confusing categorical criteria making DSM not helpful for informing the best psychological treatment. While the DSM-5 is a "top-down" taxonomy based on committee voting than science, the International Classification of Diseases (ICD-10; World Health Organization, 2004) is a "bottom-up" taxonomy based on polling mental health practitioners worldwide as to what disorders they have encountered. However, the ICD-10 is also categorical and it leaves out ideographic mental life and personality dynamics. Neither the DSM, nor ICD are good at formulating a plan for appropriate psychotherapy. Researchers found that treatments focusing on isolated and categorical symptoms and behaviors were not as effective as those that conceptualized the overall range of emotional, personality and interpersonal patterns (Western &Shedler,2000). As mental health is more than the sum of any structural or functional symptom, any comprehension of it should begin by this complex interaction of psychological variables. In decades, the issues of mental health were depicted by a mere range of observable symptoms and behaviors and at very least on a personality pattern and adaption. In part in reaction to the atheoretical, categorical medical/disease model emphasis of the *DSM and ICD,* the *Psychodynamic Diagnostic Manual-2* (PDM; Alliance of Psychoanalytic Organizations [APO], 2017) was developed to add a person-centered perspective to psychological dysfunction and to inform psychological treatment. The PDM-2 is unique among the major diagnostic systems; both DSM–5 (APA, 2013) and ICD–10 (WHO, 2019) focusses more or less exclusively on the identification of pathology while the PDM was designed to assess the full range of functioning from disturbed too healthy. As Nancy McWilliams (2011) noted, the primary goals for the PDM-2 were to create a diagnostic system that embraced the complexities of human experience (both normal and pathological) and to conceptualize the major psychological

disorders in ways that went beyond external description to capture the subjective phenomenology and underlying dynamics that shape psychological symptoms and syndromes.

The Psychodynamic Manual-2 Development and Implementation Tools.

Research for establishing a stable identity state constitute one of the fundamental approaches of personality research in the three recent decades (Marcia,1966). The most tangible sources are shown in the individual behavior whereas the less tangible sources constitute the features of our personality often inferred by patterns of feeling, thinking and behaving. Developing a Personality Prototype even though difficult and abstract in nature, is in all cases facilitates the analyzing of patterns and functions of psychodynamics of the whole person beyond just symptoms. In this context, creating a new taxonomy of analyzing one's total mental health, researchers may now have a new path of placing prophylaxis before "future earthquakes". PDM received increasing attention from researchers in recent years and the use of the PDM in Europe increased substantially during the first several years after publication (Gazzillo, et al. 2015). Now, the first edition of the PDM has been revised and updated, with PDM–2 (Lingiardi, V., & McWilliams, N. (Eds.)2017). The PDM-2 has sections on infancy, childhood, adolescence, adulthood, and old age. It comprises a totality of 1078 pages. We recommend first reading the adult section to become familiar with the system and definitions, and then move to other age groups if it is within one's spectrum of specialty. The Assessment section is a great resource for researchers and for teachers of personality assessment. Although the PDM has earned respect from both psychodynamic and non-psychodynamic practitioners (Gordon, 2019; Gordon, 2009), it was in danger of being underutilized because it lacks easily usable assessment instruments.

Overall, the PDM-2 should not only improve diagnoses of the full range of psychological functioning, but also improve the teaching, research, supervision and treatment of mental disorders. Libido therefore,is not a pleasure seeking but an object seek (of others). Relations to others that in the early mother-child attachment have been uncompleted within the process of object seeking would develop at the growing children a malfunctional relation to their libidinal future life. As a new treatment manual, PDM-2 does not look at the symptom in a categorical and isolated way as other diagnostic manuals. PDM classifies mental health in three great areas : a) Personality Patterns (Axis- P) , b) Mental Functioning (Axis-M) and c)Subjective Experiences for the Symptoms (Axis-S).

PDM-2 treats the entirety of human development:adults,adolescents,children and toddlers.The adult assessment part upon which we have enabled the present study,begins with the adult personality.P-Axis of Personality Patterns and Disorders is placed first in the PDM system as the collected data and their symptoms could not be understand or treated without a depth comprehension on the personality features of the individual.P-Axis consideres two areas with a range from a *healthy personality*(lack of a personality disorder) to *a neurotic level* of personality disorder. On the edge of the other level lays

borderline level as a personality disorder. Concepts "Neurotic","Borderline" and "Psychotic"are used in PDM as a level of severity and not as a specific personality disorder as in DSM. Degrees of personality organization (healthy,neurotic,borderline and psychotic)are defined by the assessment of the individual capacities. These capacities includes:i*dentity maturation, ability for stable satisfying relationships, affects tolerance and regulation, moral reasoning, reality testing and the ability to respond to and recover from stress.* After determining the entire level of personality organization ,we consider the P -Axis personality patterns (which may be adaptive and cause minimum if any impairment) or into a more pervasive personality disorders (which repeatedly cause pain to self or others). Personality patterns or disorders in P-Axis include:1.schizoid ;2.paranoid; 3.psychopathic (antisocial) with subtypes-passive/parasitic and aggressive ;4.narcistic with subtypes arrogant/entitled and depressed/depleted ;5.sadistic and intermediate type with manifestations of sadomasochism ; 6.masochist (self -destructive) with subtypes –moral masochistic and relational masochistic;7.depressive,subtype –introjective and analitic, converse manifestation- hypomanic; somatization ; 8.dependent ,subtypes passive-aggressive of dependent,convers manifestation-counterdependent; 9.phobic(avoidant) ,convers manifestation -counterphobic;anxious ; 10.obssesive –compulsive,subtypes obssesive and compulsive;11hysterical (histrionic), subtypes- inhibited and flamboyant;disociative;and12. mixed/other.

Then,the PDM P-Axis considers each personality disorder as their temperamental, thematic,affective,cognitive and defense patterns. The psychopathic(antisocial)personality,for example,has a high threshold of aggressively to emocional stimulation as part of the temperamental or maturational factors of the individual. The core preocuppation or concern is manipulating or being manipulated.The primary affects of this personality are *rage* and *envy.* Characteristic pathogenic belief about self would be the statement "*I can do everything*". The characteristic pathogenic belief about others would be "*All are selfish,manipulative and dishonest*". Central modes of defences are *control* and *omnipotence* on others. PDM-2 does not consider disorders as izolated and distinguished artificially. Thus,depression is not merely a mental disorder but also personality features.The manual classifies a depressive personality disorder with subtype of introjective(self-critic),analytic(high reactivity to loss and rejection) and with a converse manifestation; the hypomaniacal personality disorder (high energy,counter-depressive,fear from closeness). PDM-2 also suggest treatment when there are enough evidences.Introjective type responds better to interpretations and insight whereas the analytic type responds better to the present therapeutic-social relationship. Hypomaniacal type often avoids engagements and does not last to a relationship. PDM-2 emphasise that the engagement to treatment is very important to improvement.Individuals with a hypomaniacal personality disorder are more likely to be in the borderline level confirming defences as idealization of self and devaluation of others, comparatively to depressive personality who devaluate themselves and idealize others.

Based on these research arguments,Gazillo,Lingiardi and Del Corno (2013) created a list with 19 Prototyp Disorders related to the four foundations of Personality. Authors integrated these categories in the Psychodiagnostic Chart (Gordon & Bornstein 2012; Gordon and Stoffey 2014) that assess Personality in four basic elements : 1) Healthy 2) Neurotic 3) Borderline and 4) Psychotic

For a   Healthy Personality the chart gives a rating of **9-10 scores .** The subject has strong Ego-Real to his or her life events with appropriate coping skills.

A Neurotic Personality Level is characterized by a   **6-8** scores. The subject has a basic sense of identity,reality testing and intimacy relations but a limited fair coping mechanisms and a management and affect regulation fair and limited.

Borderline Personality Level has an approximate scores of 3-5.It represents an individual with a poor and incompleted relationship, difficulty with impulse control and self-identity with mechanisms of defense as denial, splitting and projective-identification.Therefore the subject stands on the border of and might behave sometimes as a psychotic and other times as neurotic.This personality level connects the two levels of Neurotic Personality and the Psychotic Personality Levels.

Level of Psychotic Personality range from 1-2 scores. The subject is divided from reality;his or her thinking is mostly delusional and sometimes hallucinated with an affect and regulation of flashed mood.His or her pathogenic beliefs are the focus of functionality and lead their life style.It is the most dysfunctional entity in terms of psychopathologic patterns.

b. Mental Functioning – M Axis.

The second dimension of PDM,Mental Functioning M-Axis,gives a detailed picture of the abilities that contribute to the individual personality and a degree of the overall psychological or disturbances. M-Axis abilities include:*the capacity for regulation*, *attention and learning; the capacity for relationships* (including depth, range, and consistency); *the quality of internal experience* (level of confidence and self-regard); *the capacity for affective experience, expression and communication; the level of defensive patterns; the capacity to form internal representations; the capacity for differentiation and integration*; *the self-observing capacities* (psychological mentalities) and *the capacity for internal standards and ideals*, that represents the sense of morality. Each of the described capacities was translated into specific statements in the present study.A normal identity is associated with a consistent experience of time and space of self and the Significant Other even more with the capicity to assess atributes and internal experiences in depth,complexity and wholeness. This identity is also associated to the capacity of the individual for investing in time on his professional,intellectual and creative concerns.The dynamism is routed according to values,opinions,tastes and beliefs of the individual. Individuals with a pathology in clinical identity appear with an obvious problem of conception of experiences of self and the world.Clinical pathological identity is followed by a fragmentarization and

instability of understanding self and significant others experiences in time and space.The subjective experience for self and others is often poor,with lack of depth,superficial and polarized. Tastes,opinions and values are not linear,taken by others around but they could easily be shifted.An individual with identity pathologies have a lack in the capacity of understanding others and cannot react to the social issues that surround.Despite the appearance of this pathological identity form in DSM as Borderline Personality Disorder,a range of identity pathologies characterize the majority of severe personality disorders.Clinical setting sees the individual with an identity pathology as associated with high level of treatments withdrawn,impairment of self-reflecting capacities,difficulties to maintain therapeutic alleance,tendency to concret plans for reality testing and tendency to impulsive actions.

c. Symptom patterns and Subjective Experience-S Axis

PDM-2 treats in the S-Axis Manifest Symptoms and Concerns of the subject .These are the symptomatic patterns of x DSM-IV-TR but with an emphasis in the subjective experience of the patient(subject) symptoms.Patient (subject) may evidence one or more patterns that may or may not be connected to each-other.These symptomatic patterns should be viewed in the context of personality of the person (P -Axis)and the mental functioning (M-Axis).The quality of the experience in illness and the manner which the disorder is elaborated, have a central role in forming therapeutic manifestations especially in the assessment of different psychic types. According to the psychodynamic theory,these aspects are related to the personality patterns and particularly with the conflictual issues or chain occurrences.Cognitive processes in the assessment of subjective state and personal welfare or to adaptive resources are considered as core mechanisms in the availability of the person within the patterns person-stressor (illness).

When defense mechanisms are not considered as dysfunctional and pathologic processes but also as Ego (Ess) representatives,they facilitate adequancy(Steffens & Kächele,1988). In the processes of the elaboration of an illness,defense mechanisms will serve for the intrapsychic regulation(elaboration of affects) whilst coping skills will related to availability,problem-solving and closer tothe reality (idem). The manifestation of a defence mechanism along with threatening affections and experience that imperil the integrety of Self,patterns a capability of the individual to cope in a constructive way with illness needs.In psychodynamism,the acquirement of illness and the way the   individual cope with are considered as consenquencies of the personality features of the patient,either in the cognitive,affective and internal behavioral resources. It is very important,thus,the concept of personality pattern (process of perceptions of Self,stress tolerance,various functions of the Ess,types of defense mechanisms,tolerance to frustration and self-regulated anxiety,experiences of reality and the ability to be stable in relationships). The stress is given to one's own thoughts,feelings and manners,unconscious or not,to react,elaborate or create relations in illness time,which can allow the person to take insight and

comply with therapists about interpretations. Mental psychological ability is a cruscial criteria for receiving a psychodynamic therapy with the purpose of increasing Insight and develop new behavioral chances based on a new self-image far from anxiety and intrapsychic conflicts. The individual feels released as "the unwished impulses"do not act directly as external stressors. These gratifications are linked to the motivation of individuals in maintaining the state and role of the illed. The person feels charged,as in his personal and professional life with a variety of social tasks that,in the case of illness are dissolved by mental health professionals(Horn et al.1984).In the clinical setting,behavioral relations that patient realize unconsciously,becomes observable and proved in the pattern of transference.Subjective experiences are organized according to te accompanying emotions.Subjective organization of memories and significant structures contribute in the elaboration of recent inquiries,i.e.to what a person expects by relationships.The acquirements of relations,especially to persons of reference in childhood and adolescence are shaped in an intrapsychic mode with internalized objective relations (representation of self and object),inner images are fused into a context of feelings,wishes,expectacions and fears to self and object or relations.

Maladaptive Behavioral Tendency

Repetion compulsion are an inhereted and prehistorical tendency in the unconcious that inhibit individual from repeating some actions,especially those with a painful and destructive character. If the individual is not autonomous,to be self regulated in an sufficient way and reflect on himself,he has not structured a valid relation with supply objects either external,or internal.Structural models of the individual become an interaction with other. Is essential for the psychologist to "conversate"with that individual structure that replies to the proviso of time and space "here and now"and to develop a line of interaction that is linked with the personal background in everyday life.In the analysis of structures and disfunctional relations should be clarified the levels of structural development of the person. A structural model of the masochist subtype,for instance,that is characterized by a high energetic area among submission,tolerate to pain and taking gratification against range,inner outburst and mastering may be manifested on the level of developement,empathy or control of drives. As Schacht and Henry (1994) assumed relationship patterns function as reactive lens toward maladaptive behavior.In such a way,there is a creation of circles of unconcious disfunctional convictions that determine stability and resilience to self and others.Relationships are modeled unconciously in order to influence other and confirm unconcious beliefs (Anchin,1982; Strupp & Binder ,1994).

