INTERNATIONAL CONGRESS ON ADVANCED RESEARCH AND APPLICATIONS

DECEMBER 01-02, 2023
SIVAS, TÜRKİYE

ABSTRACT BOOK

Edited by
Prof. Dr. Mehmet ŞİMŞİR
Prof. Dr. Salih Cem İNAN
Assoc. Prof. Dr. Sayiter YILDIZ
Assoc. Prof. Dr. Ebru YABAŞ

ISBN: 978-1-955094-68-9

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CONFERENCE ID

INTERNATIONAL CONGRESS ON ADVANCED RESEARCH AND APPLICATIONS

DATE-PLACE

December 01-02, 2023 / Sivas, Türkiye

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EVALUATION PROCESS

All applications have undergone a double-blind peer review process

TOTAL NUMBER OF PAPERS: 176

THE NUMBER OF PAPERS FROM TÜRKİYE: 83

OTHER COUNTRIES: 93

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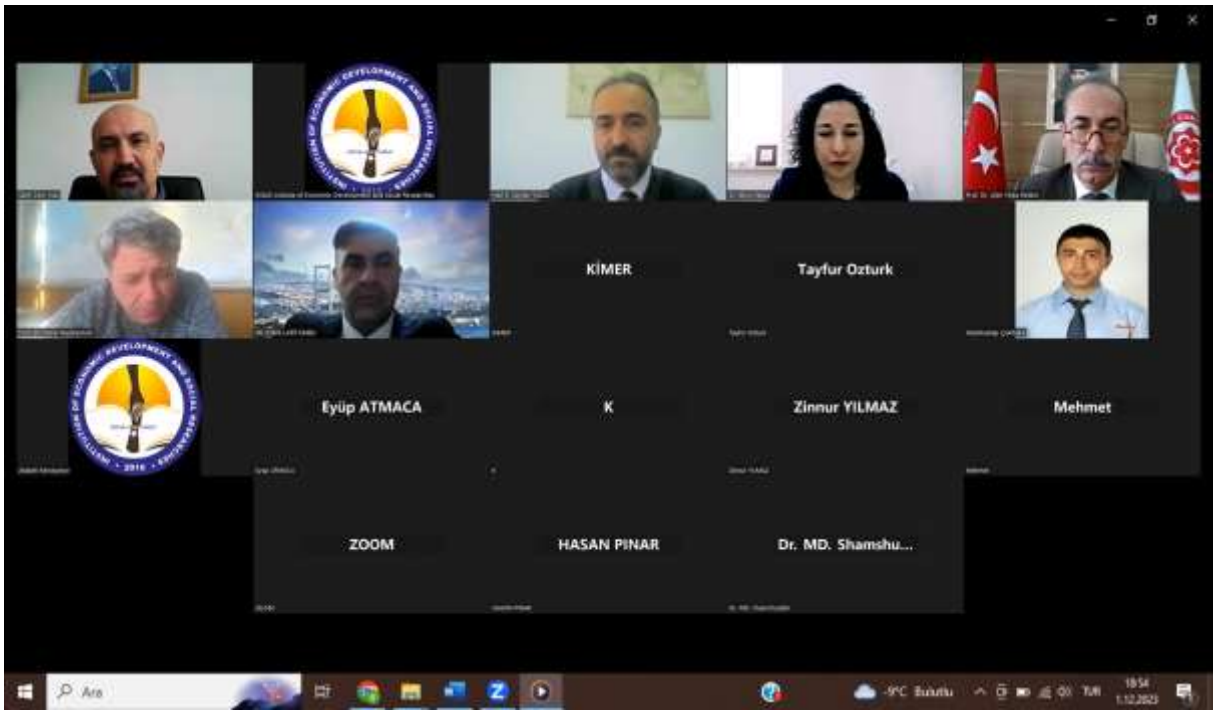

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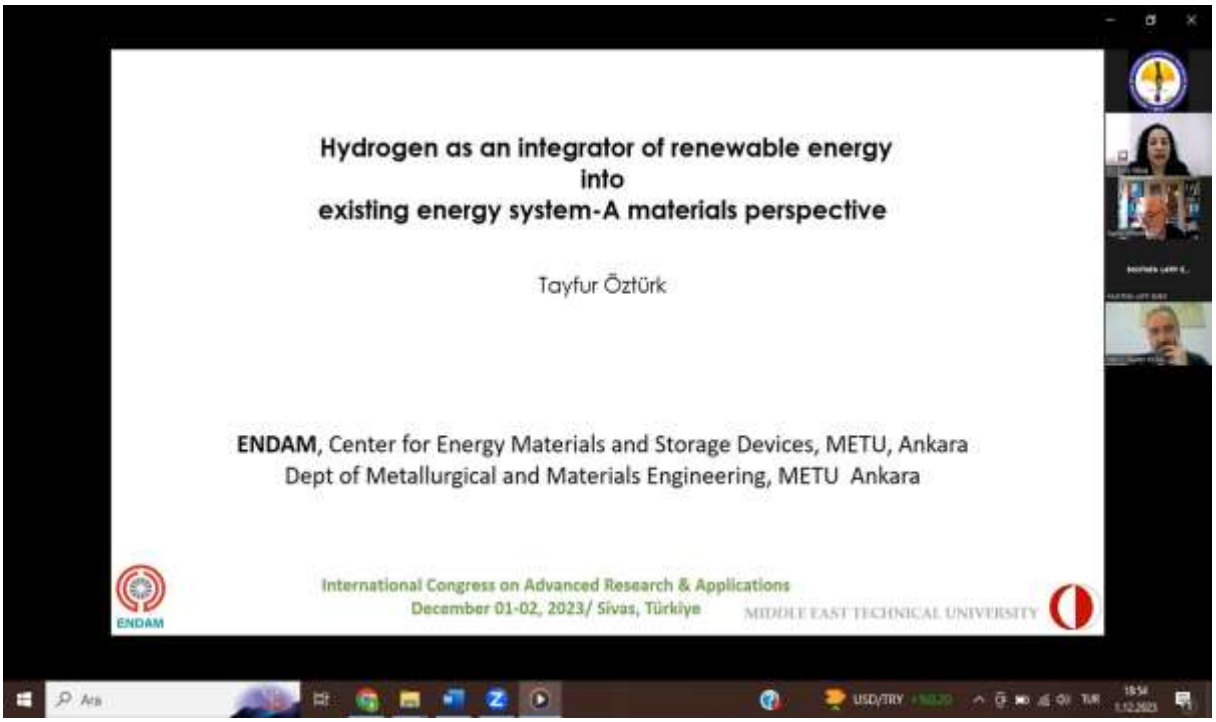
GTU
SCIENTIA POTENTIA EST
Road Infrastructure for Tourism Improvement for the Kazbegi Region in Georgia
Speaker: PETRE NADIRASHVILI, Professor, Georgian Technical University, Faculty of Civil Engineering, Road Department.
INTERNATIONAL CONGRESS ON ADVANCED RESEARCH AND APPLICATIONS
DECEMBER 01-02, 2023 / SIVAS, TURKEY

MARMARA UNIVERSITY
Post-processing Applications in Additive Manufacturing
Yusuf KAYNAK, Prof. Dr.
Advanced Manufacturing Technologies Laboratory, Department of Mechanical Engineering, Technology Faculty, Marmara University, İstanbul, TÜRKİYE
International Congress on Advanced Research and Application
01-02 December 2023, Sivas, Türkiye


Hydrogen as an integrator of renewable energy
into
existing energy system-A materials perspective
Tayfur Öztürk
ENDAM, Center for Energy Materials and Storage Devices, METU, Ankara
Dept of Metallurgical and Materials Engineering, METU Ankara
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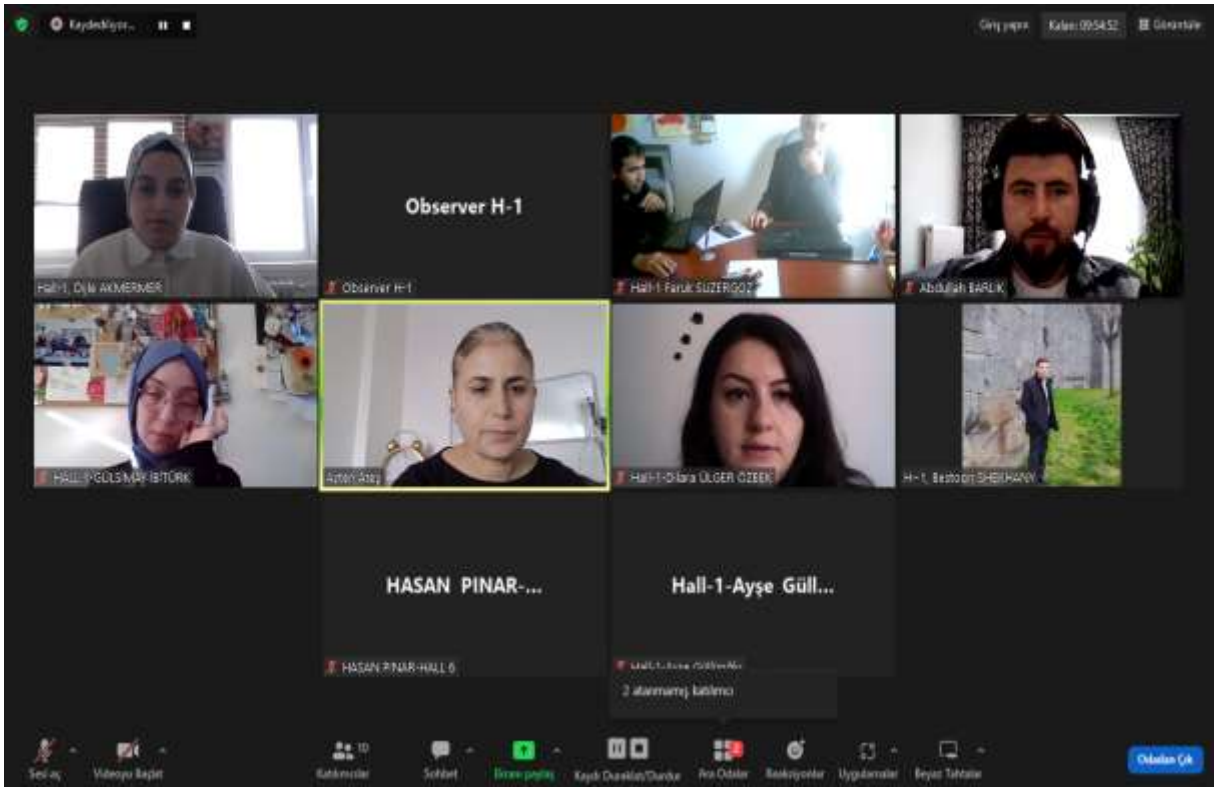
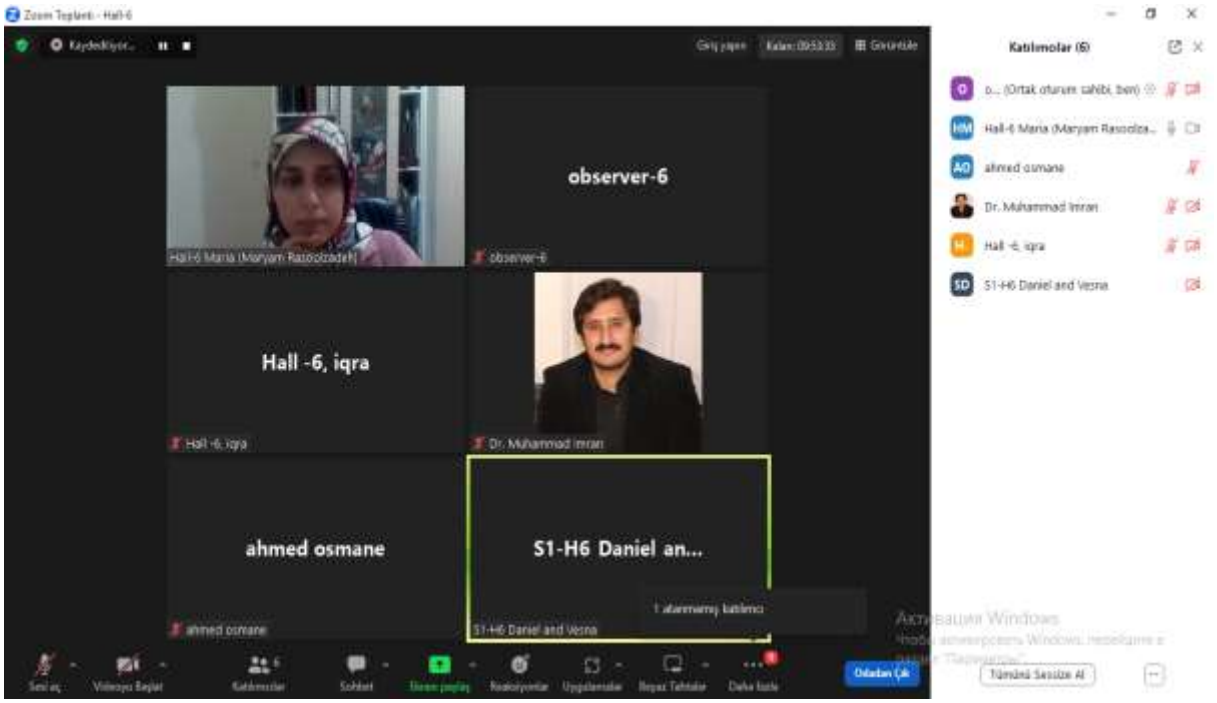
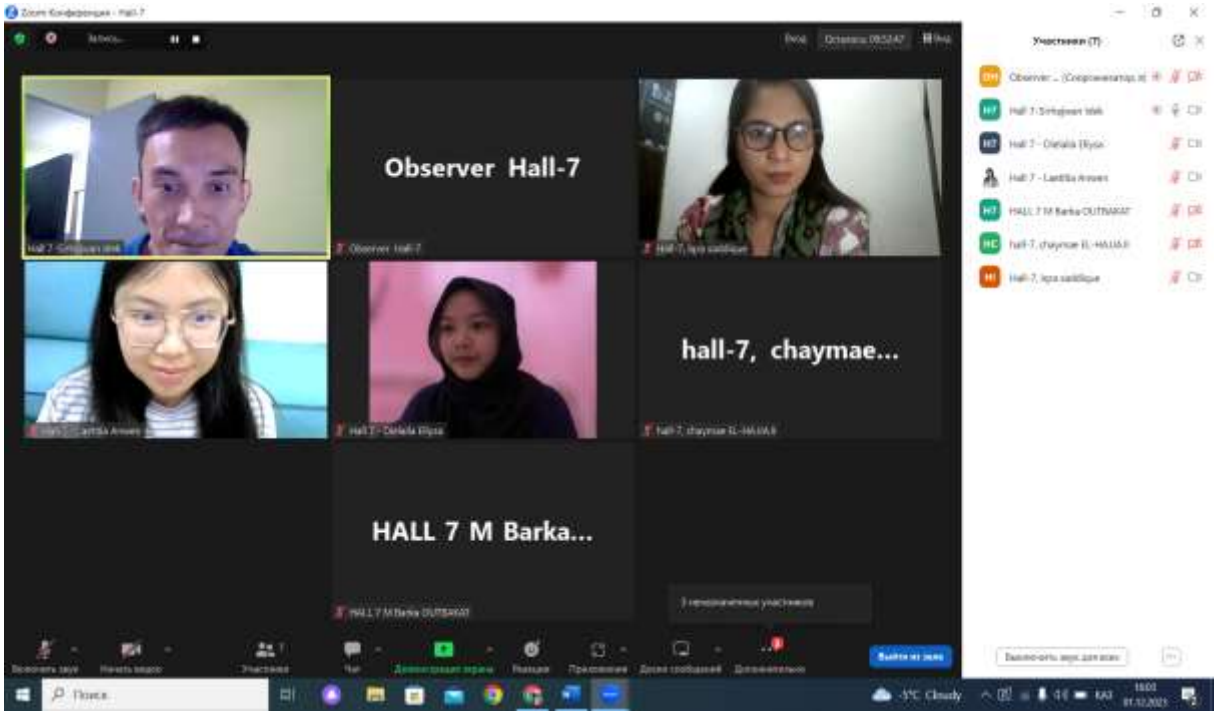
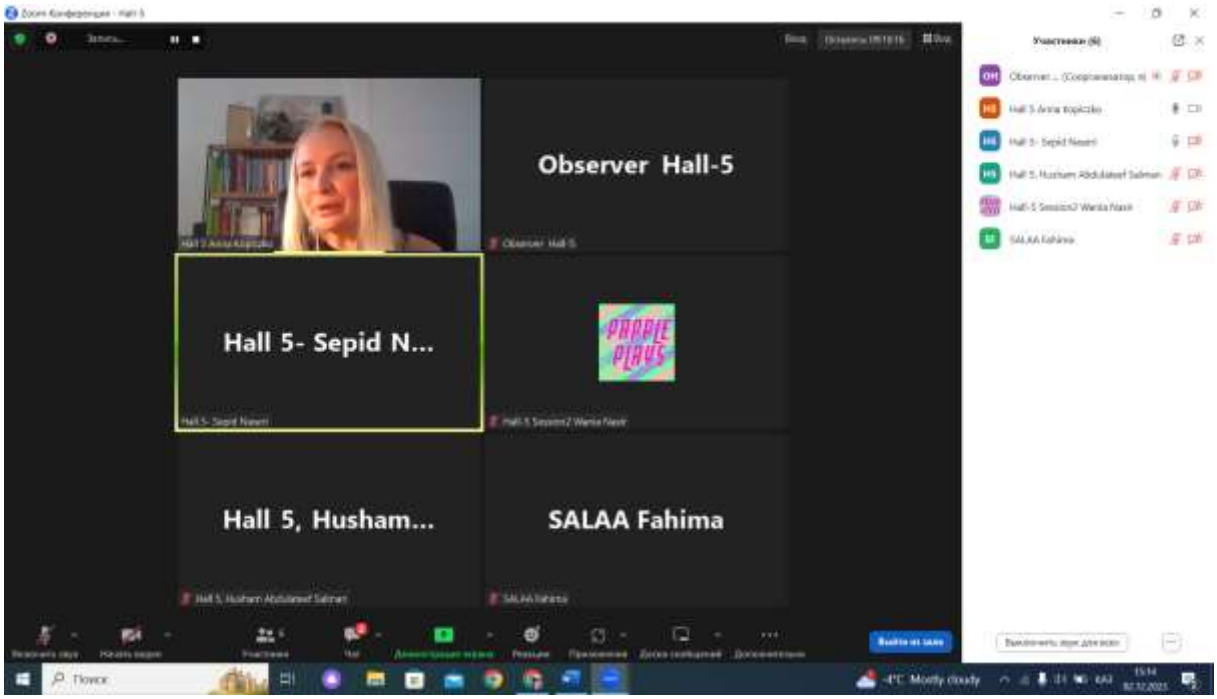
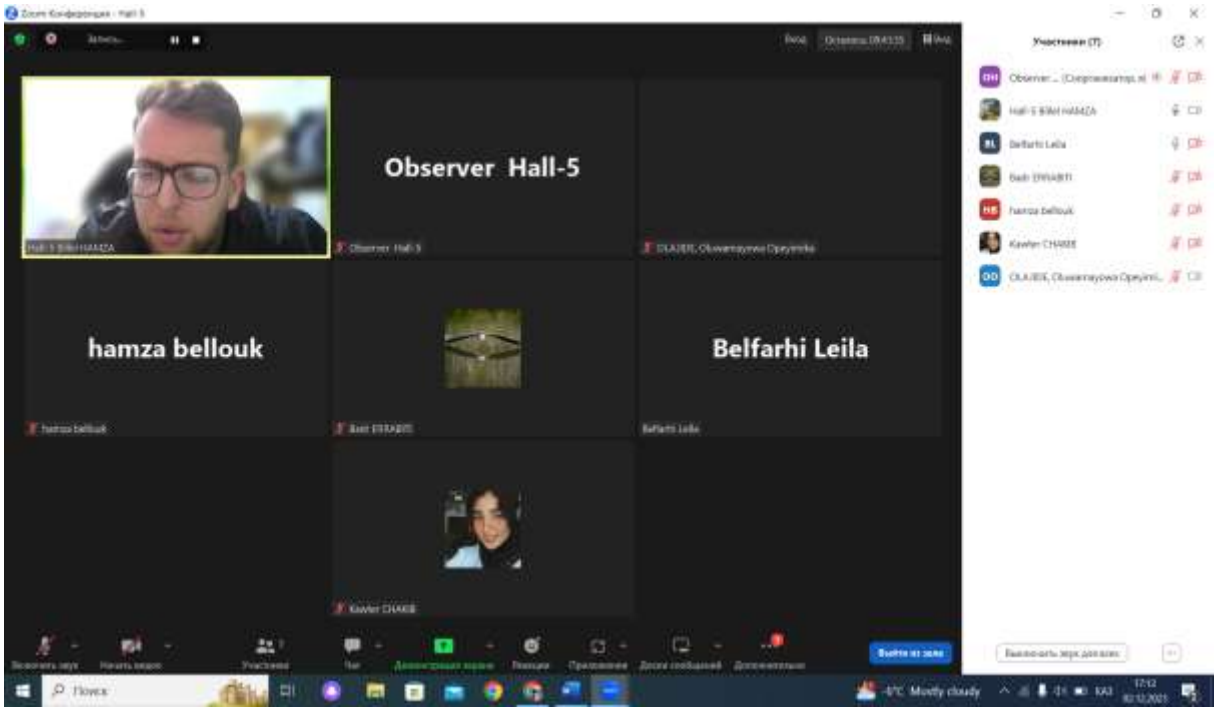

Observer H-1
HASAN PINAR-...
Hall-1-Ayşe Güll...


observer-6
Hall -6, iqra
ahmed osmane
S1-H6 Daniel an...
Katılımcılar (6)


Observer Hall-7
hall-7, chaymae...
HALL 7 M Barka...

Observer Hall-5
Hall-5, Moham...


Observer Hall-5
Hall 5- Sepid N...
Hall 5, Husham...
SALAA Fahima


Observer Hall-5
hamza bellouk
Belfarhi Leila

Zoom Toplantı - Hall-2
Kaydediliyor...
Görünüm
Observer Hall-2
Hall-2, Gamze BILGEN
HANDE GÜL TÜRKOĞLU
HOL2 - Nurullah TATAR
Hall-2-Selman Kahraman
2 atanmamış katılımcı
Sesi aç
Videoyu Başlat
Katılımcılar
Sohbet
Ekranı paylaş
Reaksiyonlar
Uygulamalar
Beyaz Tahtalar
Daha fazla
Odadan Çık

Zoom Toplantı - Hall-2
Kaydediliyor...
Geri yapın
Kalan: 09:46:23
Görüntüle
Observer Hall-2
Observer Hall-2
Hall-2, Furkan YILDIZ
Hall-2, Mehmet Murat AKKAYA
Hall-2 Ebubekir Aydın
Hall 2-zarsel koç
Hall2- Deniz Çakar
Hall-2 ,ALİ ALHRAISHAWI
Hall 2 - İzzet Yel...
Hall 2 - İzzet Yelkovan
Hall-1, Sayiter Y...
Hall-1, Sayiter YILDIZ
Sessize al
Videoyu Başlat
Katılımcılar
10
Sohbet
Ekranı paylaş
Reaksiyonlar
Uygulamalar
Beyaz Tahtalar
Daha fazla
Odadan Çık
TR
12:44
02.12.2023

Kaydediliyor...
Geri yapın
Kalan: 09:08:36
Hall-2 Beyza Erkaya Güler
Observer Hall-2
Observer Hall-2
Hall 2 - İzzet Yelkovan
Serdar Demirkaya
Prof.Dr. Evren Algın Yapar
Hall-2 Merveniur Özdemir
Hall-2, Dr. Ahmet Şahin
Hall-2 Oğuzhan AYDOĞAN
Sayiter YILDIZ
Sayiter YILDIZ

INTERNATIONAL CONGRESS ON ADVANCED RESEARCH AND APPLICATIONS

December 01-02, 2023 / Sivas, Türkiye

CONGRESS PROGRAM

Meeting ID: 862 1528 3413
Passcode: 010101

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OPENING CEREMONY

01.12.2023
ANKARA LOCAL TIME
10:00 – 10:30

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Rector of Sivas Cumhuriyet University
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KEYNOTE SPEECHES

01.12.2023
ANKARA LOCAL TIME
10:30 – 12:00

Prof. Dr. Tayfur Öztürk
Middle East Technical University, Türkiye
"Hydrogen as an integrator of renewable energy into existing energy system-A materials perspective"

Prof. Dr. Petre Nadirashvili
Georgian Technical University, Georgia
"Road Infrastructure for Tourism Improvement for the Kazbegi Region in Georgia"

Prof. Dr. Yusuf Kaynak
Marmara University, Türkiye
"Eklemeli İmalatta Ardıl İşlem Uygulamaları"

Session-1, Hall-1
01.12.2023
Moderator: Prof. Dr. Ayten Ateş
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
INVESTIGATION OF SACCULAR OTOLITH MASS ASYMMETRY IN *SPICARA FLEXUOSUM* COLLECTED FROM MEDITERRANEAN SEA (TÜRKIYE)	Semra SAYGIN Dijle AKMERMER	Ondokuz Mayıs University, Samsun, Türkiye
SPATIAL VARIATIONS IN OTOLITH MASS ASYMMETRY OF *SPICARA SMARIS* (LINNAEUS, 1758) SAMPLED FROM THE BLACK AND AEGEAN SEAS	Gülsimay İBİTÜRK Melek ÖZPİÇAK	Ondokuz Mayıs University, Samsun, Türkiye
EVALUATION OF THE EFFECTS OF DC POWER INCREASE AND LOSSES IN SOLAR POWER PLANTS	Abdullah BARLIK Özlem ONAY	Eskişehir Teknik University, Eskişehir, Türkiye
IDENTIFICATION OF KEY GENES IN COLORECTAL CANCER BASED ON INTEGRATED BIOINFORMATICS ANALYSIS	Esen ÇAKMAK	KSU, SHMYO, Kahramanmaraş, Türkiye
SPECTROSCOPIC TRACE ELEMENT ANALYSIS IN BIOLOGICAL SAMPLES	Dilara ÜLGER ÖZBEK	Sivas Cumhuriyet University, Sivas, Türkiye
ELEMENTAL CHARECTERISATION OF THE MEDICINAL PLANT ALCHEMILLA MOLLIS	Dilara ÜLGER ÖZBEK	Sivas Cumhuriyet University, Sivas, Türkiye
OPTIMIZING THE PRODUCTION OF BRUCELLA ABORTUS S-19 BACTERIA IN STEEL BIOREACTOR USING DIFFERENT CULTURE MEDIA	İbrahim Yaşar Bestoon SHEKHANY Ayşe GÜLLÜOĞLU Faruk SÜZERGÖZ	Harran University, Şanlıurfa, Turkey. Erbil Polytechnic University, Erbil, Iraq
PRODUCTION OF BIOCHAR AND APPLICATIONS FOR SUPERCAPACITORS FROM VARIOUS PLANT SOURCES	Ayten ATEŞ	Sivas Cumhuriyet University, Sivas, Türkiye

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Session-1, Hall-2

01.12.2023

Moderator: Assoc. Prof. Dr. Mehmet Hanifi DOĞRU

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
A STUDY ON THE PREPARATION OF WOODEN SLEEPERS FOR SERVICE	Mustafa DURSUNLAR Musa YILMAZ	Yozgat Bozok University, Yozgat, Türkiye
STEEL INDUSTRY PLANT LOCATION SELECTION WITH ANALYTIC HIERARCHY PROCESS (AHP) METHOD	Yasin KAYMAZ Gencay SARIIŞIK	Harran University, Şanlıurfa, Türkiye
INVESTIGATION OF THE DAMAGE RESISTANCE OF LAMINATED COMPOSITES UNDER THE EXPLOSION	Mehmet Hanifi DOĞRU Fatih DEMİR Eyüp YETER	Gaziantep University, Gaziantep, Türkiye Erciyes University, Kayseri, Türkiye
LOW COST GRAPHITE AND CELLULOSE ACETATE COMPOSITE ANTISTATIC FILMS	Gülşen TAŞKIN Tuğba TABANLIGİL CALAM Türkan Şevval ÇOŞKUNER	Gazi University, Ankara, Türkiye
PREPARATION OF AN ELECTROCHEMICAL SENSOR FOR THE DETERMINATION OF LEAD (II) IN TAP WATER	Tuğba TABANLIGİL CALAM Gülşen TAŞKIN Özge BEKTAŞ	Gazi University, Ankara, Türkiye
ESTAŞ DOMESTIC AND NATIONAL NITRILE GLOVE PRODUCTION	Rahmi CANPOLAT Fatih ÖZAYDIN Esin AZGIN Bayram Can ATCIYURT Mehmet ŞİMŞİR Osman MAVUŞ Ebru YABAŞ	ESTAŞ Sivas Cumhuriyet University, Sivas, Türkiye

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Session-1, Hall-3

01.12.2023

Moderator: Assoc. Prof. Dr. Meryem GÖKSEL SARAÇ

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
INVESTIGATING PRODUCT QUALITY IN POTATO CRISPING VIA HEAT TRANSFER	Oznur OZTUNA TANER	Aksaray University, Aksaray, Turkey
EFFECT OF TIMOL ON THE DEVELOPMENT OF AYRAN STARTERS	Fidan KILIÇ Özlem Pelin CAN	Sivas Cumhuriyet University, Sivas, Türkiye
NON-THERMAL PRESERVATION METHODS FOR MEAT AND PRODUCTS: PULSED LIGHT APPLICATIONS	Fidan KILIÇ Özlem Pelin CAN	Sivas Cumhuriyet University, Sivas, Türkiye
USE POSSIBILITIES OF DIFFERENT CEREAL FLOURS IN VEGAN MEATBALL PRODUCTION	Meryem GÖKSEL SARAÇ Tuğba DEDEBAŞ	Sivas Cumhuriyet University, Sivas, Türkiye Afyon Kocatepe University, Türkiye
EVALUATION OF COLD PRESS OIL WASTES	Tuğba DEDEBAŞ Meryem GÖKSEL SARAÇ	Afyon Kocatepe University, Türkiye Sivas Cumhuriyet University, Sivas, Türkiye

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Session-1, Hall-4

01.12.2023

Moderator: Prof. Dr. Ebru ŞENADIM TÜZEMEN

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
INVESTIGATION OF SHORT-RANGE ORDER IN Fe-Cr ALLOY BY MOLECULAR DYNAMICS SIMULATION USING THE VORONOI POLYHEDRON METHOD	Fatih Ahmet ÇELİK	Bitlis Eren University, Bitlis, Türkiye
INVESTIGATION OF LARGE EXTRA DIMENSIONS IN THE MUON COLLIDER	Salih Cem İNAN	Sivas Cumhuriyet University, Sivas, Türkiye.
PROBING THE SCALAR UNPARTICLES THROUGH THE PHOTON-PHOTON INTERACTION AT CLIC	Salih Cem İNAN	Sivas Cumhuriyet University, Sivas, Türkiye.
EXAMINATION OF ENERGY BAND GAPS OF GeOx FILMS PRODUCED AT DIFFERENT OXYGEN FLOW RATES AND DIFFERENT ANNEALING TEMPERATURES USING THE KUBELKA MUNK METHOD	Şahide Gülizar KIZIL Ayfer ÖZDEMİR Ebru ŞENADIM TÜZEMEN	Sivas Cumhuriyet University, Sivas, Türkiye
DETERMINING DIODE PARAMETERS OF LASER PATTERNED DIODE WITH OXIDE LAYER	Makbule Burcu BALI Elanur DİKİCİOĞLU Semran SAĞLAM Elif ORHAN	Gazi University, Ankara, Türkiye Yüksek İhtisas University, Ankara, Türkiye.
PATHOLOGICAL EXAMINATIONS IN BROILER BRAINS TO WHICH METHOMYL AND *SILYBUM MARIANUM* ARE ADDED TO THEIR FEED	Bahadır KILINÇ Ertan ORUÇ	Veteriner Kontrol Merkez Araştırma Enstitüsü Ankara Selçuk University, Konya, Türkiye

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Session-1, Hall-5

01.12.2023

Moderator: Prof. Dr. Yahya Kemal TÜR

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
DENSIFICATION AND FRACTURE STRENGTH PROPERTIES OF Al_2O_3 BASED ZrO_2 and Sm_2O_3 CONTAINING SANDWICH CERAMIC COMPOSITES	Tuğba ŞANLI Betül KAFKASLIOĞLU YILDIZ Elif IŞIK Yahya Kemal TÜR	Sivas Bilim ve Teknoloji University, Sivas, Türkiye Gebze Teknik University, Kocaeli, Türkiye
EVALUATION OF NITRATE HEAVY METALS POLLUTANTS REMOVAL RATE FROM ZARJOUB RIVER (IRAN) USING A WETLAND HYBRID SYSTEM	Maryam Varavipour	University of Tehran, Tehran, Iran
EVALUATION OF PHYTOREMEDIATION POTENTIAL AND YIELD OF HELIANTHUS ANNUUS UNDER SEWAGE SLUDGE APPLICATION	Elham Mohammadian, Maryam Varavipour	University of Tehran, Tehran, Iran
USING BIOCHARS MODIFIED WITH THIOUREA TO REDUCE THE IMPACT OF HARMFUL METAL POLLUTION AND ENHANCE THE GROWTH OF MUSTARD PLANTS (BRASSICA CAMPESTRIS) IN SOILS AFFECTED BY CONTAMINATION	Maria Taj	Jinnah University for Women
ASSESSMENT OF INDOOR MICROFLORA OF CARS	Vardhana Janakiraman, Thenmozhi Mani, N K Udaya Prakash	Vels Institute of Science Technology and Advanced Studies, Tamilnadu , India
FINITE ELEMENT ANALYSIS OF THE LIMB/SOCKET INTERFACE IN TRANSFEMORAL AMPUTEES	Mohammed El Sallah Zagane, Abdelmadjid Moulgada, A Sahli, Benkouachi Narimen	Université de Tiaret, Algeria Université de Sidi Bel Abbes, Algeria
3D-QSAR, ADME-TOX IN SILICO PREDICTION AND MOLECULAR DOCKING STUDIES FOR MODELING THE ANALGESIC ACTIVITY AGAINST NEUROPATHIC PAIN OF NOVEL NR2B-SELECTIVE NMDA RECEPTOR ANTAGONISTS	Mohamed El fadili, Mohammed Er-rajy, Hamada Imtara, Mohammed Kara, Sara Zarougui, Najla Altwaijry, Omkulthom M. Al kamaly, Aisha Al Sfouk and Menana Elhallaoui	Sidi Mohamed Ben Abdellah University, Fez, Morocco
ENERGY AND EXERGY ANALYSIS OF PHOTOVOLTAIC THERMAL SYSTEM (PV/T) ADDED TO ROOFS OF RESIDENCES	Okan KON İsmail CANER	Balıkesir University, Balıkesir, Türkiye