The current study

In the conduction of the present study,we were based on an extensive metanalytical research,in the variety of evidences from classical letature review,developments and contemporary trends of the psychodynamism and on the evidences of empirical data obtained on the contextual need for a reassessment of school leaders by an analytic view. Psychoanalysis is probably one of the most

important theories and methods of approaching, understanding and the analysis of development of emotional functions,motivation and drives in the human psychology. Research endeavors to define a clearly normal and abnormal personality,have not reached to set a distinction between the tendency of a personality illness state and a clear mental illness. Approaching psychoanalysis to our daily life contexts,as a denotative of problems or conflict resolution,between self and others,is early determined in literature. Dynamic forces in the cases where a greater psychic engagement is required,are more unconscious than conscious.Thus,psychoanalysis is useful to help individuals to establish their self and social relationships according to the same relational and good objectual principles of Winnicott "*a good enough relationship*"(1953,pp.285).

The advantage of evaluating a suitable personality level (healthy) of leader,either a teacher or a director in educational institutions,is of course, one of "the bells falling harder"in terms of a continuos adaption of our tranzitional society.

Monitoring these parameters of behavior and personality is a straordinary resource for clinical screening and preventions of events when maladaptive behavior as violence,persecution and abuse can turn in prevailing and on hard consequences for the future. American authors and researchers of the "American Psychological Association"(APA),have initially state a proposal for a Prototype in 2008 and Personality Level,after the first edition of "Psychodynamic Diagnostic Manual" (PDM)for maladaptive behavior tendency or disorder. As a novel diagnostic manual,PDM is a taxonomy that emphasis personality pattern and individual competencies rather than a simple treatment of symptoms.High expectations and the application of the Manual Axis,different as from approach as structure with diagnostic manuals known by now (DSM,ICD)transacted the conditions for an elaboration and publishing of the PDM-2,the edition of which is to be expected at the following months from PDM Task Force APA.

A significant supporting instrument on PDM Axis is the PDC and the PDC-2(Gordon et al,,2013;Gordon et al,2022) Researchers and clinician from all over the world contributed in collecting data as for instrument validatation and theirs impressions were very important in realizing a database for the newest version PDC-2.   Quantitative data of the present study were collected by the self-reporting method of the PDC-2,where the preliminary and testing stage transacted credibility and validity of usage in the Italian educational context. Preliminary data collected by our clinical trials and population revealed that the tendency of respondents in behavioral evaluation were in the consensus shaft   of   concourse   and   in   the   boundary   of   the   first   factor   for   elements   of healthy,neurotic,borderline,psychotic and maladaptive behavioral tendency elements.

Organization of the Personality Pattern

In their endeavours to undestanding human identity, professionals of psychology and sociology,have often used different approaches and positions. Their arguments range from the genuine intrapsychic and

macro-social viewpoints (Gecas & Burke,1995) to the identification of processes and affilated terminologies (House,1977). Researches for a stable identity state consitute one of the fundamental approaches of personality studies in the three recent decades (Marcia,1966).The great identity resources vary in the degree of importance:the most tangible sources are shown in the individual behavior and relevance whereas the less tangible sources constitute the features of our personality. Severe personality pathologies live in a continuum with the normal personality.In both cases of representation it is viewed the conservation of the ability for reality testing.While in the normal personality functionality is appropriate and flexible,in the personality pathologies we encounter a rigidity and maladaption of the personality.Our personality traits are partly developed by the defenses we use in an uncounscious , automatic and repetitive manner in different circumstances. Flexibility and adaptive function of a normal personality reflect the flexible nature of defensive operationalizations of a healthy and matured personality.On the other hand,rigidity that characterizes the levels of a pathologic personality reflect the non affilation of mechanisms and operations of defense.

Individuals with a pathologic personality are generarly based on defensive mechanisms of repression and splitting (distortion of image in the mental representations) what constitute the basic features of a "*neurotic level*" of the personality treated in this study. It is precisely the relative stability and the non affillitation of neurotic defenses that are attributed to the process of development of identity which maintains the layer of rigidity in the pathologic personality. In the forms of most severe personality pathologies,as it is encountered in the argument of Kernberg(1977) for the organization of "borderline personality organization" the rigidity of personality is viewed in establishing a pathogenic identity,characterized by the pattern and traits of maladaptive personality,contradictory,unstable and often socially unsuitable.In personality pathologies,the maladaptive personality traits may appear as inhibitors of the normal behavior "*inhibitory behavioral pattern*" or as an extension of certain behaviors "*reactive behavioral pattern*" and in most individual they are both present. In the case of inhibitory personality traits there is viewed a lack of behavioral patterns that may be suitable for a certain situation. Whereas,in the reactive personality trait,we encounter behavioral patterns that are not neccessarily needed for certain situations.For understanding the functionality of the inhibitory and reactive trait in the general population,we may take the example of a leader,who,in the inhibitory traits might be creative professionaly but withdrawn and passive in developing relations with his or her employees in the transforming leadership style. Let this point be the 0 of our example. In the situations of reactivity,the same leader may appear with a controlling and omnipotent nature on everyone and everything. This individual will experience states of anxiety and disturbances in the majority of time and may wonders when his employees, to whom until recently held a different behavior,will externalize to his wish for control. Conflict raises when the leader tries to return to the previous situation but it it impossible for him to get back to 0. The traits of pathologic personality either inhibitory or reactive may dissolve their

intensity through sublimation (Freud,1923) a specific feature of normal personality. In this process of defence,motivation conflicts are directed in a flexible form,adapted and constructive in the areas of non conflictive functions. In the current study, an individual with a normal personality will lead conflict with the feeling of aggression and competiveness keeping an assertive,effective and careful attitude,which are the primary features of an authentic personality.

This individual may take the admiration of others and be seen as somebody who will be successful and a reference for others. In the situations when assertive behavior may be not appropriate for a normal personality would be comon to master wishes and modify his behavior.

Tab. 1 **Treatment plan for the development of neurotic level of ego.**

Character Style	*Dynamic Aspects*	*Treatment considerationsës*
All styles	Superego prohibition of id impulses prevents anxiety but, also intensifies defenses of ego and leads to symptoms.	Neutralize ego defenses and reduction pf prohibitive superergo; understand how symptoms are maintained and create interpersonal distance; resolution of neurotic conflict.
Oral fixation	Individual focus on self; lacks of empathy; depression or dependency.	Motivation of empathy; treatment of passivity and fear and reduction of energetic force of aggression over other sources related to gratification.
Anal fixal	Control/Dominance/Aggression; Obsessive-Compulsive disorder.	Confront intellectualization/doubting and exploration /understanding emotional state;understanding passivity and defending from anxiety.
Phallic fixation (Oedipal)	Feelings and actions related to competitions/jealousy; guilt/shame; hysteric conversion/phobia.	Understanding defensive use of emotional defences; exploration of wishes and repressed fear /shame for feelings with a sexual background.

*Source:*F. Trimboli and K. L. Farr (2000)

The seven elements of Personality Organization,when four subforms are treated in an independent way from the escalating evaluation,involve:

1)Integrity,which implies the ability of the person to view self in a stable,complex and accurate way; 2) Object Relations,the ability to maintain intimate,stable and satisfying relationships;3) Affect Tolerance, the ability to experience the full range of age-expected emotions ;4) Affect Regulation, flexibility in using coping strategies;5) Superego Integration,the ability to use a consistent and mature moral sensibility;6) Reality Testing,the ability to appreciate conventional notions of what is realistic; 7) Ego Resilience, the ability to respond to and recover from stress resources .

Evidences supporting Personality Organization are rooted in Freudian thought,distinguishing from "*primitive"or "preoedipal*" types to "the more integrative and oedipial"of psychopathology. Depending on psychopathology types,there is an implication of different developmental levels of psychopathology. Kernberg, Caligor (2005) and McWilliams (1994, 2011) in their extendend researches,have

instrumentalized these distinctions and outlined some core features in determining Personality Organization level (Caligor & Clarkin, 2010; Kernberg &Caligor, 2005; McWilliams, 1994).

Tab.2: **Definition of Personality Organization Levels**

No . Trait of Personality Organization	Core Trait	Psychotic	Borderline	Neurotic
1	Level of Personality Integration	Severly disturbed	Marked identity diffusion	Relatively Integrated
2	Prevaling level of defenses [that] confront stressors and external or internal conflicts .	Primitive defense mechanisms (projection,splitting)	Early defense mechanisms (splitting, identification projection)	Secondary defense mechanisms(repression, rationalization,reaction formation)
3	Capacity for Reality Testing	May be seriously disturbed (for halucinacions or delusions)	Relatively intact,may be temporarily affected especially in high arousal conditions.	Intact
4	Quality of Object-Relations and mental representations of self and others.	Serious disturbances in object-relations , dissintegration of self and object representations.	Troubled interpersonal relationships,often associated with chaos,idealization,denigration,instability of self and representations of others.	Relationships may be characterized by conflicts for autonomy,integration of love and aggressivity.
5	Capacity for self-observation	Severe disturbed	Often with severe disturbances	Relatively intact
6	Nature of primary conflicts	Existential (life,death,identity)	Affected by relations	Conflicts around autonomy,guilt,shame and interpersonal relations.
7	Transference and Countertransference potentials in subjects (whether they develop the strong feeling of transference and countertransfer.)	Very strong,often positive but either countertransference.	Strong,characterized by feelings of idealization and dissintegration.	More subtle.

Source:Adapted from Kernberg , Caligor(2005) and Nancy McWilliams (2011)

These features define a continuum of pathologies that range from:1)Neurotic Organization Level,assumed to be characterized by relatively high levels of identity integration and the undconditioned reality testing ability and the predominant use of defense mechanisms;

2) Borderline Organization Level,assumed to be characterized from an identity confusion,relatively unconditioned ability in reality testing and using of primitive defenses;

3)Psychotic Organization Level,assumed to be characterized by an identity diffusion,impaired reality testing and using primitive defenses.

Personality Organization Level,argued by the authors to reflect the severity of personality pathologies and the tendency to pathology,is considered as an important predictor for prognosis and treatment reponse (Caligor &Clarkin,2010) .

McWilliams (2011) rationed that the describing axis and PO level are independent from one-another and every form of personality pathology might be seen in different levels of PO.Thus, for instance,a hysterical personality may appear in neurotic,psychotic or borderline levels.In the same pace,studies have revealed that the Borderline Level employs a wider category of personality issues rather than the Borderline Personality Disorder in DSM(Fonagy & Luyten, 2016;Shedler et al., 2011; Lowyck et al., 2013). Research evidenced that this form of diagnostic evaluation of PO may distinguish individuals with different diagnosis to have better treatment outcomes (Huprich & Greenberg, 2003).

Differently from the first psychodynamic line researchers,another researcher introduced a Model of the Two-Polarities of OP ,a model that bridges the approaches of diagnosis and treatment in the field of psychodynamic classification. In congruence with theoretical approaches to personality disorders ,impairment in the level of self and others (Livesley 2003-2004;Skodol and Bender, 2009) Blatt argued both in the descriptive and theoretical viewpoint,that personality issues are characterized initially by difficulties in attachment and difficulties with self-definition that are set in this two-dimensional continuum which he treated as a Two-Polarity Model. The model proposed by Blatt in 2008, argues that relations and self-definition are the two fundamental psychological dimensionet that create the theoretical matrix for :a)understanding processes of personality development;b)variety of normal personality organization;c)concepts of creation of psychopathology; d)integration of therapeutic action mechanisms. A well-functioning personality,according to Blatt (2008) involves the balance of development in interpersonal relation and self-definition.Thus,the mature levels of relationship facilitate development of a stable identity,autonomy and self-understanding that influence to integrated interpersonal relations. Throughout development,traumatic experiences and biological predisposition,may create distortions in the developmental lines of individuals and the neglect of relations of others. Different forms of psychopathology are not static entities caused by deficits in development but,dynamic costellations of conflicts and defences that tend to maintain balance (geshtalt)between the relationship and self-definition. The clinical usage of the Object-Relations

approach and Two-Polarities Model,as proposed by Blatt, is supported by the evidences that the model explains the comorbidity between "symptomatic disorders"and "personality disorders "(Blatt, 2004; Blatt & Luyten, 2009). Research revealed a strong correlation between maladaptive manifestation of the element of relationship and self-definition in Depression (Blatt, 2004; Luyten & Blatt ,2012), Eating Disorders (Boone et al. 2014; Thompson-Brenner et al., 2008), Substance abuse (Blatt et al.,1984;Blatt & Shichman,1983), Post -traumatic Stress Disorder(Cox et al.,2004;Gargurevich, et al.2008),Conduct Disorder (Blatt & Shichman,1983) and Functional Somatic Disorders (Luyten et al., 2012) besides the typology of Personality Disorders and Maladaptive Trend Behavior.

Referring to the acess of Prototype described in this sudy research,psychopathologic issues may be thought as *Prototypes* in the two-dimensional model. Prototype of each individual in different stages of development (Blatt & Shichman,1983;McWilliams,1994)reflects unique means (prototypes)of dealing with the balance of relationship and self-definition,ranging from "*normal personality function*" to "*full symptomatic issues and levels of personality disorders*". *Personality Prototypes* are composed by multidimensional and hierarchic structures and represent a entirety of descriptions rather than the simple ones of anxiety,fear,despair etc. Prototypes have an abstract nature as they do not constitute specific categories.Moreover,the quantity of prototypical modes for conflict resolution which can be used by an individual,is limited.