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Session-1, Hall-6

01.12.2023

Moderator: Dr. Vesna Karapetkovska - Hristova

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
OVERVIEW OF CATTLE FARMING DYNAMICS AND BEEF PRODUCTION IN N. MACEDONIA	Daniel Simakoski	University "St. Kliment Ohridski", Faculty of Biotechnical Sciences - Bitola
OVERVIEW OF CATTLE FARMING DYNAMICS AND BEEF PRODUCTION IN N. MACEDONIA	Vesna Karapetkovska - Hristova	University "St. Kliment Ohridski", Faculty of Biotechnical Sciences - Bitola
INFLUENCE OF ROOTSTOCK ON THE BIOCHEMICAL CHARACTERIZATION OF APPLES (MALUS DOMESTICA L.)	Hassane Boudad, Atman Adiba, Anas Hamdani, Abdelfattah Goubi, Mentag Rachid, El Fazazi Kaoutar, Abdelmajid Haddioui, Jamal Charafi	National Intitute of Agricultural Research, Morocco University of Sultan Moulay Slimane, BP 523, Beni Mellal, Morocco
STRUCTURAL CHARACTERIZATION OF EXOPOLYSACCHARIDE FROM LEUCONOSTOC SPP AND ITS ANTI-ADHESIVE ACTIVITY ON AISI 316L	Mariem Zanzan, Youssef Ezzaky, Fatima Hamadi, Fouad Achemchem	Ibn Zohr University, Agadir, Morocco.
INTEGRATED APPROACH TO BAUCHEMIE AS A WAY TO HEALTHY BUILDINGS	Maryam Rasoolzadeh, Mohammadjavad Mahdavinejad	Tarbiat Modares University, Tehran, Iran
LEAF STRUCTURAL AND FUNCTIONAL MODIFICATION OF IPOMOEA CARNEA JACQ. AN INVASIVE PLANT SPECIES, UNDER DIVERSE SALINITY GRADIENT	Syeda Sabika Zahra Naqvi, Syed Mohsan Raza Shah, Laiba Hameed, Aiza Hanif, Amjad Hussain, Muhammad Imran Rafique, Muhammad Farooq, Iqra	University of Education, Lahore, Pakistan
INTEGRATION OF BACILLUS CEREUS AND COMPOST TYPES TO MODULATE THE SALINITY EFFECT ON THE GROWTH OF CUCUMBER (CUCUMIS SATIVA L.)	Iqra, Sammina MAHMOOD	University of Education, Lahore
STUDY THE EFFICIENCY OF THE NATUREL LAGOONS FOR TREATED WASTEWATER DURING SEASON PERIOD IN ARID CLIMATE (MOROCCO)	Ahmed Osmane, Khadija Zidan, Rabia Benaddi, Laila Mandi, Moustapha Belmouden	Laboratoire de chimie Organique et Chimie Physique (Chimie Fondamentale et appliquée), Morocco Cadi Ayyad University, Marrakech, Morocco

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Session-1, Hall-7
01.12.2023
Moderator: Sirhajwan Idek
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 14:00 – 16:00

Title	Author(s)	Affiliation
UTILIZATION OF LYSOZYME AS A FOOD ADDITIVE IN THE FOOD INDUSTRY	K.R.Padma K.R.Don	Sri Padmavati Mahila Visvavidyalayam (Women's University), Tirupati, AP. Bharath Institute of Higher Education and Research (BIHER) Bharath University, Chennai, Tamil Nadu, India
ALGAL OIL IMPORTANCE AND APPLICATIONS	Dr. Muhammad Imran	Government College University, Faisalabad, Pakistan
EASY GO DAB: A MAKEUP BRUSH POWERED BY ELECTRIC	Laetitia Anwen, Dielaila Ellysa	Keningau Vocational College, Cosmetology Department, Keningau, Sabah
DETECTION OF LUMPY SKIN DISEASE VIRUS IN BOVINE MILK, MEAT AND LIVER SAMPLES AND DETERMINATION OF THEIR SAFETY AND QUALITY	Iqra Saddique, Ali Ikram	The University of Lahore, Pakistan
EVALUATION OF THE IN VITRO ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS OF ROSMARINUS OFFICINALIS, CITRUS AURANTIUM ET ORIGANUM MAJORANA ON THE MYCELIAL GROWTH OF PHYTOPHTORA PALMIVORA ET ALTERNARIA ALTERNATA	El-Hajjaji Chaymae, J.Dehmani, S.Msairi	National Agency for Medicinal and Aromatic Plants, Taounate, Morocco Ibn Tofail University, Kenitra, Morocco
TEMPERATURE EFFECTS ON THE CORROSION INHIBITION OF MILD STEEL IN CRUDE OIL MEDIUM BY METHANOLIC EXTRACT OF PERSEA AMERICANA (AVOCADO TREE)	Wilson, Emmanuel Okon	Akwa Ibom State Polytechnic
EXAMINATION OF ESSENTIAL OILS EXTRACTED FROM PITURANTHOS AROMATIC PLANTS AND THEIR BIOACTIVE POTENTIAL	FRIH Bariza Mekhadmi Nourelhouda Melik Randa	Echahid Hamma lakhder University, Algeria. National Institute of Agronomic Research of Algeria, Algeria
BIOCHEMICAL VARIABILITY IN APPLES (MALUS DOMESTICA L.): JOINT IMPACT OF ROOTSTOCK AND VARIETY IN APPLE CULTURES	Hassane Boudad, Atman Adiba, Sara Najjari, Abdelfattah Goubi, Mentag Rachid, El Fazazi Kaoutar, Abdelmajid Haddioui, Jamal Charafi	National Intitute of Agricultural Research, Morocco University of Sultan Moulay Slimane, Morocco Sidi Mohamed Ben Abdellah University, Morocco
USE OF PHOSPHOGYPSUM IN AGRICULTURE AS AN AMENDMENT FOR DEGRADED SOILS AND AS FERTILIZER	M Barka Outbakat, Redouane Choukr-Allah, Moussa Bouray, Mohamed EL Gharous, Khalil EL Mejahed	Mohammed VI Polytechnic University, Benguerir, Morocco
PHOTOSYNTHETIC TRAITS OF RICE LANDRACES (ORYZA SATIVA L.) UNDER DROUGHT TOLERANCE	S.JeevaPriya, S.Vincent	Tamil Nadu Agricultural University, India
REDUCING THE CARBON FOOTPRINT IN AGRICULTURAL CROPS THROUGH THE USE OF SMART NITROGEN	Toader George, Ilie Leonard	Usamv Bucharest Aectra Agrochemicals Srl

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Session-1, Hall-1

02.12.2023

Moderator: Assoc. Prof. Dr. Fevzi Çakmak BOLAT

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 10:00 – 12:00

Title	Author(s)	Affiliation
INTEGRATION OF SPECTROSCOPIC DATA AND MACHINE LEARNING MODELS FOR RAPID CLASSIFICATION OF DAIRY PRODUCTS	Yeliz DURGUN Mahmut DURGUN	Tokat Gaziosmanpaşa University, Türkiye
NUMERICAL ANALYSIS OF SANDWICH STRUCTURES CONTAINING DIFFERENT TYPES OF AUXETIC CORE STRUCTURES	Fevzi Çakmak BOLAT	Kocaeli University, Kocaeli Turkey
PIEZOELECTRIC BASED ENERGY HARVESTING MODELING AND SIMULATION IN MATLAB/SIMULINK	Bartu Türkcan ÇETİN Fevzi Çakmak BOLAT	Kocaeli University, Kocaeli Turkey
DEVELOPMENT OF ELECTRONIC LEGAL INFORMATION MANAGEMENT SYSTEM DESIGN WITH MULTIPLE REGISTERED ELECTRONIC MAIL (REM) MODELS	Ahmet Gürkan YÜKSEK Mesut AĞKUŞ Ahmet Utku ELİK	Sivas Cumhuriyet University, Sivas, Türkiye Detaysoft
AN INNOVATIVE APPROACH TO IMPROVE THE GUIDANCE TRACKING METHODS OF AUTOMATED GUIDED VEHICLE (AGV) SYSTEMS WITH EXPERT SYSTEM APPROACHES	Ahmet Gürkan YÜKSEK Ahmet Utku ELİK Mesut AĞKUŞ	Sivas Cumhuriyet University, Sivas, Türkiye Detaysoft
SPECTRE! ANALYSIS OF ATTACKS AND DEFENSE MECHANISIMS AGAINST TO SPECTRE	Hatice AKTAŞ AYDIN Gülay YALÇIN ALKAN	Sivas Bilim ve Teknoloji University, Sivas, Türkiye Abdullah Gül University, Kayseri, Türkiye
DESIGN OF ZONGULDAK BULENT ECEVIT UNIVERSITY FARABI CAMPUS INFORMATION SYSTEM AND SERVICE ON OPEN SOURCE WEB PLATFORM	Neslihan Zeynep KARABACAKOĞLU Aycan Murat MARANGOZ	Zonguldak Bülent Ecevit University, Zonguldak, Türkiye
WATER ABSORPTION MODELLING OF CERAMIC BODY USING GENETIC PROGRAMMING	Sencer SARI Ahmet CİHAN	Tbilisi State Academy of Art, Tbilisi, Georgia Düzce University, Düzce, Türkiye
DEVELOPMENT OF A REHABILITATION PROTOTYPE WITH COMPUTER AIDED AND SPATIAL ORIENTED VIRTUAL REALITY IN THE TREATMENT OF BALANCE LOSS OCCURRING DUE TO VESTIBULAR SYSTEM PROBLEMS IN HEARING IMPAIRED PEOPLE	Dr. Fzt. Seher EROL Umut ALTINKAYNAK	Ankara University, Ankara, Türkiye Gerçek Prosthesis And Orthosis, Ankara, Türkiye
CONTROL SIMULATION OF IRIS VALVE DESIGNED FOR BAGGING SCALES	Mine Şeyma BİLGİÇ Cemil KÖZKURT	YEMTAR MAKİNA San.Tic. A.Ş..Bandırma, Türkiye Bandırma Onyedi Eylül University, Bandırma, Türkiye

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Session-1, Hall-2
02.12.2023
Moderator: Assoc. Prof. Dr. Gamze Bilgen
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 10:00 – 12:00

Title	Author(s)	Affiliation
INVESTIGATION OF LEONARDITE USAGE POTENTIAL IN STABILIZATION OF WEAK SOILS	Selman Kahraman İnan Keskin Amir Hosein Vakili Amir Hosein Vakili Ayhan Kocaman Nurullah Tatar	Karabük University, Karabük, Türkiye Zand Institute Of Higher Education, Shiraz, Iran
EXPERIMENTAL EVALUATION OF THE USABILITY OF RECYCLING WASTE FLY ASH IN SOIL IMPROVEMENT	Nurullah Tatar Selman Kahraman İnan Keskin	Karabük University, Karabük, Türkiye
INVESTIGATIONS ON CONSTRUCTION COST PARAMETER IN DEMOLITION-STRENGTHENING DECISIONS DUE TO INSUFFICIENT EARTHQUAKE PERFORMANCE OF BUILDINGS	Tarhan Tuğşah GÜLERDİ Özlem ÇALIŞKAN Kerem PEKER	Bilecik Seyh Edebali University, Bilecik, Turkey Erdemli Proje ve Müşavirlik Ltd. Şti, İstanbul, Türkiye
DETERMINATION OF THE ANCHOR LOCATION USING THE GEOPHYSICAL METHODS	Hande Türkoğlu Gamze Bilgen	Zonguldak Bülent Ecevit University, Türkiye
USE OF GEO-RADAR IN GROUND INVESTIGATIONS FROM A GEOTECHNICAL PERSPECTIVE	Murat Karadeniz Gamze Bilgen	Zonguldak Bülent Ecevit University, Türkiye
A METHODOLOGICAL FRAMEWORK FOR ANALYZING AND VISUALIZING URBAN CHANGE: A CASE STUDY OF MINSK, BELARUS	Fevzi DAŞ	Iğdır University, Türkiye
EVALUATING THE EFFECTS OF TWO EARTHQUAKES IN KAHRAMANMARAS ON BUILDINGS AND ROAD NETWORKS IN IMPACTED CITIES USING OPENSTREETMAP AND OPENAERIALMAP	Fevzi DAŞ	Iğdır University, Türkiye
EVALUATION OF DEEP SEA MINING IN TERMS OF ENVIRONMENT AND DEVELOPING TECHNOLOGY	Güzide KALYONCU ERGÜLER	Kütahya Dumlupınar University, Türkiye

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Session-1, Hall-3

02.12.2023

Moderator: Dr. Priya J

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 10:00 – 12:00

Title	Author(s)	Affiliation
THE PHILOSOPHY BEHIND AND NEED FOR GREEN BUILDINGS	Dr. Priya J Ms. Jaya Varsha E	CHRIST (Deemed to be University), Bangalore, Karnataka, India
GRANULATED SLAG FROM EL HADJAR AS AN ADDITIVE IN CONCRETE	Abderrahim GUETTECHE, Salah Eddine BENSEBTI, Mohamed Nacer GUETTECHE, Abdelhafid CHABANE	Université Constantine 1, Algérie
THE LINK BETWEEN LITERATURE AND ARCHITECTURE	Ms. Jaya Varsha E Dr. Priya J	CHRIST (Deemed to be University), Bangalore, Karnataka, India
THE URBAN TRANSPORTATION IN ALGERIA: CURRENT SITUATION AND PROSPECTS FOR SUSTAINABLE URBAN DEVELOPMENT, CASE OF ALGIERA	Prof. BAOUNI Tahar Dr. BABA SLIMANE Nour El Houda	High School of Architecture and Urban Planning (EPAU), Algeria
EXTRACTION OF CRYSTALLINE CELLULOSIC FIBERS FROM SOFT RUSH USING ALKALI-PERBORATE PRETREATMENT	Mona Benali, Abdellah Oulmekki, Jamil Toyir	Université Sidi Mohammed Ben Abdellah, Marocco
CHARACTERIZING THE THERMAL QUANTUM CORRELATIONS IN A TWO-SPIN XXX HEISENBERG MODEL IN THE CONTEXT OF HEITLER-LONDON APPROACH	Prof. Youssef Khedif	University Hassan II, P.O. Box 5366, Maarif, Casablanca 20100, Morocco
CONTRIBUTION TO THE ASSESSMENT OF FLOOD CONTROL MEASURES IN AN ANTHROPIZED VALLEY. THE CASE OF THE OURIKA VALLEY (HIGH ATLAS OF MARRAKECH, MOROCCO)	L'Arfouni, Ilham Algouti, Ah Algouti, Ab. Es-sadiq, R. Moujane, S	Cadi Ayyad University, Faculty of Sciences Semlalia, Department of Geology, BP 2390, 40 000, Marrakech, Morocco. Labo2GRNT

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Session-1, Hall-4

02.12.2023

Moderator: Moses Adeolu AGOI

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 10:00 – 12:00

Title	Author(s)	Affiliation
MODELLING THE PLASTIC VISCOSITY OF WATER BASED MUDS USING ARTIFICIAL NEURAL NETWORK	Engr. Kawu Yakubu Dr. Okorıe E. Agwu Dr. Anıetıe N. Okon Engr. Dr. Hassan Ismaıl	Nigerian Building and Road Reasearch, Institute, NBRRI zonal Office, Gombe, Gombe State, Nigeria University of Uyo,Faculty of Engineering, Chemical and Petroleum Engineering Department. Uyo, AkwaIbom State, Nigeria Eyestone Investment Limited Lagos, Nigeria
MACHINE LEARNING FOR EARLY GLAUCOMA DETECTION: A COMPARATIVE ANALYSIS OF PREDICTIVE MODELS	Miss. Dipanwita Ghosh	Maulana Abul Kalam Azad University of Technology, India
EMPOWERING EDUCATION IN INDUSTRY 4.0: A CLOUD-BASED APPROACH FOR RURAL AND TRIBAL TRANSFORMATION	Vijay Kumar Pandey , Dr. Neeraj Rathore, Dr. Narayan P Bhosale	Indira Gandhi National Tribal University, India
DEEP LEARNING IN CONSERVATION BIOLOGY	Attila Barta	University of Debrecen
LINE FOLLOWER ALGORITHMS AND SENSOR STRATEGIES FOR SEAMLESS NAVIGATION	Adam Pachur	Gdynia Maritime Univercity
DIGITALIZATION, SUSTAINABILITY AND CIRCULARTY IN MACHINE KNITTING	Alenka Pavko Čuden	University of Ljubljana, Ljubljana, Slovenia
THE EFFICACY OF INTELLIGENT TRANSPORTATION SYSTEM: IMPLICATION ON MODERN DAY ROAD TRAFFIC MANAGEMENT	Moses Adeolu AGOI Solomon Abraham UKPANAH Oluwanifemi Opeyemi AGOI	Lagos State University of Education, Lagos Nigeria. Obafemi Awolowo University, Osun Nigeria

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Session-1, Hall-5
02.12.2023
Moderator: Dr. Kaïs Antar
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 10:00 – 12:00

Title	Author(s)	Affiliation
SYNTHESIS AND CHARACTERIZATION OF POLY-O-TOLIDINE USING ELECTROCHEMICAL, SPECTROSCOPIC, AND THERMOGRAVIMETRIC METHODS	Assala Marir, Mounia Guergouri	University of Constantine 1, Algeria
PROPERTIES OF ORYZA SATIVA A-AMYLASE: PRODUCTION OPTIMIZATION, KINETICS, STABILITY AND THERMODYNAMIC STUDIES	Austin I. Ugoh, Ozoemena E. Eje, Chinekwu S. Onoyima, Arinze L. Ezugwu, Ferdinand C. Chilaka	University of Nigeria, Nsukka, Enugu, Nigeria
BIMETALLIC Cu/Ag NANOPARTICLES WITH VARYING AG AS AN ANTIBACTERIAL AGENT	Mureed Shumaila Ikram Muhammad Ghaffar Rabia Irshad Muneeb Ghaffar Abdul	Government College University, Pakistan University of Education, Pakistan University of Engineering and Technology, Pakistan
THE AID OF CALORIMETRY FOR THE THERMOCHEMICAL AND KINETIC STUDY OF THE Σ-HOLE BONDING LEADING TO I2 AND 4-(DIMETHYLAMINO) PYRIDINE COMPLEXES IN SOLUTION AT 25°C	Kaïs Antar, Saoussen Wacharine-Antar, Mohamed Oussama Zouaghi, Youssef Arfaoui	University of Tunis El Manar, Tunisia
POTENTIAL ANTICANCER AND ANTIOXIDANT LAURIC ACID BASED HYDRAZONES SYNTHESIS AND COMPUTATIONAL SLANT TOWARDS THE ELECTRONIC PROPERTIES	Talha Mashhood, Dr. Muhammad Ibrahim, Dr. Akbar Ali	Government College University Faisalabad, Pakistan
COMPARATIVE STUDY ON PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF TAPINANTHUS LONGIFOLIA AND TAPINANTHUS GLOBIFERUS LEAVES EXTRACTS	Musa Halimatu Fago and Zainab Ahmad Muhammad	Umaru Musa Yar'adua University
SOL GEL SYNTHESIS, CHARACTERIZATION, CRYSTAL STRUCTURE, ELECTRONIC PROPERTIES AND MAGNETIC STUDIES OF Al2+xBixMn4-3xO7 (0.15 ≤ x ≤ 0.50) NANOCOMPOSITES	K.Palanisamy, B.B.Das, K.Parthipan	Pondicherry University, Puducherry SIVET College
INTRODUCTION OF GRAPHENE OXIDE NANOSHEETS AND SILVER NANOPARTICLES ON POLYESTER FABRIC FOR THE DIP-CATALYTIC HYDROGENATION OF 4-NITROPHENOL	Ali Majdoub, Hicham Zaitan Imane El Mrabet Mohammed Majdoub Héctor Valdés	Sidi Mohamed Ben Abdellah University, Morocco Ibnou Zohr University, Ouarzazate, Morocco The University of Mississippi Universidad Catolica de La Santisima Concepcion, Concepcion, Chile
EXPLORING THE CORROSION INHIBITION ABILITY OF NEW QUINAZOLINE COMPOUND FOR COPPER IN 3.5% NaCl	Mohammed Oubahou, Mohamed Rbaa, Driss Takky, Youssef Naimi	Hassan II University of Casablanca, Morocco Ibn Tofaïl University, Morocco

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Session-2, Hall-1

02.12.2023

Moderator: Prof. Dr. Mehtap ERŞAN

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 12:30 – 14:30

Title	Author(s)	Affiliation
EFFECT of 3-AMINOPROPYL TRIETHOXY SILANE-SURFACE MODIFICATION of DIFFERENT TYPES of NANOSTRUCTURES on the JOİNT PERFORMANCE in ADHESIVE	İclal AVİNC AKPINAR	Erzurum Technical University, Erzurum, Turkey
DEVELOPMENT OF THE ANALYSIS METHOD FOR QUANTITATION OF PHARMACEUTICAL POMADE PREPARATIONS CONTAINING DIFLUCORTOLONE VALERATE AND ISOCONAZOLE NITRATE MOLECULES BY HIGH PERFORMANCE LIQUID CHROMOTOGRAPHY (HPLC)	Çilem IŞIK Mehtap ERŞAN	Sivas Cumhuriyet University, Sivas, Türkiye
INVESTIGATION OF THE ADSORPTION OF CRYSTAL VIOLET ON HYDROXYAPATITE	Aysun ATEŞ Mehtap ERŞAN	Sivas Cumhuriyet University, Sivas, Türkiye
INVESTIGATION OF THE EFFICIENCY FOR THE PRODUCTION OF CATHODIC ZINC INGOT FROM ZINC-CONTAINING RAW MATERIALS AND WASTES	Yusuf EMİNOĞLU Ünsal AÇIKEL	Sivas Cumhuriyet University, Sivas, Türkiye
THE EFFECT OF SODIUM LAURYL SULFATE CONCENTRATION ON THE THERMOELECTRIC PROPERTIES OF ANILINE-ACRYLONITRILE COPOLYMERS	İlhan DANACI Tahsin AYDIN Fuat ERDEN Salih ÖZBAY	Sivas University of Science and Technology, Sivas, Türkiye
DYEING OF WOVEN FABRICS MODIFIED WITH EXTRACT OBTAINED FROM ONOSMA HALOPHILA ROOT	Mahmut BAYRAM	İnönü University, Malatya, türkiye
SYNTHESIS AND ANTIOXIDANT PROPERTIES OF COPPER OXIDE NANOPARTICLES BY GREEN SYNTHESIS USING *MENTHA PULEGIUM*	Gamze TOPAL CANBAZ Sayiter YILDIZ	Sivas Cumhuriyet University, Sivas, Türkiye
EXAMINATION OF THE RELATIONSHIP BETWEEN ISOCITRATE DEHYDROGENASE-1 ENZYME AND SOME ENZYMES PLAYING A ROLE IN VARIOUS SIGNAL TRANSDUCTION PATHWAYS	Esra BULUT ATALAY İbrahim TOPÇU	Sivas Cumhuriyet University, Sivas, Türkiye
SYNTHESIS OF OCTA-SUBSTITUTED OXO-TITANIUM PHTHALOCYANINE AND INVESTIGATION OF COLORIMETRIC Ph-SENSOR ACTIVITIES	Ebru YABAŞ	Sivas Cumhuriyet University, Sivas, Türkiye

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Session-2, Hall-2

02.12.2023

Moderator: Prof. Dr. Meltem SARIOĞLU CEBECİ

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 12:30 – 14:30

Title	Author(s)	Affiliation
INVESTIGATION OF TWO-STAGE BIOMASS GASIFICATION FOR METHANE-RICH SYNGAS PRODUCTION UNDER THE CO_2 ATMOSPHERE	Ebubekir Sıddık AYDIN	Sivas Bilim ve Teknoloji University, Sivas, Türkiye
EVALUATION OF CIRCULAR RECOVERY OF ZERO WASTE PRACTICES IN SIVAS PROVINCE	Furkan YILDIZ Fuat ÖZYONAR	Sivas Cumhuriyet University, Sivas, Türkiye
THE CLIMATE CHANGE IMPACT ON SURFACE WATER RESOURCES; THE CASE OF KIZILIRMAK	Mehmet Murat AKKAYA Fuat ÖZYONAR	Sivas Cumhuriyet University, Sivas, Türkiye
OBTAINING ENERGY AND BY-PRODUCTS (BIOFERTILIZER, BIOCHAR) FROM ORGANIC WASTE	Meltem SARIOĞLU CEBECİ Cansel YILDIZ	Sivas Cumhuriyet University, Sivas, Turkiye
TREATMENT OF WASTEWATER WITH ADVANCED TREATMENT METHODS AND AVAILABILITY FOR IRRIGATION: ENVIRONMENTAL HEALTH EFFECTS	Meltem SARIOĞLU CEBECİ	Sivas Cumhuriyet University, Sivas, Turkiye
FORMATION OF MICROPLASTICS, THEIR SPREAD IN NATURE AND THE ENVIRONMENTAL RISKS THEY CAUSE	Ali ALHRAISHAWI Mustafa ÖZTÜR Şükrü ASLAN	Sivas Cumhuriyet University, Sivas, Turkiye
THE CONCEPT OF SUSTAINABILITY AND SUSTAINABLE CLASSIFICATION SYSTEMS	Mustafa ÖZTÜR Ali ALHRAISHAWI Şükrü ASLAN	Sivas Cumhuriyet University, Sivas, Turkiye
EFFECTS OF FUNGICIDE AGAINST *Botrytis cinerea* ISOLATES ON MYCELIAL GROWTH AND EXPRESSION OF *Bcgst5* GENE	Ebru DERELLİ TÜFEKÇİ Seçil AKILLI ŞİMŞEK Deniz ÇAKAR	Çankırı Karatekin University, Çankırı, Türkiye
INVESTIGATION OF EFFECTS OF PEPTICIDES ON TO GROUNDWATER AND SURFACE WATER	Meltem SARIOĞLU CEBECİ Menekşe TAŞ DİVRİK	Sivas Cumhuriyet University, Sivas, Turkiye

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Session-2, Hall-3

02.12.2023

Moderator: Prof. Dr. Ülker Aslı Güler

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 12:30 – 14:30

Title	Author(s)	Affiliation
POSSIBLE EFFECTS OF MICROPLASTIC POLLUTION ON WATER ECOSYSTEMS	Firdevs Hazal DAŞTAN Ülker Aslı Güler	Sivas Cumhuriyet University, Sivas, Türkiye
INVESTIGATION OF THE REMOVAL KINETICS OF REACTIVE ORANGE 16 DYESTUFF WITH SELECTED THREE DIFFERENT NANOPARTICLES	İlknur ŞENTÜRK	Sivas Cumhuriyet University, Sivas, Türkiye
ENVIRONMENTAL MANAGEMENT AFTER NATURAL DISASTERS	İlknur ŞENTÜRK	Sivas Cumhuriyet University, Sivas, Türkiye
TREND ANALYSIS of PRECIPITATION DATA in YOZGAT AND KIRIKKALE	Zinnur YILMAZ Mustafa Bünyamin KARAGÖZOĞLU	Sivas Cumhuriyet University, Sivas, Türkiye
SPATIAL-TEMPORAL ANALYSIS OF TEMPERATURE VALUES OF KAYSERİ PROVINCE WITH INNOVATIVE TREND ANALYSIS	Zinnur YILMAZ Mustafa Bünyamin KARAGÖZOĞLU	Sivas Cumhuriyet University, Sivas, Türkiye
A STUDY TO DETERMINE THE MEDICAL WASTE DISPOSAL COST	Eyüp ATMACA İbrahim KAYA	Sivas Cumhuriyet University, Sivas, Türkiye Sivas Çevre Şehircilik ve İklim Değişikliği İl Müdürlüğü, Sivas, Türkiye
USE OF PLANT-BASED FOOD ADDITIVES IN FOODS	Nazife YIMAZ	Erzincan Binali Yıldırım University, Erzincan, Türkiye

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Session-2, Hall-4
02.12.2023
Moderator: Vidya Padmakumar
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 12:30 – 14:30

Title	Author(s)	Affiliation
PREPARATION OF CAO NANO-CATALYST FROM NATURAL WASTE SHELLS	Obiora Ebuka Muojama	University of Benin, Nigeria
ATTAINING SUSTAINABLE COMPETITIVE ADVANTAGES THROUGH PROCUREMENT IN PAKISTAN	Masaud Ahmad, Rehman Akhtar	University of Engineering and Technology Peshawar (25000), Pakistan
COMBINATION OF THE EROSION POTENTIAL MODEL (EPM) AND THE UNIVERSAL SOIL LOSS EQUATION (RUSLE) FOR WATER EROSION MAPPING AND IDENTIFICATION OF VULNERABLE AREAS IN THE INAOUENE WATERSHED UPSTREAM OF THE IDRISS 1ST DAM, MOROCCO	Laaraj Marouane Benaabidate Lahcen Mesnage Valérie	University of Sidi Mohamed Ben Abdellah, Morocco University of Rouen-NORMANDY, France
SURFACTANT-STABILIZED OIL-IN-WATER NANOEMULSION: STABILITY INSIGHTS AND IMPLICATIONS	Parthasarathi.V, Devi.R, Dr.R.Srinivasan, Sriram.R	Bharath Institute of Higher Education and Research, Chennai, India
DEVELOPMENT OF NEW METHODS OF SUBSTANCE ANALYSIS IN COMPARISON WITH THE REFERENCE SAMPLE	Alexandrov V.S.	Kazan National Research Technical University named after A.N. Tupolev, Russia
BIRD ECOLOGY ALONG THE URBAN-RURAL GRADIENT IN BENI MELLAL: EVIDENCE FROM MOROCCO (NORTHWEST AFRICA)	Ikram Douini, Mohamed Mounir, El Mostafa Benka, Mohamed Dakki, Soumaya Hammada	Sultan Moulay Slimane University of Beni Mellal, Morocco University of Mohammed V, Morocco
A CRITICAL ANALYSIS OF THE ECOLOGICAL FOOTPRINT INDICATOR: STRENGTHS, WEAKNESSES, AND FUTURE DIRECTIONS	Vidya Padmakumar Murugan Shanthakumar	Bangalore University, Bangalore, India
EXACT CONTROLLABILITY OF WAVE EQUATIONS WITH INTERIOR DEGENERACY AND ONE-SIDED BOUNDARY CONTROL	Rayan Ikram ADDOUN	University M'hamed Bougara of Boumerdes, Algeria
USING A VITREOUS PHASE TO LIMIT THE CORROSION OF ORDINARY STEEL IN ACIDIC MEDIUM: AN ELECTROCHEMICAL STUDY	Hind. EL BOULIFI, Taoufiq. Guedira, Mohamed. Cherkaoui	Université Ibn Tofail, Morocco

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Session-2, Hall-5

02.12.2023

Moderator: Dr. Anna Kopiczko

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 12:30 – 14:30

Title	Author(s)	Affiliation
OSTEOSARCOPENIA IN WOMEN: THE EFFECT OF LIFESTYLE FACTORS AND EATING HABITS	Anna Kopiczko Joanna Cieplińska Joanna Piotrowska Natalia Bieńko	Józef Piłsudski University of Physical Education in Warsaw, Poland National Institute of Public Health NIH - National Research Institute, Poland
EARLY PHYSICAL ACTIVITY AND ITS EFFECTS ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN POST-SURGERY CARDIAC PATIENTS	Husham Abdulateef Salman AL-Jaddah Dr. ISMAEL CYLAN Dr. Raed Qadri Khudhair	Kirsehir Ahi Evran University
ANTI-REGENERATIVE POTENTIAL OF LAURUS NOBILIS AGAINST ARSENIC-INDUCED ACUTE LIVER TOXICITY IN WISTAR RATS	Rameen Ishfaq, Usman Haider, Wania Nasir, Najeeb Ullah Khan, Jawad Aslam, Muhammad Saad Tariq, Wafa Majeed, Shamshad UL Hassan, Bilal Aslam, Muhammad Naeem Faisal	University of Agriculture Faisalabad, Pakistan
THE PROMISE OF NANOTECHNOLOGY IN CANCER PREVENTION, DETECTION, AND TREATMENT	Pankaj Malhotra, Deepika Yadav, Taneesha Gupta	Sushant University, India
THE PROMISE OF NANOTECHNOLOGY IN CANCER PREVENTION, DETECTION, AND TREATMENT	Pankaj Malhotra, Deepika Yadav, Taneesha Gupta	Sushant University, India
INVESTIGATING THE OCCURRENCE OF MICROPLASTICS IN COMPOST PREPARED FROM MIXED MUNICIPAL WASTE; A CASE STUDY	Hooshyar Hossini, Tooraj Massahi, Maryam Sharafi, Sepideh Naseri, Monireh Noori	Kermanshah University of Medical Sciences, Kermanshah, Iran
COADSORPTION OF PHARMACEUTICAL POLLUTANTS ON ADSORBENTS PREPARED FROM ORGANIC CLAY	SALAA Fahima, Benabbou Asmae, Medjdoub Aicha, Khelifa Amine	Université de Mostaganem, 27000, Algérie
THE OBTAINING AND STUDY OF CARBIDE SIALON NANO COMPOSITE WITH ALUMINUM OXIDE NANO POWDER	Z. Kovziridze, N.Nijaradze, G. Tabatadze, T. Cheishvili, Ts. Danelia, N. Darakhvelidze	Technical University of Georgia, Georgia
Youssef Benfatah, Amine El Bhih, Mostafa Rachik, Abdessamad Tridane	Youssef Benfatah, Amine El Bhih, Mostafa Rachik, Abdessamad Tridane	

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Session-3, Hall-1

02.12.2023

Moderator: Assoc. Prof. Dr. Salih ÖZBAY

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 15:00 – 17:00

Title	Author(s)	Affiliation
NITROAROMATIC EXPLOSIVE DETECTION, OPTICAL ABSORPTION, LUMINESCENCE	Mustafa YÜKSEK Mehmet Fatih YASUL	İskenderun Teknik University, Türkiye
EXAMINING THE RELATIONSHIP BETWEEN FRINGE FREQUENCY AND OBJECT SIZES IN THE GATES INTERFEROMETER PROFILOMETRY	Ekrem YARTAŞI Ayşe Vildan SERT	Sivas Bilim ve Teknoloji University, Sivas, Türkiye
FLOW CHARACTERISTICS OVER BIO-INSPIRED CORRUGATED AIRFOIL AT LOW REYNOLDS NUMBER	Hacımuırat DEMİR Batuhan KAYA	Aksaray University, Aksaray, Turkey
GINI COEFFICIENT TIME SERIES FOR OECD COUNTRIES MODELING AND CLASSIFICATION	Doğukan KAHRAMAN Reşat KASAP	Gazi University, Ankara, Türkiye
MEETING THE ENERGY NEEDS OF A LOCATION IN BALIKESİR MANYAS DISTRICT WITH A GRID-INDEPENDENT HYBRID SYSTEM: ENERGY AND ECONOMIC ANALYSIS	Eren ADIGÜZEL Fikret YÜKSEL	Yalova University, Yalova, Türkiye
AN EXPERIMENTAL STUDY ON USING AMMONIUM HYDROXIDE IN A DIESEL ENGINE: ANALYSIS OF ENGINE PARAMETERS	Abdülvahap ÇAKMAK	Samsun University, Samsun, Turkey

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Session-3, Hall-2

02.12.2023

Moderator: Prof. Dr. Evren ALGIN YAPAR

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 15:00 – 17:00

Title	Author(s)	Affiliation
THE RELATIONSHIP BETWEEN ORGANIZATIONAL CULTURE AND ORGANIZATIONAL CREATIVITY ACCORDING TO PRIVATE SCHOOL TEACHERS: KABİL EXAMPLE	Mustafa Erdem Jamaluddin Ahmadi	Kırşehir Ahi Evran University, Türkiye
AN EXAMINATION OF THE KNOWLEDGE AND AWARENESS LEVELS OF HEALTH WORKERS IN TURKEY ABOUT AUGMENTATİVE AND ALTERNATIVE COMMUNICATION SYSTEMS	Beyza ERKAYA GÜLER Mümüne Merve PARLAK	Sivas Numune Hastanesi, Dil ve Konuşma Terapisi Birimi, Sivas, Türkiye Ankara Yıldırım Beyazıt University, Ankara, Türkiye
EVALUATION OF DIGITAL PILLS IN TERMS OF TREATMENT AND ETHICS	Merve Nur ÖZDEMİR Evren ALGIN YAPAR	Sivas Cumhuriyet University, Sivas, Türkiye.
DOSIMETRIC COMPARISON OF DIFFERENT TPS DATA IN PERIAMPULLAR CANCERS WITH RADIOTHERAPY INDICATION	Ahmet ŞAHİN	Necmettin Erbakan University, Konya, Türkiye
IMPACT OF NKILA ON THE EXPRESSION OF BCL-2 AND BAX GENES IN ATHEROSCLEROSIS PATHOGENESIS	Burcu BAYYURT Şeyda AKIN Nil ÖZBİLÜM ŞAHİN İzzet YELKOVAN	Sivas Cumhuriyet University, Sivas, Türkiye
EXAMINING THE EFFECTS OF CLIMATE DATA ON STREAM FLOW AND THE METHODS USED	Oğuzhan AYDOĞAN Sayıter YILDIZ Can Bülent KARAKUŞ	Sivas Cumhuriyet University, Sivas, Turkey
MANAGEMENT OF SUBSTANCES CREATING TASTE AND ODOR IN DRINKING WATER	Serdar DEMİRKAYA Sayıter YILDIZ	Sivas Cumhuriyet University, Sivas, Türkiye

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Session-3, Hall-3
02.12.2023
Moderator: MD. Shamshuddin
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 15:00 – 17:00

Title	Author(s)	Affiliation
EFFECT OF ELECTROMAGNETIC TREATMENT ON THE MECHANICAL PROPERTIES OF TURBINE BLADES	Engr.Imran khan Prof. Dr. Afzal Khan Abdullah	Univesity of Engineering and Technology Peshawar,Pakistan
OSCILLATION CRITERIA FOR SECOND-ORDER DIFFERENTIAL EQUATIONS NEUTRAL DELAY EMDEN-FOWLER EQUATIONS	Maryam Alkandari	Kuwait University, Kuwait
OPTIMIZING LEACHATE TREATMENT FROM MOHAMMEDIA-BENSLIMANE LANDFILL	Roukaya Bouyakhsass, Salah Souabi, Safaa Khattabi Rifi, Soukaina Bouaouda, Abdeslam Taleb, Abdelaziz Madinzi	University Hassan II, Mohammedia, Morocco.
TOXICITY OPTIMIZATION OF GREEN ZINC OXIDE QUANTUM DOTS IN ZEBRAFISH USING BOX-BEHNKEN DESIGN: A NOVEL APPROACH FOR SAFER NANOPARTICLE SYNTHESIS	R. Mary Nancy Flora, M. Chamundeeswari, S. Palani	Arunai Engineering College, India St. Joseph's College of Engineering, India
NUMERICAL SIMULATION AND COMMUNICATION FOR NONLINEAR THERMAL AND SOLUTAL SYSTEM OF UNSTEADY NON-NEWTONIAN WITH NATURAL CONVECTION	Muhammad Awais, T. Salahuddin	Mirpur University of Science and Technology, Pakistan
ENHANCING PRODUCTION EFFICIENCY THROUGH FACILITATION AND WORK-STUDY, USING REVISED NIOSH EQUATION, A CASE STUDY	Eng. Sohail khan	
ESSENTIAL SERVICE QUALITY IN JUNIOR NON-COMMISSIONED OFFICERS IN NAVY TOWN, LAGOS	Sani Audu Maiyaki, Bala Ishiyaku, Ibrahim Idris,Sakinatu Muhammad Yayajo	
MIXED CONVECTION OF POWER LAW NANOLIQUID TRANSPORT IN CUBIC CAVITY WITH WAVY BOTTOM WALL: ENTROPY PERFORMANCE	MD. Shamshuddin	SR University, India.
DESIGN STRUCTURE MATRIX MODELING FOR SUSTAINABLE PRODUCT DESIGN: A CASE OF THE THERMAL MANAGEMENT SYSTEM OF AN ELECTRIC VEHICLE	Sheharyar Mumtaz Tufail Habib	University of Engineering & Technogolgy, Peshawar, Pakistan
SUSTAINABLE MANUFACTURING BY APPLYING VALUE STREAM MAPPING IN A HOME APPLIANCE COMPANY	Tanveer Alam Tufail Habib	University of Engineering & Technogolgy, Peshawar, Pakistan

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Session-3, Hall-4
02.12.2023
Moderator: SALAA Fahima
Meeting ID: 862 1528 3413 / Passcode: 010101
Ankara Local Time: 15:00 – 17:00

Title	Author(s)	Affiliation
CHARACTERIZATION OF LACUNARY I-CONVERGENT SEQUENCES IN CREDIBILITY SPACE	Mousami Das, Binod Chandra Tripathy, Omer Kisi	Tripura University, India Bartin University, Turkey
THE RECEIVING AND STUDY OF CARBIDE SIALON NANO COMPOSITE WITH ALUMINA OXIDE NANO POWDER	Z. Kovziridze, N.Nijaradze, G. Tabatadze, T. Cheishvili, Ts. Danelia, N. Darakhvelidze	Technical University of Georgia
STABILITY ASSESSMENT FOR A FRACTIONAL MODEL DESCRIBING COCHINEAL TRANSMISSION	Mostafa RACHIK, Oumaima EL BAZ, Mohamed Ait Ichou, Hassan LAARABI	Hassan II University Casablanca, Morocco Laboratory RST-EMA ESEF Agadir, IBN ZOHR of Agadir, Morocco.
COMPARISM OF LAND SURFACE TEMPERATURE VARIATION IN DIFFERENT LOCATIONS IN IKOT EKPENE LOCAL GOVERNMENT AREA, AKWA IBOM STATE	Enobong Jeremiah Effiong dr. (Mrs) Imabong Mfon Essen mrs. Udeme Udofia Inyang Mr. Editi Etim Paul	Akwa Ibom State Polytechnic, Ikot Osurua, Akwa Ibom State, Nigeria
COMBINING MOLECULAR DYNAMICS SIMULATIONS (MD) WITH INTEGRAL EQUATION METHODS (IEMS): STRUCTURE OF A MIXED SYSTEM: MICROEMULSIONS (MES) COVERED WITH POLYMERS	Rachid Ahfir, Ayoub Arbia, Redouane Elhajjam, Lamiae Talha, Mohammed Filali	Sidi Mohamed Ben Abdellah University, Morocco
ADSORPTION OF AN ANIONIC MICROPOLLUTANT IN AQUEOUS SOLUTION BY ORGANIC CLAYS: EQUILIBRIUM MODELLING, KINETIC AND THERMODYNAMIC EXPLORATION	SALAA Fahima, Medjdoub Aicha, Benabbou Asmae, Khelifa Amine	Université de Mostaganem, 27000, Algérie
TRANSFORMATION OF CHITIN INTO CHITOSAN: CARACTERIZATION AND STUDY OF ADSORPTION	Aicha MEDJDOUB, Zahra MEKIBES ,Fahima SALAA, Asmae BENABBOU, Halima DELALI, Fadila NEMCHI, Mostefa BELHAKEM	Université Abdelhamid Ibn Badis – Mostaganem, Algéria,
DISSOLUTION MECHANISM OF CELLULOSE IN BENZYLTRIETHYLAMMONIUM/UREA DEEP EUTECTIC SOLVENT (DES): DFT-QUANTUM MODELING, MOLECULAR DYNAMICS AND EXPERIMENTAL INVESTIGATION	Omar Azougagh Hayat El HAMMI Loubna JABIR Mohammed nor Soumya ESSAYEH Soufian EL BARKANY	Mohamed First University Morocco Abdelmalek Essaadi University, Morocco
FLOW GENERATED BY SLOW STEADY ROTATION OF A SPHERE IN A THERMO-VISCOUS FLUID BOUNDED BY A POROUS MEDIUM	N.Pothanna , P. Aparna	VNR Vignana Jyothi Institute of Engineering and Technology, Hyderabad, 500090, Telangana State, India..

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Session-3, Hall-5

02.12.2023

Moderator: Dr. Belfarhi Leila

Meeting ID: 862 1528 3413 / Passcode: 010101

Ankara Local Time: 15:00 – 17:00

Title	Author(s)	Affiliation
PREDICTIVE MODELING OF POROSITY-INDUCED MECHANISMS AND STRUCTURAL DAMAGE IN ADVANCED HIGH-STRENGTH STEEL: AN IN-DEPTH ANALYSIS	Amir Slamene, Billel Hamza, Ilies Mrabet, Mohammed Yassine Mazari, Mohamed Mokhtari, Sadek Gouasmi, Habib Benzaama	National Polytechnic School of Oran Maurice Audin, Algeria University of Abou Beckr Belkaid (UABT), Algeria
ADVANCING FINITE ELEMENT MODELING OF FUNCTIONALLY GRADED MATERIALS: INTRODUCING UMM FOR ENHANCED MECHANICAL BEHAVIOR ANALYSIS AND DAMAGE PREDICTION	Amir Slamene, Billel Hamza, Ilies Mrabet, Mohammed Yassine Mazari, Mohamed Mokhtari, Sadek Gouasmi, Habib Benzaama	National Polytechnic School of Oran Maurice Audin, Algeria University of Abou Beckr Belkaid (UABT), Algeria
A STUDY ON THE EFFECT OF TANNIC ACID AND GALLIC ACID ON 3D-PRINTED POLYLACTIC ACID SURFACE PROPERTIES AGAINST OF P. AERUGINOSA AND S. AUREUS ADHESION	ERRABITI Badr Amal EL AABEDY Sara ER-RAHMANI Soumya EL ABED Saad IBNSOUDA KORAICHI	Laboratory of Microbial Biotechnology and Bioactive Molecules, Faculty of Science and Technology, Sidi Mohamed Ben Abdellah University, Fez, Morocco
IMPROVEMENT OF THE SONO-PHOTO-FENTON SYSTEM FOR THE REMEDIATION OF LANDFILL LEACHATE FROM THE CITY OF FEZ, MOROCCO: OPTIMIZATION OF PROCESS PARAMETERS USING RESPONSE SURFACE METHODOLOGY (RSM)	Hamza Bellouk, Karim Tanji, Fouad Khalil, Mostafa Nawdali, Hicham Zaitan	Sidi Mohamed Ben Abdellah University, Morocco Mohammed VI Polytechnic University, Morocco Ibnou Zohr University, Morocco
3-D MAGNETOHYDRODYNAMIC AA7072-AA7075/METHANOL HYBRID NANOFLUID FLOW ABOVE AN UNEVEN THICKNESS SURFACE WITH SLIP EFFECT	G.P. Ashwinkumar, C. Sulochana, N.Sandeep	Vijayanagara Sri Krishnadevaraya University, India. Gulbarga University, India. Central University of Karnataka, India
ENERGY EFFECT OF CALOTROPIS PROCERA PLANTS AGAINST ENERGY OF MERCURY CHLORIDE (HgCl 2)	Dr. Belfarhi Leila	CRAPC research center in Algiera
WEIBULL-GUMBEL TYPE II DISTRIBUTION PROPERTIES AND ITS APPLICATIONS TO BIOMEDICAL DATA SETS	OLAYEMI Michael Sunday, OLAJIDE Oluwamayowa Opeyimika, MICHAEL Sunday Michael	Kogi State Polytechnic, Lokoja, Nigeria.
ANALYSIS OF MATERNAL MORTERLITY CASES IN WUKARI	Okorie Charity Ebelechukwu, Nwaokolo Martin Afam, Nwaokolo Blessing	Federal University, Wukari AirForce Institute of Technology (AFIT), Kaduna State, Nigeria
THERMODYNAMIC MODELLING AND EXPERIMENTAL STUDY OF THE MIXED SYSTEM Al-Mg-Cl-H2O at T=353.15 K	Kawter Chakib; S. Mohammed Aboufaris El Alaoui; Mohamed EL Guendouzi	University of Hassan II - Casablanca, Morocco

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EFFECT OF ELECTROMAGNETIC TREATMENT ON THE MECHANICAL PROPERTIES OF TURBINE BLADES

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ABSTRACT

Materials experiencing stress can cause a range of problems. These problems include tolerance loss, fractures, and distortions. Ultimately, these issues can lead to failures while the material is being used. As a result, it is frequently required and occasionally obligatory to find ways to reduce these pressures. A method that is often used to reduce stress is heat treatment. The purpose of heat treatment is to get rid of the built-up internal stresses that have formed within the material. However, this traditional method of relieving stress also has the effect of changing certain characteristics of the material. These characteristics include hardness, friction, wear resistance, fatigue life, and corrosion. Electromagnetic stress relief can be considered as a viable solution instead of heat treatment. This method is not just effective in reducing stress, but it also leads to significant enhancements in material properties. Electromagnetic stress relief is known for being fast, affordable, and easy to use. Furthermore, it does not have any noticeable effect on the way the product looks. Pulsed Magnetic field is an effective method for improving mechanical properties without damaging the sample. Hardness, impact toughness, and residual stress testing give clear indication of the effect of magnetic field on the turbine blades. During the trials, the level of residual stress shifted significantly. M-T, there was about a 10% reduction in the typical amount of residual stress. The use of magnetic treatment results in notable improvements in the performance of materials.

Keywords: Internal Stress, Failure, Heat treatment, Electromagnetic

AHŞAP TRAVERSLERİN SERVİSE HAZIRLANMASI ÜZERİNE BİR ARAŞTIRMA

A STUDY ON THE PREPARATION OF WOODEN SLEEPERS FOR SERVICE

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ÖZET

Demiryolu taşımacılığı hem yük hem de yolcu taşımacılığı için küresel ölçekte tercih edilen bir ulaşım sektörü olup sürdürülebilir ve verimli bir sistem olarak öne çıkmaktadır. Gelişen teknoloji, demiryolu taşımacılığını daha cazip hale getirmektedir. Bu gelişmeler, demiryollarındaki hızları ve dingil yüklerini artırma fırsatları sunmaktadır. Ancak, maliyet ve çevresel faktörler nedeniyle bazı uygulamaların ve hat bileşenlerinin kullanımı azalmaktadır.

Traversler, demiryolu üstyapısının kritik bir bileşeni olup raylara destek sağlamak, raylara yataklık yapmak ve ekartmanı korumak gibi görevleri vardır. Aynı zamanda demiryolu taşıtlarının dingil yüklerini balasta dengelemekte kritik bir rol oynarlar. Dünya genelinde, demiryolu sistemlerinin çeşitliliği ve farklı çevresel şartlar, taşıt tipleri ve yükler gibi faktörlere dayalı olarak, traversler farklı malzemelerden üretilirler. Ahşap traversler, demiryolu üstyapısında genellikle hemzemin geçit, gar, makas ve köprülerde kullanılan önemli bir bileşen olmasına rağmen, günümüzde çeşitli doğal ve beşerî nedenlerle tercih edilmez hale gelmiştir. Demiryolu taşıtlarının artan yükleri ve hızları, ray ve travers boyutlarında büyümeyi beraberinde getirmiş ve bu büyümeyi desteklemek için teknolojik gelişmeler önemli bir rol oynamıştır. Ancak, ahşap traverslerin kullanım alanları sınırlanmış ve çatlamaları bu traverslerin ömürlerini kısaltmıştır.

Bu çalışma, ahşap traverslerin bakım ve servise hazırlık süreçlerini incelemekte ve bu uygulamaların ahşap traverslerin olumsuz etkilerini azaltmaya yardımcı olduğunu göstermektedir. Ahşap traverslerin bakım ve servis uygulamaları, demiryolu taşımacılığının konforunu ve güvenliğini artırarak demiryolu hizmet ömrünü uzatmaktadır.

Anahtar Kelimeler: Raylı Sistem, Demiryolu, Ahşap Travers, Travers Hataları

ABSTRACT

Rail transportation is a globally preferred mode of transportation for both freight and passenger services, recognized for its sustainability and efficiency. Advancements in technology have made railway transportation increasingly attractive, offering opportunities to enhance speeds and axle loads on railroads. However, due to cost and environmental factors, the utilization of certain practices and track components is decreasing.

Sleepers, as a critical component of railway infrastructure, serve various functions including providing support to the rails, acting as a foundation for the tracks, and preserving the ballast. Additionally, they play a pivotal role in balancing the axle loads of railway vehicles. Worldwide, sleepers are manufactured from various materials to accommodate the diversity of railway systems, environmental conditions, types of vehicles, and loads. Although wooden sleepers have traditionally been a significant component in railway infrastructure, particularly for applications such as level crossings, stations, turnouts, and bridges, they have become less preferred today due to a variety of natural and human-induced reasons. The increasing loads and speeds of railway vehicles have led to the growth of rail and sleeper dimensions, with technological advancements playing a crucial role in supporting this expansion. Nevertheless, the usage of wooden sleepers has been restricted, and cracking issues have shortened their lifespan.

This study examines the maintenance and preparation processes for wooden sleepers, demonstrating that these practices help mitigate the adverse effects on wooden sleepers. Maintenance and service applications for wooden sleepers contribute to extending the service life of railway systems, thereby enhancing the comfort and safety of railway transportation.

Keywords: Rail Systems, Railway, Wooden Sleepers, Sleeper Defects

PIEZOELECTRIC BASED ENERGY HARVESTING MODELING AND SIMULATION IN MATLAB/SIMULINK

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ABSTRACT

The piezoelectric effect is defined as the ability of some crystalline materials to generate electrical voltage under mechanical stress. The piezobender, modeled in the Matlab/SIMULINK environment, is based on this principle and when a mechanical force or moment is applied, it creates an electrical potential difference between the plus and minus poles, or vice versa, when an electrical signal is applied, it deforms the material by creating a bending moment. In this study, vibration-based energy harvesting study was carried out using piezoelectric material in Matlab/SIMULINK environment. Vibration-based energy harvesting modeling and simulation was carried out by applying the vibration signal produced in the simulation environment to the piezoelectric material in the simulation environment.

Keywords; energy harvesting, piezoelectric material, smart material, Matlab/Simulink

NUMERICAL ANALYSIS OF SANDWICH STRUCTURES CONTAINING DIFFERENT TYPES OF AUXETIC CORE STRUCTURES

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ABSTRACT

In this study, sandwich structures with different types of core internal structures were created. Sandwich beams were created by placing inner core structures at different heights placed between aluminum sheets. The CAD model of these beams was designed in the Solidworks environment and imported into the ANSYS environment. In the ANSYS environment, the inner core material is defined as PLA. Numerical analyzes were carried out by defining embedded free boundary conditions. Numerical analyzes were carried out as harmonic, modal, static and transient, respectively.

Keywords; sandwich structure, auxetic structure, Numerical analysis

YEMLERİNE METHOMYL VE *SİLYBUM MARİANUM* İLAVE EDİLMİŞ BROİLERDE BEYİN DOKUSU ÜZERİNE HİSTOPATOLOJİK İNCELEMELER*

PATHOLOGICAL EXAMINATIONS IN BROILER BRAINS TO WHICH METHOMYL AND SILYBUM MARIANUM ARE ADDED TO THEIR FEED

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ÖZET

Pestisitler, tarımda bitkileri büyüme sırasında bitki zararlılarından, yabani otlardan, bakteriyel veya mantar hastalıklarından, gıdaları depolama sırasında farelerden, böceklerden veya çeşitli biyolojik kirleticilerden korumak için uygulanmaktadır. Pestisitlerin gerekli olduğu ancak kullanılmadığı durumlarda ürünlerde %60'lara ulaşan kalite ve verim kayıpları olduğu bilinmektedir. Pestisitler bitki koruma yanında uygunsuz kullanıldıklarında insan ve hayvanlar için olumsuz etkilere neden olurlar. Methomyl bitkisel üretim alanları olan tarlalar başta olmak üzere birçok bitkide belirlenen koşullarda ticari kullanım için ruhsatlı bir bileşendir. 1968'den beri pestisit olarak kullanılmaktadır. *Silybum marianum*, *Asteraceae* ailesine ait otsu bir bitki olup tohumlarında çok fazla miktarda bulunan silymarin sebebiyle güçlü bir antioksidan etkiye sahiptir.
Çalışma methomyl'in beyin dokusunda yol açtığı histopatolojik bulgular ve Silymarin'in önleyici/ iyileştirici etkilerinin araştırılması amacıyla planlanmıştır. Bu amaçla; Kontrol (KONT), Methomyl (MET), Silymarin (SMT) ve Methomyl+Silymarin (MET+SMT) deney grupları oluşturulmuş ve 7, 14, 21 ve 28. günlerde her bir gruptan rastgele seçilen hayvanlarda beyin dokusunda histopatolojik inceleme yapılmıştır. Histopatolojik değerlendirme kriterleri olarak; hiperemi, kanama, gliozis, dejenerasyon, nekroz, perivasküler genişleme, perinöral ödem ile perivasküler hücre infiltrasyonu bulguları semikantatif olarak değerlendirilmiştir.
Beyin dokusundaki histopatolojik değişikliklerin skorları toplamlarına bakıldığında MET grubunda 7. günde hafif şiddette, 14. günde orta şiddette, 21. günde şiddetli ve 28. günde en şiddetli düzeyde hasarlı olduğu ($P < 0,01$) istatistiksel olarak bulunmuştur. KONT, SMT ve MET+SMT gruplarında günler arasında istatistiki olarak değişiklik ($P > 0,05$) bulunmamıştır.
Anahtar Kelimeler: Beyin, Histopatoloji, Methomyl, Silybum marianum.

ABSTRACT

Pesticides are applied in agriculture to protect plants from plant pests, weeds, bacterial or fungal diseases during growth, and to protect food from mice, insects, or various biological contaminants during storage. It is known that when pesticides are required but not used, quality and yield losses in products reach 60%. Pesticides, when used inappropriately in addition to plant protection, cause negative effects for humans and animals.
Methomyl is a licensed component for commercial use under specified conditions in many plants, especially in fields with plant production areas. It has been used as a pesticide since 1968.
Silybum marianum is a herbaceous plant belonging to the Asteraceae family and has a strong antioxidant effect due to the large amount of silymarin found in its seeds.

The study was planned to investigate the histopathological findings caused by methomyl in brain tissue and the preventive/curative effects of Silymarin. For this purpose, Control (CONT), Methomyl (MET), Silymarin (SMT) and Methomyl+Silymarin (MET+SMT) experimental groups were created and histopathological examination was performed on the brain tissue of randomly selected animals from each group on days 7, 14, 21 and 28. As histopathological evaluation criteria; Hyperemia, bleeding, gliosis, degeneration, necrosis, perivascular expansion, perineural edema and perivascular cell infiltration findings were evaluated semiquantitatively.

Considering the sum of the scores of histopathological changes in the brain tissue, it was statistically found that in the MET group, the damage was mild on the 7th day, moderately damaged on the 14th day, severe on the 21st day, and most severe on the 28th day ($P < 0.01$). There was no statistical change ($P > 0.05$) between days in the CONT, SMT and MET+SMT groups.

Keywords: Brain, Histopathology, Methomyl, Silybum marianum.

AN EXPERIMENTAL STUDY ON USING AMMONIUM HYDROXIDE IN A DIESEL ENGINE: ANALYSIS OF ENGINE PARAMETERS

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ABSTRACT

This study experimentally investigated the use of ammonium hydroxide as a partial replacement for conventional diesel fuel in a diesel engine. Ammonium hydroxide was added to the diesel-biodiesel blend by 5% (AH5) and 10% (AH10) volume, incorporating Span 80 and Tween 80 surfactants to increase fuel stability. It followed the engine experiments on a stationary diesel engine performed at different brake power outputs. Increasing the concentration of ammonium hydroxide from 5% to 10% disrupted the engine run, and hence, AH10 was eliminated from engine tests. However, AH5 offered a smooth engine operation with comparable engine performance and emissions. The engine thermal efficiency improved by 2.81%, and smoke opacity decreased by 52.92%, with the cost of increasing NOx emission by 3.46%, compared to B20 fuel. The findings of this study support that ammonium hydroxide can be utilized partially as a substitute fuel for fossil diesel. Still, further experimental and modelling studies should be performed to implement its usage on a large and commercial scale.

Keywords: Ammonium hydroxide, Diesel Engine, Hydrogen, Combustion, Emission.

INVESTIGATING PRODUCT QUALITY IN POTATO CRISPING VIA HEAT TRANSFER

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ABSTRACT

This study focuses on the product quality of heat transfer (HT) in potato crisp (PCR). Crisping is an essential activity in the food industry, and HT is critical for determining the quality of the end product. The many approaches available for assessing product quality via HT and their implications for the food industry are explained in this presentation. The food processing industry is constantly seeking methods to improve the quality and consistency of its products. Product quality in PCR can be difficult to maintain and can vary greatly depending on the precise conditions and procedures employed. It can acquire insights into process quality, consistency, and efficiency by studying the product quality using HT. Product quality is vital to customer satisfaction and the establishment of a solid reputation for quality and excellence. Improving product quality can minimize waste and optimize production operations. In an increasingly congested market, high-quality items can provide a competitive advantage. HT (conduction) between the potatoes and the hot surface of the frying oil transfer's heat. Hot oil currents swirl around potatoes, delivering heat to the entire surface (convection), resulting in a consistently crispy finish. The tremendous heat of the oil radiates into the surface of potatoes, creating a variety of physical and chemical changes that affect the quality of the finished product. Specific process variables and circumstances can be discovered and improved to improve the efficiency and reduce waste. These results have also opened new avenues for product development and innovation. These new innovative approaches can optimize the PCR process by employing HT as a guide, resulting in enhanced efficiency and reduced waste. In the future, some studies can be conducted by exploring new options for improving product quality, reducing waste, and innovating in the food industry.

Keywords: potato crisp (PCR); heat transfer (HT); food industry; product quality.

ENERGY AND EXERGY ANALYSIS OF PHOTOVOLTAIC THERMAL SYSTEM (PV/T) ADDED TO ROOFS OF RESIDENCES

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ÖZET

Çalışmada, müstakil konutların çatılarına sonradan eklenen, elektrik üretimi, kış döneminde ısıtma ve yaz döneminde ise soğutma amaçlı kullanılan hava akışlı fotovoltaik termal (PV/T) sistemin enerji ve ekserji analizleri yapılmıştır. Müstakil konutun Balıkesir ilinde olduğu kabul edilmiştir. Balıkesir ilin güneş radyasyonu, güneşlenme süresi, dış ortam sıcaklığı, rüzgâr yönü ve rüzgâr hızı dikkate alınmıştır. Konutların çatılarına sonradan monte edilen hava akışlı fotovoltaik sistemle hem konut için elektrik üretilirken hem de elde edilen havanın sıcaklığı ile kışın ısıtma amaçlı kullanılabilmektedir. Çalışmada, fotovoltaik termal (PV/T) sistemin elektrik enerjisi ve kış döneminde ısıtma enerjisi verimleri tespit edilmiştir. Ekserji analizi ile elde edilen bu enerjinin ne kadarının kullanılabileceğinin araştırılmasını yapılmıştır. Böylece yapılan ekserji analizleri ile fotovoltaik termal (PV/T) sistemin ekserji yani gerçek verimini anlamamızı sağlanacaktır. Fotovoltaik termal (PV/T) sistemde, güneş panellerinin çatıya hangi açıda monte edildikleri, yüzeyin absorptivity, transmittivity, emissivity, yutucu levha özelliği, yalıtım tabakası özelliği, güneş hücrelerinin özelliği, hava miktarı ve hava hızı, hava akının özelliği, panellerdeki diğer malzemelerin özellikleri, dış ortam güneş radyasyonu, güneşlenme süresi, dış ortam sıcaklığı, rüzgâr yönü ve rüzgâr hızı gibi meteorolojik özellikler önemli parametrelerdir. PV panellerinin üst kısmında ve iç kısmında meydana gelen iletim, taşınım ve radyasyon ile ısı transferi önemli diğer parametreleri incelenmiştir. Çalışmada tüm meteorolojik, parametreler ve özellikler dikkate alınarak incelemeler yapılmıştır. Enerji ve ekserji verimleri tespit edilmiştir.

Anahtar Kelimeler: Fotovoltaik termal (PV/T) sistemler, bina ısıtma, enerji ve ekserji verimi, konutların enerji ihtiyacı

ABSTRACT

In the study, energy and exergy analyses of the airflow photovoltaic thermal (PV/T) system, which was subsequently placed on the roofs of detached houses and used for both electricity generation and heating in the winter and cooling in the summer, were performed. It is accepted that the detached house is located in Balıkesir province. Solar radiation, sunshine duration, outdoor temperature, wind direction and wind speed of Balıkesir province were taken into consideration. With the air flow photovoltaic system installed later on the roofs of the houses, electricity is produced for the house and can be used for heating purposes in winter with the heat of the circulating air. In the study, the electrical energy and winter heating energy efficiency of the photovoltaic thermal (PV/T) system were determined. It was investigated how much of this energy obtained through exergy analysis could be used. Thus, the exergy analyzes will enable us to understand the exergy efficiency, which is the real efficiency of the photovoltaic thermal (PV/T) system. In the photovoltaic thermal (PV/T) system, angle of placement of solar panels on the roof, the absorptivity, transmissivity, emissivity of the surface, the absorber plate feature, the insulation layer feature, the feature of the solar cells, the amount of air and airspeed, the feature of the airflow, the features of other materials in the panels, Meteorological features such as outdoor solar radiation, sunshine duration, outdoor temperature, wind direction and wind speed are important parameters. Other parameters such as conduction, convection, radiation and heat transfer occurring in the upper and inner parts of the PV panels were also examined. In the study, examinations

were made taking into account all meteorological parameters and features. Energy and exergy efficiencies were determined.

Keywords: Photovoltaic thermal (PV/T) systems, building heating, energy and exergy efficiency, energy needs of residences

TİMOL' ÜN AYRAN STARTERLERİ GELİŞİMİ ÜZERİNE ETKİSİ

EFFECT OF TIMOL ON THE DEVELOPMENT OF AYRAN STARTERS

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ÖZET

Timol nane bitkisinin bileşiminde bulunan antimikrobiyel ve antioksidan etkili esansiyel yağ asididir. Nane sahip olduğu aramo bileşenleri sayesinde ayran vb. süt ürünlerinde yaygın olarak kullanılmaktadır. Bu çalışmada; nane aroma bileşeni olan timol' ün ayran oluşumu sırasında starter kültür gelişimi ve ayranın duyusal özelliklerine olan etkilerini araştırmak için yapılmıştır. Bu amaçla üç deneysel grup (K: kontrol, A: 0.5 mikrolitre timol ve B: 0.1 mikrolitre timol) oluşturulmuştur. Starter kültür ile belirlenen miktarda timol süte aynı anda ilave edilerek inkübasyonun 0., 2., 6. ve 12. saatlerinde mikrobiyolojik analiz (laktik asit bakteri sayısı) yapılmıştır. Ayrıca bu yöntem ile elde edilen deneysel ayranları duyusal analizleri (görünüş, kıvam, lezzet, aroma) yapılmıştır. Farklı miktarlarda ilave edilen timol, inkübasyon sırasında starter kültürlerin gelişimini engellemediği tespit edilmiştir. B grubuna ait örnekler ile K grubu örneleri aroma ve lezzet bakımından en yüksek puanları aldığı tespit edilmiştir. Sonuç olarak; nane aroma bileşenlerinde olan timol ayran üretilirken ilave edildiğinde strater kültür gelişimini inhibe etmediği ancak duyusal olarak ürünün beğenilebilirliğini artırdığı söylenebilir.

Anahtar kelimeler: Ayran, Timol, Starter Gelişimi, Duyusal

ABSTRACT

Thymol is an essential fatty acid with antimicrobial and antioxidant effects in the composition of the mint plant. Thanks to its aramo components, mint is widely used in dairy products such as buttermilk. In this study; It was conducted to investigate the effects of thymol, which is a mint flavor component, on starter culture development during buttermilk formation and the sensory properties of buttermilk. For this purpose, three experimental groups (K: control, A: 0.5 microliter thymol and B: 0.1 microliter thymol) were formed. The amount of thymol determined by starter culture was added to the milk at the same time and microbiological analysis (lactic acid bacteria count) was performed at the 0th, 2nd, 6th and 12th hours of incubation. In addition, sensory analysis (appearance, consistency, flavor, aroma) of experimental buttermilk obtained by this method was performed. It has been established that thymol, added in different quantities, does not inhibit the development of starter cultures during incubation. It was determined that the samples belonging to the B group and the K group samples received the highest scores in terms of aroma and taste. After all; It can be said that when thymol buttermilk, which is in mint flavor components, is added while it is produced, it does not inhibit the development of strater culture, but it increases the appreciation of the product sensorially.

Keywords: Buttermilk, Thymol, Starter Development, Sensory

ET VE ÜRÜNLERİNDE TERMAL OLMAYAN MUHAFAZA YÖNTEMLERİ: ATIMLI IŞIK UYGULAMALARI

NON-THERMAL PRESERVATION METHODS FOR MEAT AND PRODUCTS: PULSED LIGHT APPLICATIONS

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ÖZET

Termal olmayan teknikler, gıda kalitesinin (renk, tat, tat ve besin değeri) korunması ve kaliteyi bozan enzimler ile bozulmaya neden olan mikroorganizmaların inaktivasyonu üzerine etkilidir. Ayrıca enerji tüketimi açısından büyük avantajları vardır. Et protein bakımından zengin ancak kolay bozulabilen gıdalar arasında yer almaktadır. Termal olmayan teknolojiler arasında vurgulu elektrik alan, vurgulu ışık ve ultrases teknolojisi gibi teknolojiler bulunmaktadır. Bu teknolojiler tek başına kullanılabildiği gibi diğer teknolojilerle birlikte kombine olarak da kullanılabilmektedir. Atımlı ışık (PUV); ışık geniş bir spektrumda elektromanyetik dalga içeren ve yüksek UV ışık içeriğine sahip olan bir dekontaminasyon tekniğidir. PUV ışık lambası olarak inert gaz lambaları (özellikle ksenon) kullanılmaktadır. PUV ışık mekanizması, bir kapasitör içerisinde kısa sürelerde depolanan elektriğin, istenilen materyalin üzerine atımlar halinde bırakılmasını içerir. Bu serbest bırakma durumu (atım) saniyenin birkaç yüz milyonda biri sürede gerçekleşir. PUV ışık kısa işlem sürelerinde kullanıldığında ısıl olmayan bir muhafaza yöntemidir ve bir çok mikroorganizma türü üzerinde etkilidir. Pastörizasyon gibi ısıl işlemlerin gıda maddelerinde enzimatik olmayan esmerleşmeye, karbonhidrat ve vitamin parçalanmasına, renk, koku ve tat gibi duyusal parametrelerde değişikliklere yol açması sebebiyle PUV ışık uygulaması ısıl işlemlere alternatif bir yöntem olarak düşünülmektedir.