Boundaries between prototypes are breached,that allows individual to use features from different prototypes.In the clinical setting,the spectrum of prototypes that constitute a personality may affect personality development in the form of synergistic interactions of experiences of relationships and self-definition,experiences of closeness and splitting,similarities and unsuitableness and in turn,the consolidation of these interactions(Safran, et al., 2011; Safran, et al.2002)as to the principle of "chain"

The object relations approach as argued by Fairnbairn(2011), Kenberg (1983-1995),McWilliams (2011) has a significant contribution in the understanding of the attachment process of individual with the dysfunctional patterns. Pathologic patterns stands in the origin of unconscious object-relations that can produce a maladaptive or pathogenic behavior tendency in the late life.

The Personality Organization Chart -2 (PDC-2)

The Psychodiagnostics Chart (PDC) developed by Gordon and Bornstein in 2012 and later revised by the authors according to the changes of PDM-2, in the 2017 (PDC-2) and reviewed by Ibrahimi (2020), aims to assess the entire PDM Axis either in adults, children or adolescents. The tool was developed so that key constructs assessed in the PDM could be operationalized and recorded using a brief, clinician-friendly tool, and to integrate PDM diagnostic data with those of DSM-5 and ICD-10; PDC items are written to be accessible for clinicians of any theoretical orientation. Even in its first version, the PDC can be used to help frame an initial diagnostic formulation, identify treatment goals,

and track progress throughout treatment. The construction of" *Psychodiagnostics Chart-2" is* based on theoretical-scientific and empirical evidences provided by a variety of assessing research Gordon and Stoffey, 2014; Gordon and Bornstein, 2017). The chart was constructed to be a flexible, idiographic and useful for educators, practitioners and researchers of various orientations. The PDC may be valuable in teaching contexts as well and has been used in research settings that emphasize the empirical study of psychodynamic constructs and concepts (Gordon, et al., 2013; Ibrahimi, 2020). Each PDM-2 section has its own PDC rating scales reflecting the unique developmental issues of that age group.   The Psychodiagnostic Chart-2 is free and can be found online and downloaded.

The version used in the current study,the PDC-2, is the adult one based on our clinical trials populations,mainly psychotherapists and client sessions. PDC-2 is a categorical and dimensional chart ,with a range from (1) "most disturbed" to (10) "healthy".In the continuity of development of the second version of PDM,in 2016,the authors (Gordon and Bornstein,2015)have developed the second version of PDC updated as the newly reviews and formulations of PDC.

The tool comprises five sectio+ns which include:

1.*Personality Organization,* whereas are used the seven PDM-2 capacities to assess the level of severity.Initially,the clinician rates each of the seven capacities from 1(severe) to 10 (healthy) and then is degreed to the overall personality structure from 1 (psychotic) to 10 (healthy);

2.*Personality Patterns*,in which lies a review of personality patterns according to the P, M and S Axis of the PDM-2.The clinician controls how many of these descriptions in the Axis apply to the individual and define the pattern or personality disorder that prevails.At the end is defined the level of severity from 1-10;

3.*Mental Funtioning* ,where the clinician rates from 1-10 the nine descriptions of the core mental functions of the individual. Then,the clinician defines the overall functionality throught the same scale,with a variance from 1(with severe deficits) to 10(optimal).

4.*Symptoms*.The clinician designs a list with 4 or more symptoms or subjective complaints and rates their degree of severity from 1 (severe) to 10 (mild).

5.*Cutural and contextual contexts* ,in which the specialist considers how many of the cultural and contex factors influence symtomps manifestaton .

For instance,if an individual,during the PDC-2 assessment, does not meet one of the criteria of the four mentioned foundations or to PDP,then,there he could be assessed for a tendency trait between that

ranges between 7 - 8 scores of a Neurotic PO in the tool. Therefore,the psychologist may establish a differential diagnosis without treating the subject as ill but,as a person with a increasing risk of illness.

Results

For the validation and consistence of PDC-2 on a PDM-2 bases,authors (Gordon et al.2012; Gordon et al.,2022) surveyed online questionnaires with 511 psychologists and mental health practitioners from various parts of the world ,part of which were either the research team of the present study.Then,they tested the validation of PDC with 38 psychologists who already knew the procedure and have used MMPI-2 with patients,psychotherapists,disability or penintenciar services. From testing the reliability of participants,validitation for the Overall Personality Organization scale was .92 (p<.001); for the Overall Severity and Personality Disorder was .89 (p<.001); for the 9 capacities of Mental Functioning ranges from .77 to .89 (p<.001); and for Severity of Symptoms was .87 (p<.001). All the PDC-2 constructs revealed strong correlations with MMPI-2 scores (Gordon & Stoffey,2014). The MMPI-2 scales for Schizophrenia (Sc), Hysteria (Hy) and Ego Strength (Es) revealed a good validity for categorical components of the levels of Psychotic, Borderline and Neurotic Personality Organization. These categorical components were collected by dividing in 10 points the scale of Personality Organization : psychotic (ratings *1-3, no. = 13*), borderline (ratings *4-6, no. = 52*) and neurotic (ratings *7-10, no. = 33*)

For the psychotic level scale ,authors predicted a significantly higher mean than both Hy and Es scales. From the pairwise comparison data was revealed that Sc is significantly higher than Es (M = 85.77, SD = 19.55 vs. 34.31, SD = 6.78, p = .001) and slightly higher than Hy (M = 85.77, SD = 19.55 vs. 72.69, SD = 18.46, p = .017). For the borderline level scale ,authors predicted that the means of the scales Sc and Hy should not be significantly different but both should be significantly higher than the mean of Es: Sc and Hy are not very different but Sc is much higher than Es (M = 62.21, SD = 12.31, vs. 43.58, SD = 10.25, p = .001) and Hy is much higher than Es (64.21, SD = 12.31 vs. 43.58, SD = 10.25, p = .001). For the neurotic level scale,it was predicted that the scales Es,Sc and Hy had an average distribution and that Ego Strength was oriented to the normal distribution as it can be seen in the preliminary results of the following tables.

Tab. 3 : Correlations for the 7 Elements of the Overall Personality Organization Scale

Components	*r*	*M*	*SD*
Identity	.84*	.5.50	.1.68
Object Relations	.83*	.4,85	.1,75
Affect Tolerance	.85*	.5.40	.1.59
Affect Regulation	**.86***	.4.91	.1.63
Superego Integration	.80*	. 6.22	.2.00
Reality Testing	.90*	. 6.84	.1.93
Ego Resilience	.69*	.5.83	.1.87
Overall Scale	.92*	.5.50	.1.68

* p < .001 Source: Gordon & Stoffey, 2014.

Tab. 4 Summary of the Correlations of Test-retest, Means and Standard Deviations for the 9 Elements of

the Mental Functionality

Mental Functioning	r	M	SD
Capacity for Attention, Memory, Learning and Intelligence	.89*`	6.63	1.92
Capacity for Relations and Intimacy	80*	4.73	1.75
Quality of Inner Experiences	84*	5.26	1.63
Affective comprehension, Expression and Communication	77*	5.88	1.70
Level of Defenses or Coping Models	.83*	5.31	1.69
Capacity to form Internal Representations	.82*	5.48	1.58
Capacity for Differentiation and Integration	.87*	6.03	1.90
Capacity for Self-Observation	89*	5.94	2.12
Reality and Moral Understanding	83*	6.53	2.10

*p<.001 Source: "/Operationalizing PDM: A preliminary study of the Psychodiagnostic Chart (PDC) Gordon, R.M. and Stoffey, R.W. (2014; Gordon, Lyon 2022) Menninger Clinic,78, (1).

Whilst the symptoms referred by the subject do not represent a correlation with a known diagnostic criteria as e.g. Major Depression (in DSM-5), mental function does not affect Personality functionality and thus the individual should be better treated as a Personality with a Depresive tendency (in PDP).

We can define in this line the strength of Ego functioning in terms of a tendency of Personality towards illness.If for example,a leader with a Depressive Personality would live in an isolated social environment for a certain time,he/she is more likely to develop the complete range of symptoms of Major Depression.The same is true for any potential behavioral tendency. Other significant variables of the current study were Mental Functioning and Ego Strength. The use of PCD-2 (Gordon,2022; Lingiardi &McWilliams, 2017; Gordon & Bornestein ,2017) were a significant and interesting source for the interpretation of values of integrity of Ego. The first stage of the current project aimed at the preliminary assessment of PDC-2 and its suitability to the context with 100 non-clinical settings participants, mainly organization leaders working in the Italian bussinesses. Data of significance alpha (n=100; =.835)revealed a strong correlation between the assessment of viewpoints for personality organization in through the PDC-2 tool.Correlations between Pearson variables revealed a positive correlation among variables(organization leaders) and statements related to their personality organization and character style(Q.2, Q.5, Q.24).Factorial analysis for all 100 subjects reported the creation of 17 factors,from which 4 were considered stable on a level of 0.75 -0.85. These factors were considered significant and were reported for the further statistical distribution. Collected data on stability and significance in pre-test helped us in designing the second stage of the PDC-2 evaluation in non-clinical trials in two versions,English and Italian with a definitive number of five sections. Collected data were initially added in the dataset divided for each section.Further,through the JASP software,there were designed the orthogonal variables and matrices among subjects.

Below is the summary of tables and graphs for preliminary data:

*Tab.*5.Record data for Variables of the preliminary PDC-2 stage

Matrix Range	(-5 ,-4,-3,-2,-1,0,1,2,3,4,5)
Distribution of Q	100
Pearson Correlation for preliminary Q statements	0,93
No.Significance for preliminary Q	0,84

Tab.6: Validity and Weight analysis for the orthogonal variables in Varimax Rotation.

Analysis of Significance	
Cronbach Alpha	
,819	77

No.Section	Factor weight of rotation Orthogonal Variables	Weight of rotation factors Orthogonal Variable 1
1		1,65
2		1,51
3	0,39	
4	0,23	
5	0,42	

As it can be seen by the tables above,the components of the first and second sections have a strong factorial weight between them and the boundaries is not over 0,4 ,which allows for a complete analysis in Varimax Rotation λ > 1.The matrix of transformation for the core components in Varimax Rotation is on Kaiser normalization.The matrix of the core rotated components,is convergent in 3 interactions. For the factorial analysis,all components are not below the limit of 0,4 so they would all be submitted to further analysis in the second stage. Pearson correlations indices,not presented in the present paper ,for the 1st and 2nd factor of Personality Organization ,the most significant index is related to the Neurotic Behavior Tendency with Obsessive-Compulsive capacities in passive libidinal affect (Sig2. p = 0.01< 0.05, r=.990).This means that as a Maladaptive Behavior Trend,in the preliminary data,leaders tend to show a Neurotic level with the presence of the tendency of control and rulling. If not properly channeled,this behavior trend can be transformed into a Neurotic behavior or Obsessive-Compulsive Personality Disorder. Personality Organization in turn can affect their relationships with the employees and their social identity. Pathogenic beliefs themselves can affect the strength of the Ego in a very important way. The connections between these two categories are also supported in the literature (Alessandri et al., 2016; Eisenberg et al. 2010). Factors such as social roles and stressful events affect our Ego-Protective structures by reducing immunity of the Ego as the principle of reality and encouraging the emergence of cognitive distortions of pathogenic thought that, when combined with values, turn into pathogenic beliefs. Therefore, as a result, the individual behaves as if he has scattered relationships and is confused with reality. His reality can change, if some of these beliefs are detached and the Ego returns to the Ego-Real. The Ego's capacity for resilience (rehabilitation) has been shown to be influenced by early childhood experiences, the shape of endopsychic structures, libidinal energy, and temperament. It also affects aspects of concentration, emotions and behavior (Eisenberg et al. 2010; Taylor et al., 2013). As Vallaint   argued a Powerful Ego can develop a Strong Mind, but a Strong Mind not always carries a Powerful Ego! (2003) Therefore, it is crucial "*the learning of our inner personality* "the creation of map for knowing oneself, controlling unconscious impulse and developing relationships with others. Statements relating to maladaptive behavior are a very good index of functional and dysfunctional mechanisms of Ego and Mind. This is the Prototype of an individual with a non-mature Ego-strength and thus a Pathogenic tendency.

CONCLUSIONS

Research for a Prototypical Identity are of great importance in understanding depth and prevent difficulties later in life. Finding an identity that could establish a consistent development in prototype represents a long and hard journey for the clinical science. Every category of population is affected at different degrees by stressing events and the psychological and social consequences it provides. The relation with the other object-subject is equally important in defining one's psychological outlook. Since the early writings of Freud, maladaptive behavior took a special attention as it is the prelude of "*all sins*" (Freud,1929). Individual have already developed an own Pathogenic Belief, that characterizes the changing of the personality pattern from "*with a psychopathologic potential*" to "*psychopathologic risk*".

The behavioral tendency of the individual is probably not studied in the context of mental health and improvement of psychopathologic parameters as for raising efficiency and efficacity not only for the individual but also for the entire society. Seeking for a maladaptive behavioral trend is surely end endeavor but also crucial for prevention and intervention in the clinical context. The more predictable a behavior, the greater the prevention to it. The individual perceptions on personality, behavioral trend and character style, are significant for a comprehension of these parameters but, also to outline some points from which to develop a strategic middle or long-term plan. Research of Fishbein and Ajzen on the perceptions and concepts (1975) revealed that attitudes and behaviors might change through education. Preliminary results reveal that an individual with a high level of Neurotic PO, have higher chances for a violent tendency behavior than another with a borderline PO. Thus, individuals with high levels of Neurotic PO should be put in the first line of psychological based intervention. Relationship with the significant other, internal mental functioning (M), symptomatic patterns PO(P) and subjective experience toward these relations(S) are the most powerful predictors of prototype organization and maladaptive behavior. The Psychodynamic Manual and its recent improved second addition are a taxonomy of the whole of personality from healthy to very disturbed. Most of respondents of the preliminary stage of present study, emphasized an overlapping of personality organization levels between Neurotic, Borderline and Healthy (56 %). The subjective experience of individuals in such Personality Organization patterns increases the tolerance toward a deviant behavior in future. Thus, if one's cured the viewpoints of self, his all psychic and social relationship is cured! The overlapping of these elements of personality organization, is an alarm trumpet for the following step by step and prevention of turning them into a real pathogenic cycle, very dangerous for the future ahead. In the beginning taxonomies of mental illness have been based on categorical descriptions of disease symptoms leaving out the whole person. As fore, conducing an ad-hoc working group for translating and adapting the psychodynamic clinical instruments in Albanian language, Implementing PDM-2 and PDC-2 as new mental health assessment tools in clinical and non-clinical settings affect variables in the development

of Prototype, healthy Personality and Psychological Welfare in society and developing a profound research regarding Personality Organization and Patterns are the fundamental lines for a structuring and prospective progress in the society. The preliminary results of the present study will help therapists, psychologists and mental health policy makers to develop a framework for monitoring and implementing them in order to prevent or intervene in the risky or deviant potential situations.

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RATLARDA ASETOMİNOFEN KULLANIMI SONUCU MEYDANA GELEN NEFROTOKSİSİTENİN ÖNLENMESİNDE COENZİM Q 10 İLE NİFEDİPİNİN KORUYUCU ETKİLERİNİN KARŞILAŞTIRILMASI

A COMPARISON OF THE PROTECTIVE EFFECTS OF COENZYME Q 10 AND NIFEDIPINE ON THE PREVENTION OF NEFROTOXICITY RESULTING FROM ACETOMINOPHEN USE IN RATS

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Özet

Asetaminofen (parasetamol; APAP) analjezik ve antipiretik özellikte olup, genelde iyi   tolere edilir ve terapötik dozlarda kullanıldığında güvenlidir. Yapılan in vivo çalışmalarda nefrotoksisitenin nedenleri arasında Asetaminofen de yer almaktadır. Doğal olarak oluşan Koenzim Q10 (CoQ10), etkili ve güvenli terapötik bir antioksidandır. Koenzim Q10'un membran fosfolipidlerini, mitokondriyal membran proteinlerini ve serbest radikal oluşumuna bağlı gelişen oksidatif hasarları önleyebildiği gösterilmiştir. Kalsiyum kanal blokerleri, anjina, aritmiler ve hipertansiyon gibi çeşitli kardiyovasküler hastalıkların tedavisinde uzun yıllardır kullanılmaktadır. Ayrıca Nifedipin endotel hücrelerinde antiapoptotik etki göstererek, endotel disfonksiyonları iyileştirdiği de bilinmektedir. Biz de bu çalışmada Asetaminofen'e bağlı böbrek dokularında oluşacak hasarın önlenmesinde Koenzim Q10 ile Nifedipine'nin etkinliğini karşılaştırmayı amaçladık.

Bu çalışmada toplam 48 adet Wistar Albino cinsi dişi rat kullanılıp, her grupta 8 hayvan olacak şekilde 6 gruba ayrıldı. Gruplar; Kontrol, Nifedipine, Koenzim Q 10, Asetominofen, Asetominofen+ Koenzim Q 10, Asetominofen+ Nifedipine grubu olarak ayrıldı. Alınan böbrek dokuları histopatolojik incelemeler amacıyla H&E ile boyandı.

Kontrol (KNT), Nifedipine (Nif) ve Koenzim Q10 (Co Q10) gruplarına ait böbrek dokularının normal görünümde olduğu, patolojik olarak herhangi bir bulguya rastlanmadığı izlendi. Asetominofen (APAP) grubunda ise; glomeruler alanda inflamasyon, interstisyel fibrozis görüldü. APAP+ Co Q10 grubunda ise; inflamatuar hücre infiltrasyonunun çok hafifte olsa devam ettiği görülürken, APAP+ Nif grubunda; distal tübüllerde şiddetli dilatasyonun devam ettiği gözlendi.

Bu çalışmanın sonunda Asetominofen toksisitesine bağlı böbrek dokusunda meydana gelen histopatolojik bulguların Koenzim Q 10 ile daha fazla düzeldiğini gözlemledik.

Anahtar Kelimeler: Asetominofen, Coenzim Q10, Nifedipine, Nefrotoksisite

A COMPARISON OF THE PROTECTIVE EFFECTS OF COENZYME Q 10 AND NIFEDIPINE ON THE PREVENTION OF NEFROTOXICITY RESULTING FROM ACETOMINOPHEN USE IN RATS

Abstract

Acetaminophen (paracetamol; APAP) has analgesic and antipyretic properties, is generally well tolerated and is safe when used in therapeutic doses. Acetaminophen is also among the causes of nephrotoxicity in in vivo studies. Naturally occurring Coenzyme Q10 (CoQ10) is an effective and safe therapeutic antioxidant. It has been shown that coenzyme Q10 can prevent membrane phospholipids, mitochondrial membrane proteins and oxidative damage due to free radical formation. Calcium channel blockers have been used for many years in the treatment of various cardiovascular diseases such as angina, arrhythmias and hypertension. It is also known that nifedipine improves endothelial dysfunctions by showing antiapoptotic effect on endothelial cells. In this study, we aimed to compare the effectiveness of Coenzyme Q10 and Nifedipine in preventing damage to kidney tissues due to Acetaminophen.

In this study, a total of 48 Wistar Albino female rats were used and they were divided into 6 groups with 8 animals in each group. Groups; Control, Nifedipine, Coenzyme Q 10, Acetaminophen, Acetaminophen + Coenzyme Q 10, Acetominophene + Nifedipine group were separated. Renal tissues taken were stained with H&E for histopathological examinations.

It was observed that the kidney tissues of the control (CNT), Nifedipine (Nif) and Coenzyme Q10 (Co Q10) groups had a normal appearance and no pathological findings were observed. In the acetaminophen (APAP) group; Inflammation and interstitial fibrosis were observed in the glomerular area. In the APAP+ Co Q10 group; It was observed that inflammatory cell infiltration continued, albeit very mildly. In the APAP+ Nif group; Severe dilatation was observed in the distal tubules.

At the end of this study, we observed that histopathological findings in kidney tissue due to acetominophen toxicity improved more with Coenzyme Q 10.

Keywords: Acetaminophen, Coenzyme Q10, Nifedipine, Nephrotoxicity

GİRİŞ

Asetaminofen (parasetamol; APAP) reçetesiz olarakta kullanılabilen analjezik ve antipiretik bir ilaçtır (1). APAP, kas ağrısı, kronik ağrılar, migren, baş ağrısı, sırt ağrısı, ateş ve diş ağrısı gibi ağrıları tedavi etmede etkinliği ile bilinen bir ilaçtır (2). Terapötik dozlarda kullanıldığı zaman hiçbir yan etkisi görülmemektedir, fakat uzun süreli kullanımlarda ve aşırı dozlarda alındığında, nefrotoksisiteye hatta bazen ölüme bile neden olabilmektedir (3). APAP'nin, mitokondriyal geçirgenlik geçişi (MPT) ve mitokondriyal disfonksiyonu indüklediği bilinmektedir (4). Yapılan in vivo çalışmalarda bağışıklık aktivasyonunun APAP toksisitesine katkıda bulunduğunu ve reaktif oksijen türlerinin (ROS) oluşumunu daha da arttırdığı göstermiştir (5). Ayrıca APAP kullanımı sonucu böbrek dokusunda tübüler hücre hasarı, akut böbrek yetmezliği ve bazende ölüm gerçekleştiği de görülmüştür (6).

Doğal olarak oluşan Koenzim Q10 (CoQ10), etkili ve güvenli terapötik bir antioksidandır (7). Koenzim Q10 (ubikinon olarak da adlandırılır) yağda çözünen bir benzokinondur (8). Çalışmalar, Koenzim Q10'un bir antioksidan olduğunu, membran fosfolipidlerini, mitokondriyal membran proteinlerini, serbest radikallerden etkilenen oksidatif hasardan koruyabildiğini göstermiştir (9)

Son yıllarda yapılan birçok klinik çalışmalarda Nifedipinin sadece hipotansif etkilere sahip olmadığını, aynı zamanda kardiyovasküler organ koruyucu etkilerinin de olduğu ileri sürülmüştür (10,11). Nifedipinin endotel hücrelerinde antiapoptotik etki göstererek, endotel disfonksiyonlarını iyileştirdiği de görülmüştür (12). Nifedipin de, hipertansiyon ve anjina tedavisinde yaygın olarak kullanılan 1,4-dihidropiridin türevi bir kalsiyum kanal blokeridir. Buna rağmen, antioksidan aktivitesinin, diğer 1,4-dihidropiridin kalsiyum kanal blokerlerinkinden daha az özellikte olduğu bilinmektedir (13).

Çalışmamızın amacı asetaminofenin uzun süreli ve yüksek dozlarda kullanımı sonucu böbrek dokularında oluşabilecek hasara karşı biri doğal bir antioksidan olan Coenzim Q 10 ile diğeri kalsiyum kanal blokeri olan Nifedipin'in antioksidan etkilerinden yararlanıp bu toksisitenin incelenmesi ve tedavi edilmesi hususunda hangisinin daha effektif olduğunu ortaya koymaktır.

MATERYAL

Bu çalışmanın, Dicle Üniversitesi Prof. Dr. Sabahattin Payzın Sağlık Bilimleri Araştırma ve Uygulama Merkezi Hayvan Deneyleri Yerel Etik Kurulu (DÜHADEK)'nun 01/12/ 2021 tarih ve 2021/30 protokol numarası ile etik onayı alınmıştır.

Çalışmada ortalama 8 -10 haftalık ve 150-200 gram ağırlığında 48 adet Wistar Albino cinsi dişi sıçan kullanıldı. 22 – 25 ℃ oda sıcaklığında 12 saat ışık (7:00 - 19:00) ve 12 saat karanlıkta (19:00 - 07:00) tutulan sıçanlar her gün altları temizlenen kafeslerde beslendi. Yemler; çelik kaplarda, su; cam biberonlarda normal çeşme suyu olarak verildi.

METOD

Sıçanlar her grupta 8 adet olacak şekilde 6 gruba ayrıldı. Sıçanlar havalandırma sistemi bulunan bir ortamda, özel olarak hazırlanmış kafeslerde barındırıldı. Davranışsal değişiklikleri, fiziksel görünümleri günlük olarak gözlemlenip kaydedildi. Günlük besin ve su alımları Ad libitum olup her 24 saatte bir ölçülüp kaydedildi.

Deneyde kullanılacak olan Asetominofen grubundaki ratlara Asetominofen 700 mg/kg/gün olarak 14 gün boyunca gavajla peroral (p.o.) uygulanırken (14), Coenzim Q10 grubundaki ratlara Coenzim Q10 4 mg/kg/gün dozdan 4 hafta boyunca p.o. verildi (15). Nifedipine grubundaki ratlara ise Nifedipine 10 mg/kg/gün dozdan 4 hafta boyunca p.o. verildi (16).

Grup 1 (n=8): Kontrol grubu olup, deney süresince herhangi bir işlem uygulanmadı. Hayvanlar deney sonunda ekzanguinasyon ile sakrifiye edilerek böbrek dokuları alındı.

Grup 2 (n=8): Nifedipine grubu olup, Nifedipine 10mg/kg/gün 4 hafta p.o. verildi. Deney sonunda ratlar ekzanguinasyon ile sakrifiye edilip böbrek dokuları inceleme amacıyla alındı.

Grup 3 (n=8): Coenzim Q10 grubu olup, Coenzim Q10 4 mg/kg/gün dört hafta p.o. verildi. . Deney sonunda ratlar ekzanguinasyon ile sakrifiye edilip böbrek dokuları inceleme amacıyla alındı.

Grup 4 (n=8): Asetominofen grubuolup, Asetominofen 700 mg/kg/gün iki hafta boyunca p.o.verildi.Deney sonunda ratlar ekzanguinasyon ile sakrifiye edilip böbrek dokuları inceleme amacıyla alındı.

Grup 5 (n=8): Asetominofen+ Coenzim Q 10 grubu olup, 2 hafta süresince Asetominofen 700 mg/kg/gün p.o verilirken eş zamanlı olarak Coenzim Q10da 4 mg/kg/gün p.o verildi. Sonrasında iki hafta daha Coenzim Q10 aynı doz ve uygulama yolu ile verildi. Deney sonunda ratlar ekzanguinasyon ile sakrifiye edilip böbrek dokuları inceleme amacıyla alındı.

Grup 6 (n=8): Asetominofen+ Nifedipine grubu olup, 2 hafta süresince Asetominofen 700 mg/kg/gün p.o verilirken eş zamanlı olarak Nifedipine de 10mg/kg/gün p.o verildi. Sonrasında iki hafta daha Nifedipine aynı doz ve uygulama yolu ile verildi. Deney sonunda ratlar ekzanguinasyon ile sakrifiye edilip böbrek dokuları inceleme amacıyla alındı.

Deneyin Sonlandırılması

Tüm gruplardaki sıçanlar deney sonunda tartıldıktan sonra, Ketamin HCl (Ketalar, Pfizer Inc, USA) (90 mg/kg) + Xylazine HCl (Rompun, Bayer Health Care AG, Germany) (10 mg/ kg) i.p uygulanarak genel anestezi altında ekzanguinasyon ile sakrifiye edilerek çalışma sonlandırıldı. Genel anesteziye alınan hayvanlarda sedasyon kontrolü cilt veya parmak kıstırma hareketine bakılarak düzenli aralıklarla yapıldı.