Anahtar kelimeler: Et, Et Ürünleri, Atımlı Işık Uygulamaları

ABSTRACT

Non-thermal techniques are effective on the preservation of food quality (color, taste, taste and nutritional value) and the inactivation of enzymes that degrade quality and microorganisms that cause spoilage. In addition, it has great advantages in terms of energy consumption. Meat is among the foods rich in protein but perishable. Non-thermal technologies include technologies such as hover electric field, hover light, and ultrasound technology. These technologies can be used alone or in combination with other technologies. Pulsed light (PUV); It is a decontamination technique that contains a wide spectrum of electromagnetic waves and has a high UV light content. Inert gas lamps (especially xenon) are used as PUV light lamps. The PUV light mechanism involves the release of electricity stored in a capacitor for short periods of time on the desired material in pulses. This release (pulse) takes place in a few hundred millionths of a second. When PUV light is used in short processing times, it is a non-thermal preservation method and is effective on many types of microorganisms. PUV light application is considered as an alternative method to heat treatments, as heat treatments such as pasteurization lead to non-enzymatic browning of foodstuffs, carbohydrate and vitamin breakdown, and changes in sensory parameters such as color, smell and taste.

Keywords: Meat, Meat Products, Pulsed Light Applications

INVESTIGATION OF SHORT-RANGE ORDER IN Fe-Cr ALLOY BY MOLECULAR DYNAMICS SIMULATION USING THE VORONOI POLYHEDRON METHOD

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ÖZET

Moleküler dinamik (MD) simülasyonları, faz morfolojisi, bağ kovalansı ve kafes boyutu gibi yapısal ve kimyasal faktörleri analiz etmek için kullanılabilir çünkü değişken koşullar altında atomik düzeyde yapısal gelişimin ve çeşitli fiziksel özelliklerin evrimini tahmin etmemize olanak tanımaktadır. Son yıllarda MD yöntemi, klasik MD simülasyonları ve diğer hesaplamalı yöntemler kullanılarak birçok alaşımın farklı fiziksel özelliklerini tahmin etmek için çeşitli araştırmacılar tarafından benimsenmiştir. Bunlar arasında demir-krom (Fe-Cr) alaşımları, iyi korozyon direncine sahip olan paslanmaz çelikler olarak bilinen mühendislik malzemeleri içinde önemli teknolojik rol oynamaları nedeniyle son zamanlarda oldukça ilgi çekmektedir. Sunulan çalışmada Fe-Cr alaşım sistemi, SCIGRESS çoklu platform moleküler tasarım, modelleme ve dinamik yazılımı aracılığıyla moleküler dinamik (MD) simülasyon yöntemi kullanılarak modellenmiştir. Model sistem, Cr'un düşük yüzdeli bölgesindeki kristal kafes yapısına uygun olarak oluşturulmuş ve atomlar arası potansiyel olarak Grujicic-Zhou (GZ) tipi gömülü atom yöntemi (EAM) tercih edilmiştir. Fe-Cr alaşımının ısıtma işlemi sırasındaki kısa menzilli düzeni (SRO), Voronoi yapısal analiz yöntemi ile karakterize edilmiştir. 800-1200K sıcaklık aralığında cisim merkzli kübik (bcc) kristal yapılı çokyüzlülerin (polyhedron) sayısı azalırken yüzey merkezli kübic (fcc) kristal yapılı çokyüzlülerin (polyhedron) varlığı baskın hale gelmektedir.

Anahtar Kelimeler: Fe-Cr alaşımları, Voronoi çokyüzlü yöntemi, faz dönüşümü, modelleme, moleküler dinamik.

ABSTRACT

Molecular dynamics (MD) simulations can be used to analyse the structural and chemical factors such as phase morphology, bond covalence and lattice size because it allows us to predict the evolution of structural development and a variety of physical properties at the atomic level under variable conditions. In recent years, MD method have been adopted by various researchers to predict different physical properties of many alloys by using classical MD simulations and other computational methods. Among them, the iron–chromium (Fe-Cr) alloys have attracted interest because they play significantly technological role within engineering materials known as stainless steels which has good corrosion resistance. In the presented study, Fe-Cr alloy system was modelled by using molecular dynamics (MD) simulation method via SCIGRESS multiplatform molecular design, modeling and dynamics software. Model system was built in accordance with the crystal lattice structure in the low percentage region of Cr and the interatomic potential was preferred to the Grujicic-Zhou (GZ) type embedded atom method (EAM). The short-range order (SRO) during the heating process Fe-Cr alloy were characterized by Voronoi structural analysis method. while the number of the body centered cubic (bcc)-type polyhedrons decreased, the existence of the face centered cubic (fcc)-type polyhedrons become the dominant in the temperature range of 800-1200K.

Keywords: Fe-Cr alloys, Voronoi polyhedron method, phase transformation, modeling, molecular dynamics.

SPEKTROSKOPİK VERİ VE MAKİNE ÖĞRENMESİ MODELİNİN ENTEGRASYONU İLE SÜT ÜRÜNLERİNİN HIZLI SINIFLANDIRILMASI

INTEGRATION OF SPECTROSCOPIC DATA AND MACHINE LEARNING MODELS FOR RAPID CLASSIFICATION OF DAIRY PRODUCTS

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ÖZET

Günümüzde tüketiciler giderek daha bilinçli ve seçici hale geliyor; yiyeceklerinin kaynakları ve işlenme yöntemleri hakkında daha fazla bilgi edinmek istiyorlar. Bu eğilim, doğal ve işlenmemiş gıdalara olan talebi artırmış, böylece çiğ süt tüketimi gibi bazı geleneksel tüketim şekillerini popüler hale getirmiştir. Çiğ süt, özellikle "doğal tüketim" ve "yerel satın alma" eğilimleri bağlamında tercih edilen bir içecek olarak ön plana çıkmaktadır. Bu durum, tüketiciler arasında işleme ve uzun süreli muhafaza yöntemlerinin sütün besinsel değerini düşürdüğü ve sağlığa zararlı etkileri olabileceği algısına dayanmaktadır. Bu algı, yerel olarak üretilen ve işlenmemiş sütün besin kalitesinin ve lezzetinin, endüstriyel işleme yöntemlerine tabi tutulan sütten üstün olduğu inancıyla pekiştirilmiştir. Bu çalışma, Visible Near-Infrared (VIS-NIR) spektroskopisi ve makine öğrenmesi tekniklerini kullanarak çiğ ve işlenmiş süt örneklerinin sınıflandırılmasını araştırmaktadır. Süt tüketiminin artmasıyla birlikte, özellikle çiğ sütün tüketimi güvenlik ve besin değeri açısından dikkatle değerlendirilmelidir. Araştırmada, çiğ ve işlenmiş süt örnekleri arasındaki kimyasal ve mikrobiyolojik farklılıkları belirleyebilmek için spektral ölçümler yapılmıştır. Makine öğrenmesi algoritmaları, özellikle Lojistik Regresyon modeli, süt örneklerini büyük bir doğrulukla sınıflandırmak için kullanılmıştır. Model, test setinde %100 doğruluk sağlayarak, VIS-NIR spektroskopisinin süt işleme durumunu belirlemede güvenilir bir araç olduğunu kanıtlamıştır. Bu bulgular, gıda güvenliği ve kalite kontrol uygulamalarında spektral imza ve makine öğrenmesi tekniklerinin kullanımını desteklemekte, aynı zamanda süt ürünlerinin hızlı ve etkin bir şekilde sınıflandırılmasına olanak tanımaktadır. Araştırma, süt endüstrisinde kalite ve güvenlik standartlarının iyileştirilmesine katkı sağlamakla kalmayıp, gıda izlenebilirliği ve tüketici sağlığının korunması yönünde önemli adımlar atmıştır. Bu çalışmanın sonuçları, süt sınıflandırma tekniklerinin geliştirilmesi ve uygulanması konusunda yeni yollar sunmakta ve bu teknolojilerin potansiyelini vurgulamaktadır.

Anahtar Kelimeler: Visible Near-Infrared Spektroskopisi (VIS-NIR),Makine Öğrenmesi,Lojistik Regresyon,Süt Ürünleri Sınıflandırması,Çiğ Süt Tüketimi

ABSTRACT

In today's world, consumers are becoming increasingly aware and selective; they seek more information about the sources and processing methods of their food. This trend has boosted the demand for natural and unprocessed foods, thus making traditional consumption forms like raw milk consumption popular. Raw milk, especially within the context of "natural consumption" and "local purchasing" trends, has emerged as a preferred beverage. This preference is rooted in the perception among consumers that processing and long-term preservation methods may reduce the nutritional value of milk and potentially have harmful health effects. This belief is reinforced by the notion that locally produced and unprocessed milk's nutritional quality and flavor are superior to that of milk subjected to industrial processing

methods. This study investigates the classification of raw and processed milk samples using Visible Near-Infrared (VIS-NIR) spectroscopy and machine learning techniques. With the increase in milk consumption, particularly the consumption of raw milk, its safety and nutritional value must be carefully evaluated. The research has conducted spectral measurements to identify the chemical and microbiological differences between raw and processed milk samples. Machine learning algorithms, particularly the Logistic Regression model, have been used to classify milk samples with high accuracy. The model has proven the reliability of VIS-NIR spectroscopy in determining the processing status of milk by achieving 100% accuracy in the test set. These findings support the use of spectral signatures and machine learning techniques in food safety and quality control applications, and also facilitate the rapid and effective classification of dairy products. The research contributes to improving quality and safety standards in the dairy industry and takes significant steps toward food traceability and consumer health protection. The results of this study offer new avenues for the development and application of milk classification techniques and highlight the potential of these technologies.

Keywords: Visible Near-Infrared Spectroscopy (VIS-NIR),Machine Learning,Logistic Regression, Dairy Product Classification, Raw Milk Consumption.

ZAYIF ZEMİNLERİN STABİLİZASYONUNDA LEONARDİT KULLANIM POTANSİYELİNİN ARAŞTIRILMASI

INVESTIGATION OF LEONARDITE USAGE POTENTIAL IN STABILIZATION OF WEAK SOILS

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ÖZET

Leonardit, tarım topraklarındaki zararlı maddelerin yok edilmesine katkıda bulunan ve tarım sektöründe yaygın olarak kullanılan, çevre dostu ve sürdürülebilir bir tarım katkı maddesidir. Leonardit, turba ve linyit arasında dönüşen, organik madde açısından oldukça zengin, nemli bir organik malzemedir. Kökeni milyonlarca yıllık bitki materyallerinden oluşan ve çoğunlukla açık ocak linyit (kömür) madenlerinin üst katmanlarında bulunmaktadır. Yani Leonardit henüz kömür aşamasına ulaşmamış organik bir üründür. Karbonizasyon işleminde daha yüksek oksidasyon içeriği, daha yüksek hümik asit derecesi ve daha fazla karboksil grubu içermesi nedeniyle linyitten farklılık göstermektedir. Diğer organik hümik asit kaynaklarının aksine Leonarditler moleküler yapıları nedeniyle oldukça biyoaktif bir yapıya sahiptir. Ayrıca Leonardit'i gübre olarak tanımlamak da doğru değildir. Leonardit, tarım toprakları için toprak düzenleyici, biyokatalizör ve biyostimülan görevi görmektedir. Bu özelliği sayesinde diğer organik ürünlere göre özellikle bitki gelişimini ve toprak verimliliğini çok fazla desteklemektedir. Literatürde tarımsal özelliği ile ön plana çıkan bu çevre dostu malzemenin zemin iyileştirme potansiyeli ve sorunlu zeminlerin istenmeyen davranışlarını kontrol edebilme yeteneği, mühendislik özellikleri vurgulanarak incelenmemiştir. Literatürdeki bu malzemeye ilişkin boşluğa dayanarak, mevcut boşlukları doldurmak ve leonarditle stabilize edilmiş zeminlerin dayanıklılığının kapsamlı bir şekilde anlaşılmasını sağlamak amacıyla bu çalışma yapılmıştır. Çalışma kapsamında zemin stabilizasyonunda kullanılacak leonardit kürlenmeyes bırakılarak serbest basınç testi (UCS) ve üç eksenli basınç testleri ile araştırılmış ve dikkat çekici sonuçlar elde edilmiştir.

Anahtar Kelimeler: Leonardit, Marn, Zemin İyileştirme

ABSTRACT

Leonardite is an environmentally friendly and sustainable agricultural additive that contributes to the elimination of harmful substances in agricultural soils and is widely used in the agricultural sector. Leonardite is a moist organic material that is very rich in organic matter and transformed between peat

and lignite. It originates from plant materials that are millions of years old and is mostly found in the upper layers of open-pit lignite (coal) mines. In other words, Leonardite is an organic product that has not yet reached the coal stage. It differs from lignite due to its higher oxidation content in the carbonization process, higher humic acid degree and more carboxyl groups. Unlike other organic humic acid sources, Leonardites have a highly bioactive structure due to their molecular structure. Additionally, it is not correct to describe Leonardite as fertilizer. Leonardite serves as a soil conditioner, biocatalyst and biostimulant for agricultural soils. Thanks to this feature, it supports plant growth and soil fertility more than other organic products. The soil improvement potential of this environmentally friendly material, which stands out with its agricultural properties in the literature, and its ability to control the undesirable behavior of problematic soils have not been examined by emphasizing its engineering properties.Based on the gap in the literature regarding this material, this study was conducted to fill the existing gaps and provide a comprehensive understanding of the durability of leonardite stabilized soils. Within the scope of the study, leonardite, which will be used in soil stabilization, was left to cure and investigated with unconfined pressure test (UCS) and triaxial pressure tests, and remarkable results were obtained.

Keywords*:* Leonardite, Marl, Soil Improvement

GERİ DÖNÜŞÜM ATIĞI UÇUCU KÜLÜNÜN ZEMİN İYİLEŞTİRMESİNDE KULLANILABİLİRLİĞİNİN DENEYSEL OLARAK DEĞERLENDİRİLMESİ

EXPERIMENTAL EVALUATION OF THE USABILITY OF RECYCLING WASTE FLY ASH IN SOIL IMPROVEMENT

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ÖZET

Bu çalışmada, belediyelerin evsel atıkları enerji üretimi amacıyla yakılması sonucu ortaya çıkan uçucu külün zemin dayanım ve şişme parametrelerine etkisi araştırılmıştır. Bu amaçla Tokat Karben A.Ş'den elde edilen bentonit ile Karabük ilinin Safranbolu ilçesinden elde edilen dere kumu 10 nolu elek ile elendikten sonra, bentonit/dere kumu oranı 1 olacak şekilde ham (raferans) numune hazırlanmıştır. Bu karışıma Malatya Büyükşehir Belediyesi ve MİMSAN Grup ortaklığında kurulan atık geri dönüşüm tesisinden elde edilen evsel atıkların yakılması sonucu ortaya çıkan uçucu külü 10 nolu elekten geçirdikten sonra ham numunenin ağırlığınca %2,5, %5, %10, %15 ve %20 eklenip her bir karışım için kompaksiyon deneyi yapıldıktan sonra optimum su içerikleri belirlenmiştir. Optimum su içeriğinde hazırlanan numuneler 1, 7, 14, 21 ve 28 günlük küre bırakılmış; kür sonucunda tek eksenli basınç deneyi, üç eksenli basınç deneyi ve şişme basıncı deneyleri uygulanmıştır. Deneyler sonucunda içsel sürtünme açısı, kohezyon ve şişme basıncı değerleri bulunmuştur. Bu deneylere ek olarak karışımların 7. ve 28. Kür gününde X ışını kırınımı (XRD) deneyi yapılarak numunelerin iç yapısı incelenmiştir. Sonuç olarak, kül katkılı zemin numunenin referans numuneye göre dayanım açısından arttığı, şişme potansiyeli açısından azaldığı gözlemlenmiştir. Bu sonuçlar çerçevesinden bakıldığında geri dönüşüm atık uçucu külünün zemin parametrelerini iyileştirmede alternatif bir ürün olduğu ortaya konulmuştur. Ayrıca uçucu külün zemin iyileştirmede kullanılması doğaya bırakılan evsel atığın bertarafı için doğa dostu bir yöntem olduğu literatüre girmiştir.

Anahtar Sözcükler: Zemin iyileştirme, zemin dayanımı, atık kül, geri dönüşüm, bentonit, evsel atık

ABSTRACT

In this study, the effect of fly ash, which is produced by burning municipal wastes for energy production, on soil strength and swelling parameters was investigated. For this purpose, after the bentonite obtained from Tokat Karben A.Ş. and the stream sand obtained from Safranbolu district of Karabük province were sieved with sieve no. 10, a raw (reference) sample was prepared with a bentonite/stream sand ratio of 1. To this mixture, 2.5%, 5%, 10%, 15% and 20% by weight of the raw sample was added to this mixture, after passing the fly ash resulting from the burning of domestic waste obtained from the waste recycling facility established in partnership with Malatya Metropolitan Municipality and MİMSAN Group, through sieve no. 10. Optimum water contents were determined after a compaction test was performed for a mixture. Samples prepared at optimum water content were left to cure for 1, 7, 14, 21 and 28 days; As a result of the cure, uniaxial pressure test, triaxial pressure test and swelling pressure tests were applied. As a result of the experiments, internal friction angle, cohesion and swelling pressure values were found. In addition to these experiments, the internal structure of the samples was examined by X-ray diffraction (XRD) tests on the 7th and 28th curing days of the mixtures. As a result, it was observed that the ash-mixed soil sample increased in terms of strength and decreased in terms of swelling potential compared to the reference sample. When considered within the framework of these results, it

has been revealed that recycling waste fly ash is an alternative product to improve soil parameters. In addition, the use of fly ash in soil improvement has entered the literature as an environmentally friendly method for the disposal of domestic waste released into the nature.

Keywords: Soil improvement, soil strength, waste ash, recycling, bentonite, domestic waste

KARADENİZ VE EGE DENİZLERİ'NDEN ÖRNEKLENEN *SPİCARA SMARİS* (LİNNAEUS, 1758) TÜRÜNÜN OTOLİT KÜTLE ASİMETRİSİNDEKİ ALANSAL VARYASYONLAR

SPATIAL VARIATIONS IN OTOLITH MASS ASYMMETRY OF *SPICARA SMARIS* (LINNAEUS, 1758) SAMPLED FROM THE BLACKSEA AND AEGEAN SEA

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ÖZET

Bu çalışmada, Karadeniz ve Ege Denizleri'nden örneklenen ekonomik değeri yüksek bir balık olan izmarit, *Spicara smaris* türünün otolit kütle asimetrisinin belirlenmesi ve lokasyonlar arasındaki alansal varyasyonlarının karşılaştırılması amaçlanmıştır. Örnekler Karadeniz ve Ege Denizleri'nde ticari avcılık gerçekleştiren balıkçılarda temin edilmiştir. Karadeniz'den 49 birey, Ege Denizinden ise 56 birey örneklenmiştir. Örneklerin total boyları ölçülmüş (±0,1 cm) ve sagittal otolitleri sağ-sol ayrımları yapılarak çiftler halinde çıkarılmıştır. Her bir sagittal otolit hassas terazi yardımı ile ±0,0001g hassasiyetle tartılmıştır. Elde edilen örneklerin ortalama boy ve ağırlık değerleri (ort±se) Karadeniz ve Ege Denizi için sırası ile 12,50±0,17 cm, 19,11±0.903 g ve 15,47±0,13 cm, 34,82±0,86 g olarak hesaplanmıştır. Otolit kütle asimetrisi (X) ve mutlak kütle asimetrisi ($|X|$) de lokalitelere göre ayrı ayrı belirlenmiştir. Gerçekleştirilen analizler sonucunda ortalama otolit kütle asimetrisi (X±se) değerleri Karadeniz ve Ege Denizi için sırasıyla 0,00058±0,0013 ve -0,00211±0,0009, mutlak kütle asimetrisi ($|X|$ ±se) ise 0,00701±0,0008 ve 0,00553±0,0007 olarak hesaplanmıştır. Bu çalışmanın sonuçlarına göre, otolit kütle asimetrisinin lokaliteler arasında anlamlı farklılık gösterirken (Mann-Whitney U Testi, $P<0,05$), mutlak otolit kütle asimetrisinin fark göstermediği saptanmıştır (Mann-Whitney U Testi, $P>0,05$). Ayrıca, X değerinin Karadeniz için balık boyu ile ilişkili olduğu ($P<0,05$), ve Ege Deniz için ise balık boyu ile ilişkili olmadığı ($P>0,05$) belirlenmiştir. $|X|$ değerinin ise Karadeniz ve Ege Denizler için balık boyu ile ilişkili olmadığı saptanmıştır ($P>0,05$). Otolit kütle asimetrisi; ağır metaller, pestisitler, stres faktörleri, suyun fiziko-kimyasal özellikler gibi balıkların yaşadığı ortamla ilgili değişiklikler ve kirlilik faktörleri hakkında bilgi verebilir. Bu çalışma, Karadeniz ve Ege Denizleri'nden örneklenen izmarit balığının otolit kütle asimetrisi ve mutlak otolit kütle asimetrisinin incelendiği ve balık boyu ile ilişkilerinin değerlendirildiği ilk çalışmadır.

Anahtar Kelimeler: *Spicara smaris*, Karadeniz, Ege Denizi, otolit kütle asimetrisi, mutlak kütle asimetrisi.

ABSTRACT

In this study, it was aimed to determine the otolith mass asymmetry and compare the spatial variations between locations of the picarel, *Spicara smaris*, a commercially important fish species, sampled from the Black and Aegean Seas. Samples were obtained from commercial fishermen in the Black and Aegean Seas. A total of 49 individuals were sampled from the Black Sea and 56 individuals from the Aegean Sea. The total lengths of the samples were measured (±0.1 cm) and, left and right sagittal otolith pairs were removed, separetely. Each sagittal otolith pairs were weighed by a precision balance with an accuracy of ±0.0001g. The mean length and weight (mean±se) of the samples are calculated as 12.50±0.17 cm, 19.11±0.903 g and 15.47±0.13 cm, 34.82±0.86 g for the Black Sea and the Aegean Sea, respectively. Otolith mass asymmetry (X) and absolute mass asymmetry ($|X|$) were also determined separately according to localities. As a result of the analyses, the mean otolith mass asymmetry (X±se) is calculated as 0.00058±0.0013 and -0.00211±0.0009 and the absolute mass asymmetry ($|X|$ ±se) is 0.00701 and 0.00553±0.0007 for the Black Sea and the Aegean Sea, respectively. According to the results of this study, when there were no significant differences between localities for absolute otolith

mass asymmetry (P>0.05), there were significant differences for otolith mass asymmetry (P<0.05). In addition, it was determined that X is related to fish length for Black Sea (P<0.05) but not for Eagean Sea (P>0.05). Also, it was determined that the $|X|$ value was not related to fish length for the Black Sea and Aegean Seas (P>0.05). Otolith mass asymmetry can provide information about changes and pollution factors in the environment where fish live, such as heavy metals, pesticides, stress factors, physico-chemical properties of water. This is the first study to examine the otolith mass asymmetry and absolute otolith mass asymmetry and to evaluate their relationship with fish length of picarel sampled from the Black and Aegean Seas.

Keywords: *Spicara smaris*, Black Sea, Aegean Sea, otolith mass asymmetry, absolute mass asymmetry

AKDENİZ (TÜRKİYE)'DEN ÖRNEKLENEN *Spicara flexuosum* TÜRÜNÜN SAKKULAR OTOLİT KÜTLE ASİMETRİSİNİN İNCELENMESİ

INVESTIGATION OF SACCULAR OTOLITH MASS ASYMMETRY IN *Spicara flexuosum* COLLECTED FROM MEDITERRANEAN SEA (TURKIYE)

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ÖZET

Otolit kütle asimetrisi, balıklarda çevresel stresin sebep olduğu bazı durumların araştırılmasında kullanılmaktadır ve yüksek otolit kütlesi asimetrisi balıkların hayat döngülerinde olumsuz etkilere sebep olabilmektedir. Bu araştırmada, Akdeniz'in Türkiye kıyılarında yayılış gösteren *Spicara flexuosum* Rafinesque, 1810 türünün populasyon geneli, dişi ve erkek bireylere ait sagittal otolitlerin, otolit kütle (x) ve mutlak kütle (|x|) asimetrisinin hesaplanması ve bu değerlerin eşeyler arasında karşılaştırılması amaçlanmıştır. *Spicara flexuosum* bireylerinin (40 dişi, 39 erkek) total boyları ölçülmüş (±0.1 cm) sakkular otolitleri çiftler halinde çıkarılmıştır. Sağ ve sol otolitlerin ağırlıkları hassas terazi ile tartılmıştır (±0.0001 g). Otolit kütle asimetrisi ve bu verilerin mutlak değeri alınarak otolit mutlak kütle asimetrisi populasyon geneli, dişi ve erkek bireyler için ayrı ayrı belirlenmiştir. Tüm verilerin tanımlayıcı istatistikleri hesaplanmıştır. Otolit kütle/mutlak kütle asimetrisi ile total boy arasındaki ilişkiler, linear ilişki denklemi kullanılarak ortaya çıkarılmıştır. Populasyon genelinde total boylar 11,3-18,9 cm (ort, ss; 15,7±1,41) arasında değişmiştir. Otolit ağırlıkları ise populasyon genelinde 0,0114-0,0272 g arasındadır. Dişi ve erkek bireylerin otolitleri karşılaştırıldığında; sağ otolitler de (P=0,607), sol otolitler de (P=0,450) ağırlık bakımından eşeyler arasında farklılık göstermemiştir (Mann-Whitney U testi). Otolit kütle asimetrisi balıklarda -0,2<x<+0,2 arasında değişmektedir ve *Spicara flexuosum* türünün sagittal otolit kütle asimetrisi ($\bar{x}$ ±ss) populasyon geneli, dişi ve erkek bireyler için sırası ile -0,00815±0,02154, -0,01299±0,02109, -0,00319±0,021123'tür. Otolit mutlak kütle asimetrisi (|x|±ss) ise populasyon genelinde 0,01894±0,01295, dişi bireylerde 0,02028±0,01399, erkek bireylerde 0,01757±0,01181'dir. Otolit kütle/mutlak kütle asimetrisinin balık boyu ile ilişkisi olmadığı belirlenmiştir (P>0,05). Otolit kütle asimetrisi değerleri, türün dişi ve erkek bireyleri arasında istatistiki açıdan farklılık göstermemiştir (independent t testi, P= 0.052). Aynı şekilde otolit mutlak kütle asimetrisi dişi ve erkek bireyler arasında benzerdir (Mann Whitney U testi, P=0,583). Otolit kütle asimetrisinin belirlenmesi balıklardaki stres faktörlerinin, çevresel şartların, balık gelişimi üzerindeki etkilerinin ortaya çıkarılmasında etkilidir. *Spicara flexuosum* türünün otolit kütle asimetrisinin daha önceden çalışılmamış olması nedeniyle bu araştırma bu konudaki eksikliğin giderilmesine katkı sağlayacaktır.

Anahtar Kelimeler: *Spicara flexuosum*, Sagitta, Otolit Kütle Asimetrisi, Akdeniz, Türkiye

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ABSTRACT

Otolith mass asymmetry is used to investigate some conditions caused by environmental stress in fish, and high otolith mass asymmetry can cause negative effects on the life cycle of fish. In this study, it was aimed to calculate the otolith mass (x) and absolute mass (|x|) asymmetry of the sagittal otoliths of general, female and male individuals of the population of the species *Spicara flexuosum* Rafinesque, 1810, which is distributed on the Turkish coast of the Mediterranean, and to compare these values between the sexes. Total lengths of *Spicara flexuosum* individuals (40 females, 39 males) were measured (±0.1 cm) and their saccular otoliths were removed in pairs. The weights of the right and left otoliths

were weighed with a precision balance (±0.0001 g). By taking the otolith mass asymmetry and the absolute value of these data, the otolith absolute mass asymmetry was determined separately for general population, female and male individuals. Descriptive statistics of all data were calculated. The relationships between otolith mass/absolute mass asymmetry and total length were investigated using the linear relationship equation. Total length in general population varied between 11.3-18.9 cm (mean, sd; 15.7±1.41). Otolith weights are between 0.0114-0.0272 g in the general population. When the otoliths of male and female individuals are compared; neither the right otoliths (P=0.607) nor the left otoliths (P=0.450) showed any difference in weight between the sexes (Mann-Whitney U test). Otolith mass asymmetry varies between -0.2<x<+0.2 in fish, and the sagittal otolith mass asymmetry ($\bar{x}$ ±ss) of the *Spicara flexuosum* species is -0.00815±0.02154, -0.01299±0.02109, -0.00319±0.021123 for the general population, female and male individuals, respectively. Otolith absolute mass asymmetry (|x|±ss) is 0.01894±0.01295 in the general population, 0.02028±0.01399 in female individuals, and 0.01757±0.01181 in male individuals. It was determined that otolith mass/absolute mass asymmetry had no relationship with fish length (P>0.05). Otolith mass asymmetry values did not differ statistically between male and female individuals of the species (independent t test, P = 0.052). Likewise, otolith absolute mass asymmetry is similar between male and female individuals (Mann Whitney U test, P = 0.583). Determination of otolith mass asymmetry is effective in revealing the effects of stress factors and environmental conditions on fish development. Since the otolith mass asymmetry of the *Spicara flexuosum* species has not been studied before, this research will contribute to filling this gap.

Keywords: *Spicara flexuosum*, Sagitta, Otolith Mass Asymmetry, Mediterranean, Türkiye.

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BÜYÜK EK BOYUTLARIN MÜON ÇARPIŞTIRICISINDA İNCELENMESİ

INVESTIGATION OF LARGE EXTRA DIMENSIONS IN THE MUON COLLIDER

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ÖZET

Hiyerarşi problemi, elektrozayıf ölçeğinin yaklaşık birkaç yüz GeV iken Planck ölçeğinin yaklaşık 10^{19} GeV mertebesinde olmasıdır. Hiyerarşi probleminde bir çözüm olarak Arkani-Hamed, Dimopoulos ve Dvali mm ölçeğinde henüz keşfedilememiş ek boyutların var olabileceğini önermişlerdir. Model ADD modeli veya büyük ekstra boyut modeli olarak bilinir. Aslında hiyerarşi problemini ADD modeli tam olarak çözememekle birlikte, daha yeni, ılımlı bir hiyerarşi problemine yol açmaktadır. Yeni hiyerarji problemi kompaktlık yarıçapı ile elektrozayıf ölçek arasındaki farklılıktır. Bir yerde hiyerarşi problemi, başka fakat daha az keskin bir hiyerarşi problemiyle yer değiştirmektedir. Bu modelin ana düşüncesi şuna dayanır: Doğada yegâne temel ölçek elektrozayıf ölçeğidir, dolayısıyla hiyerarşi problemi Planck ölçeğinin indirgenmesiyle çözülebilir. Kütleçekim kuvvetinin diğer kuvvetlere göre zayıflığı veya Planck ölçeğinin çok büyük olmasının nedeni sadece gravitonun hareket edebildiği ek boyutların varlığıdır. Modelde tüm Standart Model dâhilinde olan parçacıklar, sicim teorisinde "duvar" veya "3-zar (3-brane)" olarak bilinen 4-boyutlu uzay-zamanda kısıtlanmışlardır. Graviton ise, d ek boyut sayısı olmak üzere, $D = 3 + d + 1$ boyutlu ve "bulk" adı verilen tüm uzay-zamanda hareket edebilmektedir. Gelecekte yapılması planlanan müon çarpıştırıcısının büyük bir fiziksel potansiyeli vardır. Temel parçacıkların çok yüksek enerjilerdeki çarpışmaları aktif olarak incelenebilmektedir. Bu hızlandırıcıların en büyük avantajı, müonların doğrusal veya dairesel elektron-pozitron çarpıştırıcılarına kıyasla senkrotron radyasyonu sınırlaması olmadan bir halkada hızlandırılabilmesidir. Ayrıca bu hızlandırıcılara ilgi, SM'nin ötesindeki fiziği araştırma yeteneğine de dayanmaktadır. Bu çalışmada ADD modelinin müon çarpıştırıcısında araştırma potansiyeli ortaya koyulacaktır.

Anahtar Kelimeler: ADD Modeli, müon çarpıştırıcısı

ABSTRACT

The hierarchy problem is that the electroweak scale is about a few hundred GeV, while the Planck scale is on the order of about GeV. As a solution to the hierarchy problem, Arkani-Hamed, Dimopoulos, and Dvali suggested that there may be extra dimensions on the mm scale that have not yet been discovered. The model is known as the ADD model, or large extra-dimensional model. In fact, although the ADD model cannot fully solve the hierarchy problem, it leads to a newer, moderate hierarchy problem. The new hierarchy problem is the difference between the compactified radius and the electroweak scale. At one point, the problem of hierarchy is replaced by another, but less sharp, problem of hierarchy. The main idea of this model is based on the following: The only fundamental scale in nature is the electroweak scale, so the hierarchy problem can be solved by reducing the Planck scale. The reason why the gravitational force is weak compared to other forces or the Planck scale is so large is the existence of extra dimensions in which only the graviton can move. In the model, all particles within the Standard Model are restricted to 4-dimensional space-time, known as "wall" or "3-brane" in string theory. The graviton, on the other hand, can move in the entire space-time called "bulk" with D = 3 + d + 1 dimensions, where d is the number of extra dimensions. The muon collider planned for the future has great physical potential. Collisions of elementary particles at very high energies can be actively studied. The major advantage of these accelerators is that muons can be accelerated in a ring without the limitation of synchrotron radiation, compared to linear or circular electron-positron colliders. Additionally, interest in these accelerators is also based on their ability to investigate physics beyond the SM. In this study, the research potential of the ADD model in muon colliders will be revealed.

Keywords: ADD model, muon collider

SKALER PARÇACIK-OLMAYANLARIN CLIC'te FOTON-FOTON ETKİLEŞMESİ İLE İNCELENMESİ

PROBING THE SCALAR UNPARTICLES THROUGH THE PHOTON-PHOTON INTERACTION AT CLIC

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ÖZET

Standart Model (SM), temel parçacık fiziğinde temel gerçekleri açıklamada oldukça başarılı olmuştur ve günümüzün en geçerli modelidir. Ancak hala çözülemeyen bazı problemler, SM'nin ötesindeki modellerin varlığını önermiştir. SM'nin ötesindeki modellerin birçoğu ya yeni parçacıklar ya da yeni etkileşmeleri önerir. Bu tür yeni modellerden biri "parçacık-olmayanlar" olarak bilinir. Sürekli kütle dağılımına sahip olası bir ölçekte değişmez gizli sektörü tanımlamak için bu senaryo önerilmiştir. Bu ölçekle değişmeyen sektör, O_{UV} parçacık olmayanın operatörü, O_{SM} Standart Model operatörü olmak üzere, $O_{UV}O_{SM}$ biçimindeki etkileşimler aracılığıyla SM ile birleştirilir. Büyük Hadron Çarpıştırıcısı (LHC) günümüzün en önemli araştırma laboratuarlarından biridir ve önemli çalışmalara yol açmıştır. Bunların en önemlisi, uzun süredir aranan Higgs bozonunun keşfedilmesidir. Bu başarı, SM'nin son eksik parçasını tamamlasa da, LHC, SM ötesinde düşük ölçekli süpersimetri, anomal etkileşmeler, ekstra boyutlar vb. gibi yeni fizik konularında henüz bir ipucu yakalayamamıştır. Bu nedenle farklı özeliklerde yeni tür hızlandırıcılar planlanmaktadır. Bunlardan bir tanesi temelde e^+e^- çarpıştırıcısı olan Kompakt Çizgisel Çarpıştırıcı (CLIC)'dir. Bu çarpıştırıcıda e^+e^- saçılmasına ek olarak $e\gamma$ ve $\gamma\gamma$ çarpışmalarınında gerçekleştirilmesi mümkündür. CLIC'deki yüksek enerjili gerçek foton ışınları Lazer Compton geri saçılımı yöntemi ile üretilebilir. Burada süreç düşük enerjili lazer fotonları ile elektron ışınları çarpıştığında, büyük bir miktarda ana elektron enerjisine sahip yüksek enerjili bir foton demeti üretilebilmesidir. Bu çalışmada, $\gamma\gamma$ etkileşmeleri ile CLIC'te skaler parçacık olmayanlar araştırılacaktır.

Anahtar Kelimeler: Skaler Parçacık-Olmayanlar, CLIC

ABSTRACT

The Standard Model (SM) has been very successful in explaining the fundamental facts in elementary particle physics and is the most valid model today. However, some still-unsolved problems have suggested the existence of models beyond the SM. Most models beyond the SM propose either new particles or new interactions. One such new model is known as "unparticle". This scenario is proposed to describe a possible scale-invariant hidden sector with continuous mass distribution. This scale-invariant sector is coupled to the SM through interactions of the form, where is the operator of the nonparticle and is the Standard Model operator. The Large Hadron Collider (LHC) is one of the most important research laboratories today and has led to important work. The most important of these is the discovery of the long-sought Higgs boson. Although this achievement completes the last missing piece of the SM, the LHC does not allow the possibility of low-scale supersymmetry, anomalous interactions, extra dimensions, etc. beyond the SM. It has not yet caught a clue about new physics issues such as For this reason, new types of accelerators with different properties are planned. One of these is the Compact Linear Collider (CLIC), which is basically a collider. In this collider, in addition to scattering, it is possible to perform eγ and $\gamma\gamma$ collisions. High-energy real photon beams in CLIC can be generated by the laser-compton backscattering method. The process here is that when low-energy laser photons and electron beams collide, a high-energy photon beam with a large amount of parent electron energy can be produced. In this study, scalar unparticles through the $\gamma\gamma$ inretactions in CLIC will be investigated.

Keywords: Scalar Unparticles, CLIC

GÜNEŞ ENERJİ SANTRALLERİNDE DC GÜÇ ARTIŞI VE KAYIPLARIN ETKİLERİNİN DEĞERLENDİRİLMESİ

EVALUATION OF THE EFFECTS OF DC POWER INCREASE AND LOSSES IN SOLAR POWER PLANTS

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ÖZET

Güneş enerji santrallerinde kayıpların oluşması kaçınılmazdır, ancak daha iyi tasarlanmış sistemler ve gelişmiş teknolojiler sayesinde bu kayıplar azaltılabilir. Güneş enerji santrallerinde DC güç artışı, panellerdeki güneş ışığına maruz kalma süresine, panel verimine ve panel sayısına bağlıdır. Panel sayısının artırılmasıyla, ağa bağlı olan DC güç artar. Panel veriminin artırılması ve güneş ışığına maruz kalma süresinin artması da DC güç artışını etkiler. Güneş panellerinin verimliliği, inverterlerdeki kayıplar, kablo ve trafolardaki kayıplar, çevre koşulları ve panellerin yüzeyindeki kirlilik, güneş enerji santrallerindeki kayıpların ana nedenleridir. Güç artışı, bu kayıpları artırabilir. Ancak, DC kurulu güçleri farklı olan santrallerin kayıplara olan etkileri, Fotovoltaik (PV) sistemlerin tasarımı, simülasyonu ve analizi için yenilenebilir enerji sektöründe sıklıkla sıklıkla kullanılan profesyonel bir yazılım olan PVSYT programı kullanılarak gösterilebilir ve uygun DC/AC oranları sağlanarak, sistemden en yüksek verim alınabilir. Yapılan bu çalışmada, Eskişehir ili Çifteler ilçesinde bulunan lokasyonunda PVSYT simülasyon programı kullanılarak. DC güçleri 1.1, 1.2 ve 1.3 MWp olan ve çıkış güçleri 999 KWe olarak sınırlandırılan (PV modül) bağlantılarının kıyaslaması yapılmıştır. Similasyon programında elde edilen; optimım güç değerleri, maliyetleri ve fizibilite kıyaslamaları kullanılarak alınan parametreler için optımum güç değerleri olan Güneş Enerji Santrali tasarımı yapılmıştır. Yapılan çalışma sonucunda en uygun kayıp ve maliyet açısından nominal DC güç oranı AC gücün 1,2 katı olarak en optimum düzeyde olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Güneş Enerjisi Santralleri, Performans Oranı, Solar enerji, Fotovoltaik

ABSTRACT

It is inevitable that losses occur in solar power plants, but these losses can be reduced thanks to better designed systems and advanced technologies. DC power increase in solar power plants depends on the sunlight exposure time on the panels, panel efficiency and the number of panels. By increasing the number of panels, the DC power connected to the network increases. Increasing panel efficiency and increasing sunlight exposure time also affect DC power increase. The efficiency of solar panels, losses in inverters, losses in cables and transformers, environmental conditions and pollution on the surface of the panels are the main reasons for losses in solar power plants. Increasing power can increase these losses. However, the effects of power plants with different DC installed powers on losses can be shown using the PVSYT program, which is a professional software frequently used in the renewable energy sector for the design, simulation and analysis of Photovoltaic (PV) systems, and the highest efficiency can be obtained from the system by providing appropriate DC / AC ratios. . In this study, the PVSYT simulation program was used in the location in Çifteler district of Eskişehir province. A comparison will be made of (PV module) connections with DC powers of 1.1, 1.2 and 1.3 MWp and output powers limited to 999 KWe. Obtained in the simulation program; By using optimum power values, costs and feasibility comparisons, a Solar Power Plant design with optimum power values was made for the parameters taken. As a result of the study, it was concluded that the nominal DC power ratio is 1.2 times the AC power at the optimum level in terms of optimal loss and cost.

Keywords: Solar Power Plants, Performance Rate, Solar energy, Photovoltaic

NİTROAROMATİK PATLAYICI DEDEKSİYONU İÇİN POTANSİYELLERİNİN İNCELENMESİ

NİKOTİNAMİDLİ CU(II), ZN(II), CO(II) VE Nİ(II) 3,4,5-TRİMETOKSİBENZOAT KOMPLEKSLERİNİN NİTROAROMATİK PATLAYICI DEDEKSİYONU İÇİN POTANSİYELLERİNİN İNCELENMESİ

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ÖZET

Bu çalışmada, Nikotinamidli Cu(II), Zn(II), Co(II) ve Ni(II) 3,4,5-trimetoksibenzoat Komplekslerinin nitroaromatik patlayıcıları dedekte etme potansiyelleri yaptıkları optik soğurma ve ışımaya (floresansa) dayalı olarak incelendi. Bu sistem, nitroaromatik patlayıcıların yaklaşık 350 – 500 nm aralığındaki ışığı sönümlemelerinin altında yatan özelliklerine dayanmaktadır. Dünya çapında, yaşadığımız dönemde terör faaliyetlerinin çok artması ve bu faaliyetlerin TNT, 2NO2, 3NO2 ve NH4NH3 gibi nitroaromatik patlayıcılar kullanılarak yapılması vesilesiyle hem insanları hem de güvenlik güçlerini böyle saldırılardan korumak adına son derece önemli bir çalışmadır.

Bu çalışma kapsamında, 350 nm ve daha düşük dalgaboylu ışınları soğuran ve 350 – 500 nm veya daha uzun dalga boylarında ışıma yapan yeni nikotinamidli Cu(II), Zn(II), Co(II) ve Ni(II) 2,4-dihidroksibenzoat komplekslerinin floresans özelliğinden yararlanılmaktadır. Nikotinamidli Cu(II), Zn(II), Co(II) ve Ni(II) 2,4-dihidroksibenzoat komplekslerinin 350 – 500 nm dalgaboyu aralığında yaptıkları floresansın $2NO_2$, $3NO_2$ ve NH_4NH_3 gibi nitroaromatik patlayıcılar tarafından sönümlenme potansiyelleri belirlendi. Bilindiği gibi malzemelerin çözelti hallerinden ziyade katı formdaki halleri teknolojik uygulamalarda daha kullanışlıdır. Bu nedenle, nikotinamidli Cu(II), Zn(II), Co(II) ve Ni(II) 2,4-dihidroksibenzoat komplekslerinin spin kaplama yöntemiyle ince filmleri de büyütülerek optik soğurma ve floresans özellikleri incelendi ve nitroaromatik patlatıcıları dedekte etme potansiyelleri belirlendi.

Anahtar Kelimeler: Nitroaromatik patlayıcı, optik soğurma, floresans

ABSTRACT

In this study, the potential nitroaromatic explosives dedection abilities of Cu(II), Zn(II), Co(II) and Ni(II) 3,4,5-trimethoxybenzoate complexes with nicotinamide were investigated based on their optical absorption and fluorescence behaviors. This system is based on the underlying properties of nitroaromatic explosives the quenching of light in the range of approximately 350 – 500 nm. It is an extremely important work to protect both people and security forces from such attacks which are carried out as terrorist activities and increased worldwide in this term, using nitroaromatic explosives such as TNT, $2NO_2$, $3NO_2$ and NH_4NH_3.

Within the scope of this study, the absorption under 350 nm wavelength and emitting properties among 350 and 500 nm or longer wavelengths of Cu(II), Zn(II), Co(II) and Ni(II) 3,4,5-trimethoxybenzoate complexes with nicotinamide are used. The fluorescence property of dihydroxybenzoate complexes is used. The potential fluorescence quenching properties of Cu(II), Zn(II), Co(II) and Ni(II) 2,4-dihydroxybenzoate complexes with nicotinamide were determined in the wavelength range of 350 – 500 nm by using $2NO_2$, $3NO_2$ and NH_4NH_3 nitroaromatics. As well known, in the technological applications the rigid forms of the materials are more usable than their liguid forms. For this reason, thin films of Cu(II), Zn(II), Co(II) and Ni(II) 2,4-dihydroxybenzoate complexes with nicotinamide deposited by using spin coating method and their optical absorption and fluorescence properties were investigated to determine their potentials for the detecting of nitroaromatic explosives.

Keywords: Nitroaromatic explosive, optical absorption, fluorescence

EFFECT of 3-AMINOPROPYL TRIETHOXY SILANE-SURFACE MODIFICATION OF DIFFERENT TYPES OF NANOSTRUCTURES ON THE JOINT PERFORMANCE IN ADHESIVE JOINTS

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ABSTRACT

In adhesive-bonded joints, the interaction of interfacial bond forces between the adhesive and the bonded material significantly affects the joint performance. In the presented study, different types of nanostructure-added silane coating method was used on the bonded surface to increase the interfacial bond strengths between the adhesive and the bonded material. In the study, double-component structural adhesive DP460 was used as the adhesive, aluminum alloy was used as the bonded material, and graphene oxide, organoclay, titanium dioxide and aluminum oxide nanostructures were used as nanostructures. The nanostructures were functionalized with 3-aminopropyltriethoxysilane (APTES) in methanol/water, and the aluminum surfaces were coated by dipping into the solution. Additionally, butt joint samples were produced by adding 1% nanostructures by weight to the adhesive and were subjected to tensile testing to examine the joint performance. When the results of the study were compared with the control samples (samples without surface treatment and without nanostructure additives), the joint performance of the samples coated with nanostructure-added APTES compound increased by approximately 9% to 35%. Additionally, when both the surface is coated and the adhesive is reinforced with nanostructure, the increase in the performance of the joint is approximately 31% to 78%. This improvement in joint performance was explained by scanning electron microscopic (SEM) analysis and fracture surface morphology.

Keywords: Surface modification, Silane, Adhesive, Nanostructures, Joints/joining, Tensile testing.

OVERVIEW OF CATTLE FARMING DYNAMICS AND BEEF PRODUCTION IN N. MACEDONIA

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ABSTRACT

This study provides a comprehensive overview of the state of cattle farming in North Macedonia, particularly focusing on beef production from 2014 to 2019. During this period, there was a significant 26% decrease in beef production. Cattle farming predominantly serves the requirements of the local community with only a small percentage of farms specializing in intensive production.

Official data indicates that local farms produced approximately 4,000 to 5,000 tons of beef between 2014 and 2019. However, annual beef consumption is much higher, ranging from 14,000 to 16,000 tons, indicating a significant gap in locally produced beef. To fill this gap, the country heavily relies on importing beef from neighboring nations.

The structure of cattle farms is largely characterized by small-scale operations, with about 73.6% having capacities of up to 5 heads and 21.1% having 6 to 20 heads. Farms with over 20 heads make up only 5.3% of the total. This suggests that the agricultural structure is decentralized, with many small-scale cattle farming operations.

Efforts to address the deficit in locally produced beef are highlighted, emphasizing the need for increased breeding and raising of meat-oriented cattle. The government's role in encouraging larger-scale production is also stressed, aiming to reduce dependence on beef imports.

In terms of population data, as of 2020, there were 440 purebred cattle in the registry of controlled meat-producing cattle, while 45,300 uncontrolled cattle were primarily raised for fattening as cow-calf pairs to meet the needs of farming families in mountainous villages.

Future research opportunities could explore the reasons behind the significant reliance on imported beef despite notable domestic production. This research could investigate economic factors, consumer preferences, and potential impacts on the local agricultural sector.

Keywords: Cattle farming, Beef production, Agricultural structure, N. Macedonia.

OECD ÜLKELERİ İÇİN GİNİ KATSAYISI ZAMAN SERİLERİ MODELLEMESİ VE SINIFLAMASI

GINI COEFFICIENT TIME SERIES FOR OECD COUNTRIES MODELING AND CLASSIFICATION

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ÖZET

OECD ülkelerinin Gini katsayısı zaman serileri modellemesi ve sınıflanması bakımından bu çalışmada incelenmiştir. Gini Katsayısı, gelir dağılımında meydana gelen eşitsizliği, 0 ile 1 değerleri arasında ölçmektedir. 1'e yaklaştıkça gelir dağılımındaki eşitsizliğin arttığını, 0'a doğru yaklaştıkça eşitsizliğin azaldığını göstermektedir.
Verileri elde edilen tüm kurucu OECD ülkeleri kapsamaktadır: Türkiye, ABD, Avusturya, Kanada, Fransa, Hollanda, Lüksemburg, Almanya, İtalya, İngiltere, Belçika, Danimarka, İrlanda, Yunanistan, İsviçre, İsveç, İspanya, İzlanda, Norveç, Portekiz.
Analizler için Tek değişkenli zaman serileri modelleri ile kümeleme analizi kullanılmıştır. Zaman serilerinde SARIMA(p,d,qX(P,D,Q)s ile Üstel düzgünleştirme modelleri kullanıldı. Küme Analizinde ise gruplanmamış bir veri topluluğunu benzerliklerine göre sınıflandıran Dendogram grafiği kullanılmıştır.
Gini katsayısı verileri; Harvard Database (SWID 9.4) sitesinden elde edilmiş olup, 1995-2019 yıllarına ait veriler kullanılmıştır. Yıllık Gini katsayısına ait değişkeni için elde edilen kestirimler açısından en uygun modeller belirlenmiştir. Buna göre, ABD, Avusturya, Fransa, Hollanda, İngiltere, Lüksemburg, Portekiz ve Türkiye ARIMA modeline uygun görülür. Danimarka, Yunanistan, İsviçre, Kanada, Almanya, İtalya, İrlanda, İsveç, Norveç ve İspanya ise Simple Seasonal modeline uygundur. Belçika ve Fransa ise Simple, Brawn ve Holt olmak üzere üstel düzgünleştirme modeline uygun oldukları bulunmuştur.
Gini katsayısı değerleri bakımından OECD ülkelerinin sınıflandırma analizinde ise İngiltere, İzlanda, İrlanda, Yunanistan, Türkiye ve Portekiz bir sınıf olarak tespit edilmişlerdir. İkinci sınıf ise Almanya, Danimarka, Lüksemburg, Hollanda, Avusturya, Fransa, İspanya, İsveç, İtalya, Belçika, Kanada, ABD ve Norveç'tir. Bu ikinci sınıfta olmasına rağmen İsviçre diğerlerine göre ayrı bir sınıf oluşturduğunu belirtmek lazım.
Anahtar kelimeler: Gini katsayısı, Zaman serisi modelleri, Kestirim, Sınıflandırma.

ABSTRACT

The Gini coefficient of OECD countries was examined in this study in terms of time series modeling and classification. Gini Coefficient measures the inequality in income distribution between 0 and 1. It shows that as it approaches 1, inequality in income distribution increases, and as it approaches 0, inequality decreases.
It covers all constituent OECD countries for which data were obtained: Turkey, USA, Austria, Canada, France, Netherlands, Luxembourg, Germany, Italy, UK, Belgium, Denmark, Ireland, Greece, Switzerland, Sweden, Spain, Iceland, Norway, Portugal.
Cluster analysis with univariate time series models was used for analyses. Exponential smoothing models with SARIMA(p,d,qX(P,D,Q)s) were used in time series. Dendogram chart, which classifies an ungrouped data collection according to their similarities, was used in Cluster Analysis.
Gini coefficient data; It was obtained from the Harvard Database (SWID 9.4) site and data for the years 1995-2019 was used. The most appropriate models were determined in terms of the estimates obtained for the annual Gini coefficient variable. Accordingly, the USA, Austria, France, the Netherlands, the UK, Luxembourg, Portugal and Turkey are deemed suitable for the ARIMA model. Denmark, Greece,

Switzerland, Canada, Germany, Italy, Ireland, Sweden, Norway and Spain are suitable for the Simple Seasonal model. Belgium and France were found to be suitable for the exponential smoothing model, namely Simple, Brawn and Holt.
In the classification analysis of OECD countries in terms of Gini coefficient values, England, Iceland, Ireland, Greece, Turkey and Portugal were determined as a class. The second class is Germany, Denmark, Luxembourg, Netherlands, Austria, France, Spain, Sweden, Italy, Belgium, Canada, USA and Norway. Although it is in the second class, it should be noted that Switzerland creates a separate class compared to the others.
Key words: Gini coefficient, Time series models, Forecasting, Classification.

Al_2O_3 ESASLI ZRO_2 VE SM_2O_3 İÇEREN SANDVİÇ YAPILI SERAMİK KOMPOZİTLERİN YOĞUNLAŞMA VE KIRILMA DAYANIMI ÖZELLİKLERİNİN İNCELENMESİ

DENSIFICATION AND FRACTURE STRENGTH PROPERTIES OF Al2O3 BASED ZrO_2 and Sm_2O_3 CONTAINING SANDWICH CERAMIC COMPOSITES

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ÖZET

Bu çalışmada, farklı hacim oranlarında samaryum oksit (Sm_2O_3) ve zirkonyum oksit (ZrO_2) takviyelerinin hem ayrı ayrı Al_2O_3 içerisindeki hem de alümina (Al_2O_3) esaslı sandviç yapı içerisindeki mikroyapı ve mekanik özellikler üzerindeki etkisi incelenmiştir. Sandviç yapının ve takviyelerin etkisiyle yoğunlaşmanın ve mekanik özelliklerin iyileştirilmesi amaçlanmıştır. Çalışma kapsamında, disk formunda üretilen saf Al_2O_3, Al_2O_3-%0,8Sm_2O_3, Al_2O_3-%5ZrO_2, Al_2O_3-%5ZrO_2-%0,8Sm_2O_3 ve sandviç yapılı (orta tabaka Al_2O_3-%5ZrO_2, alt ve üst tabakalar Al_2O_3-%0,8Sm_2O_3; orta tabaka Al_2O_3-%5ZrO_2-%0,8Sm_2O_3, alt ve üst tabakalar Al_2O_3-%0,8Sm_2O_3) numunelerin üretimi, mikroyapı analizleri ve mekanik karakterizasyonu gerçekleştirilmiştir. Kuru ve soğuk izostatik presleme yöntemi kullanılarak üretilen ve basınçsız sinterlenen numunelerin yoğunlaşmasını incelemek amacıyla hem Arşimet metoduyla hem de hacimsel olarak numune kütle ve boyutlarından yoğunluk ölçümleri gerçekleştirilmiştir. Elastisite modülü değerleri rezonans frekans metodu ile ölçülürken, eğilme mukavemetleri eşikieksenli eğme mukavemet test yöntemiyle belirlenmiştir. Mikroyapı incelemeleri için kullanılan SEM analizi sonucunda, takviye elemanlarının mikroyapıda homojen bir şekilde dağıldığı görülmüştür. Ayrıca Al_2O_3-%0,8Sm_2O_3 ve sandviç yapılı kompozitlerde aşırı tane büyümesi meydana gelmiştir. Yapılan yoğunluk ölçüm sonuçlarına göre, en iyi yoğunlaşma orta tabakası Al_2O_3-%5ZrO_2 kompozisyonu olan sandviç yapılı kompozitlerde tespit edilmiştir. Mekanik test sonuçlarına göre, en yüksek elastik modülüs (392±9 GPa) saf Al_2O_3 numunelerde ölçülürken en yüksek eğilme mukavemeti (415±83 MPa) Al_2O_3-%5ZrO_2 numunelerde elde edilmiştir ve eğilme mukavemetinde saf Al_2O_3'e kıyasla %63,4 artış sağlanmıştır. Sandviç yapının ise Al_2O_3'nın eğilme mukavemeti üzerinde olumlu bir etkisi olmadığı anlaşılmıştır (Bu çalışma 122M179 nolu Tübitak 3501 projesi kapsamında gerçekleştirilmiştir.)

Anahtar Kelimeler: Al_2O_3, Sm_2O_3, ZrO_2, Sandviç Yapı, Mekanik Özellikler.

ABSTRACT

In this study, the effects of samarium oxide (Sm_2O_3) and zirconium oxide (ZrO_2) additives at different volume ratios on the microstructure and mechanical properties of Al_2O_3 and Al_2O_3-based sandwich structures were examined separately. It is aimed to improve densification and mechanical properties with the effect of sandwich structure and additives. Within the scope of the study, production, microstructure analysis and mechanical characterization of pure Al_2O_3, Al_2O_3-0.8%Sm_2O_3, Al_2O_3-

5%ZrO_2, Al_2O_3-5%ZrO_2-0.8%Sm_2O_3 and sandwich structure (middle layer Al_2O_3-5%ZrO_2, lower and upper layers Al_2O_3-0.8% Sm_2O_3; middle layer Al_2O_3-5%ZrO_2-0.8%Sm_2O_3, lower and upper layers Al_2O_3-0.8% Sm_2O_3) samples were carried out. In order to examine the densification of the samples produced using dry and cold isostatic pressing method and pressureless sintering, density measurements were carried out both by the Archimedes method and volumetrically from the sample mass and dimensions. While elasticity modulus was measured by the resonance frequency method, bending strength were determined via equibiaxial flexural strength test. As a result of SEM microstructure analysis, it was seen that the additives were distributed nearly homogeneously in the microstructure. Additionally, abnormal grain growth occurred in Al_2O_3-0.8%Sm_2O_3 and sandwich structured composites. According to the density measurements, the highest densification was found in sandwich structured composites with a middle layer of Al_2O_3-5%ZrO_2 composition. According to mechanical test results, the highest elastic modulus (392±9 GPa) was measured in pure Al_2O_3 samples, while the highest bending strength (415±83 MPa) was obtained in Al_2O_3-5%ZrO_2, and a 63.4% increase in bending strength was achieved compared to pure Al_2O_3. It was seen that the sandwich structure did not have a positive effect on the bending strength of Al_2O_3 (This study was supported by the Scientific and Technical Research Council of Turkey - TUBITAK through project no 122M179.)

Keywords: Al_2O_3, Sm_2O_3, ZrO_2, Sandwich Structure, Mechanical Properties.

Botrytis cinerea İZOLATLARINA KARŞI FUNGİSİTİN MİSELYAL BÜYÜME ÜZERİNE ETKİLERİ VE *Bcgst5* GENİNİN İFADESİ

EFFECTS OF FUNGICIDE AGAINST *Botrytis cinerea* ISOLATES ON MYCELIAL GROWTH AND EXPRESSION OF *Bcgst5* GENE

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ÖZET

Gri küf hastalığı etmeni olan *Botrytis cinerea* Pers. Fr. (teleomorf: *Botryotinia fuckeliana* (de Bary) Whetzel) birçok tarımsal üründe zararlara yol açmaktadır. Bu ürünlerden biri olan çilekte, çiçek veya meyvede kurşuni küf hastalığına sebep olmakta, hem hasat öncesinde hem de hasat sonrasında çilekteki başlıca ürün kayıpları bu hastalıktan kaynaklanmaktadır. Bu patojenin kontrolünde fungisitler yaygın olarak kullanılmaktadır. Ancak günümüzde bu gibi patojenlerin etkili ve hızlı kontrolüne yarayan fungisitlere karşı dayanıklılık oluşumu önemli bir sorun teşkil etmektedir. Bu çalışmada çilekten izole edilen iki farklı *B. cinerea* izolatının, etken maddesi % 25.2 Boscalid + % 12.8 Pyraclotrobin olan fungisit uygulaması sonucu fungusun miselyal gelişimi üzerine etkileri ve *Bcgst5* geninin ifade seviyesinin belirlenmesi hedeflenmiştir. Bu kapsamda öncelikle, çalışmada kullanılan *B. cinerea* izolatları, Çankırı ilindeki pazarlardan satın alınan ve çürüme belirtileri gösteren çileklerden elde edilmiştir. İzolasyonlar sırasında, altı farklı satıcıdan elde edilen çürümüş çilek meyvelerinden izole edilen fungal etmen *B. cinerea* olarak tanımlanmıştır. Çilekten izole edilen iki farklı *B. cinerea* izolatının, etken maddesi % 25.2 Boscalid + % 12.8 Pyraclotrobin olan fungisite karşı duyarlılığını belirlemek amacıyla, fungusitlerin 20 ppm ve 40 ppm konsantrasyonları hazırlanarak besi ortamlarına eklenmiş ve kontrol petrilerinde ise steril su kullanılmıştır. Etken maddelerin, fungusun miselyal gelişimi üzerine etkilerini belirlemek amacıyla, miselyal büyümeyi engelleme yüzdeleri (%) hesaplanmıştır. Ayrıca fungisit uygulaması sonrasında, *B. cinerea* izolatlarında oksidatif strese toleransta önemli bir rol oynayan Glutatyon S-transferaz (GST) kodlayan *Bcgst5* geninin ifade seviyeleri kontrol ve uygulama örneklerinde qRT-PZR ile karşılaştırılmıştır. Sonuç olarak; çileklerin hasat döneminde büyük kayıplara neden olan, *B. cinerea*'a karşı, % 25.2 Boscalid + % 12.8 Pyraclotrobin etken maddesi içeren fungisitinin *in vitro* etkinliği belirlenmiş olup, bu etkinliğin gen ifade seviyelerinde ortaya çıkardığı farklılıklar tespit edilmiştir. Elde edilen sonuçlar bitkisel üretimde verimliliğin artması ve olumsuz şartlara dayanıklı ürünlerin seçilmesi bakımından önemli fayda sağlayacaktır.

Anahtar Kelimeler: Fungisit, *Bcgst5* geni, Gen ifadesi, Fungal hastalıklar

ABSTRACT

Botrytis cinerea Pers. Fr. (teleomorph: *Botryotinia fuckeliana* (de Bary) Whetzel) is the causal agent of grey mould disease, causing damage to various agricultural products. In crops such as strawberries, it leads to grey mould disease in flowers or fruits, resulting in significant product losses both pre and post-harvest. Fungicides are commonly used for the control of this pathogen. However, the development of resistance to fungicides effective for the rapid control of such pathogens is currently a significant problem. In this study, it was aimed to determine the effects of two different *B. cinerea* isolates isolated

from strawberry on the mycelial development of the fungus as a result of fungicide treatment with 25.2% Boscalid + 12.8% Pyraclostrobin and to determine the expression level of *Bcgst5* gene. The *B. cinerea* isolates used in the study were obtained from strawberries showing signs of decay that were purchased from markets in Çankırı province. During the isolations, the fungal agent isolated from decayed strawberry fruits obtained from six different vendors was identified as *B. cinerea*. Two isolates of *B. cinerea* obtained from strawberries were tested for their sensitivity to a fungicide containing 25.2% Boscalid and 12.8% Pyraclostrobin. To determine sensitivity, concentrations of the fungicides at 20 ppm and 40 ppm were prepared and added to culture media, while sterile water was used in control petri dishes. Percentages of inhibition of mycelial growth were calculated to assess the effects of the active ingredients on fungal mycelial development. In addition, after fungicide application, the expression levels of *Bcgst5* gene encoding Glutathione S transferase (GST), which plays an important role in tolerance to oxidative stress in *B. cinerea* isolates, were compared by qRT-PCR in control and treatment samples. The *in vitro* effectiveness of the fungicide containing the active ingredients 25.2% Boscalid and 12.8% Pyraclostrobin against *B. cinerea*, which causes significant losses during the strawberry harvest season, has been determined. Additionally, differences in gene expression levels resulting from this effectiveness have been identified. The results obtained will provide important benefits in terms of increasing productivity in plant production and selecting products resistant to adverse conditions.

Keywords: Fungicide, *Bcgst5* gene, Gene expression, Fungal disease

CO_2 ATMOSFERİ ALTINDA METANCA ZENGİN SENTEZ GAZI ÜRETİMİ İÇİN İKİ AŞAMALI BİYOKÜTLE GAZLAŞTIRMASININ ARAŞTIRILMASI

INVESTIGATION OF TWO-STAGE BIOMASS GASIFICATION FOR METHANE-RICH SYNGAS PRODUCTION UNDER THE CO_2 ATMOSPHERE

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ÖZET

Genel olarak ısı ve elektrik üretiminde kullanılan ve doğalgaz olarak da bilinen metan (CH_4) gazı birçok kimyasalın (metanol, asetik asit, hidrojen vb.) üretiminde hammadde olarak kullanılmaktadır. Ayrıca, biyokütleden CH_4 üretimi hem enerji üretimi hem de çevresel sürdürebilirlik açısından oldukça önemlidir. Bu çalışma, sabit yataklı bir reaktörde mobilya atıklarından metanca zengin sentez gazını üretmek için iki kademeli termokimyasal dönüşüm yöntemi önermektedir. İlk aşamada 350°C azot (N_2) atmosferinde odun peletlerinin pirolizi gerçekleştirilmiş ve akabinde 500-900°C arasında karbondioksit ortamında (CO_2) gazlaştırılması gerçekleştirilmiştir. Her iki yöntemde N_2 ve CO_2 akış debisi 150 mL/dk olarak ayarlanmıştır. Elde edilen sentez gazı ölçümleri neticesinde, termokimyasal yöntemler olan piroliz ve gazlaştırmanın sentez gaz içeriğine etkisi ortaya koyulmuştur. 350°C azot ortamında yürütülen piroliz sonucu CH_4 içeriği %7,75±0,44 olarak ölçülmüştür. Piroliz işleminin devamında, reaktör sıcaklığının arttırılmış ve atmosfer değişimi yapılmıştır. Yürütülen bu çalışmalarda, 500°C CO_2 atmosferinde elde edilen CH_4 içeriği %23,79±1,10 olurken, 700°C de CH_4 içeriği %45,65±1,22 değerine ulaşmıştır. Gazlaştırma sıcaklığının 900°C'ye sabitlendiği denemede CH_4 gaz oranı sentez gaz içeriğinde önemli ölçüde azalarak %8,96±2,29 civarında ölçülmüştür. Bu noktada, CO_2'in karbon (çar) ile vermiş olduğu reaksiyon önemli rol oynamış ve sentez gaz ürünü olan karbonmonoksit (CO) oranı %63,46±1,26 olarak ölçülmüştür. Elde edilen bulgular neticesinde, biyokütleden CH_4 eldesinde sıcaklığın önemli bir rol oynadığı ve maksimum CH_4 oranına 700°C ulaşıldığı ortaya koyulmuştur.

Anahtar Kelimeler: Biyokütle, Sentez gazı, Metan, Piroliz, Gazlaştırma.

ABSTRACT

Methane (CH_4) gas, also known as natural gas and commonly used for heat and electricity production, is used as a raw material in the production of many chemicals (methanol, acetic acid, hydrogen, etc.). In addition, CH_4 production from biomass is very important for both energy production and environmental sustainability. This study proposes a two-stage thermochemical conversion process to produce methane-rich synthesis gas from furniture waste in a fixed-bed reactor. In the first stage, wood pellets were pyrolyzed in a nitrogen (N_2) atmosphere at 350°C and then gasified in a carbon dioxide (CO_2) environment between 500-900°C. In both methods, the N_2 and CO_2 flow rates were set at 150 mL/min. As a result of the synthesis gas measurements obtained, the effect of the thermochemical methods, pyrolysis and gasification, on the synthesis gas content was revealed. As a result of the pyrolysis carried out in a nitrogen environment at 350°C, the CH_4 content was measured to be 7.75±0.44%. During the continuation of the pyrolysis process, the reactor temperature was increased and the atmosphere was changed. In these studies, the CH_4 content obtained in a CO_2 atmosphere at 500°C was 23.79±1.10%, while the CH_4 content at 700°C reached 45.65±1.22%. In the experiment where the gasification temperature was fixed at 900°C, the CH_4 gas ratio in the syngas content decreased significantly and was measured at around 8.96±2.29%. At this point, the reaction of CO_2 with carbon (char) played an important role, and the ratio of carbon monoxide (CO), which is the synthesis gas product, was measured as 63.46±1.26%. The results showed that temperature played an important role in the production of CH_4 from biomass and the maximum CH_4 rate was reached at 700°C.

Keywords: Biomass, Synthesis gas, Methane, Pyrolysis, Gasification.

ANALİTİK HİYERARŞİ PROSES (AHP) YÖNTEMİ İLE ÇELİK ENDÜSTRİSİ TESİS YERİ SEÇİMİ

STEEL INDUSTRY PLANT LOCATION SELECTION WITH ANALYTIC HIERARCHY PROCESS (AHP) METHOD

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ÖZET

Artan rekabet koşulları ve küreselleşen dünya, işletmelerin başarısı için doğru bir kuruluş yerinin belirlenmesini kritik hale getirmiştir. Özellikle Türkiye'deki çelik endüstrisi gibi ekonomik potansiyele sahip sektörlerde, kuruluş yeri seçimi sektör yatırımları açısından hayati bir öneme sahiptir.

Bu çalışmada, çelik endüstrisinde bir fabrikanın kuruluş yeri tespiti için bir karar destek modeli önerilmektedir. Dört aday yer arasından en uygun yerin belirlenmesi amacıyla matematiksel ve mantıksal model temelli çok kriterli karar verme yöntemi olan AHP kullanılmıştır. Çalışmada kullanılan kuruluş yeri değerlendirme kriterlerinde arazi, hammadde, ulaşım ve işletme maliyeti dikkate alınmıştır. Bu kriterlerin karmaşıklığı ve kuruluş yeri alternatiflerinin çeşitliliği göz önüne alınarak AHP yöntemi kullanılarak çözümler üretilmiş ve elde edilen sonuçlar karşılaştırılmıştır. Uygulamanın, diğer endüstrilerdeki kuruluş yeri seçim problemleri için bir öngörü oluşturabileceği düşünülmektedir. Bu önerilen karar destek modeli, işletmelerin etkin bir şekilde kuruluş yerlerini seçmelerine ve rekabet avantajı elde etmelerine yardımcı olabilir. Ayrıca, çeşitli karar verme yöntemlerinin bir araya getirilmesiyle daha kapsamlı ve güvenilir bir değerlendirme sağlanmıştır.

Anahtar Kelimeler: Çelik endüstrisi, Çok kriterli karar verme yöntemi, AHP yöntemi, Kuruluş yeri seçimi

ABSTRACT

Increasing competition conditions and a globalizing world have made it critical to determine the right location for the success of businesses. Especially in sectors with economic potential, such as the steel industry in Turkey, the choice of location is vital for investments in the sector.