Histopatolojik Analiz

Tüm ratlardan alınan böbrek dokuları, %10'luk tamponlu formaldehidsolüsyonunda, 48 saat tespit edildikten sonra rutin histolojik takip serilerinden geçirildi. Daha sonra, alınan böbrekdokuları, parafin bloklara gömüldü ve bu parafin bloklardan, mikrotom ile (Leica) 4-5 mikrometre (µm) kalınlığındakesitler alındı. Alınan kesitler, Hematoksilen Eosin (H&E) ile boyandı.

Alınan böbrek dokuları Solez ve ark. skorlama sistemine göre; tübüler dilatasyon, interstisyel ödem (Bowman aralığında genişleme) ve inflamasyon hasarına göre değerlendirildi:

• **Grade 0:** Hiçbir hasar yoksa 0 puan,

• **Grade 1:** Hafif hasar varsa 1 puan,

• **Grade 2:** Orta derecede hasar varsa 2 puan,

• **Grade 3:** Belirgin hasar durumunda 3 puan (17,18).

İstatiksel Analiz

Verilerin istatistiksel analizleri SPSS for Windows version 20 (SPSS Inc., Chicago, IL, USA) istatistik programında yapıldı. Verilerin normal dağılımı varsayımına uygun olup olmadığı Shapiro Wilk testi uygulanarak incelendi. Normal dağılım gösteren ölçümlere Tek Yönlü Varyans (ANOVA) Analizi uygulandı. Normal dağılım göstermeyen ölçümlere ise Kruskal Wallis testi uyguldı. Anlamlılık düzeyi $p<0.05$ değeri durumunda anlamlı olarak kabul edildi.

BULGULAR

Böbrek Dokularının Histopatolojik Analizi ve Bulgular

Böbrek dokularına ait transversal kesiti alınan preperatlar Hematoksilen& Eozin boyama ile boyanarak, ışık mikroskobu altında incelendiğinde;

Kontrol (KNT), Nifedipine (Nif) ve Koenzim Q10 (Co Q10) gruplarına ait kesitler incelendiğinde; böbrek dokularının normal görünümde olduğu, patolojik olarak herhangi bir bulguya rastlanmadığı izlendi (sırasıyla Şekil 1, Şekil 2, Şekil 3).

Asetominofen (APAP) grubuna ait kesitler incelendiğinde ise; distal tübül yapısında şiddetli dilatasyon ve konjesyonlar görülürken, glomeruler alanda inflamasyon, endotel hücrelerinde piknozis ve interstisyel fibrozis izlendi. Hasarın ortalama skorlaması +3 olarak belirlendi (Şekil 4).

APAP+ Co Q10 grubuna ait kesitler incelendiğinde ise; inflamatuar hücre infiltrasyonunun çok hafifte olsa devam ettiği, glomerul yapısının normal görünümde olduğu izlendiği. Hasarın ortalama skorlaması +1 olarak belirlendi (Şekil 5). APAP+ Nif grubuna ait kesitler incelendiğinde ise; Glomeruler alanda dejenerasyon, distal tübüllerde şiddetli dilatasyonun devam ettiği gözlendi. Hasarın ortalama skorlaması +2 olarak belirlendi (Şekil 6).
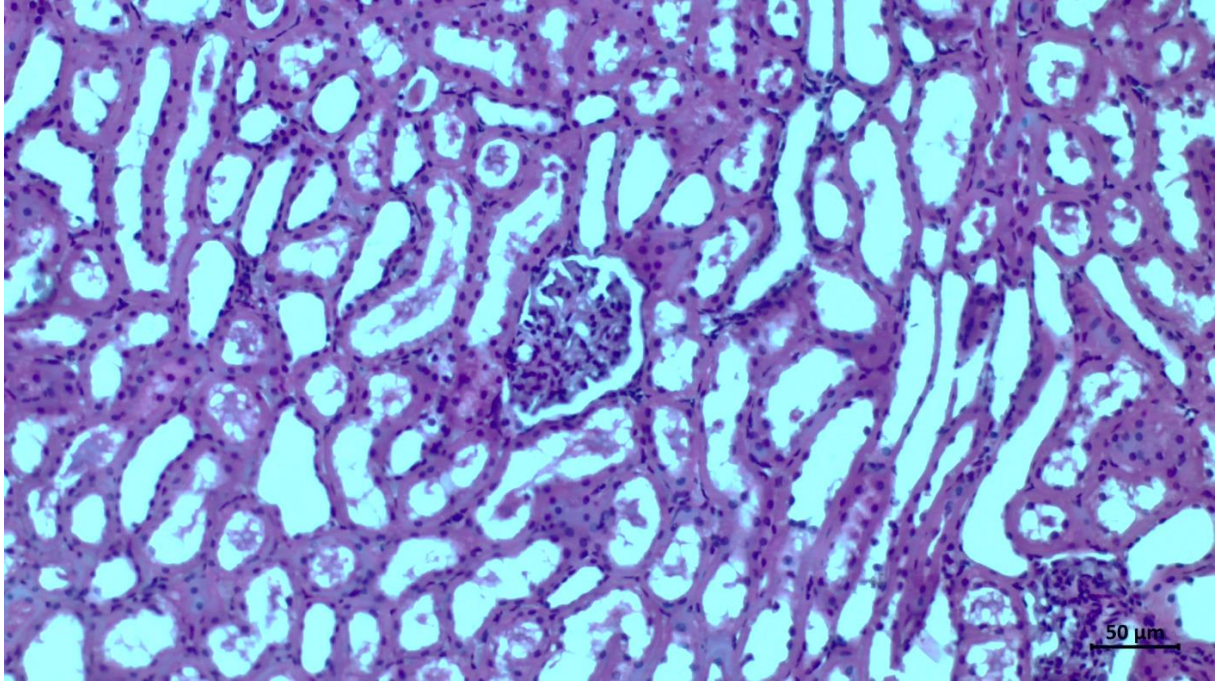
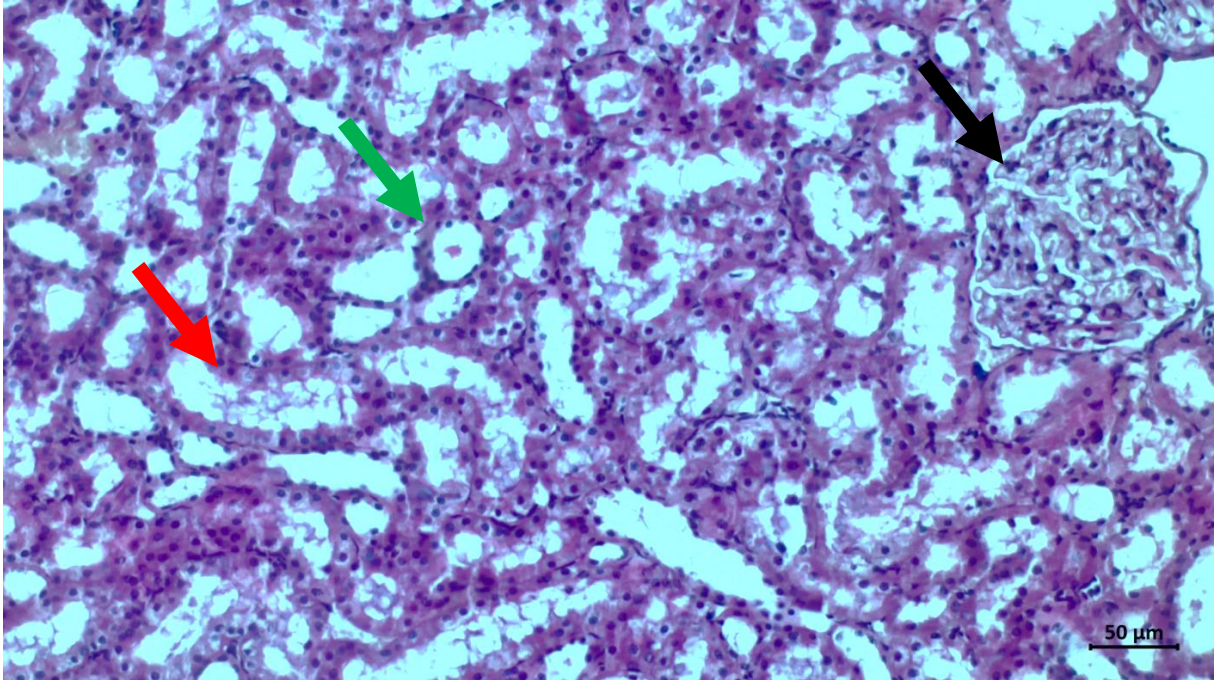**Şekil 1.** KNT grubuna ait böbrek dokusu korteksi ışık mikroskop görüntüsü. Normal histolojik görünümde glomerul yapısı (siyah ok), normal proksimal tübül (kırmızı ok), normal distal tübül (yeşil ok). (H&E, Bar 50 µm).
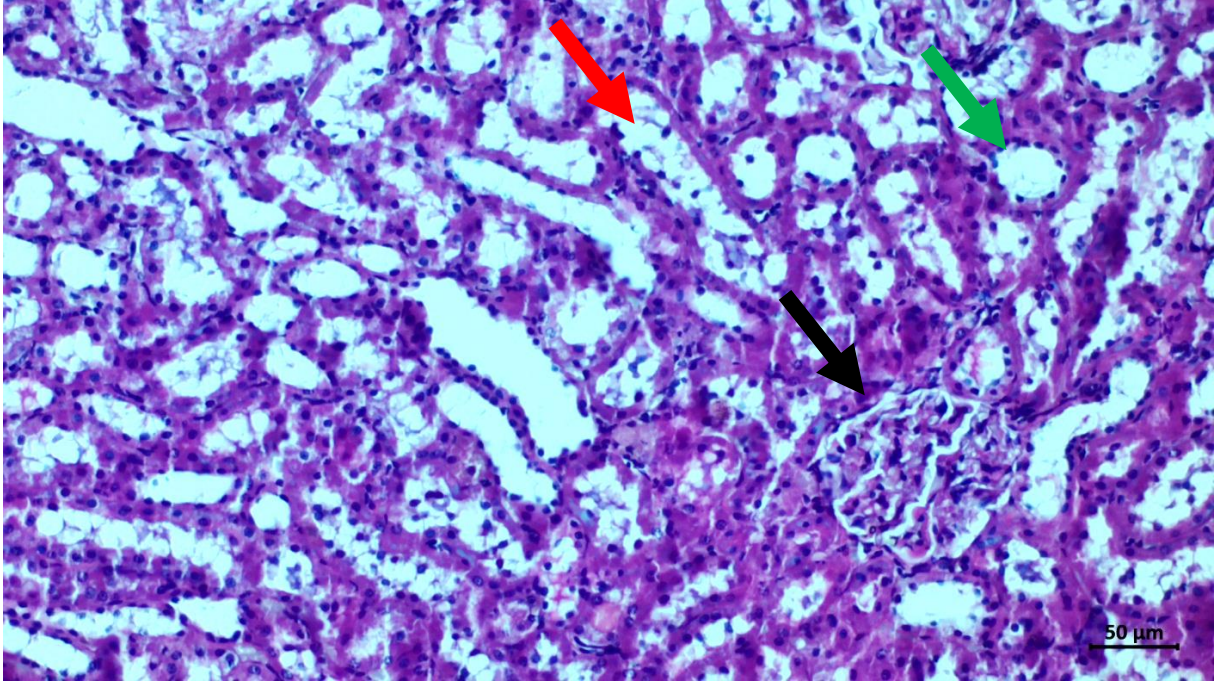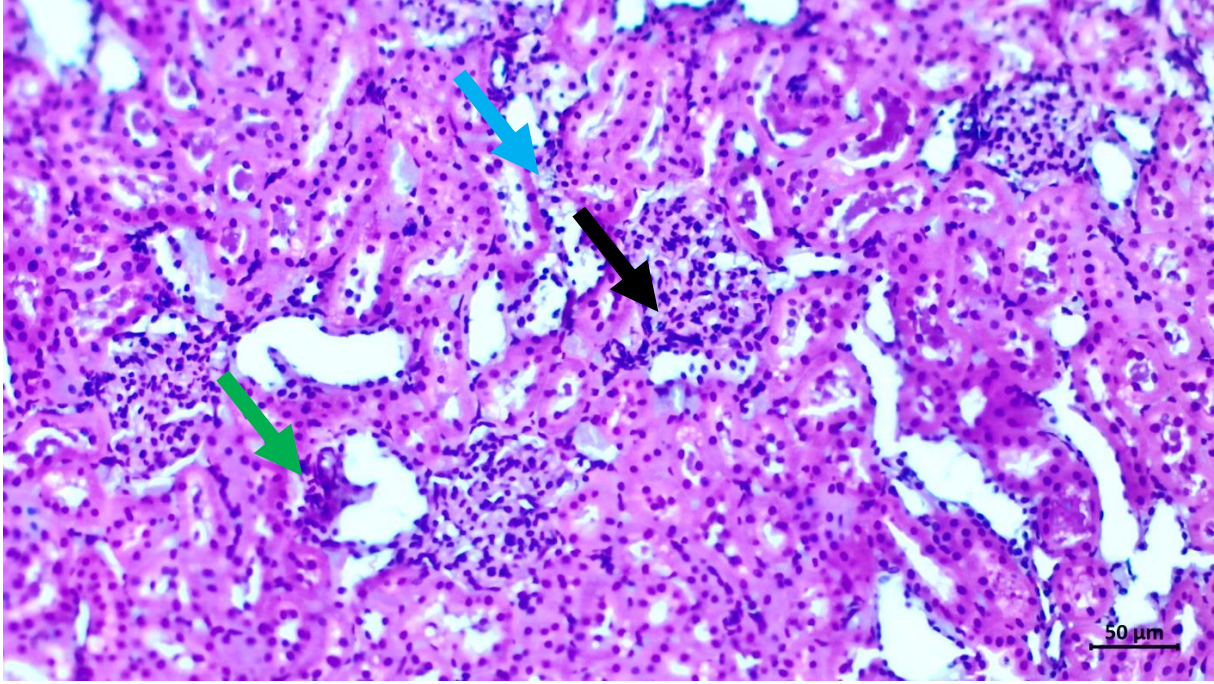
Şekil 2. Nif grubuna ait böbrek dokusu korteksi ışık mikroskop görüntüsü. Normal histolojik görünümde glomerul yapısı (siyah ok), normal proksimal tübül (kırmızı ok), normal distal tübül (yeşil ok). (H&E, Bar 50 µm).
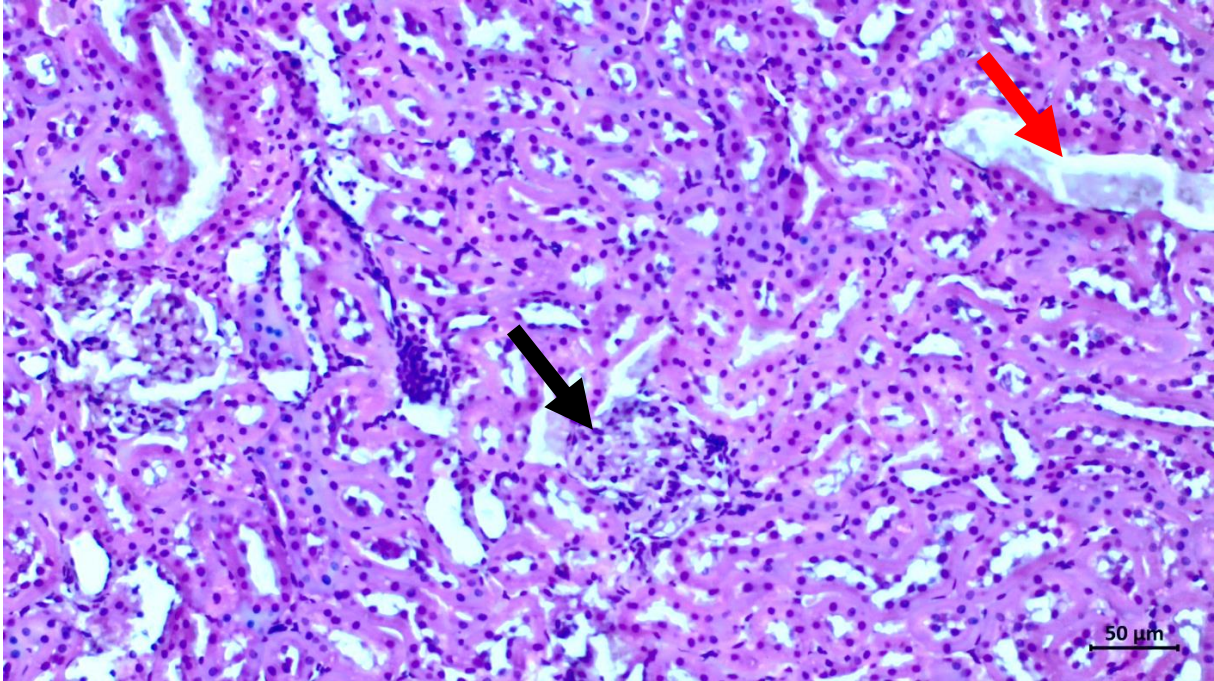

Şekil 3. Co Q10 grubuna ait böbrek dokusu korteksi ışık mikroskop görüntüsü. Normal histolojik görünümde glomerul yapısı (siyah ok), normal proksimal tübül (kırmızı ok), normal distal tübül (yeşil ok). (H&E, Bar 50 µm).

Şekil 4. APAP grubuna ait böbrek dokusu korteksi ışık mikroskop görüntüsü. Distal tübül yapısında şiddetli dilatasyon ve konjesyonlar görülürken (yeşil ok), glomeruler alanda inflamasyon (siyah ok) ve interstisyel fibrozis izlendi (mavi ok) (H&E, Bar 50 µm).

Şekil 5. APAP+ Co Q10 grubuna ait böbrek dokusu korteksi ışık mikroskop görüntüsü. Normal görünümde glomerul yapısı (siyah ok),proksimal tübül yapısında konjesyon (kırmızı ok) (H&E, Bar 50 µm).
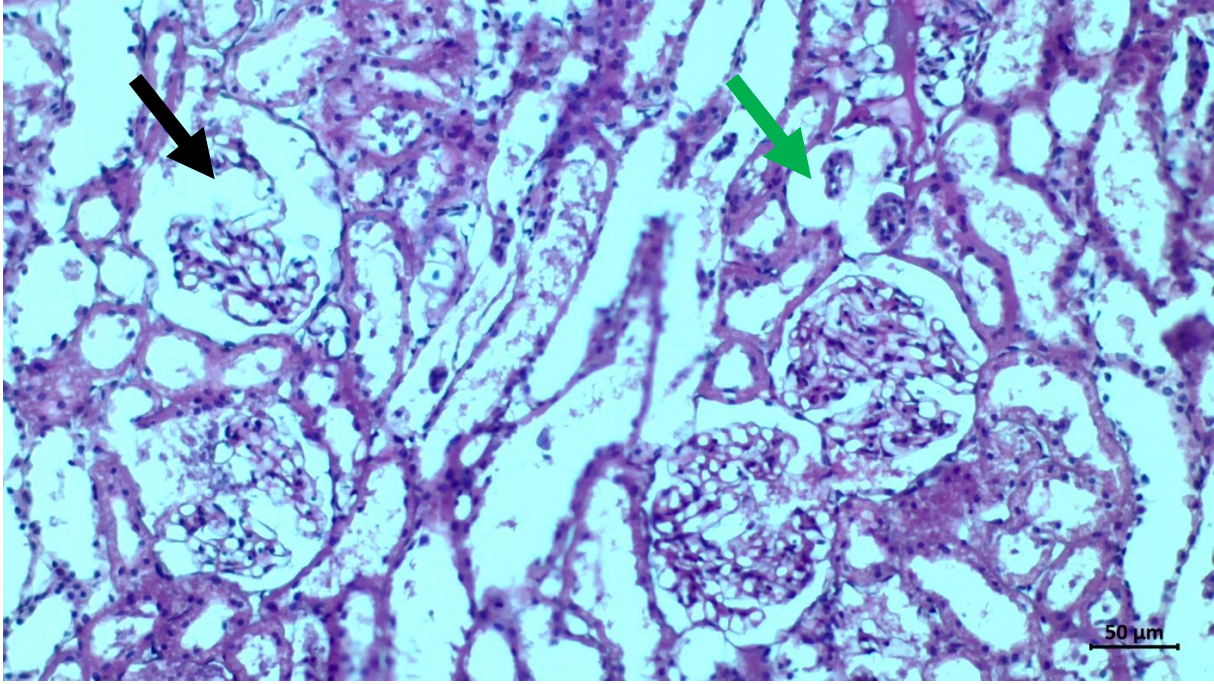
Şekil 6. APAP+ Nif grubuna ait böbrek dokusu korteksi ışık mikroskop görüntüsü. Glomeruler alanda dejenerasyon (siyah ok), distal tübüllerde şiddetli dilatasyon (yeşil ok) (H&E, Bar 50 µm).

TARTIŞMA

Daha önce yapılan çalışmalarda Parasetamol uygulamasına bağlı nefrotoksisite gelişiminde başlıca böbrekte bulunan P-450 oksidaz izoenzimleri rol oynadığı görülmüştür (Mazer and Perrone, 2008). Parasetamolün hem karaciğer hem de böbrek toksisitesine karşı doğal ilaçların koruyucu etkilerini değerlendiren çok az çalışma vardır (Menyiy 2018). Bizde çalışmamızda doğal bir antioksidan olan Co Q10 ile Nif'in böbrek toksisitesine karşı koruyucu etkinliğini karşılaştırdık.

Yüksek dozda APAP alınmasının renal fonksiyonları olumsuz etkilediği daha önce yapılan çalışmalarda gösterilmiştir (49,50). Adil M ve ark. yapmış oldukları çalışmalarında APAP uygulamasının lipit metabolizmasını bozduğunu, histomorfolojik yapıyı bozarak renal toksisiteye sebep olduğunu gözlemlemişlerdir **(Adil M).** Benzer şekilde bizde yaptığımız bu çalışmada APAP uygulamasının ardından böbrek dokusunda patolojik değişikliklerin oluıştuğunu gözlemledik. Fakat APAP sonrası Co Q10 ile Nif kullandığımızda ise bu patolojik değişikliklerin şiddetinde APAP+ Co Q10 grubunda azalma olduğunu gözlemledik.

SONUÇ

Sonuç olarak yapmış olduğumuz çalışmamızda Asetominofen kullanımı nefrotoksisite oluşması durumunda hem Coenzim Q10'un hemde Nifedipine'nin koruyucu etkinliği olduğunu saptadık. Fakat Coenzim Q10 ile Nifedipine'nin koruyucu etkinliklerini karşılaştırdığımızda ise Coenzim Q 10'un daha koruyucu özellikte olduğunu saptadık. Fakat yine de bakılan parametreler yetersiz olduğundan geniş kapsamlı araştırılmaların gerekliliği kanaatine vardık.

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RATLARDA DELTAMETRİN'E BAĞLI TOKSİSİTESİNİN ÖNLENMESİNDE ROSEMARİNİC ASİT'İN TESTİSLERDEKİ KORUYUCU ETKİNLİĞİNİN İNCELENMESİ

INVESTIGATION OF THE PROTECTIVE EFFECTIVENESS OF ROSEMARINIC ACID IN THE TESTES IN PREVENTION OF DELTAMETRIN DUE TOXICITY IN RATS

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Özet

Deltamethrin (DM), sebze ve meyveleri karıncalar, akarlar, böcekler ve kurtlara karşı korumak amacıyla yaygın olarak kullanılan geniş spektrumlu bir insektisit'tir. Ayrıca çiftlik hayvanlarını keneler, akarlar, pire ve sineklere karşı topikal olarak ektoparazitisit olarak ta kullanılmaktadır. Rosmarinik asit (RA) ise, Lamiaceae (nane) familyasındaki bitki ve baharatlarda bulunan doğal bir fenol karboksilik asittir. Rosmarinik asitin antioksidan özelliklere sahip olduğu bilinmektedir. Bizde planladığımız bu çalışmada Deltametrin toksisitesine bağlı olarak ratlarda gelişen testiküler hasarın önlenmesinde Rosmarinik asit'in antioksidan özelliğinden faydalanarak koruyucu etkinliğinin olup olmadığını inceledik.

Bu çalışmada toplam 28 adet erkek rat kullanılmış olup, dört eşit gruba ayrıldı. Kontrol grubuna deney süresince herhangi bir işlem uygulanmadı. Rosmarinik asit grubuna 7 gün boyunca 20 mg/kg' dan Rosmarinik asit gavajla peroral (p.o.) verildi. Deltametrin grubuna ise sakrifikasyondan 24 saat önce Deltametrin 35 mg/kg p.o. tek doz olarak verildi. Deltametrin + Rosmarinik asit grubuna ise 7 gün boyunca Rosmarinik asit 20 mg/kg dozundan verilerek 7. günün sonunda Deltametrin 35 mg/kg tek doz verildi ve 24 saat sonra çalışma sonlandırıldı. Deney sonunda tüm gruplardaki ratlara laparotomi yapılarak hayvanlar ekzanguinasyon ile sakrifiye edildi. Kan örnekleri ve testis dokuları inceleme amacıyla alınarak çalışma sonlandırıldı.

Biz de yapmış olduğumuz bu çalışmada DM grubunun Total antioksidan (TAS) düzeyinin RA+DM grubundan düşük olduğunu gözlemledik. DM alan grubun seminifer tübüllerinde Spermatogenik hücreler ve Sertoli hücrelerinde piknozis, spermatogenik hücre kaybı, seminifer tübül yapısında bozulmalar gözlemledik. Fakat DM+RA grubunun seminifer rübüllerinde ise histopatolojik değişikliklerin nispeten daha hafif düzeyde olduğunu, buna karşın spermatogenik hücre sayısındaki azalmanın devam ettiğini gözlemledik.

Çalışmamızda Deltametrin toksisitesi sonucu testiküler dokuda histopatolojik değişiklikler olduğunu, ancak Rosmarinik asitin bu histopatolojik değişiklikleri büyük oranda iyileştirdiğini fakat spermatogenik hücre kaybının yinede devam ettiğini gözlemledik.

Anahtar Kelimeler: Deltametrin, Rosmarinik asit, Testis

INVESTIGATION OF THE PROTECTIVE EFFECTIVENESS OF ROSEMARINIC ACID IN THE TESTES IN PREVENTION OF DELTAMETRIN DUE TOXICITY IN RATS

Abstract

Deltamethrin (DM) is a broad spectrum insecticide widely used to protect vegetables and fruits against ants, mites, insects and worms. It is also used topically as an ectoparasiticide against ticks, mites, fleas and flies on farm animals. Rosmarinic acid (RA) is a natural phenol carboxylic acid found in herbs and spices in the Lamiaceae (mint) family. Rosmarinic acid is known to have antioxidant properties. In this study, which we planned, we examined whether Rosmarinic acid has a protective effect in the prevention of testicular damage in rats due to deltamethrin toxicity by utilizing its antioxidant properties.