In this study, a decision support model is proposed for the location of a plant in the steel industry. AHP, a mathematical and logical model based multi-criteria decision making method, is used to determine the most suitable location among four candidate locations. Land, raw materials, transportation and operating cost are considered in the location evaluation criteria used in the study. Considering the complexity of these criteria and the diversity of establishment location alternatives, solutions were generated using the AHP method and the results obtained were compared. It is thought that the application can provide an insight for the location selection problems in other industries. This proposed decision support model can help businesses to choose their location efficiently and gain competitive advantage. Moreover, a more comprehensive and reliable evaluation is provided by combining various decision-making methods.

Keywords: Steel industry, Multi-criteria decision making method, AHP method, Location selection

FARKLI OKSİJEN AKIŞ ORANLARINDA VE FARKLI TAVLAMA SICAKLIKLARDA ÜRETİLEN GEOX FİLMLERİN KUBELKA MUNK YÖNTEMİYLE ENERJİ BANT ARALIKLARININ İNCELENMESİ

EXAMINATION OF ENERGY BAND GAPS OF GeOx FILMS PRODUCED AT DIFFERENT OXYGEN FLOW RATES AND DIFFERENT ANNEALING TEMPERATURES USING THE KUBELKA MUNK METHOD

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ÖZET

Ge'nin optik özellikleri, yüksek yük taşıyıcı hareketliliği ve güçlü foton soğurması nedeniyle diğer yarıiletkenlere kıyasla çok çekicidir. Ayrıca, daha düşük enerji bant aralığı ve Ge'nin benzersiz enerji bant aralığı yapısı nedeniyle, gelecek nesil için yeni olanaklar sunmaktadır. Ancak saf yarıiletkenlerin yüksek işlem maliyeti ve kimyasal kararsızlığı nedeniyle uygulama alanlarını kısıtlamaktadır. Bu sebepten dolayı cihazların düşük maliyetli üretimi ile yüksek verimlilikleri için kullanılan malzemelerin belirli özelliklere sahip olmalarına büyük ihtiyaç duyulmaktadır. Geniş bant aralıklı yarıiletken oksit malzemelerin yeteneği, optoelektronik, mikroelektronik, fotonik cihazlar ve bellek uygulamalarında yapı taşı olarak kullanım için yeni imkânlar açmıştır. Bundan dolayı bu çalışmada, reaktif RF Magnetron söktürme yöntemi ile silisyum alttaş üzerine Germanyum oksit (GeO_x) filmleri üretilmiştir. 250 °C sabit alttaş sıcaklığında oksijen yüzdeleri %7, %8 ve % 9 olan üç farklı film elde edilmiştir. Üretilen filmler daha sonra kül fırınında, farklı tavlama sıcaklıklarında hava ortamında (300, 400, 500, 600, 700, 800, 900, 1000 °C) tavlanmıştır. Optik özellikleri spektrofotometre ile incelenmiştir. Spektrofotometre ile toplam ve dağınık yansıma ölçümleri yapılmıştır. Dağınık yansıma yoluyla enerji bant aralığı Kubelka Munk yöntemiyle hesaplanmıştır. Sonuçlardan tavlama sıcaklığı arttıkça enerji bant aralığının değiştiği görülmüştür.

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Anahtar Kelimeler: GeO_x, RF magnetron söktürme, optik spektrofotometre,

ABSTRACT

The optical properties of Ge are very attractive compared to other semiconductors due to its high charge carrier mobility and strong photon absorption. Moreover, due to the lower energy bandgap and unique energy bandgap structure of Ge, it offers new possibilities for the next generation. However, pure semiconductors limit their application areas due to their high processing costs and chemical instability. For this reason, there is a great need for the materials used to have certain properties for low-cost production and high efficiency of the devices. The ability of wide bandgap semiconductor oxide materials has opened new possibilities for use as building blocks in optoelectronics, microelectronics, photonic devices and memory applications. Therefore, in this study, Germanium oxide (GeO_x) films were produced on silicon substrate by reactive RF Magnetron sputtering method. Three different films with oxygen percentages of 7%, 8% and 9% were obtained at a constant substrate temperature of 250

°C. The produced films were then annealed in a muffle furnace in air at different annealing temperatures (300, 400, 500, 600, 700, 800, 900, 1000 °C). Its optical properties were examined with a spectrophotometer. Total and diffuse reflection measurements were made with a spectrophotometer. The energy band gap was calculated by the Kubelka Munk method through diffuse reflection. From the results, it was seen that the energy band gap changed as the annealing temperature increased.

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Keywords: GeO_x, RF Magnetron Sputtering, Optic Spectrophotometer

ENTEGRE BİYOİNFORMATİK ANALİZE DAYALI OLARAK KOLOREKTAL KANSERDE ANAHTAR GENLERİN TANIMLANMASI

IDENTIFICATION OF KEY GENES IN COLORECTAL CANCER BASED ON INTEGRATED BIOINFORMATICS ANALYSIS

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ÖZET

Kolorektal kanser, çeşitli kanser türleri arasında en önemli tümörlerden biridir. Genel olarak düşük sağkalım oranı nedeniyle, erken teşhis ve tanı için yeni tedavi stratejilerinin geliştirilmesi son derece önemli hale gelmiştir. Kolorektal kanserdeki anahtar genleri tanımlamak, bu genlerin hangi yolaklarda yer aldığını belirlemek, düzenleyici moleküllerle etkileşimlerini araştırmak bu çalışmanın amacını oluşturmaktadır. Çalışmada, GEO veri tabanında kolorektal kanserli hastaları ait verilerden bazıları kullanılarak farklı ifade edilen genler (DEG) belirlenmiştir. Bu genler için gen ontolojisi ve KEGG yolak analizleri yapılmış, protein-protein etkileşim ağları oluşturulmuştur. Cytoscape programı aracılığıyla protein-protein etkileşiminde en yüksek korelasyona sahip anahtar (hub) genler tespit edilmiş ve bu genlerin miRNA'lar ve transkripsiyon faktörleri gibi düzenleyici moleküllerle ilişkisi incelenmiştir. Biyoinformatik analizler sonucunda, iki farklı mikroarray veri setinde örtüştüğü tespit edilen 107 DEG tanımlanmıştır. Bu DEG'ler arasında COL11A1, COL1A1, COL1A2, CXCL1, CXCL12, CXCL8, MMP1, MMP3, MMP7 ve SPP1 hub genler olarak öne çıkmıştır. hsa-mir-1-3p, hsa-mir-124-3p, hsa-mir-146-5p ve hsa-mir-335-5p en çok etkileşime giren miRNA'dır. GLIS2 (COL1A1 ve CXCL12) ve ZNF76 (COL1A1 ve CXCL1) transkripsiyon faktörlerini de anahtar genler ile en çok etkileşimde olan transkripsiyon faktörleridir. UALCAN veri tabanı ile yukarı regule olan COL11A1, COL1A2, COL1A2, CXCL1, MMP1, MMP3, MMP7 ve SPP1 genlerinin ve aşağı regule olan CXCL12 geninin ekspresyon seviyeleri doğrulanmıştır. Bununla birlikte, İnsan Protein Atlası veri tabanından alınan verilere göre normal ve tümör dokularında COL1A1, COL1A2, CXCL2, CXCL8, MMP3 ve MMP7 genlerin validasyonu yapılmıştır. Elde edilen sonuçlara göre tanımlanan ve valide edilen bu genler kolorektal kanserin tanı ve tedavisinde potansiyel anahtar genler olarak işlev görebilir.

Anahtar Kelimeler: Kolorektal kanser, biyoinformatik analiz, anahtar genler

ABSTRACT

Colorectal cancer is one of the most important tumors among various types of cancer. The development of new treatment strategies for early detection and diagnosis has become extremely important due to the generally low survival rate. The aim of this study is to identify the key genes in colorectal cancer, to determine the pathways in which these genes are involved and to investigate their interactions with regulatory molecules. In this study, differentially expressed genes (DEG) were identified using some of the data of colorectal cancer patients in the GEO database. For these genes, gene ontology and KEGG pathway analyses were performed and protein-protein interaction networks were created. The key (hub) genes with the highest correlation in protein-protein interaction were identified through the Cytoscape programme and the relationship of these genes with regulatory molecules such as miRNAs and transcription factors was examined. As a result of bioinformatic analysis, 107 DEGs were identified that overlapped in two different microarray datasets. Among the DEGs, COL-11A1, COL-1A1, COL-1A2, CXCL-1, CXCL-12, CXCL-8, MMP-1, MMP-3, MMP-7 and SPP-1 emerged as hub genes. hsa-mir-1-3p, hsa-mir-124-3p, hsa-mir-146-5p and hsa-mir-335-5p are the most interacting miRNAs. GLIS2 (COL1A1 and CXCL12) and ZNF76 (COL1A1 and CXCL1) transcription factors are also the most interacting transcription factors with key genes. The expression levels of the upregulated COL11A1, COL1A2, COL1A2, CXCL1, MMP1, MMP3, MMP7 and SPP1 genes and the downregulated CXCL12 gene were validated using the UALCAN database. In addition, COL1A1, COL1A2, CXCL2, CXCL8, MMP3 and MMP7 genes were validated in normal and tumor tissues according to the data obtained

from the Human Protein Atlas database. According to the results obtained, these identified and validated genes may function as potential key genes in the diagnosis and treatment of colorectal cancer.

Keywords: Colorectal cancer, bioinformatic analysis, key genes

OSTEOSARCOPENIA IN WOMEN: THE EFFECT OF LIFESTYLE FACTORS AND EATING HABITS

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ABSTRACT

Osteosarcopenia is characterized by low muscle mass and bone mineral density, muscle weakness, and lower physical function. Osteoporosis is a systemic skeletal disease characterized by loss of bone mineral density and microstructural integrity. Sarcopenia is a multisystem disease, which predisposes to muscle weakness and frailty.

The aim of the study was to evaluate the influence of lifestyle factors and dietary habits on the development of osteosarcopenia among 300 postmenopausal Caucasians women.

Bone tissue parameters of the femoral neck and lumbar spine and muscle mass were assessed by densitometry. Muscle strength was measured using a dynamometer. Functional fitness was assessed by Chair Stand Test. Lifestyle factors and dietary habits was assessed by interview.

The highest percentage with osteosarcopenia was in women with the lowest level of physical activity (PA) and high sitting time. Energy expenditure, protein intake and total time PA (hours/week) were significantly higher in healthy women without osteosarcopenia. Consumption of dairy products during the day significantly lowering the risk of osteosarcopenia among women. Systematic participation in physical exercises with a high osteogenic index, such as Pilates, nordic walking, gymnastics, and resistance exercises significantly reduced the risk of osteosarcopenia.

Lifestyle, especially physical inactivity and sedentary behavior, significantly affect the risk of developing osteosarcopenia.

Keywords: osteosarcopenia, energy expenditure, protein, physical activity, sedentary behaviors, postmenopausal women

BİNALARIN YETERSİZ DEPREM PERFORMANSI SEBEBİYLE YIKIM-GÜÇLENDİRME KARARLARINDAKİ İNŞAAT MALİYETİ PARAMETRELERİNE YÖNELİK İNCELEMELER

INVESTIGATIONS ON CONSTRUCTION COST PARAMETER IN DEMOLITION-STRENGTHENING DECISIONS DUE TO INSUFFICIENT EARTHQUAKE PERFORMANCE OF BUILDINGS

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ÖZET

Deprem öncesinde ve sonrasında mevcut zayıf yapıların yıkılıp yeniden inşa edilmesi veya güçlendirilmesi kararı pek çok parametreye bağlıdır; bunlardan biri de gerçekçi yeniden inşa maliyetinin tahminidir. Sunulan bildiri kapsamında Türkiye'de yaklaşık bina ve inşaat maliyetlerinin yıllık tahmin süreçleri anlatılacak, bakanlıklar tarafından yayınlanan bina maliyetlerinin belirlenmesi süreci incelenecek ve yıllık bina inşaat maliyetlerinin değişimi yayınlanacak. 1995-2023 yılları arası incelenecektir. Bu amaçla 28 yıllık veriler derlenmiş, ilgili yılın döviz bazında tercümesi yapılmış, bugün döviz ($) ve yerel para birimi (TL) yapılmış, analiz edilmiş ve gerekli düzeltmeler yapılarak grafiklere yorumlanmıştır. Çalışma sonucunda inşaat sektöründeki maliyet değişimlerinden sonuçlar çıkarmak, yeniden inşa veya güçlendirme kararlarının alınmasında tahmin araçları önermek amaçlanmaktadır.

Anahtar Kelimeler: inşaat maliyet mühendisliği, deprem performansı, onarım takviyesi maliyeti.

ABSTRACT

Before and after the earthquake, the decisions of the existing weak structures to demolish and rebuild or strengthened, depends on many parameters one of which is "the estimation of the realistic reconstruction cost". Within the scope of the paper presented, the yearly estimation processes of the approximate building and construction costs in Turkey will be explained, the process of the determination of the building costs published by the ministries will be examined and the change of annual building construction costs published between 1995 and 2023 will be investigated. For this purpose, 28 years of data were compiled, translated into foreign exchange basis of the relevant year, foreign exchange ($) and local currency (TL) were made today, analyzed and interpreted to the graphics by making necessary corrections. The objective is to extrapolate outcomes from cost fluctuations within the construction industry, intending to propose forecasting mechanisms for guiding decisions on reconstruction or reinforcement.

Keywords: construction cost engineering, earthquake performance, repair strengthening cost.

SİVAS İLİNDE SIFIR ATIK UYGULAMALARININ DÖNGÜSEL KAZANIMININ DEĞERLENDİRİLMESİ
EVALUATION OF CIRCULAR RECOVERY OF ZERO WASTE PRACTICES IN SİVAS PROVINCE

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ÖZET

Sıfır Atık, yaklaşımı döngüselliğe dayalı bir kaynak ve atık yönetimidir. Sürdürülebilir tüketim alışkanlıkları ile üretimi teşvik eder ve kaynakların verimli kullanılmasını destekler. Sıfır atık, israftan kaçınmayı ve atığın önlenmesini, azaltılmasını, yeniden kullanılmasını ve geri dönüştürülmesini savunan bir sistemdir. Böylece sosyal dayanışmanın geliştirilmesi de dahil olmak üzere olumlu sosyo-ekonomik sonuçlara ulaşılmasına yardımcı olabilir. Kağıt, ahşap, plastik, cam, kompozit, metal, bitkisel atık yağ, elektronik ve atık pil sıfır atık yönetimi kapsamındaki atık türleridir. Ülkemizde 2019 yılından itibaren Sıfır Atık Yönetmeliği ile beraber Sıfır Atık sistemine geçmek yasal zorunluluk olmuştur. Sivas ili genelinde de Sıfır Atık projelerinde uygulamaya geçilmiş ve bu çalışmada 2018-2023 yılları arasında gerçekleştirilen bu projelerin sayısı ve döngüsel olarak doğal kaynaklar-çevresel açılardan kazanımlar incelenmiştir. Sivas ilinde sıfır atık projesine şu ana kadar toplam olarak 1.333 kurum ve kuruluş katılmıştır. 2018 ve 2023 yılları arasında toplamda yaklaşık olarak 2.014 ton atık plastik, 5.833 ton atık kağıt, 35 ton atık pil, 42 ton atık motor yağı, 2.539 ton elektrikli ve elektronik atık, 103 ton bitkisel atık yağ, 11.268 ton atık metal, 39 ton atık cam ve toplamda 21.840 ton atık toplanmış ve döngüsel kazanımı sağlanmıştır. Bu kazanımlar ile; 53.559 m^3 atık depolama alanı tasarrufu, 42.776.105 kwh enerji tasarrufu, 2.187 ton sera gazı, 5.251.555 lt petrol, 99.154 adet ağaç, 163.313 m^3 su tasarrufu, 30 lt baz yağ, 16.472 ton hammadde ve 103.191 lt biyodizel döngüsel kazanımı sağlanmıştır. Ayrıca Sıfır atık farkındalığının arttırılması amacıyla kurum ve kuruluşlar aracılıyla 190.325 kişiye eğitim verildiği görülmüştür.

Anahtar Kelimeler: Sıfır atık, Döngüsel Kazanım, Sivas

Abstract

Zero Waste is a resource and waste management approach based on circularity. It encourages production with sustainable consumption habits and supports the efficient use of resources. Zero waste is a system that advocates avoiding waste and preventing, reducing, reusing and recycling waste. Thus, it can help achieve positive socio-economic outcomes, including improving social solidarity. Paper, wood, plastic, glass, composite, metal, waste vegetable oil, electronics and waste batteries are the types of waste within the scope of zero waste management. In our country, it has become a legal obligation to switch to the Zero Waste system with the Zero Waste Regulation since 2019. Zero Waste projects were implemented throughout Sivas province, and in this study, the number of these projects carried out between 2018 and 2023 and the gains in terms of natural resources and environmental aspects were examined cyclically. A total of 1,333 institutions and organizations have participated in the zero waste project in Sivas province so far. Between 2018 and 2023, a total of approximately 2,014 tons of waste plastic, 5,833 tons of waste paper, 35 tons of waste batteries, 42 tons of waste engine oil, 2,539 tons of electrical and electronic waste, 103 tons of waste vegetable oil, 11,268 tons of waste metal, 39 tons of waste. Glass and a total of 21,840 tons of waste were collected and recycled. With these gains; 53,559 m3 of waste storage space was saved, 42,776,105 kWh of energy was saved, 2,187 tons of greenhouse gases, 5,251,555 lt of oil, 99,154 trees, 163,313 m3 of water were saved, 30 lt of base oil, 16,472 tons of raw materials and 103,191 lt of biodiesel were saved. Additionally, it was observed that 190,325 people were trained through institutions and organizations in order to increase zero waste awareness.

Keywords: Zero waste, Circular Recovery, Sivas

İKLİM DEĞİŞİKLİĞİNİN YÜZEYSEL SU KAYNAKLARI ÜZERİNE ETKİSİ; KIZILIRMAK ÖRNEĞİ

THE CLIMATE CHANGE IMPACT ON SURFACE WATER RESOURCES; THE CASE OF KIZILIRMAK

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ÖZET

İklim sistemimizde meydana gelen değişiklikler nedeniyle oluşan çevre sorunları günümüzde önemli konular arasındadır. Özellikle iklim sisteminin değişimine sebep olan küresel ısınma ile doğrudan ilişkilidir. Küresel ısınma uzun sürede (yıllarca), sistemli olarak yağış ve sıcaklıkta meydana gelen değişiklikler olarak ifade edilebilir. İklim değişikliğinin olumsuz etkileri arasında en önemlisi canlı ve insan yaşamı üzerinde doğrudan etkisi olan karasal su döngüsü üzerinde meydana getirdiği etkilerdir. Ülkemizde bulunan sınırlı su kaynakları ve nüfusunun artışı göz önünde bulunduğunda, son yıllarda su talebi ile arzı arasında oluşan fark sürekli olarak artmaktadır. İlerleyen yıllarda gerekli önlem ve uyum çalışmaları yapılmaz ise bu durum mevcut su kaynaklarını tehlikeye atarak kötüleştirmesine neden olabilir. Bu çalışmada Sivas il sınırları içerisinden doğarak Karadeniz'e boşalan Türkiye'nin en uzun nehri olan Kızılırmak'ın uzun yıllar akım ortalaması ve son 10 yılda akım rejiminin meteorolojik faktörlerle ilgisi ortaya konulmuştur. Bu amaçla 5 akım gözlem istasyonundan (DSİ) akım verileri ve 4 Meteoroloji istasyonundan (MGM) veriler alınmıştır. Meteoroloji verilerinden il merkezi ve Kızılırmak havzasında yer alan ilçelerde uzun yıllar ortalama sıcaklıklarda 1 ile 2 ^{O}C derece aralığında bir artış olduğu bu artışın ise şu andaki ortalama dünyamızın yüzey sıcaklığı artışı olan (+1,16 ^{O}C) ile örtüştüğü görülmüştür. Sivas ilinde yıllık ortalama yağışlarda bölgesel olarak %10-20 ve Kızılırmak havzası akarsu debilerinde ise %30'lara varan azalmaların olduğu hesaplanmıştır. Ayrıca DSİ'den temin edilen elektriksel iletkenlik (EC) verilerine bakıldığında son yıllarda EC parametresi bakımından Kızılırmak'ın su kalitesinin düştüğü görülmüştür.

Anahtar Kelimeler: Küresel ısınma, Yüzey suları, Debi, Sıcaklık, Yağış.

ABSTRACT

Environmental problems caused by changes in our climate system are among the most important issues today. It is directly related to global warming, which causes changes in the climate system. Global warming can be expressed as systematic changes in precipitation and temperature over a long period of time (years). The most important among the negative effects of climate change is its effects on the terrestrial water cycle, which has a direct impact on living and human life. Considering the limited water resources in our country and the increase in population, the difference between water demand and supply has been increasing continuously in recent years. If necessary precautions and adaptation studies are not taken in the following years, this situation may jeopardize and worsen the existing water resources. In this study, the long-term average flow of Kızılırmak, the longest river of Turkey, which originates in Sivas province and empties into the Black Sea, and the relationship between the flow regime in the last 10 years and meteorological factors were revealed. For this purpose, flow data were obtained from 5 current observation stations (DSİ) and 4 meteorological stations (MGM). From the meteorological data, it is seen that there has been an increase in the average temperatures in the provincial center and the districts located in the Kızılırmak basin in the range of 1 to 2 ^{O}C degrees for many years, and this increase coincides with the current average increase in the surface temperature of the earth (+1.16 ^{O}C). It has been calculated that there are regional decreases of 10-20% in annual average precipitation in Sivas

province and up to 30% in Kızılırmak basin stream flow rates. In addition, the electrical conductivity (EC) data obtained from DSI showed that the water quality of Kızılırmak has decreased in terms of EC parameter in recent years.

Keywords: Global warming, Surface waters, Flow, Temperature, Precipitation.

DİFLUKORTOLON VALERAT VE İZOKONAZOL NİTRAT MOLEKÜLLERİNİ İÇEREN FARMASÖTİK POMAD ÜRÜNLERİNDE YÜKSEK PERFORMANSLI SIVI KROMOTOGRAFİSİ (HPLC) İLE MİKTAR TAYİNİ ANALİZ YÖNTEMİNİN GELİŞTİRİLMESİ

DEVELOPMENT OF THE ANALYSIS METHOD FOR QUANTITATION OF PHARMACEUTICAL POMADE PREPARATIONS CONTAINING DIFLUCORTOLONE VALERATE AND ISOCONAZOLE NITRATE MOLECULES BY HIGH PERFORMANCE LIQUID CHROMOTOGRAPHY (HPLC)

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ÖZET

Bu tez kapsamında, Streptococcus, Staphylococcus aureus ve Corynebacterium minutissimum gibi, gram-pozitif bakterilerin oluşturduğu derideki mantar tedavisinde kullanılan Diflukortolon Valerat, ve İzokonazol Nitrat etken maddelerini içeren farmasötik preparatın analizi için yüksek performanslı sıvı kromatografisi (HPLC) cihazı ile yöntem geliştirme ve metot validasyonu çalışmaları gerçekleştirilmiştir. Analiz yönteminde, sabit faz olarak, ACE C18 100x4.6 mm, 3 µm kolon tercih edilmiş olup, hareketli faz olarak tercih edilen Asetonitril: Metanol: Tampon (40: 42: 18) gradient sistemi ile 1.0 mL/dk akış hızında metot optimize edilmiştir. Ultraviyole dedektörde 235 nm dalga boyunda gerçekleştirilen çalışmada Diflukortolon Valerat ve İzokonazol Nitrat alıkonma zamanları sırasıyla 4.0 dk, 8.0 dk'dır. Geliştirilen yöntemler ICH Q2(R1) analitik yöntem validasyon parametreleri baz alınarak gerçekleştirilmiş olup, Spesifiklik, çalışma aralığı, doğrusallık, doğruluk, kesinlik, tekrarlanabilirlik, sağlamlık, çözelti stabilitesi, sistem uygunluk parametreleri esas alınmıştır. Doğrusallık aralıkları %25 ile %150 arasında bakılmış olup Diflukortolon Valerat 0,005 mg/mL – 0,024 mg/mL, İzokonazol Nitrat için 0,05 mg/mL – 0,24 mg/mL, olarak raporlandırılmıştır. Cihazda oluşabilecek küçük çaptaki kolon sıcaklığı değişimi ve akış hızı değişiminin yöntemi etkilemediği güvenilirlik çalışması ile kontrol edilmiştir. Yapılan çalışmalarda numune ve standart çözeltisinin 30 saat boyunca stabil olduğu gözlemlenmiştir. Geliştirilen yöntemin validasyon çalışmaları sonuçları neticesinde, doğru, kesin, özgün, duyarlı, tutarlı ve sağlam olduğu ispatlanmıştır. Valide edilen yöntem ile piyasadan temin edilen, her iki etken maddeyi içeren farmasötik preparat analiz edilmiş ve birim dozda olması gereken etken madde miktarının güvenirliliği kanıtlanmıştır.

Anahtar Kelimeler: HPLC, Diflukortolon Valerat, İzokonazol Nitrat, Metot Validasyonu

ABSTRACT

Within the scope of this thesis, method development and method validation studies were carried out with a high-performance liquid chromatography (HPLC) device for the analysis of pharmaceutical preparations containing the active ingredients Diflucortolone Valerate and Isoconazole Nitrate, which are used in the treatment of skin fungi caused by gram-positive bacteria such as Streptococcus, Staphylococcus aureus and Corynebacterium minutissimum has been carried out. In the analysis method, ACE C18 100x4.6 mm, 3 µm column was preferred as the stationary phase, and the method was optimized at a flow rate of 1.0 mL/min with the Acetonitrile: Methanol: Buffer (40: 42: 18) gradient system, which was preferred as the mobile phase. In the study carried out in an ultraviolet detector at a wavelength of 235 nm, the retention times of Diflucortolon Valerate and Isoconazole Nitrate were 4.0 min and 8.0 min, respectively. The developed methods were based on ICH Q2(R1) analytical method

validation parameters. Specificity, working range, linearity, accuracy, precision, repeatability, robustness, solution stability and system suitability parameters were taken as basis. Linearity ranges were examined between 25% and 150% and were reported as 0.005 mg/mL – 0.024 mg/mL for Diflucortolone Valerate and 0.05 mg/mL – 0.24 mg/mL for Isoconazole Nitrate. Small column temperature changes that may occur in the device and it has been checked by reliability study that the flow rate change does not affect the method. In the studies conducted, it was observed that the sample and standard solution were stable for 30 hours. As a result of the validation studies, the developed method has been proven to be accurate, precise, specific, sensitive, consistent and robust. With the validated method, the pharmaceutical preparation containing both active ingredients, obtained from the market, was analyzed and the reliability of the amount of active ingredient required in the unit dose was proven.

Keywords: HPLC, Diflucortolone Valerate, Isoconazole Nitrate, Method Validation

KRİSTAL VİYOLENİN HİDROKSİAPATİT İLE ADSORSİYONUN İNCELENMESİ

INVESTIGATION OF THE ADSORPTION OF CRYSTAL VIOLET ON HYDROXYAPATITE

Aysun ATEŞ

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ÖZET

Atık suların çevresel etkilerinin azaltılması, özellikle büyük hacimli atık suların içinde bulunan toksik ve kanserojen özelliklere sahip boyar maddelerin etkili bir biçimde uzaklaştırılması, günümüzde çevre koruma alanında artan bir öneme sahiptir. Bu bağlamda, özellikle Kristal Viyole gibi boyar maddelerin arıtımı, çevre koruma çabalarının merkezine yerleştirilmiştir. Bu çalışma, sulu çözeltilerden Kristal Viyole boyar maddesinin adsorpsiyon yoluyla uzaklaştırılması için sentezlenen hidroksiapatitin kullanılabilirliğini araştırılmıştır. Araştırma sonuçlarına göre, maksimum adsorpsiyon değerleri, pH 4, 0.5 g adsorbent içeren ortamda, 25°C'de ve başlangıç Kristal Viyole konsantrasyonunun 50 mg/L olduğu durumda elde edilmiştir. Adsorbent miktarının belirli bir değere kadar artışı, boyar madde gideriminde artışa neden olmuştur. Ayrıca, adsorpsiyonun 120. dakikada dengeye ulaştığı ve boyar madde konsantrasyonundaki artışın giderim verimini düşürdüğü belirlenmiştir. Sıcaklığın 25°C'den 45°C'ye çıkarılmasının da boyar madde giderimini artırdığı tespit edilmiştir. Optimal deney koşullarında, hidroksiapatitin Langmuir ve Freundlich izoterm modelleri ile yalancı birinci ve ikinci derece kinetik modellere uygunluğu analiz edilmiş ve Kristal Viyole' nin giderim mekanizmaları araştırılmıştır. Termodinamik parametreler arasında Gibbs serbest enerjisi (ΔG°), entropi (ΔS°), ve entalpi (ΔH°) değerleri belirlenmiştir. Hidroksiapatit için negatif ΔG° değerleri, adsorpsiyonun kendiliğinden gerçekleştiğini göstermiştir. ΔS°' nin pozitif değerleri, adsorpsiyon işlemi sırasında katı/sıvı ara yüzeyinin düzensizliğinin arttığını, negatif olması düzensizliğin azaldığını gösterir. Kristal Viyole işlemlerinin adsorpsiyonu için pozitif ΔH° olması da adsorpsiyonun endotermik ve kendiliğinden olduğunu göstermiştir. Bu çalışma, hidroksiapatitin Kristal Viyole'nin adsorpsiyonu için etkili bir adsorban olarak kullanılabileceğini ortaya koyulmuştur.

Anahtar Kelimeler: Adsorpsiyon, Boyar madde, Kinetik, Kristal Viyole, Termodinamik

ABSTRACT

The mitigation of environmental issues stemming from wastewater, particularly the effective and economical removal of colorants found in large-volume wastewater, holds increasing significance in contemporary environmental conservation. In this context, the purification of colorants with toxic and carcinogenic effects, such as Crystal Violet, has become a focal point of environmental protection efforts. This study investigates the use of hydroxyapatite, synthesized for the adsorption-based removal of Crystal Violet colorant from aqueous solutions. According to the findings of the research, maximum adsorption values were observed at pH 4, in a medium containing 0.5 g of adsorbent, at 25°C, with an initial Crystal Violet concentration of 50 mg/L. The increase in the amount of adsorbent up to a certain value led to an enhancement in colorant removal. Additionally, it was determined that adsorption reached equilibrium at 120 minutes and an increase in colorant concentration beyond this point resulted in a reduction in removal efficiency. The elevation of temperature from 25°C to 45°C was also found to increase colorant removal. Under optimal experimental conditions, the suitability of hydroxyapatite for Crystal Violet removal was analyzed with Langmuir and Freundlich isotherm models, as well as pseudo-first and second-order kinetic models. The mechanisms of Crystal Violet removal were explored. Thermodynamic parameters, including Gibbs free energy (ΔG°), entropy (ΔS°), and enthalpy (ΔH°),

were determined. Negative ΔG° values for hydroxyapatite indicated the spontaneity of the adsorption process. Positive ΔS° values suggested an increase in the disorder at the solid/liquid interface during the adsorption process, while negative values indicated a decrease in disorder. The positive ΔH° for Crystal Violet adsorption processes demonstrated the endothermic nature and spontaneity of adsorption. This study demonstrates that hydroxyapatite can effectively serve as an adsorbent for the removal of Crystal Violet through adsorption processes.

Keywords: Adsorption, Dyestuff, Kinetics, Crystal Violet, Thermodynamics.

ÖZEL OKUL ÖĞRETMENLERİNE GÖRE ÖRGÜT KÜLTÜRÜYLE ÖRGÜTSEL YARATICILIK ARASINDAKI İLİŞKİ: KABİL ÖRNEĞİ

THE RELATIONSHIP BETWEEN ORGANIZATIONAL CULTURE AND ORGANIZATIONAL CREATIVITY ACCORDING TO PRIVATE SCHOOL TEACHERS: KABİL EXAMPLE

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ÖZET

Örgüt kültürü, bir örgütü başka bir örgütten ayıran aslında o örgüte özel ve benzersiz bir kişilik ve kimlik kazandıran özel bir yol veya alandır. Dolayısıyla örgüt kültürü her örgütün sosyal kimliğini oluşturur. Örgüt kültürü örgüt içinde bulunan inanç, değer ve varsayımların birleşimidir. Örgüt kültürü türleri; yapıcı, pasif/savunmacı, agresif/savunmacı, rasyonel, ideolojik, katılımcı, hiyerarşik kültür olmak üzere 7 kültür türü sıralanabilir.

Yaratıcılık, insanların baktığı olgulara bakmanın farklı bir yoludur. Yaratıcılık, örgütün sosyal ve ekonomik gücünde hedefli bir değişim yaratma girişimidir. Genel olarak yaratıcılığı etkileyen faktörleri; bireysel, grupsal ve örgütsel faktörler olmak üzere üç bölümde ele alınabilir. Bireysel faktörler; risk alma, meydan okuma, belirsizlik, içsel motivasyon, entelektüel yetenek, geniş görüş alanı, kişilik, bilim, bilgi, uzmanlık, eylemde bağımsızlıktır. Grup faktörlerini; grup çeşitliliği, grup uyumu ve iletişim sistemi oluşturur. Örgütsel faktörler de örgüt kültürü, örgüt yapısı, örgüt iklimi, yönetim desteği, iletişim sistemi, liderlik tarzı, kontrol, kaynaklar, tesisler, strateji, hedefler, değerlendirme ve ödül sistemini içerir.

Bu araştırmanın amacı örgüt kültürünün örgütsel yaratıcılığa etkisini belirlemektir. Araştırma Afganistan'ın Kabil İlinde özel ortaokulda görev yapan 27 öğretmeni kapsamaktadır. Araştırma nitel bir çalışmadır. Araştırma verilerini toplamak için araştırmacılar tarafından geliştirilmiş olan beş temel, üç alt sorular olmak üzere 8 sorudan oluşmuştur. Veriler görüşme tekniğiyle toplanmış, görüşmeler ses kayıt cihazı ve yazıyla kayıt altına alınmıştır.

Elde edilen bulgulara göre öğretmenler örgüt kültürünün öğretmenlerin yaratıcılığına olumlu veya olumsuz yönde etkilediğini ifade etmişlerdir. Eğer örgüt kültürü yaratıcılık için olumlu bir ortam hazırlarsa yaratıcılığı artıracağını, olumsuz bir ortam hazırlarsa yaratıcılığı olumsuz yönde etkileyeceğini ifade etmişlerdir.

Anahtar kalemler: Örgüt kültürü, örgütsel yaratıcılık, öğretmenler, Kabil, Afganistan

ABSTRACT

Organizational culture is a unique path or domain that distinguishes one organization from another and essentially gives that organization a distinct personality and identity. Therefore, organizational culture determines the social identity of each organization, encompassing beliefs, values, and assumptions within the organization. Various types of organizational cultures exist, including constructive, passive/defensive, aggressive/defensive, rational, ideological, participative, and hierarchical cultures.

Creativity is a different way of looking at phenomena compared to others. Creativity is an intentional effort within the social and economic power of an organization to bring about targeted change. Generally, factors influencing creativity can be categorized into three sections; individual, group, and organizational factors. Individual factors encompass risk-taking, challenging assumptions, dealing with uncertainty, internal motivation, intellectual capability, broad perspective, personality, science, knowledge, and expertise, including independence in action. Group factors involve diversity within the group, group cohesion, and communication systems. Organizational factors include organizational culture, organizational structure, organizational climate, management support, communication system, leadership style, control, resources and facilities, strategy and goals, and assessment and reward systems. The aim of this research is to determine the impact of organizational culture on organizational creativity. The study encompasses 27 teachers working in a private middle school in Kabul, Afghanistan. It is a

qualitative study, and data collection involves eight questions based on five main and three sub-questions developed by the researchers. The data were collected through interview techniques and recorded both in audio and written formats.

According to the findings, teachers expressed that organizational culture positively or negatively influences teachers' creativity. If organizational culture creates a positive environment for creativity, it enhances creativity; however, if it creates a negative environment, it adversely affects creativity.

Keywords: Organizational culture, Organizational creativity, Teachers, Kabil, Afganistan

OBTAINING ENERGY AND BY-PRODUCTS (BIOFERTILIZER, BIOCHAR) FROM ORGANIC WASTE

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ÖZET

Organik artıklardan anaerobik koşullarda üretilen metan gazının yanı sıra kalan atık da bitki besin elementleri açısından zengin olup gübre olarak değerlendirilebilmektedir. Yanıcı olan biyogaz karışımı, yüksek ısıl değere sahip bir enerji kaynağıdır. Biyogaz üretimi sonucunda sıvı halde fermente organik gübre (biyogübre) oluşmaktadır. Biyogaz üretim tesisi çıkışında oluşan bu gübre tarlaya sıvı halde enjekte edilebileceği gibi granül formuna dönüştürülebilir veya doğal kurumaya da tabi tutulabilir. Bu şekilde elde edilen gübrenin en önemli avantajı anaerobik fermantasyon sonrası patojen mikroorganizmaların büyük bir bölümün yok edilmiş olmasıdır.

Biyokömür materyali karbon içeriği zengin, lignoselülozik biyokütlenin, alglerin, belediye katı atıklarının, kentsel organik atıkların ve hayvan atıklarının oksijen bakımından sınırlı bir ortamda termokimyasal dönüşüm işlemi ile oluşan katı haldeki ürünlerdir. Termokimyasal hammadde dönüşümü esnasında, hammaddenin yapısında bulunan bağların kopması yada zincir kırılmaları sonucunda organik madde bozunarak katı, sıvı ve gaz ürünlere dönüşür. Oluşan katı ürün biyokömür, sıvı ürün biyo-yağ ve gaz ürünlere de sentez gazı denilmektedir. Biyokömür toprak düzenleyici, inşaat sektörü, kozmetik endüstrisi , gida endüstrisi ve enerji üretimi gibi farklı alanlsarda kullanılmaktadır. Bu çalışmada organik atıklarınn cevreye faydalı ürünler olarak değerlendirebileceği ve bu konularda ülkemizde ve dünyadaki mevcut durum tartışılacaktır.

Anahtar Kelimeler: anaerobik arıtım, organik atık, biyokömür, biogaz, biogübre

ABSTRACT

In addition to the methane gas produced from organic residues under anaerobic conditions, the remaining waste is also rich in plant nutrients and can be used as fertilizer. The flammable biogas mixture is an energy source with high calorific value. As a result of biogas production, liquid fermented organic fertilizer (biofertilizer) is formed. This fertilizer, which is formed at the exit of the biogas production facility, can be injected into the field in liquid form, or it can be converted into granule form or subjected to natural drying. The most important advantage of the fertilizer obtained in this way is that most of the pathogenic microorganisms are destroyed after anaerobic fermentation.

Biochar materials are solid products formed by the thermochemical transformation process of carbon-rich, lignocellulosic biomass, algae, municipal solid waste, urban organic waste and animal waste in an oxygen-limited environment. During thermochemical raw material transformation, organic matter decomposes and turns into solid, liquid and gaseous products as a result of the breaking of bonds or chain breaks in the structure of the raw material. The solid product formed is called biochar, the liquid product is called bio-oil and the gaseous products are called synthesis gas. Biochar is used in different areas such as soil conditioner, construction industry, cosmetics industry, food industry and energy production. In this study, it will be discussed that organic wastes can be evaluated as environmentally beneficial products and the current situation on these issues in our country and in the world.

Keywords: anaerobic treatment, organic waste, biochar, biogas, biofertilizer

DERİN DENİZ MADENCİLİĞİNİN ÇEVRE VE GELİŞEN TEKNOLOJİ AÇISINDAN DEĞERLENDİRİLMESİ

EVALUATION OF DEEP SEA MINING IN TERMS OF ENVIRONMENT AND DEVELOPING TECHNOLOGY

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ÖZET

Derin deniz madenciliği sahip oldukları büyük mineral rezervuarı nedeniyle ((hidrotermal sülfürler, polimetalik nodüller ve manganez kabukları), gaz-hidratlar ve biyolojik-biyoteknoloji ile nadir toprak elementleri (NTE)), yüksek teknoloji ve savunma uygulamalarında kullanılan metal yataklar, yeşil teknolojiler veya iletişim sistemleri ve eko-endüstri için metaller ve minerallerin artan gereksinimi karşılaması söz konusudur.

Bu çalışmada bu gereksinimle gelinen madencilik uygulamalarının mekanik süreci ve çevresel etmenler incelenmiştir. Derin deniz madenciliği insan faaliyetleri nedeniyle tortu bulutlarının oluşmasının önemli bir çevresel risk kaynağı olarak bilinmektedir. Derin deniz bentik faunası için tehdit oluşturmaktadır. Süngerler, derin deniz ekosistemlerinin önemli bileşenleridir ve özellikle yüksek askıda tortu konsantrasyonlarına karşı hassastırlar. Derin deniz ekosistemlerinde yaşam; düşük sıcaklık, yok denecek kadar az güneş radyasyonu ve son derece yüksek basınç altındadır. Bu durum aşırı zayıf ortam karakterizasyonu sağlar ve teknolojik kısıtlamalar oluşturur.

Derin deniz cevherlerini taşımanın en umut verici yolu yüzeye dikey hidrolik (VHT) taşımadır. VHT'nin dinamik performansları üzerine çok sayıda çalışma hesaplamalı akışkanlar dinamiği ve ayrık elemanlar metodu (CFD-DEM) ile yapılmaktadır. Karmaşık okyanus akıntıları ve kırılgan ekolojik nedenlerle derin deniz ortamı ileri teknoloji ekipmanların geliştirilmesini zorunlu kılmıştır.

Yakın geleceğin enerji kaynakları alışılagelmedik hidrokarbon kaynaklar olarak nitelendirilmektedir. Daha fazla su derinliğine sahip alanlarda gelişen sondaj teknolojisi sayesinde erişim sağlanabilir olması özellikle etrafı denizlerle kaplı ülkeler için sondaj gemisi üretim teknolojilerinin gelişimini ön plana çıkarmaktadır. Bu tür üretim teknolojileri ekosistemini oluşturan ülkeler her çoğrafyada doğal kaynak arayan ülkelerdir.

Anahtar Kelimeler: Çevresel etmenler, derin deniz madenciliği, maden makinaları

ABSTRACT

Deep-sea mining is important due to its large mineral reservoirs ((hydrothermal sulphides, polymetallic nodules and manganese crusts), gas-hydrates and biological-biotechnology and rare earth elements (REE)), metal deposits used in high-tech and defense applications, green technologies or communications. It is possible to meet the increasing demand for metals and minerals for industrial systems and eco-industry.

In this study, the mechanical process and environmental factors of mining applications that come with this requirement are examined. Deep-sea mining is known to be a significant source of environmental risk due to the formation of sediment clouds due to human activities. It poses a threat to deep-sea benthic fauna. Sponges are important components of deep-sea ecosystems and are particularly sensitive to high suspended sediment concentrations. Life in deep sea ecosystems; It is under low temperature, almost no solar radiation and extremely high pressure. This provides extremely poor environmental characterization and creates technological limitations.

The most promising way to transport deep-sea ores is surface vertical hydraulic (VHT) transportation. Many studies on the dynamic performances of VHT are carried out using computational fluid dynamics

and discrete element method (CFD-DEM). Due to complex ocean currents and fragile ecological conditions, the deep-sea environment has necessitated the development of high-tech equipment.

The energy sources of the near future are described as unconventional hydrocarbon resources. The availability of access thanks to the developing drilling technology in areas with greater water depth brings to the fore the development of drilling ship production technologies, especially for countries surrounded by seas. Countries that form this type of production technologies ecosystem are countries that seek natural resources in every geography.

Keywords: Environmental factors, deep sea mining, mining machinery

PATLAMA ALTINDA KATMANLI KOMPOZİTLERİN HASAR DİRENCİNİN ARAŞTIRILMASI

INVESTIGATION OF THE DAMAGE RESISTANCE OF LAMINATED COMPOSITES UNDER THE EXPLOSION

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ÖZET

Kompozit malzemeler birden fazla malzemenin bir araya getirilerek, malzemelerin farklı avantajlı yönlerinin tek bir malzemede birleştiği bir yapıdır. Kompozit malzemelerin kullanım alanı özellikle savunma ve havacılık sanayinde giderek artmaktadır. Günümüzde önemi giderek artan zırhlı kara araçları ve İHA'ların tasarımında kompozit malzemelerin yüksek mukavemeti ve düşük yoğunluğu sebebiyle kullanımı yaygınlaşmaktadır. Karbon/Epoksi ve Glass/Epoksi malzemelerinin bu alanlarda yoğun bir şekilde tercih edildiği görülmektedir. Bu sebeple bu çalışmada Karbon/Epoksi ve Glass/Epoksi malzemeler kullanılarak ANSYS ile altı, sekiz ve on iki katman sayısı ve 100x100 mm ebatlarında kompozit bir plaka oluşturulmuş ve üzerine uygun anlık basınç oluşturan patlayıcılar tanımlanarak farklı patlayıcı enerji (48Joule, 384 Joule) ile malzemenin gerilme, deformasyon gibi mekanik özellikleri incelenmiştir. Bu patlayıcı yükler günümüzde literatürde referans olarak kabul gören birim hacimdeki TNT patlayıcı malzeme olarak tanımlanmıştır. Bu plakalar her biri kolay ulaşılabilir olan 0.25 mm kalınlığında toplam on iki sekiz ve altı katmandan oluşan farklı kombinasyonlarda oluşturulmuştur. Bu kombinasyon modelleri şu şekildedir;

- [(0C/90C/0C)]S
- [(0G/90G/0G)]S
- [(0C/90C/0C/90C)]S
- [(0G/90G/0G/90G)]S
- [(0C/90C/0C/90C/0C/90C)]S
- [(0G/90G/0G/90G/0G/90G)]S

İlk dört dizilime uygulanan patlayıcı ebatları ve buna bağlı patlayıcı enerjileri eşit olup, bu patlamada Karbon/Epoksi ve Glas/Epoksi plakanın patlayıcı enerjiye maruz kaldığında yapısal deformasyonları incelenmiştir. Yine aynı malzeme dizilimine sahip altı ve sekiz katmanlı dizilimler ile; malzeme kalınlığının yapısal deformasyona etkileri incelenmiştir. On iki katmandan oluşan son iki dizilimde patlayıcı ebatları ve katman sayıları arttırıldığında yüksek enerjili patlayıcı ile yapılan analiz sonuçları kıyaslanmıştır. Elde edilen sonuçlar Karbon/Epoksinin yaygın olarak tercih edilme sebepleri hakkında fikir vermektedir. Bu çalışma, zırhlı kara araçları ve İHA'ların tasarımında kullanılan kompozit malzemelerin en yaygın türlerinden olan Karbon/Epoksi ve Glass/Epoksi'nin yüksek enerjili hasara maruz kaldığında tepkilerinin incelenmesine ve daha uygun kombinasyonlar ile tasarımın optimize edilmesine katkı sağlamaktadır.

Anahtar Kelimeler: Kompozit, Karbon/Epoksi, Glass/Epoksi Sonlu Elemanlar Metodu, ANSYS, Yapısal Hasar

ABSTRACT

Composite materials are a type of construction that involves the combination of many materials, allowing for the integration of their respective favorable properties into a single material. The application of composite materials is progressively expanding, particularly in the defense and aerospace fields. The usage of composite materials in the construction of armored ground vehicles and unmanned aerial vehicles (UAVs), which are gaining significance in contemporary times, is becoming prevalent owing to their exceptional strength and low weight. The Carbon/Epoxy and Glass/Epoxy compound is often favored in these locations. For this reason, in this study, a composite plate with a number of six, eight, and twelve layers and dimensions of 100x100 mm was formed with ANSYS using carbon/epoxy and Glass/Epoxy materials and the mechanical properties of the material such as stress, deformation were examined with different explosive energy (48Joule, 384 Joule) by defining explosives that create appropriate instantaneous pressure on it. These explosive charges are defined as TNT explosive material per unit volume, which is currently accepted as a reference in the literature. These plates were formed in different combinations of twelve eight and six layers, each with a thickness of 0.25 mm, each of which is easily accessible. These combination models;

- [(0C/90C/0C)]S
- [(0G/90G/0G)]S
- [(0C/90C/0C/90C)]S
- [(0G/90G/0G/90G)]S
- [(0C/90C/0C/90C/0C/90C)]S
- [(0G/90G/0G/90G/0G/90G)]S

The explosive sizes and the associated explosive energies applied to the first four arrays were equal, and the structural damages of the Carbon/Epoxy and Glas/Epoxy plate when exposed to explosive energy were investigated in this explosion. The effects of material thickness on structural deformation were analyzed with six and eight-layer formations with the same material arrangement. In the last two arrays consisting of twelve layers, the results of the analyses performed with high-energy explosives were compared when the explosive sizes and the number of layers were increased. The obtained data provide perspective into the factors that contribute to the widespread preference for Carbon/Epoxy. This study contributes to investigating the response of Carbon/Epoxy and Glass/Epoxy, which are the most common types of composite materials used in the design of armored ground vehicles and UAVs, when exposed to high energy damage and to optimize the design with more suitable combinations.

Keywords: Composite, Carbon/Epoxy, Glass/Epoxy, Finite Element Method, ANSYS, Instantaneous Pressure

ÇİNKO İÇEREN HAMMADDE VE ATIKLARDAN KATODİK ÇİNKO KÜLÇE ÜRETİMİ İÇİN VERİMİNİN ARAŞTIRILMASI

INVESTIGATION OF THE EFFICIENCY FOR THE PRODUCTION OF CATHODIC ZINC INGOT FROM ZINC-CONTAINING RAW MATERIALS AND WASTES

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ÖZET

Çalışmada Zn metalinin farklı hammaddelerden üretilmesi incelenmiştir. Hammadde olarak %10-13 (liç artığı veya cevher) ve %65-74 Zn içeren (kalsine) hammaddeler ile ayrı ayrı veya bunların karışımı kullanılarak 0.8-2.5 pH aralığında çözümlendirme (liç) işlemleri yapılmış ve sonrasında arıtma işlemleri ile elektrolitik çinko çözeltisi elde edilmiştir. Liç işlemi için sülfürik asit kullanılmıştır. Çözeltideki Fe^{+2} iyonlarının Fe^{+3} iyonlarına yükseltilmesi için H_2O_2 ve $KMnO_4$ yükseltgenlerinden faydalanılmıştır. Liç artığındaki çözünebilir çinkonun çözümlendirilmesi için optimum şartlar; 400 g katı/L pulp oranında 25-40 ^oC sıcaklık, pH=2-2.5 aralığı ve reaksiyon süresi 2 saat olarak bulunurken karbonatlı cevher için bu değerler pulp oranı = 400 g katı/L, sıcaklık=70-75 ^oC, pH=1.2-1.5 aralığı, reaksiyon süresi= 2 saat şeklinde olmuştur. Liç işlemi sonrasında kalsine (veya kalsin) içinse optimum çözündürme şartları 200 g katı/L katı/sıvı (pulp) oranında 75 ^oC sıcaklık, pH=1.5-1.8 aralığı ve reaksiyon süresi 4-6 saat olarak bulunmuştur.

Anahtar Kelimeler: Çinko, Liç, Atık, Külçe, Metalurji.

ABSTRACT

In this study, the production of Zn metal from different raw materials was investigated. With raw materials, containing 10-13% Zn (leach residue or ore) and 65-74% Zn (calcine) as raw materials, dissolution (leaching) processes were carried out in the pH range of 0.8-2.5 either separately or by using a mixture of these, and then with purification processes electrolytic zinc solution was obtained. Sulfuric acid was used for the leaching process. The oxidants H_2O_2 and $KMnO_4$ were used to increase the Fe^{2+} ions in the solution to Fe^{+3} ions. The optimum conditions for the leaching of soluble zinc in the leach residue are found to be 400 g/L solid/liquid (pulp) ratio at 25-40 ^oC temperature, pH=2-2.5 range and reaction time of 2 hours, while these values for carbonate ore are pulp ratio = 400 g/L solid/liquid, temperature=70-75 ^oC, pH=1.2-1.5 range, reaction time=2 hours. Optimum leaching conditions for calcine after leaching were found to be 200 g/L pulp at 75 ^oC temperature, pH=1.5-1.8 range and reaction time 4-6 hours.

Keywords: Zinc, Leaching, Waste, Ingot, Metallurgy.

SODYUM LAURİL SÜLFAT KONSANTRASYONUNUN ANİLİN-AKRİLONİTRİL KOPOLİMERLERİNİN TERMOELEKTRİK ÖZELLİKLERİ ÜZERİNE ETKİSİ

THE EFFECT OF SODIUM LAURYL SULFATE CONCENTRATION ON THE THERMOELECTRIC PROPERTIES OF ANILINE-ACRYLONITRILE COPOLYMERS

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ÖZET
Son zamanalarda, enerji ihtiyacımızın bir kısmının karşılanabilmesi için yenilenebilir enerji kaynaklarından biri olan termoelektrik malzemeler üzerine araştırma faaliyetleri gerçekleştirilmektedir. Termoelektrik malzemeler organik ve inorganik olmak üzere iki gruba ayrılabilirler ve atık ısıdan enerji üretme özelliğine sahiptirler. Organik termoelektrik malzemeler arasında kritik bir polimer olan polianilin (PANI), kolay sentezlenebilmesi, düşük maliyeti ve yeterli stabilitesi ile öne çıkmaktadır. PANI'nin çeşitli katkılama metotlarıyla birlikte elektriksel iletkenliğinin arttırılabildiği ve bu özelliği sayesinde termoelektrik malzeme olarak çok geniş bir alanda kullanıldığı iyi bilinmektedir. Anilin (ANI) ile farklı monomerlerin oluşturduğu kopolimerlerin termoelektrik özellikleri üzerine çeşitli çalışmalar yapılmıştır. Fakat yaygın kullanılan yalıtkan polimerlerden biri olan poliakrilonitril (PAN) ile PANI'yi aynı anda çalışan çok nadir çalışma olduğu göze çarpmaktadır. Bu çalışmanın amacı emülgatör olarak sodyum lauril sülfat (SLS) kullanarak anilin-akrilonitril kopolimerlerini sentezlemek ve reaksiyon ortamına beslenen SLS miktarının monomer dönüşümü, seebeck katsayısı, elektriksel iletkenlik ve power faktor değerlerine olan etkilerini saptamaktır. Bu bağlamda farklı SLS besleme koşullarında ters emülsiyon polimerizasyonu ile poli(ANI-ko-AN) kopolimerleri sentezlenmiş ve monomer dönüşümleri tespit edilmiştir. Yapılan polimerizasyonlar sonucunda en yüksek monomer dönüşümüne 0,0045 mol SLS ile sentezlenen kopolimerde ulaşılmıştır. Ayrıca, sentezlenen kopolimerler kamfor sülfonik asit (CSA) ile katkılanmış ve termoelektrik özellikleri incelenmiştir. 0,003 mol SLS ile sentezlenen kopolimerin monomer dönüşümü %67,4 iken güç faktörü (PF) değeri 0,81 olarak hesaplanmıştır ve maksimum PF değerine en yüksek monomer dönüşümünde ulaşılmamıştır. Yapılan değerlendirmeler sonucunda termoelektrik verim ile monomer dönüşümü arasında doğrudan bir bağlantı olmadığı fakat dolaylı yoldan bir etkinin olduğu görülmüştür.
Anahtar kelimeler: anilin, akrilonitril, sodyum lauril sülfat, kopolimer, termoelektrik

ABSTRACT

Recently, research activities have been conducted on thermoelectric materials, which is one of the renewable energy sources, to supply some amount of our energy needs. Thermoelectric materials can be categorized into two groups as organic and inorganic, and they are capable of generating energy from waste heat. Polyaniline (PANI) is a critical polymer among the organic thermoelectric materials, and stands out due to its easy synthesis, low cost and adequate stability. It is well known that the electrical conductivity of PANI can be enhanced through various doping methods, making it suitable for a wide range of applications as a thermoelectric material. Various studies have been conducted on the thermoelectric properties of copolymers comprised from aniline (ANI) and different monomers. However, it should be noted that there are few studies including polyacrylonitrile (PAN), which is insulating polymer, and PANI simultaneously. The aim of this study is to synthesize aniline-acrylonitrile copolymers using sodium lauryl sulfate (SLS) as an emulsifier, and to determine the effects of the amount of SLS feed into the reaction medium on monomer conversion, Seebeck coefficient, electrical conductivity and power factor values. In this context, poly(ANI-co-AN) copolymers were synthesized by inverted emulsion polymerization using different SLS feed conditions, and monomer conversions were determined. According to the polymerizations performed, the highest monomer conversion was achieved in the copolymer synthesized with 0.0045 mol SLS. Besides, the synthesized copolymers were doped with camphor sulfonic acid (CSA) and their thermoelectric properties were examined. While the monomer conversion of the copolymer synthesized with 0.003 mol SLS was 67.4%, the power factor (PF) value was calculated as 0.81, and the maximum PF value was not reached at the highest monomer conversion. According to the evaluations, it was observed that there is no direct relationship between thermoelectric efficiency and monomer conversion values, however existence of indirect relationship has been seen.

Keywords: aniline, acrylonitrile, sodium lauryl sulfate, copolymer, thermoelectric

ONOSMA HALOPHİLA KÖKÜNDEN ELDE EDİLEN ÖZÜT İLE YÜZEYİ MODİFİYE EDİLMİŞ ÖRME KUMAŞLARIN BOYANMASI

DYEING OF WOVEN FABRICS MODIFIED WITH EXTRACT OBTAINED FROM ONOSMA HALOPHILA ROOT

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ÖZET

Kumaş üretimi ve renklendirmesinin tarihi günümüzden yaklaşık olarak beş bin yıl kadar öncesine dayanmaktadır. Tarih boyunca kumaşların renklendirilmesinin sebebi sadece estetik değil aynı zamanda sosyal konumun ve sınıfın da bir göstergesi olarak kullanılmıştır. Kumaş boyama estetik nedenlerin dışında kumaşın ömrünü uzatma, bazı böceklerin ısırığından ve güneş ışınlarından korunma için yapılmıştır ve aynı gerekçeler günümüzde de geçerlidir. Bazı böcekler ve bazı bitkilerin kök, yaprak veya çiçeklerinden elde edilen doğal boyalar yıllardır kıyafetleri, diğer tekstil kumaşlarını ve deriyi boyamak için kullanılmaktadır. Ancak doğal boyaların yün, pamuk ve deri gibi malzemelerin yüzeylerine tutunup kalıcı olması güç olduğundan yıkama ve kullanım koşullarından kaynaklı zamanla sahip oldukları rengi kaybetmektedirler. Boyama esnasında doğal boyaların uygulandığı yüzeyde kalıcılığını arttırmak için mordanlama yöntemi kullanılmaktadır. Mordanlama işlemi selüloz liflerinin yüzeylerini katyonik yaparak anyonik olan bitkisel pigmentlerin yüzeye sıkıca bağlanmasını ve boyanın kalıcılığını sağlamaktır. Ancak mordanlama işlemi sonrasında çevreye çok miktarda zararlı ağır metal atılması bu yöntemi dezavantajlı hale getirmektedir.

Bu proje kapsamında Mersin bölgesinde yetişen ve halk arasında Acı Emcek olarak bilinen Onosma Halophila bitkisi köklerinin ultrasonik banyoda ve sokslet cihazı ile özütleri alınmıştır. Alınan özütlerin değişik pH noktalarında farklı renkler verdiği görülmüştür. Çalışmaların devamında farklı şartlarda ve pH noktalarında boyama deneyleri yapılmıştır. Deneyler sonucunda boyama işleminin başarılı olduğu görülmüş ve mordanlama kimyasalları eklenerek deneyler tekrarlanmıştır. Ardından kumaş yüzeyleri 3-aminopropiltrietoksisilan (APS) ile modifiye edilip doğal boyama çalışması yapılmıştır. Haslık sonuçları incelenmiştir. Yapılan çalışma sonucunda APS ile yüzey modifikasyonu yapılmasının doğal boyamada haslığa etkisi görülmüştür.

Anahtar Kelimeler: Onosma Halophila, Doğal Boyama, Kumaş Boyama

ABSTRACT

The history of fabric production and dyeing dates back approximately five thousand years from the present day. Throughout history, the coloring of fabrics has been used not only for aesthetic reasons but also as an indicator of social status and class. Fabric dyeing has been carried out not only for aesthetic reasons but also to extend the lifespan of the fabric, protect it from the bites of certain insects, and shield it from sunlight. These reasons remain valid today.

Natural dyes obtained from the roots, leaves, or flowers of some insects and plants have been used for years to dye clothing, other textile fabrics, and leather. However, the adhesion and permanence of natural dyes to surfaces such as wool, cotton, and leather are challenging, causing them to gradually lose their color over time due to washing and usage conditions. To enhance the permanence of natural dyes on the surface during the dyeing process, a mordanting method is employed. The mordanting process involves cationizing the surfaces of cellulose fibers, allowing the anionic vegetable pigments to tightly bind to the surface and ensuring the permanence of the dye. However, the substantial release of harmful heavy metals into the environment after the mordanting process disadvantages this method.

In this project, extracts from the roots of the plant Onosma Halophila, locally known as "Acı Emcek" in the Mersin region, were obtained using ultrasonic bath and soxhlet apparatus. It was observed that the obtained extracts produced different colors at different pH levels. Subsequent experiments were conducted with dyeing under different conditions and pH levels. The results showed the success of the dyeing process, and further experiments were conducted by adding mordanting chemicals. Following this, fabric surfaces were modified with 3-aminopropyltriethoxysilane (APS), and a natural dyeing study was carried out, analyzing the colorfastness results. The study revealed the impact of APS surface modification on the colorfastness in natural dyeing..

Keywords: Onosma Halophila, Natural Dyeing, Fabric Dyeing

MENTHA PULEGİUM KULLANILARAK YEŞİL SENTEZ İLE BAKIR OKSİT NANOPARTİKÜL SENTEZİ VE ANTİOKSİDAN ÖZELLİKLERİ

SYNTHESIS AND ANTIOXIDANT PROPERTIES OF COPPER OXIDE NANOPARTICLES BY GREEN SYNTHESIS USING *MENTHA PULEGIUM*

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ÖZET

Son yıllarda nanopartiküllere olan ilgi artmıştır. Nanopartiküller küçük boyutlu olmaları, yüksek biyolojik aktiviteye sahip olmaları nedeni ile geniş bir kullanım alanına sahiptirler. Nanopartiküllerin sentez basamaklarında toksik yapıdaki kimyasalların kullanılmalarından dolayı bazı dezavantajlarının olduğu belirlenmiştir. Bu dezavantajlar yüksek maliyet, toksik yapıda olabilmeleri ve kararsız yapıda olmalarıdır. Bu sorunların üstesinden gelmek amacı ile fiziksel ve kimyasal yöntemler dışında bir üretim yöntemi arayışı gündeme gelmiş ve yeşil sentez yöntemi ortaya çıkmıştır. Yeşil sentez ile nanopartikül sentezinde kimyasal maddeler ile nanopartikül sentezi yapmak yerine bitki ekstraktları, mantar, maya gibi biyolojik kaynaklar ile nanopartikül sentezi yapılmaktadır. Bu kaynaklar ile çinko, bakır, gümüş, titanyum gibi birçok metal nanopartikül sentezi gerçekleştirilmektedir. Bu çalışmada metal nanopartiküllerden bakır oksit nanopartikülünün yeşil sentez yöntemi ile üretimi yapılmıştır. Bakır oksit nanopartikülleri antibakteriyel, fotokatalizör ve gaz sensör gibi uygulama alanları nedeni ile oldukça ilgi çekmektedirler. Sunulan çalışmada *Mentha pulegium* bitkisinden elde edilen ekstrakt indirgeyici olarak kullanılarak bakır oksit nanopartikülleri sentezlenmiştir. Karakterizasyon analizlerinde ilk olarak UV-Vis spektroskopi analizi ile nanopartikülün sentezi doğrulanmıştır. Sentezlenen bakır oksit nanopartiküllerinin kristal yapısı X ışını disfraktometresi (XRD) ile analiz edilmiştir. Fourier dönüşümlü kızılötesi spektroskopisi (FTIR) ile nanopartikül yapısındaki olası bağ yapıları tanımlanmıştır. *Mentha pulegium* eksrtaktı kullanılarak yeşil sentez yöntemi ile üretilen bakır oksit nanopartiküllerinin antioksidan kapasiteleri incelenmiştir. Farklı derişim aralıklarında yapılan çalışmada bakır oksit nanopartiküllerinin antioksidan özelliğe sahip olduğu belirlenmiştir.

Anahtar Kelimeler: *Mentha pulegium*, bakır oksit nanopartiküller, yeşil sentez, antioksidan aktivite

ABSTRACT

In recent years, interest in nanoparticles has increased. Nanoparticles have a wide range of applications due to their small size and high biological activity. It has been determined that nanoparticles have some disadvantages due to the use of toxic chemicals in the synthesis steps. These disadvantages are high cost, toxicity and instability. In order to overcome these problems, the search for a production method other than physical and chemical methods has come to the agenda and green synthesis method has emerged. In nanoparticle synthesis with green synthesis, instead of synthesizing nanoparticles with chemical substances, nanoparticles are synthesized with biological sources such as plant extracts, fungi, yeast. With these sources, many metal nanoparticles such as zinc, copper, silver, titanium are synthesized. In this study, copper oxide nanoparticles from metal nanoparticles were produced by green synthesis method. Copper oxide nanoparticles are of great interest due to their application areas such as antibacterial, photocatalyst and gas sensor. In the present study, copper oxide nanoparticles were synthesized using the extract obtained from Mentha pulegium plant as a reductant. In the characterization analysis, the synthesis of the nanoparticles was first confirmed by UV-Vis spectroscopy

analysis. The crystal structure of the synthesized copper oxide nanoparticles was analyzed by X-ray disfractometer (XRD). Fourier transform infrared spectroscopy (FTIR) was used to identify possible bond structures in the nanoparticle structure. The antioxidant capacity of copper oxide nanoparticles produced by green synthesis method using Mentha pulegium extract was investigated. In the study carried out at different concentration ranges, it was determined that copper oxide nanoparticles have antioxidant properties.

Keywords: *Mentha pulegium*, copper oxide nanoparticles, green sythesis, antioxidant activity

MİKROPLASTİK KAYNAKLI KİRLENMENİN SU EKOSİSTEMLERİNE OLASI ETKİSİ

POSSIBLE EFFECTS OF MICROPLASTIC POLLUTION ON WATER ECOSYSTEMS

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ÖZET

Plastik kullanımının artması ve atık miktarının yükselmesi, mikroplastik kirliliğini küresel bir sorun haline getirmiştir. Atık plastikler, zamanla bozunarak mikroplastiklere dönüşmekte ve sucul ortamlarda büyük bir tehlike oluşturmaktadır. Kozmetik ve ilaç endüstrilerinde de üretilen mikroplastikler çevreye salınarak mikroplastik kirliliğine katkıda bulunmaktadır. Bu durum, zaman içinde çevre ve insan sağlığı için büyük bir tehdit oluşturmakta ve çevrede mikroplastik birikimine, taşınımına katkıda bulunmaktadır. Aynı zamanda mikroplastikler adsorpsiyon özellikleri nedeniyle çevrede bulunan mikro kirleticileri ve ağır metalleri bünyelerinde tutarak bunların yayılmalarına neden olmaktadır. Mikroplastiklerin sucul ortamlardaki bu olası etkilerinin anlaşılabilmesi için daha kapsamlı çalışmalara ihtiyaç vardır.

Bu derleme çalışması kapsamında, mikroplastik kaynaklı kirlenmenin su ekosistemlerine olası etkileriyle ilgili yapılmış olan literatür çalışmaları incelenmiştir.

Anahtar kelimeler: Mikroplastik kirliliği, su ekosistemleri, çevre sağlığı

ABSTRACT

The increase in plastic use and the increase in the amount of waste has made microplastic pollution a global problem. Waste plastics decompose over time and turn into microplastics, which poses a great danger in aquatic environments. Microplastics also produced in the cosmetics and pharmaceutical industries are released into the environment lead to microplastic pollution. This situation poses a great threat to the environment and human health over time that contributes to the accumulation and transport of microplastics in the environment. At the same time, due to their adsorption properties, microplastics retain micropollutants and heavy metals in the environment so these cause them to spread. These possible effects of microplastics in aquatic environments needs more comprehensıve studies to understand them better.

Within the scope of this review study, literature studies on the possible effects of microplastic-induced pollution on aquatic ecosystems were examined.

Key words: Microplastic pollution, aquatic ecosystems, environmental health

MUSLUK SUYUNDA KURŞUN (II) TAYİNİ İÇİN ELEKTROKİMYASAL BİR SENSÖRÜN HAZIRLANMASI

PREPARATION OF AN ELECTROCHEMICAL SENSOR FOR THE DETERMINATION OF LEAD (II) IN TAP WATER

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ÖZET

Ağır metaller arasında kurşun, akülerde, benzinde ve boyalarda kullanılması nedeniyle çevrede en sık karşılaşılan toksik kirletici maddedir. Çevresel, gıda ve biyolojik numuneler gibi çeşitli ortamlarda kurşun(II) iyonu (Pb(II)) bulunabilir. Bu nedenle ağır metal iyonları insan vücuduna besinlerle, içme suyuyla, solunum sistemiyle ve deri tarafından emilme yoluyla girebilmektedir. İnsan vücuduna giren kurşun, hipertansiyon, akciğer kanseri, böbrek hasarı, nörolojik hastalıklar gibi kritik sağlık etkilerine neden olabilir. Bu nedenle kurşunun tayini önemlidir. Bu nedenle bu çalışmada kurşun (II) tayini için bir elektrokimyasal sensör hazırlanması amaçlanmıştır. Pb (II) tayini için ucuz, iletken ve kolay bulunabilme özelliklerine sahip olan grafit kalem ucu (PGE) 1H-1,2,4-triazole-3-thiol (124T3T) ile dönüşümlü voltametri (CV) tekniği kullanılarak kaplanmış ve elektrokimyasal bir sensör (124T3T/PGE) hazırlanmıştır. Hazırlanan 124T3T/PGE sensörünün yüzeyi CV ve elektrokimyasal impedans spektroskopisi (EIS) teknikleri kullanılarak karakterize edilmiştir. Hazırlanan sensör kullanılarak Pb(II) iyonunun tayini için destek elektrolit ortamının türü ve pH değeri gibi optimum deney şartları belirlenmiştir. Ardından belirlenen optimum deney şartlarında sensörün analitik performansı incelenmiştir ve gerçek numune olarak musluk suyunda Pb^{2+} tayini diferansiyel puls voltametrisi tekniği kullanılarak yapılmıştır. Yapılan gerçek numune analiz çalışması 102,83 ve 103,25 geri kazanım ve %3,73 ile %4,69 bağıl standart sapma değerleri ile gerçekleştirilmiştir. Bu sonuçlar hazırlanan modifiye elektrot yüzeyinin Pb(II) tayini için iyi bir analitik performans sergilediğini göstermektedir.