A total of 28 male rats were used in this study, and they were divided into four equal groups. No procedure was applied to the control group during the experiment. Rosmarinic acid group was given 20 mg/kg Rosmarinic acid peroral (p.o.) by gavage for 7 days. Deltamethrin group was given 35 mg/kg p.o. 24 hours before sacrification. given as a single dose. In the Deltamethrin + Rosmarinic acid group, Rosmarinic acid was given at a dose of 20 mg/kg for 7 days, and a single dose of 35 mg/kg Deltamethrin was given at the end of the 7th day, and the study was terminated after 24 hours. At the end of the experiment, rats in all groups were sacrificed by exsanguination by laparotomy. The study was terminated by taking blood samples and testicular tissues for examination.

In our study, we observed that the total antioxidant (TAS) level of the DM group was lower than that of the RA+DM group. We observed pycnosis, spermatogenic cell loss, and deterioration in seminiferous tubule structure in Spermatogenic cells and Sertoli cells in the seminiferous tubules o f the DM group. However, we observed that the histopathological changes were relatively mild in the seminiferous tubules of the DM+RA group, whereas the decrease in the number of spermatogenic cells continued.

In our study, we observed that there were histopathological changes in the testicular tissue as a result of deltamethrin toxicity, but Rosmarinic acid greatly improved these histopathological changes, but spermatogenic cell loss still continued.

Keywords: Deltamethrin, Rosmarinic acid, Testis

GİRİŞ

Deltametrin (DM), tarımsal ürünleri, sebze ve meyvelere karıncalar, akarlar, böcekler ve kurtlara karşı korumak amacıyla yaygın olarak kullanılan geniş spektrumlu bir sentetik insektisit'tir (1). Hızlı metabolize olması sebebiyle, insanlarda ve diğer hedef olmayan hayvanlarda düşük toksisitesiye neden olduğundan yaygın olarak kullanılır. Ayrıca zararlı insektler üzerinde yüksek etkinliğe sahiptir (2).DM'nin akarisidal ve insektisidal etkilerinin ana mekanizması, voltaj kapılı Sodyum (Na^{++}) kanallarına bağlanıp, bu kanalların deaktivasyonu ve inaktivasyonunu inhibe ederek açık kalmasının uzamasını sağlamaktır (3). Uygulama yoluna bağlı olarak tek doz DM kullanımı sonucu oluşan toksisitenin şiddeti oldukça değişkenlik gösterebilir (4). Ratlardaki minimum toksik dozu 10 mg/kg olup, hafif düzeyde salivasyona sebep olmuştur (5). DM sıçanlara oral yolla verildikten 24 saat içinde hızla emilir ve idrarda (%19-47) ve dışkıda (%32-55) atılır (6).Yapılan çalışmalarda DM' nin üreme sistemi üzerinde zararlı etkiler oluşturduğu görülmüştür (7). Memelilerde yapılan bir çalışmada, sperm plazma zarları üzerinde aşırı derecede doymamış yağ asiti konsantrasyonuna neden olduğu izlenmiştir (8).

Rosmarinik asit, Lamiaceae (nane) familyasındaki Rosmarinus officinalis L. (biberiye), Origanum vulgare L. (kekik), Thymusvulgaris L. (dağ kekiği) vb. bitki ve baharatlarda bulunan bir doğal fenol karboksilik asittir (9). Rosmarinik asitin antioksidan ve antienflamatuar gibi farklı özellikleri olduğu bilinmektedir (10). Rosmarinik asitin iskemi-reperfüzyon hasarı gibi oksidatif stres kaynaklı patolojilerde prooksidan durumunu azaltmada etkin bir ajan olduğu da gösterilmiştir (11).

Çalışmamızın amacı Deltametrin toksisitesine bağlı olarakratlarda gelişen testiküler hasarın önlenmesinde Rosmarinikasit'in antioksidan özelliğinden faydalanarak koruyucu etkinliğinin olup olmayacağını ortaya koymaktır.

MATERYAL

Bu çalışmanın, Dicle Üniversitesi Prof. Dr. Sabahattin Payzın Sağlık Bilimleri Araştırma ve Uygulama Merkezi Hayvan Deneyleri Yerel Etik Kurulu (DÜHADEK)'nun 06/01/2021 tarih ve 2020/40 protokol numarası ile etik onayı alınmıştır.

Çalışmada 8-10 haftalık ağırlıkları 320-400 gr arasında değişen Wistar Albino cinsi 28 adet erkek sıçan kullanıldı. 22 – 25 ^{0}C oda sıcaklığında 12 saat ışık (7:00 - 19:00) ve 12 saat karanlıkta (19:00 - 07:00) tutulan sıçanlar her gün altları temizlenen kafeslerde beslendi. Yemler; çelik kaplarda, su; cam biberonlarda normal çeşme suyu olarak verildi.

Kimyasalların Temini

Deltamethrin (Butox® 50 mg/ml) klinik formülasyonda Intervet Co.'dan (Fransa) ticari ürün olarak, Rosmarinik asit ise Sigma Aldrich Inc' den satın alındı.

METOD

Sıçanlar her grupta 7 adet olacak şekilde 4 gruba ayrıldı. Sıçanlar havalandırma sistemi bulunan bir ortamda, özel olarak hazırlanmış kafeslerde barındırıldı. Davranışsal değişiklikleri, fiziksel görünümleri günlük olarak gözlemlenip kaydedildi. Günlük besin ve su alımları Ad libitum olup her 24 saatte bir ölçülüp kaydedildi.

Grup 1 (n=7): Kontrol grubu olup, deney süresince herhangi bir işlem uygulanmadı. Hayvanlar deney sonunda ekzanguinasyon ile sakrifiye edilerek kan örnekleri ve testis dokuları alındı.

Grup 2 (n=7): Rosmarinik asit grubu olup, ratlara 7 gün boyunca Rosmarinik asit 20 mg/kg dozunda gavaj uygulamasıyla peroral (p.o.) verildikten 24 saat sonra, anestezi altında laparotomi yapıldı. Hayvanlar deney sonunda ekzanguinasyon ile sakrifiye edilerek kan örnekleri ve testis dokuları alındı.

Grup 3 (n=7): Deltametrin grubu olup, deneyin 7. güne kadar herhangi bir uygulama yapılmadı. 7. gün p.o. Deltametrin 35 mg/kg tek doz olarak verildi. 24 saat sonra intraperitoneal (ı.p.) 10 mg/kg Xylazin ve 90 mg/kg Ketamin uygulamasıyla ratlara anestezi verildi. Daha sonra laparotomi yapılarak, ekzanguinasyon ile sakrifiye edilip, testis dokusu ve kan örnekleri inceleme amacıyla alındı.

Grup 4 (n=7): Rosmarinik asit+ Deltametrin grubu olup, bu gruptaki ratlara 7 gün boyunca Rosmarinik asit 20 mg/kg/gün dozunda p.o. verildi. 7. gün Rosmarinik asit uygulamasından bir saat sonra Deltametrin 35 mg/kg tek doz olarak verildi. 24 saat sonra anestezi altında laparotomi yapıldı. Hayvanlar deney sonunda ekzanguinasyon ile sakrifiye edilerek kan örnekleri ve testis dokuları alındı.

Deneyin Sonlandırılması

Tüm gruplardaki sıçanlar deney sonunda tartıldıktan sonra, Ketamin HCl (Ketalar, Pfizer Inc, USA) (90 mg/kg) + Xylazine HCl (Rompun, Bayer Health Care AG, Germany) (10 mg/ kg) i.p uygulanarak genel anestezi altında ekzanguinasyon ile sakrifiye edilerek çalışma sonlandırıldı. Genel anesteziye alınan hayvanlarda sedasyon kontrolü cilt veya parmak kıstırma hareketine bakılarak düzenli aralıklarla yapıldı.

Histopatolojik incelemeler

Deney sonunda alınan testis dokuları % 10'luk Formaldehit içerisinde 48 saat boyunca fikse edildikten sonra, 12 saat çeşme suyunda yıkandı. Sonrasında dokular dehidrasyon için artan alkol serilerinden geçirilip, parafin bloklara gömüldü. Elde edilen bloklardan rotary mikrotom ile 4-5 mikronluk kesitler alındı ve histopatolojisini incelemek amacıyla Hematoksilen& Eozin (H&E) boyası ile boyandı.

Biyokimyasal Analizler

TAS ve TOS Analizleri

Deney sonunda tüm gruptaki ratlardan ekzanguinasyon ile kan örnekleri alındıktan sonra, alınan kan örnekleri -80 °C'de muhafaza edildi. Alınan kan örnekleri biyokimya laboratuarında Total Antioksidan Status (TAS) ve Total Oksidan Status (TOS) analizine tabii tutuldu.

Alınan kan örneklerinden TAS durumunu değerlendirmek amacıyla Rel Assay Diagnostics (Gaziantep, Turkey)'den kitler satın alındı. Süpernatant fazın TAS'ı, Erel tarafından geliştirilen yeni otomatik ölçüm yöntemi kullanılarak analiz edildi (12).

Alınan kan örneklerinden TOS durumunu değerlendirmek amacıyla Rel Assay Diagnostics (Gaziantep, Turkey)'den kitler satın alındı. Süpernatant fazın TOS seviyeleri Erel tarafından geliştirilmiş yeni otomatik ölçüm yöntemi ile ölçüldü (13).

İstatiksel Analiz

Verilerin istatistiksel analizleri SPSS for Windows version 20 (SPSS Inc., Chicago, IL, USA) istatistik programında yapıldı. Verilerin normal dağılımı varsayımına uygun olup olmadığı Shapiro Wilk testi uygulanarak incelendi. Normal dağılım gösteren ölçümlere Tek Yönlü Varyans (ANOVA) Analizi uyguldı. Normal dağılım göstermeyen ölçümlere ise Kruskal Wallis testi uyguldı. Anlamlılık düzeyi $p < 0.05$ değeri durumunda anlamlı olarak kabul edildi.

BULGULAR

Biyokimyasal Analizler

TAS ve TOS Analizleri

Serumda bakılan total antioksidan ve oksidan seviyeleri değerlendirildiğinde TAS değerlerinin istatiksel analizinde; Kontrol grubu ile RA grubu ve RA+DM grubu arasında istatiksel olarak anlamlı bir fark olmadığı izlendi. DM grubunun TAS düzeyleri ise RA+DM grubundan anlamlı derecede düşüktü (Tablo 1).

TOS değerlerinin istatiksel analizinde ise; Kontrol grubu ile RA grubu arasında istatistiksel olarak anlamlı bir fark olmadığı izlendi. DM grubunun TOS düzeyleri ise diğer grupların TOS düzeylerinden anlamlı derecede yüksekti (Tablo 1).

Tablo-1: İstatistiksel analizi yapılan verilerin ortalama, minimum, maksimum, standart hata ve toplam değerleri.

|		TAS mmol/L				
Gruplar	**n**	**Ortalama**	**Min.**	**Mak.**	**Std. hata**	**Toplam**
Kontrol	7	1,85	1,44	2,09	0,80	13,01
RA	7	2,54	1,57	3,31	0,22	17,81
DM	7	1,24	1,09	1,48	0,05	8,74
RA+DM	7	1,57	1,46	1,68	0,03	10,99
		TOS μmol/L				
Gruplar	**n**	**Ortalama**	**Min.**	**Mak.**	**Std. hata**	**Toplam**
Kontrol	7	17,29	11,76	24,58	1,81	121,04
RA	7	17,00	12,81	21,25	1,15	119,00
DM	7	82,38	55,99	110,27	7,08	576,67
RA+DM	7	42,93	29,31	57,19	3,90	300,56

Testis Dokularının Histopatolojik Bulguları

Kontrol grubunun transversal kesitinin incelemelerinde; bazal membran yapısı düzenli görünümde izlendi. Sertoli hücreleri ile spermatogenik hücreler normal yapıda olup, lümende serbest halde dolaşan gelişimini tamamlamış spermiyumların olduğu görüldü. İntertübüler alanda Leydig hücreleri normal üçgenimsi yapıda değerlendirildi (Resim1).
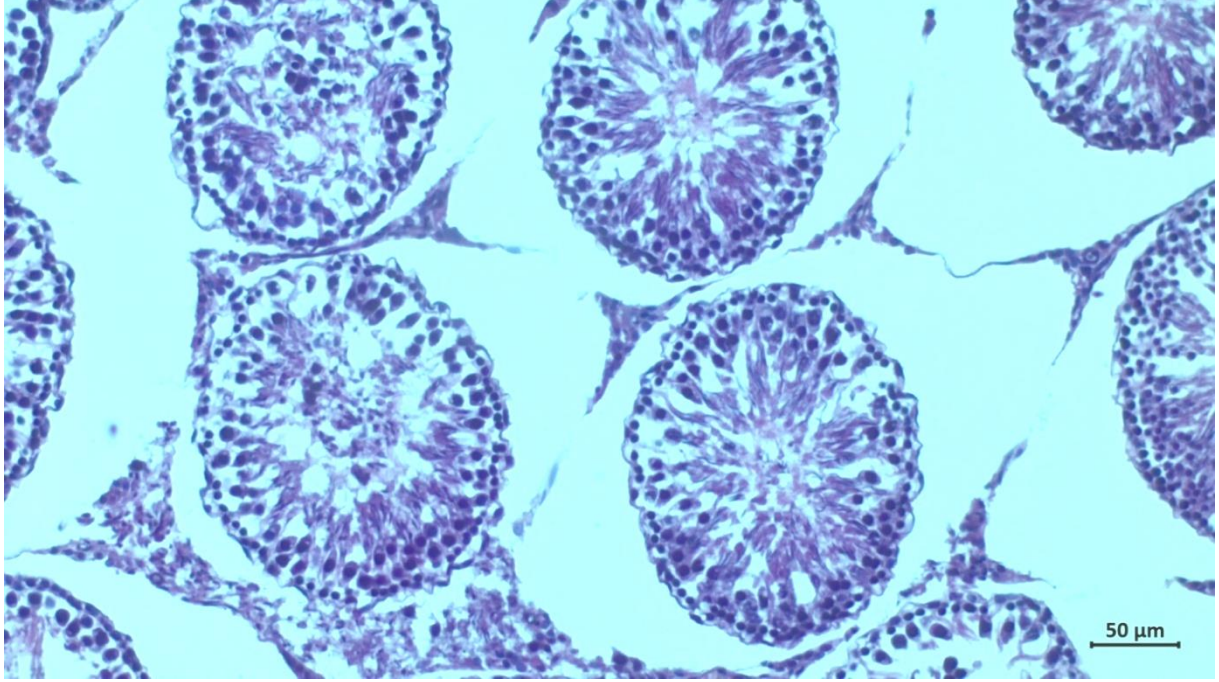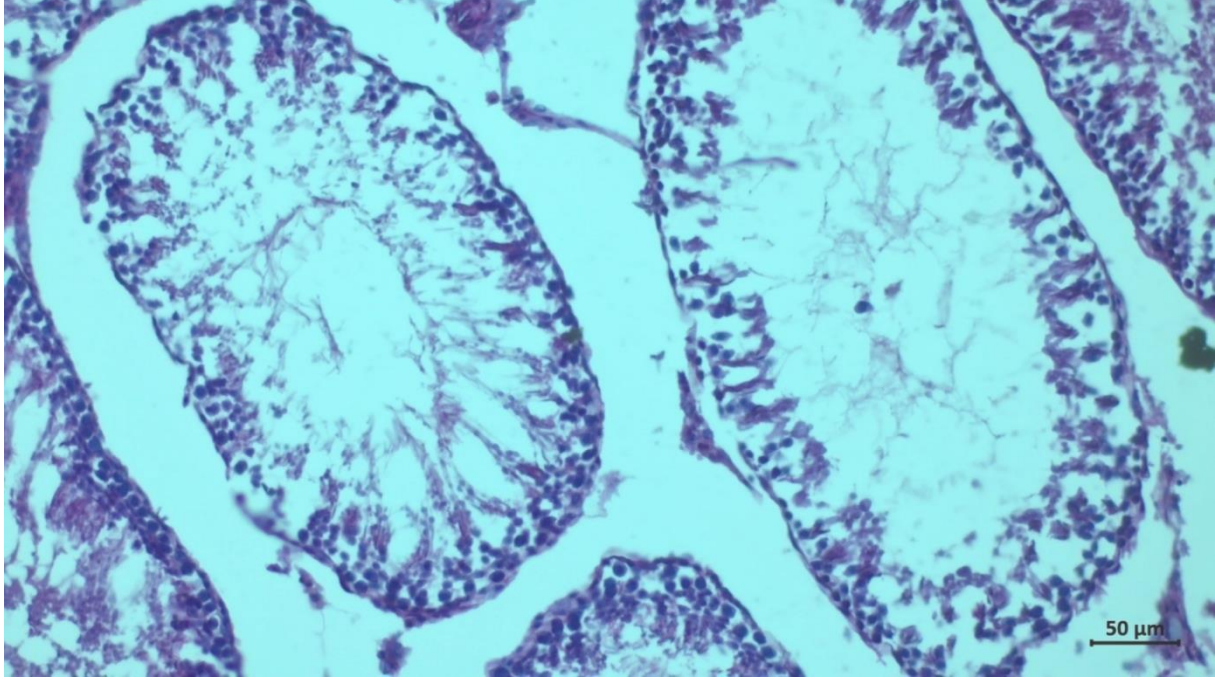
Resim 1. Kontrol grubuna ait testis yapısının transversal kesiti. Normal görünümde seminifer tübüller (H&E, Bar 50 μm).

Rosmarinik asit grubuna transversal kesitler incelendiğinde; kontrol grubuna benzer normal görünümde seminifer tübüller izlendi (Resim 2).
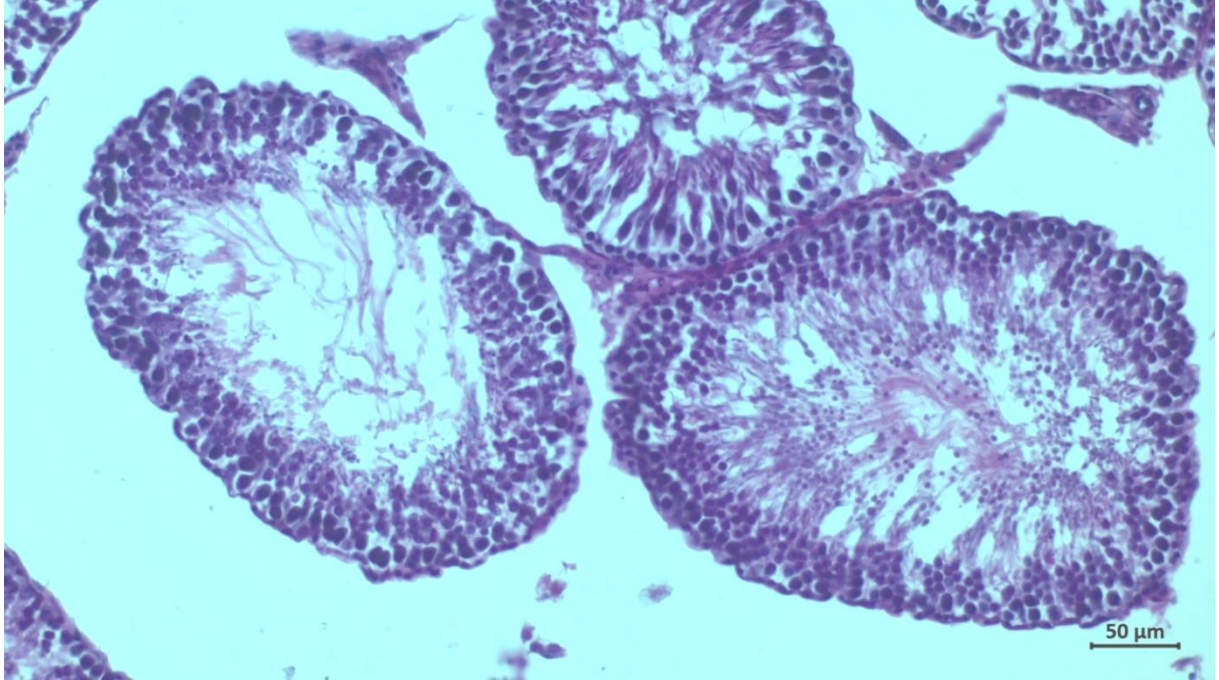
Resim 2. Rosmarinik asit grubuna ait testis yapısının transversal kesiti. Normal görünümde seminifer tübüller (H&E, Bar 50 μm).
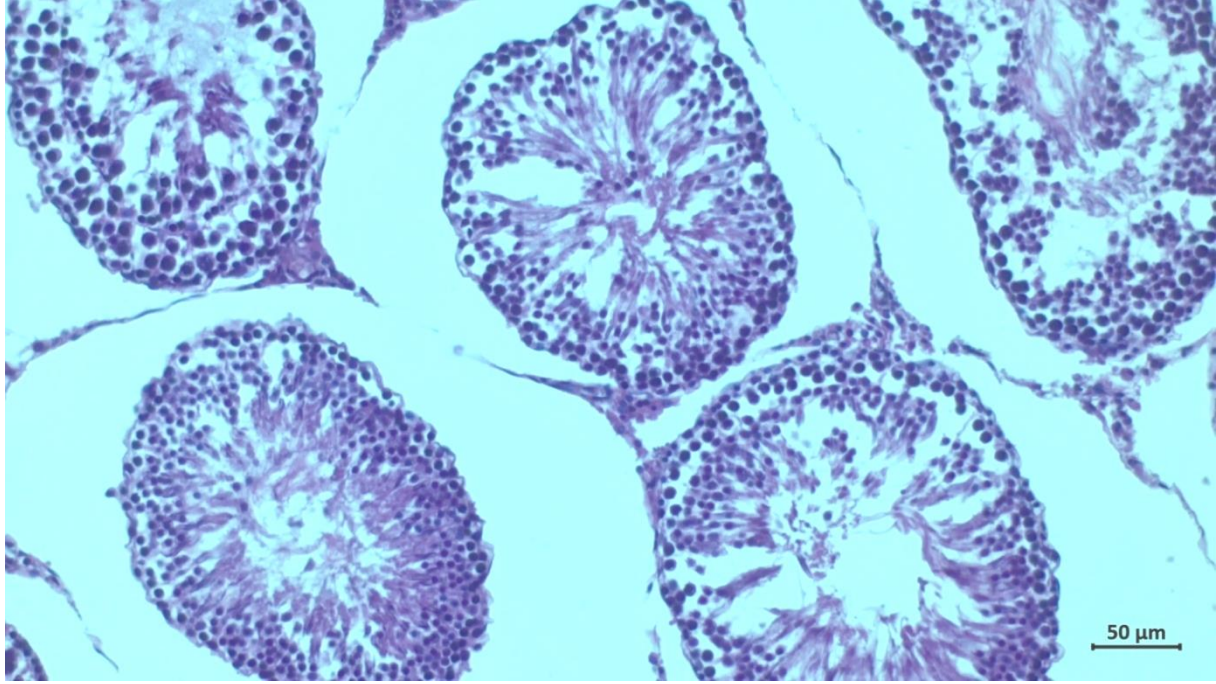
Deltametrin grubunun transversal kesitinin incelemelerinde; seminifer tübüllerinin yapısal bütünlüğünde bozulmalar izlendi. Spermatogenik hücreler ve Sertoli hücrelerinde piknozis görüldü. Ayrıca lümende sprematosit kaybı görüldü (Resim 3).

Resim 3. Deltametrin grubuna ait testis yapısının transversal kesiti. Sertoli hücreleri ile birlikte sermatogenik hücrelerde piknozis, Lümende spermatogenik hücre kaybı, seminifer tübül yapısında bozulmalar (H&E, Bar 50 μm).

Rosmarinik asit+ Deltametrin grubunun transversal kesitinin incelemelerinde; seminifer tübül yapısında kısmen iyileşmeler olduğu ve bazal membran bütünlüğünün korunduğu görüldü. Tübüllleri birbirinden ayıran interstisyel doku normal yapıda olup bu alanda yer alan Leydig hücreleri normal yapıda olduğu izlendi (Resim 4).

Resim 4. Rosmarinik asit+ Deltametrin grubuna ait testis yapısının transversal kesiti. Spermatogenik hücre sayısında azalma, normal görünümde Leydig hücreleri (H&E, Bar 50 µm).

TARTIŞMA

Rosmarinik asit Melissaofficinalis, Rosmarinusofficinalis ve Prunellavulgaris gibi bitkilerde bulunan doğal antioksidan özelliklere sahip bir bitki türüdür (14). Rosmarinikasit'in serbest radikallerin neden olduğu hastalıkları hafiflettiği (15) ayrıca antikarsinojenik, antiinflamatuar, antidepresan,veantimikrobiyal etkilere sahip olduğu bilinmektedir (13).

Deltametrin (DM), oldukça geniş kullanım alanına sahip, sentetik bir insektisittir. Oral yollardan hızlıca emilir. Bu pestisite maruz kalma kaynaklarının başında kontamine su ve yiyecekler gelir (16). Deltametrin uygulamasına bağlı gelişen toksisite durumunda ortaya çıkan sonuçlar oldukça değişkenlik gösterirken, minimum toksik dozun 10 mg/ kg olduğu bulunmuştur (17).

Abdel-Daim et al. yapmış olduğu çalışmasında DLM uygulamasının hepatik ve renal malondialdehit (MDA) seviyesini yükselterek lipid peroksidasyonunu arttırdığını, hepatik ve renal antioksidanları (süperoksit dismutaz, katalaz, GSH) azalttığını bulmuşlardır (18). Benzer şekilde DLM uygulanan grubun düşük TAS düzeyi ve yüksek TOS düzeyi çalışmamızla uyum göstermiştir. Oğuz A. ve ark. yapmış oldukları karaciğer IR çalışmasında, RA'nın TAS düzeylerini arttırdığını ve TOS düzeylerini ise düşürdüğünü gözlemlemiştir (19). Bizde yapmış olduğumuz çalışmamızda RA'nın TAS düzeylerinde artışa ve TOS düzeylerinde ise düşüşe sebep olduğunu gözlemledik.

Oda and El-Maddawy ve ark. yapmış oldukları çalışmalarında DM verilen grubun testis dokularında testiküler dejenerasyon, nekroz, Sertoli hücrelerinin epitelinde ve sprematogonial hücrelede vakuolizasyon oluştuğunu gözlemlemişlerdir (20,21). Benzer şekilde bizde yapmış olduğumuz çalışmamızda DM alan grubun seminifer tübüllerinde Spermatogenik hücreler ve Sertoli hücrelerinde piknozis, spermatogenik hücre kaybı, seminifer tübül yapısında bozulmalar gözlemledik. Çalışmamız bu konuda yapılan diğer çalışmalar ile uyum göstermiştir. Fakat DM+RA grubunun seminifer rübüllerinde ise histopatolojik değişikliklerin nispeten daha hafif düzeyde olduğunu, buna karşın spermatogenik hücre sayısındaki azalmanın devam ettiğini gözlemledik.

SONUÇ

Sonuç olarak çalışmamızda Deltametrin toksisitesi sonucu testiküler dokuda histopatolojik değişiklikler olduğunu, ancak Rosmarinik asitin bu histopatolojik değişiklikleri büyük oranda iyileştirdiğini fakat spermatogenik hücre kaybının yinede devam ettiğini gözlemledik. Rosmarinik asitin Deltametrin toksisitesine bağlı testiküler yapıdaki değişiklikleri hangi mekanizmalarla önlediğini anlamak için farklı doz, süre ve teknikler kullanılarak yeni çalışmalar yapılması gerekmektedir.

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