Anahtar Kelimeler: Kurşun, zehirli, voltametrik tayin, elektrokimyasal sensör.

ABSTRACT

Among heavy metals, lead is the most common toxic contaminant in the environment due to its use in batteries, gasoline, and paints. Lead(II) ion (Pb(II)) can be found in a variety of media, such as environmental, food, and biological samples. Therefore, heavy metal ions can enter the human body through food, drinking water, the respiratory system, and absorption by the skin. Lead entering the human body can cause critical health effects such as hypertension, lung cancer, kidney damage, and neurological diseases. Therefore, the determination of lead is important. Therefore, this study aimed to prepare an electrochemical sensor for the determination of lead (II). Graphite pencil tip (PGE), which is cheap, conductive, and easily available for the determination of Pb (II), was coated with 1H-1,2,4-triazole-3-thiol (124T3T) using the cyclic voltammetry (CV) technique and an electrochemical sensor was used. (124T3T/PGE) was prepared. The surface of the prepared 124T3T/PGE sensor was characterized using CV and electrochemical impedance spectroscopy (EIS) techniques. Optimum experimental conditions, such as the type and pH value of the supporting electrolyte medium, were

determined for the determination of Pb(II) ion using the prepared sensor. Then, the analytical performance of the sensor was examined under the determined optimum experimental conditions and the determination of Pb2+ in tap water as a real sample was made using the differential pulse voltammetry technique. The real sample analysis study was carried out with recovery values of 102.83 and 103.25 and relative standard deviation values of 3.73% and 4.69%. These results show that the prepared modified electrode surface exhibits good analytical performance for the determination of Pb(II).

Keywords: Lead, toxic, voltammetric determination, electrochemical sensor

DÜŞÜK MALİYETLİ GRAFİT VE SELÜLOZ ASETAT KOMPOZİT ANTİSTATİK FİLMLER

LOW COST GRAPHITE AND CELLULOSE ACETATE COMPOSITE ANTISTATIC FILMS

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ÖZET

Biyobozunur polimer bazlı elektrolitler malzeme bilimi alanında ilgi görmektedir. Hafif olması, düşük sıcaklıkta sentez prosesi, düşük maliyetli olması, aşındırıcı olmaması ve toksik olmaması gibi avantajlara sahiptirler. Biyobozunurluk ve doğal bolluk özellikleriyle öne çıkan selüloz asetat (CA), endüstride ve biyotıpta yaygın olarak kullanılmaktadır. Mükemmel termal stabilite, metanole düşük izin verilebilirlik ve zenginleştirilmiş fonksiyonel gruplar vb. gibi ek avantajlar, CA'yı ambalaj malzemesi için ideal bir alternatif olarak kabul etmektedir. Ancak CA'nın antistatik özelliği zayıftır; birincisi statik elektrik birikmesine ve ardından ciddi sorunlara (örneğin toz çekme, iç içe geçme ve elektrik çarpması) neden olur. Polimerlerin antistatik özelliklerini geliştirmek için en kolay strateji, karbon, metal ve metal oksit malzemeler gibi elektriksel iletken dolgu maddelerinin eklenmesidir. Grafit (Grp), üstün elektron hareketliliği sayesinde polimerlerin antistatik özelliğini geliştirmek için mükemmel bir aday olarak kabul edilir. Bu arada, grafenin ultra yüksek mekanik özellikleri, kompozitin gelişmiş mekanik özelliklerini kendiliğinden geliştirebilir. Bu çalışmada CA polimerine grafit eklenerek elektriksel iletkenliğinin artması ve gerek ambalajlamada gerekse diğer uygulamalarda kullanılabilir çevre dostu malzeme geliştirilmesi hedeflenmiştir. Grafenin dağılmasına yardımcı olmak üzere 1,3,4-Thiadiazole-2,5-dithiol (BT-I) kullanılmıştır. CA'ya grafit ile iyi bir uyumluluk sağlayacağından, CA kompozitinin antistatik özelliklerinin geliştirmesi makul bir şekilde beklenmektedir. Sonuç olarak çalışmada, hazırlanan CA/BT-I-Grp kompozit filmlerinin su tutma kapasitesi, şişme oranı, proton iletkenliği ve elektriksel iletkenliği incelenmiştir. En yüksek su tutma kapasitesine sahip membran CA/BT-I-50Grp olarak belirlenmiştir. Membranların impedans ölçümlerinde en düşük yük transfer direnci değeri yine CA/BT-I-50Grp de elde edilmiştir. En iyi proton iletkenliği 0,0308 S/cm olarak CA/BT-I-50 Grp membranlarında bulunmuştur. Geliştirilmiş bu çevre dostu bu membranların basit üretimi, proton iletkenliği ve antistatik özellikleri göz önüne alınırsa, CA/BT-I-Grp kompozit filmi paketlemede, yakıt hücrelerinde kullanılabilecek yeni bir malzeme olarak umut vaat etmektedir.

Anahtar Kelimeler: Selüloz Asetat, grafit, antistatik film.

ABSTRACT

Biodegradable polymer-based electrolytes are attracting interest in the field of materials science. They have advantages such as being lightweight, having a low-temperature synthesis process, low cost, non-corrosive and non-toxic. Cellulose acetate (CA), distinguished by its biodegradability and natural abundance properties, is widely used in industry and biomedicine. Excellent thermal stability, low permissibility to methanol and enriched functional groups, etc. Additional advantages such as make CA an ideal alternative for packaging material. However, the antistatic property of CA is poor; the former causes a build-up of static electricity and subsequent serious problems (e.g., dust attraction, ingress, and

electrocution). The most straightforward strategy to improve electrically conductive fillers such as carbon, metal, and metal oxide materials. Graphite (Grp) is considered an excellent candidate to improve the antistatic properties of polymers due to its superior electron mobility. Meanwhile, the ultra-high mechanical properties of graphene can spontaneously enhance the advanced mechanical properties of the composite. In this study, we aimed to increase electrical conductivity by adding graphite to the CA polymer and develop an environmentally friendly material for packaging and other applications. 1,3,4-Thiadiazole-2,5-dithiol (BT-I) was used to aid in the dispersion of graphene. It is expected that the antistatic properties of the CA composite will be enhanced, as it will give CA good compatibility with graphite. As a result of the study, the water retention capacity, swelling ratio, proton conductivity, and electrical conductivity of the prepared CA/BT-I-Grp composite films were examined. The membrane with the highest water retention capacity was determined as CA/BT-I-50Grp. In the impedance measurements of the membranes, We again obtained the lowest load transfer resistance value in CA/BT-I-50Grp.CA/BT-I-50 Grp membranes as 0.0308 S/cm. Considering the simple production, proton conductivity, and antistatic properties, CA/BT-I-Grp composite film is promising as a new material for packaging and fuel cells.

Keywords: Cellulose Acetate, graphite, antistatic film.

TÜRKİYE' DEKİ SAĞLIK ÇALIŞANLARININ ALTERNATİF VE DESTEKLEYİCİ İLETİŞİM SİSTEMLERİ HAKKINDA BİLGİ VE FARKINDALIK DÜZEYLERİNİN İNCELENMESİ

AN EXAMINATION OF THE KNOWLEDGE AND AWARENESS LEVELS OF HEALTH WORKERS IN TURKEY ABOUT AUGMENTATİVE AND ALTERNATİVE COMMUNICATION SYSTEMS

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ÖZET

Giriş: Alternatif ve destekleyici iletişim sistemleri (ADİS), sözlü ve yazılı iletişim biçimlerini de kapsayan, konuşma dili üretimi ve/veya anlamadaki bozuklukların telafisini hedefleyen bir klinik uygulama alanıdır. Bu çalışmada Türkiye' deki sağlık çalışanlarının ADİS hakkında bilgi ve farkındalık düzeylerinin belirlenmesi amaçlanmaktadır.
Yöntem: Literatürdeki çalışmalar incelenerek, Google Forms üzerinden onay sorusu hariç 6 demografik bilgi, 41 de ADİS hakkında bilgi sorusu olmak üzere toplam 47 soru hazırlanmıştır. Soruların hazırlanmasında çoktan seçmeli, kısa cevaplı ve likert tip ölçek olmak üzere karma yöntem kullanılmıştır. Toplam 4 bölümden oluşan ankete katılımcılar, kartopu yöntemi ile Whatsaap üzerinden davet edilmiştir.
Bulgular: İki haftalık süreçte 25 farklı ilden yaş ortalaması 29 ± 6,847 yıl olan toplam 75 sağlık çalışanı (65 kadın, 10 erkek) ankete katılmıştır. Katılımcıların %20' si hemşire, %18,7' si dil ve konuşma terapisti (DKT), %9,3'ü doktor ve %52'si diğer sağlık meslek gruplarından oluşmaktaydı. Katılımcıların %57'3'ü daha önce ADİS' i hiç duymamıştı ve %53,3' ü ADİS' in açılımını bilmiyordu. Katılımcıların %73,3'ü kurumlarında ADİS kullanımını hiç görmemişti. Katılımcıların %75,3' ü ADİS' in DKT tarafından uygulandığını ya da önerildiğini, %12'si ise tıp doktorları tarafından uygulayabileceğini düşünmekteydi. ADİS denilince çalışmaya katılan sağlık çalışanlarının aklına en %69,3 ile işaret dili gelmiştir. ADİS'e en çok ihtiyacı olan hasta gruplarından olmasına rağmen, ADİS kullanımı gerekliliği için en az seçilen hastalık %41,3 ile Amyotrofik Lateral Skleroz (ALS) olmuştur.
Sonuç: Bu çalışmaya katılan sağlık çalışanlarının farklı ADİS çeşitleri ve ADİS için aday olan hastalık ve sendrom durumlarında bilgi ve farkındalık düzeylerinin daha düşük olduğu belirlenmiştir. Buna rağmen çalışmaya katılan sağlık çalışanlarının büyük çoğunluğu ADİS' in kullanımını, özelliklerinin bilinmesini ve ADİS kullanımının önerilmesi gerektiğini düşünmektedir. Bu nedenle sağlık çalışanlarının ADİS çeşitleri, ADİS hakkında eksik olduğu hastalıklar ve sendromlara karşı bilgi ve farkındalıkları arttırılmalıdır. Böylelikle ADİS ihtiyacı olan ve olabilecek bireylerin erkenden ADİS kullanımı için yönlendirilmelerini sağlayabilirler.

Anahtar Kelimeler: sağlık çalışanı, ADİS, iletişim, alternatif ve destekleyici iletişim, farkındalık

ABSTRACT

Introduction: Augmentative and alternative communication (AAC) systems are a field of clinical practice that aims to compensate for impairments in spoken language production and/or comprehension, including oral and written forms of communication. This study aims to determine the level of knowledge and awareness of AAC among healthcare professionals in Turkey.
Method: After reviewing the studies in the literature, a total of 47 questions were prepared, including 6 demographic information questions and 41 questions about AAC, excluding the consent question via Google Forms. A mixed method, including multiple-choice, short-answer, and Likert-type scales, was used in the preparation of the questions. The questionnaire consisted of a total of 4 sections, and the participants were invited via Whatsapp using the snowball method.

Results: A total of 75 healthcare workers (65 women and 10 men) from 25 different provinces with an average age of 29 ± 6.847 years participated in the survey over a two-week period. Of the participants, 20% were nurses, 18.7% were speech-language pathologists (SLPs), 9.3% were physicians, and 52% were from other healthcare professions. 57.3% of the participants had never heard of AAC, and 53.3% did not know the definition of AAC. 73.3% of the participants had never seen the use of AAC in their institutions. 75.3% of the participants thought that AAC was applied or recommended by SLPs, and 12% thought that it could be applied by medical doctors. When AAC was mentioned, the health workers who participated in the study thought of sign language with 69.3%. Amyotrophic lateral sclerosis (ALS) was one of the patient groups most in need of AAC, yet it was the disease least frequently selected by respondents for the need to use AAC at 41.3%.

Conclusion: The healthcare professionals who participated in this study had lower levels of knowledge and awareness about different types of AAC and diseases and syndromes that are candidates for AAC. Despite this, the majority of the healthcare professionals who participated in the study think that the use of AAC and its features should be known, and the use of AAC should be recommended. For this reason, the knowledge and awareness of healthcare professionals about AAC types, diseases, and syndromes that they lack should be increased. In this way, they can ensure that individuals who need and may need AAC are directed toward early AAC use.

Keywords: health care workers, AAC, communication, augmentative and alternative communication, awareness

OKSİT KATMANLI LAZER DESENLİ DİYOTUN DİYOT PARAMETRELERİNİN BELİRLENMESİ

DETERMINING DIODE PARAMETERS OF LASER PATTERNED DIODE WITH OXIDE LAYER

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ÖZET

Bir Schottky diyot, bir metal ve bir yarıiletkenin birleşiminden oluşan yarıiletken bir cihazdır. Bu diyot, bir metal-yarıiletken birleşimi kullanarak bir enerji bariyeri oluşturur. Schottky diyotları, bir metalin yarıiletkenle temas ettiği birleşimde oluşan enerji bariyerine dayanır. Bu bariyer, elektronların hızla yarıiletken içine hareket etmelerine izin verir. Bu diyotlar, hızlı anahtarlama özelliklerinden dolayı genellikle yüksek frekanslarda çalışan cihazlarda kullanılır, düşük ters gerilim toleransına sahiptir ve doğrusal olmayan voltaj-akım karakteristikleri sergilerler. Metal-Yalıtkan-Yarıiletken (MIS) yapıları, bir metal, bir yalıtkan ve bir yarıiletkenin birleşiminden oluşur. Bu yapı, elektrik alanını manipüle ederek yarıiletken yüzeyindeki taşıyıcı yoğunluğunu kontrol edebilir. MIS yapıları genellikle kapasitif bileşenler olarak düşünülür. Metal elektrot ile yarıiletken arasındaki yalıtkan, yarıiletken yüzeyine bağlıdır. Bir elektrik alanı uygulandığında, bu alan yarıiletken içindeki taşıyıcıları etkiler. MIS yapıları, transistörlerde ve entegre devrelerde izolasyon katmanı olarak kullanılabilir ve genellikle kapasitif cihazlarda ve yarıiletken bellek cihazlarında bulunurlar. MOS (Metal-Oksit-Yarıiletken) yapılarda ise, yalıtkan katmanı olarak genellikle SiO 2 , Al 2 O 3 , ZnO, TiO 2 gibi bir oksit malzemesi kullanılır. Bu yapılar, özellikle entegre devrelerde ve MOS transistörlerinde yaygın olarak kullanılır. Bu çalışmada bir oksit ara katmana sahip bir diyot yapısı oluşturulması amaçlanmıştır. Bu bağlamda, deneysel sürecin başlangıcında, p-tipi silikon alttaşın mat yüzeyine alüminyum (Al) omik kontak oluşturuldu. Sadece alttaşın orta bölgesi lazer aşındırma işlemi ile desenlendirildi. İkinci adımda, alttaşın tüm yüzeyi, Atomik Katman Biriktirme (ALD) tekniği kullanılarak TiO 2 ince film ile kaplandı. Son adımda, Fiziksel Buhar Biriktirme (PVD) tekniği ile Al doğrultucu kontaklar biriktirilerek ince film üzerinde diyot yapısı oluşturuldu. Akım-gerilim ölçümleri gerçekleştirildi ve bu diyota ait diyot parametreleri termiyonik emisyon (TE) teorisi kullanılarak hesaplandı.

Anahtar Kelimeler: Schottky diyot, I-V ölçümü, titanyum oksit.

ABSTRACT

A Schottky diode is a semiconductor device formed by the junction of a metal and a semiconductor. This diode utilizes a metal-semiconductor junction to create an energy barrier. Schottky diodes rely on the energy barrier formed at the junction where a metal contacts a semiconductor. This barrier allows electrons to rapidly move into the semiconductor. The diode commonly used in high-frequency applications due to their fast switching characteristics, have a low reverse voltage tolerance exhibit non-linear voltage-current characteristics. Metal-Insulator-Semiconductor (MIS) structures consist of a combination of metal, an insulator, and a semiconductor. This structure can control the carrier density

on the semiconductor surface by manipulating the electric field. MIS structures are often considered as capacitive components. The insulator between the metal electrode and the semiconductor is connected to the semiconductor surface. When an electric field is applied, it affects the carriers within the semiconductor. MIS structure used in transistors and integrated circuits as an isolation layer and commonly found in capacitive devices and semiconductor memory devices. In MIS structures, the insulator layer is typically directly connected to a semiconductor surface and may consist of various materials, not necessarily an oxide layer. In Metal-Oxide-Semiconductor (MOS) structures, an oxide material such as SiO 2 , Al 2 O 3 , ZnO, TiO 2 is typically used as the insulator layer. These structures are widely used, especially in integrated circuits and MOS transistors. In this study, the aim was to create a diode structure with an oxide intermediate layer. In this context, at the beginning of the experimental process, an aluminum (Al) ohmic contact was formed on the surface of the p-type silicon substrate.

Only the central region of the substrate was patterned through laser ablation. In the second step, the entire surface of the substrate was coated with a TiO 2 thin film using the Atomic Layer Deposition (ALD) technique. In the final step, Al rectifying contacts were deposited onto the thin film to create a diode structure by using Physical Vapor Deposition (PVD) technique. Current-voltage measurements were performed, and diode parameters of the diode were extracted using thermionic emission (TE) theory.

Keywords: Schottky diode, I-V measurement, titanium oxide.

THE EFFICACY OF INTELLIGENT TRANSPORTATION SYSTEM: IMPLICATION ON MODERN DAY ROAD TRAFFIC MANAGEMENT

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ABSTRACT
Recent advances in computational technology have led to dynamic changes in road traffic management. These unprecedented innovations have impacted immensely on traffic monitoring gantry, thanks to intelligent transportation technology. The evoking technology aims to provide innovative services relating to road traffic management and the overall transportation modes so as to enable users to be better informed, more coordinated and make safer use of transport networks. According to the directive of European Union (2010), Intelligent Transportation System (ITS) is defined as systems in which information and communication technologies (ICT) are applied in the sphere of road transport which includes vehicle, infrastructure and users in mobility and transport management as well as the interfaces with other modes of transport. This paper is a descriptive survey of the impacts of intelligence transportation system (ITS) and it effects on modern day road traffic management. In order to collect vital information for the paper discussion, carefully formulated questionnaires were administered to respondents using online Google form questionnaire instrument. The gathered responses were subjected to reliability analysis. The paper concludes that ITS technology has the potentials to help reduce journey times and significantly increase the capacity of busy roads.
Keywords: Road Traffic Management, Transportation System, ICT, Modern day.

ELEMENTAL CHARECTERISATION OF THE MEDICINAL PLANT *ALCHEMILLA MOLLIS*

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ABSTRACT

Aim: Alchemilla, commonly called “lady’s mantle”, is a genus of herbaceous perennial plants belonging to the family Rosaceae. Alchemilla plants (Lady’s mantle) are commonly used in traditional medicine for treatment of many gynecological diseases. People have been using medicinal plants in the treatment of diseases since ancient times. Today, in this respect, herbalists are the most easily accessible commercial source of medicinal plants. Our aim in this study is to compare the elemental contents of the Lady's Mantle plant taken commercially from two different herbalists.

Materials-Method: Alchemilla mollis plants, purchased commercially from 2 different herbalists, were first washed and dried in sunlight. It was then ground into powder with the help of a grinder. The plants were weighed in certain amounts and digested in the microwave digestion system with an acid mixture of 1/3 H2O2:HNO3 and the organic phase was removed. Then, a certain amount of diluted samples were injected into the ICP-MS device. The elements to be examined were grouped as essential macro/micro elements, essential elements only for some plant species, and heavy metals, depending on the plant's needs. The results are expressed in ppm.

Result: When examined in terms of essential microelements, the Mn and Fe levels of the plant taken from herbalist 1 were found to be quite high compared to the plant taken from the other herbalist. While Al levels which are essential elements for some plants, were found to be very high in herbalist 1 compared to the other herbalist. Na levels were found to be quite high in the plant taken from herbalist 2. In terms of macro elements, the Mg and Ca levels of the plant taken from 1 were found to be quite high compared to the other herbalist. The K levels of the plant taken from herbalist 2 were found to be higher than those obtained from herbalist 1. Finally, when heavy metal contents are examined; Cr, As, Sn and Pb levels of the plant taken from herbalist 1 were found to be higher than the other. In herbalist 2, Li levels were found to be higher than the other herbalist.

Conclusion: As a result of this study, it was seen that there was a significant difference in the element contents of the same plant taken from 2 different herbalists. We can list the reasons for this such as the mineral quality of the soil where the plant grows, the nutritional content it receives, environmental factors, the region where it grows, and weather conditions.

Keywords: Alchemilla Mollis, ICP-MS, macro/micro elements, heavy metals

SPECTROSCOPIC TRACE ELEMENT ANALYSIS IN BIOLOGICAL SAMPLES

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ABSTRACT

Trace elements are inorganic components that have important functions in our body. Their levels are important for the diagnosis and treatment of various diseases in the living body, as well as detection of conditions such as toxicity and exposure. Such trace elements can be easily detected in biological materials of living things such as blood, tissue, urine, hair, nails, organs and masses. Sometimes, even in routine analyses, the levels of these elements are quickly determined in low amounts of blood samples. Since elemental determination of biological samples is a very laborious process, sample collection, preparation and measurement with the correct method and instrument are of great importance in terms of accuracy. For this purpose, in our study, we aimed to provide general information about the instruments and methods that enable trace element analysis in biological samples. Especially analytical devices and spectroscopic techniques were mentioned. In this study, we examined the spectroscopic devices that perform elemental analysis: Atomic Absorption Spectroscopy (AAS), Inductively Coupled Plasma-Optical Emission Spectrometer (ICP-OES), Inductively Coupled Plasma-Mass Spectrometer (ICP-MS), Laser Ablation Inductively Coupled Plasma-Mass Spectrometer (LA-ICP-MS). Their advantages and disadvantages against each other in biological analyzes were discussed. From this perspective, ICP MS was found to be the most efficient device for analyzing biological samples.

Keywords: Biological samples, instruments, trace elements, spectroscopic techniques.

OTOMATİK GÜDÜMLÜ ARAÇ (AGV) SİSTEMLERİNİN GÖZÜ OLAN KLAVUZ TAKİP YÖNTEMLERİNİN UZMAN SİSTEM YAKLAŞIMLARI İLE İYİLEŞTİRİLMESİ ÜZERİNE YENİLİKÇİ BİR YAKLAŞIM

AN INNOVATIVE APPROACH TO IMPROVE THE GUIDANCE TRACKING METHODS OF AUTOMATED GUIDED VEHICLE (AGV) SYSTEMS WITH EXPERT SYSTEM APPROACHES

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ÖZET

Otomatik Yönlendirmeli Araçlar (AGV'ler), kendilerine verilen görevleri yerine getirmek için haritalama ve navigasyon teknolojilerini kullanarak hareket etme yeteneğine sahip, kılavuzlar tarafından yönlendirilen robotik araçlardır. Kamera, kızılötesi veya manyetik sensör verilerini kullanarak şerit kılavuz takibini gerçekleştirebilir ve komuta kontrol sisteminden gelen tanımlı rota planına göre hareket edebilirler. AGV'ler rota takibini bir kılavuz yardımı ile yapmaktadır. AGV sistemlerinde navigasyon yerel ve küresel olmak üzere ikiye ayrılmaktadır. Yerel navigasyon ise üç kısma ayrılmaktadır bunlar; doğrudan, göreceli ve mutlak. Doğrudan yerel navigasyon manyetik özelliği olmayan siyah/beyaz bant, manyetik bant ve endüktif kablo ile, göreceli yerel navigasyon manyetik nokta ve lazer kılavuz ile ve son olarak mutlak yerel navigasyon sistemleri ise LİDAR gibi doğal kılavuz sistemlerini içermektedir. AGV robotların hareket planlamasında ki temel ister, kılavuz takibini farklı çevresel etkiler altında yüksek doğruluk ile gerçekleştirmektir. Bunun için iki önemli aşama bulunmaktadır. Birincisi AGV'lerin takip edecek olduğu kılavuzların tespit edilmesi, ikincisi ise hareket sistemini oluşturan motorların araç kinematiğine göre doğru yönde ve hızda tahrik edilmesidir. Önerilen sistemde kılavuz olarak kullanılan siyah çizginin tespiti kamera kullanılarak sağlanmıştır. Kameradan gelen geniş perspektifli görüntü kademeli olarak küçültülerek daha dar perspektifte daha öz ama problemi temsil eden görüntü bilgisine dönüştürülecek şekilde tasarlanmıştır. Bu sayede daha az bilgi ve işlem yükü ile gerçek zamana yakın, hızlı işlem yapılarak istenilen veri çıkarılabilmektedir. Bu çalışmada kamera ile elde edilen görüntü üzerindeki çizgi hattı birbirleri arasında aracın çalışma hızıyla doğru orantıda değişen mesafeye sahip iki adet sensör dizisi kullanılarak aracın sadece çizgiyi tespit etmesi değil çizginin ilerleyen kısımlarında akış yönününde tespit edilebilmesini sağlamıştır. Şerit kılavuzu tespit edildikten sonra sensör dizilerinden elde edilebilecek olası tüm senaryolar için üyelik fonksiyonları belirlenmiş olup Bulanık Mantık Kontrol (Fuzzy Logic Control) kullanılarak AGV robotun hareket katmanını oluşturan sol ve sağ motorlar için hız ve yön çıktıları üretilmektedir. Elde edilen hız ve yön bilgileri mikrodenetleyici tarafında PWM sinyallere dönüştürülerek AGV robot üzerindeki motorların kontrolü sağlanmıştır.

Anahtar Kelimeler: Otomatik Yönlendirmeli Araçlar, Çizgi Takibi, Görüntü İşleme, Bulanık Mantık.

ABSTRACT

Automated Guided Vehicles (AGVs) are robotic vehicles guided by guides, with the ability to move using mapping and navigation technologies to fulfil their assigned tasks. They can perform lane guidance tracking using camera, infrared or magnetic sensor data and move according to the defined route plan from the command and control system. AGVs perform route tracking with the help of a guide. Navigation in AGV systems is divided into two as local and global. Local navigation is divided into three parts; direct, relative and absolute. Direct local navigation is performed with non-magnetic

black/white tape, magnetic tape and inductive cable, relative local navigation is performed with magnetic point and laser guidance, and finally absolute local navigation systems include natural guidance systems such as LIDAR. The main requirement in motion planning of AGV robots is to realise the guidance tracking with high accuracy under different environmental effects. There are two important steps for this. The first is the determination of the guides that the AGVs will follow, and the second is to drive the motors that make up the motion system in the right direction and speed according to the vehicle kinematics. In the proposed system, the detection of the black line used as a guide is achieved by using a camera. The wide perspective image from the camera is designed to be gradually reduced and converted into image information representing the problem in a narrower perspective. In this way, the desired data can be extracted by performing fast processing close to real time with less information and processing load. In this study, the line line on the image obtained with the camera is detected by using two sensor arrays with a distance between each other that varies in direct proportion to the operating speed of the vehicle, enabling the vehicle to detect not only the line but also the flow direction in the later parts of the line. After the lane guidance is detected, membership functions are determined for all possible scenarios that can be obtained from the sensor arrays, and speed and direction outputs are generated for the left and right motors that form the motion layer of the AGV robot using Fuzzy Logic Control. The obtained speed and direction information is converted into PWM signals on the microcontroller side to control the motors on the AGV robot.

Keywords: Automated Guided Vehicles, Line Tracking, Image Processing, Fuzzy Logic.

ÇOKLU KAYITLI ELEKTRONİK POSTA (KEP) MODELLERİ İLE ELEKTRONİK YASAL BİLGİLENDİRME YÖNETİM SİSTEMİ TASARIMININ GELİŞTİRİLMESİ

DEVELOPMENT OF ELECTRONIC LEGAL INFORMATION MANAGEMENT SYSTEM DESIGN WITH MULTIPLE REGISTERED ELECTRONIC MAIL (REM) MODELS

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ÖZET

Vergi Usul Kanununa göre çalışanların bordrosunu görmesi ve teslim alma sorumluluğu işveren işletmelere aittir. Maaş bordrolarının ilgili personele doğal yollar ile ulaşımının sağlanmasında, özellikle bünyesinde fazla sayıda personel bulunan işletmeler için, iş gücü kaybı, sarf malzeme tüketimi, ekipman ve dağıtım giderleri gibi problemler ile karşılaşmaktadırlar. Bu kapsamda önerilen çalışma, işverenlerin işçilerine sunmakla yükümlü tutulduğu maaş bordrolarının, Kayıtlı Elektronik Posta (KEP) adresleri aracılığıyla yasal ve güvenli bir şekilde elektronik ortamda iletilmesini sağlayan ve Kurumsal Kaynak Planlama (Enterprise Resource Planning-ERP) sistemine bütünleşmiş bir şekilde çalışan platform oluşturulmasını ve model geliştirilmesini konu edinmektedir. Bu iş sürcenin elektronik ortama taşınması ilede çevre faktörlerini kullanımını ortadan kaldırarak çevreci bir çalışma olmaktadır. İşletme veya ERP sistemi kullanan kamu kurumlarının iş süreçlerini elektronik ortama taşınmasında yasal sorumluğuda yüklenmesi ile oluşturulabilecek diğer süreçelere de temel oluşturacak bakış açısı sağlamaktadır. Yapılacak İmzalama metodolojisi ile kaynak sistemlerin de değiştirilebilir olmasını sağlayacaktır, bu sayede asıl bordroların dağıtılmasını sağlayan metodoloji aynı kalsada bordro sağlan sistemlerin değiştirilebilir olması bununla birlikte KEP hizmeti sağlayan micro servis yapılarınında seçilebilir olması hızlı ve esnek bir implementasyon süreci sağlanmış olacaktır. Çoklu kullanım seçeneği ilede etki alanın artırılması hedeflenmektedir. Modellenen platform, maaş bordrolarının isteğe bağlı şekilde, dönem bazında, tek tek veya şekilde gönderilmesini ve maaş bordrolarını kullanıcı tarafından görüntüleme ve yazdırma imkânı sunmasını amaçlanmaktadır. RabbitMQ yöntemleri üzerinden ERP sistemleri ve KEP servis arasında bir köprü görevi görecek model planlanmıştır. Micro servis mimarisinde son kullanıcı ekranlarına verilerek kullanıcı tekrardan KEP sunucularına gitme ihtiyacı olmayacaktır. KEP ve ERP sistemleri arasında kullanılan teknoloji Net teknolojisi olarak belirlenmiştir. Farklı KEP adres sağlayıcılarının aynı imzayı tanıması için mikro servis oluşturulmuş. ERP sisteminden alınan veriler RabbitMQ kuyruklama yöntemi ile veri tabanlarında depolanabilecek ve üçüncü parti uygulamalara aktarılabilecektir. Sunucu tarafında sanallaştırma işlemleri gerçekleştirilecek ve platform bağımsız şekilde planlanmıştır. Sürecin genel mimarisinde ERP sistemlerinden tetiklenecek micro servisler aracılığı ile imzalama, kuyruklama, gönderim, akıbet tespit işlemlerini yaparak sunucu üzerinde çalışabilecek bütünleşmiş uygulama modellenmiştir.

Anahtar Kelimeler: Bilgi Sistem Tasarım, Kayıtlı Elektronik Posta, ERP Sistem Entegrasyon, e-imza, e-bordro, Docker.

ABSTRACT

According to the Tax Procedure Law, the responsibility of seeing and receiving the payroll of the employees belongs to the employer enterprises. In ensuring the delivery of payrolls to the relevant personnel by natural means, especially for enterprises with a large number of personnel, they face problems such as loss of labour force, consumption of consumables, equipment and distribution costs. In this context, the proposed study deals with the creation of a platform and model development that enables the payrolls that employers are obliged to provide to their employees to be legally and securely transmitted electronically via Registered Electronic Mail (KEP) addresses and integrated into the

Enterprise Resource Planning (ERP) system. With the transfer of this business process to the electronic environment, it is an environmentalist work by eliminating the use of environmental factors. It provides a perspective that will form the basis for other processes that can be created by assuming legal responsibility for moving the business processes of public institutions using business or ERP systems to the electronic environment. With the signing methodology, it will ensure that the source systems can be changed, so that the methodology that enables the distribution of the actual payrolls remains the same, but the systems that provide the payroll can be changed, and the micro service structures that provide KEP service can be selected, and a fast and flexible implementation process will be provided. It is aimed to increase the impact area with multiple usage options. The modelled platform aims to send payrolls optionally, on a period basis, individually or in a way, and to provide the opportunity to view and print payrolls by the user. The model is planned to act as a bridge between ERP systems and KEP service through RabbitMQ methods. In the micro service architecture, the user will not need to go to the KEP servers again by giving the end user screens. The technology used between KEP and ERP systems is determined as Net technology. A microservice was created for different KEP address providers to recognise the same signature. The data received from the ERP system can be stored in databases with RabbitMQ queuing method and can be transferred to third party applications. Virtualisation processes will be performed on the server side and planned to be platform independent. In the general architecture of the process, an integrated application that can run on the server by performing signing, queuing, sending, fate determination operations through micro services to be triggered from ERP systems has been modelled.

Keywords: Information System Design, Registered Electronic Mail, ERP System Integration, e-signature, e-payroll, Docker.

SPECTRE! ANALYSIS OF ATTACKS AND DEFENSE MECHANISIMS AGAINST TO SPECTRE

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ABSTRACT

Big data processing, high-performance computing, virtualisation, and cloud systems determine the direction of sector requirements and developments in today's computer technology. With advancing technology and growing needs, speed and performance have emerged as the most crucial features sought in computers. Processor manufacturers are experimenting with new methods to fulfil this demand and continually refine their techniques. Some of the most popular methods used to enhance performance in modern processors include cache systems, out-of-order execution, and speculative execution. While these systems notably increase processor performance, they also leave these systems vulnerable to attacks and security vulnerabilities. One of the most significant threats is Spectre attacks, which impact all modern processors. This attack, using the recently exposed security vulnerability caused by speculative execution, poses a threat not only to physical computers but also to widely-used cloud and virtual systems. Various methods of preventing Spectre attacks have been presented in literature and the industry. Protection mechanisms, developed and offered on software or hardware bases, have yet to fully address these attacks. The developed methods are again rendered ineffective by new versions of the Specter attack, and most recommended methods cause performance loss. This study provides a thorough analysis of Spectre attacks and presents various software and hardware-based protection mechanisms. Moreover, a study showcasing the implementation of the Spectre attack by utilizing the Bubblesort algorithm is included.

Keywords: hardware security, processor security, speculative execution, Specre attacks

BALIKESİR MANYAS İLÇESİNDE BİR MAHALLİN ENERJİ İHTİYACININ ŞEBEKEDEN BAĞIMSIZ HİBRİT SİSTEMLE KARŞILANMASI: ENERJİ VE EKONOMİK ANALİZLERİ

MEETING THE ENERGY NEEDS OF A LOCATION IN BALIKESİR MANYAS DISTRICT WITH A GRID-INDEPENDENT HYBRID SYSTEM: ENERGY AND ECONOMIC ANALYSIS

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ÖZET
Dünya nüfusundaki artış paralelinde, enerji ihtiyacının karşılanması için fosil yakıtlardan yararlanılması sonucunda sera gazı emisyonları da artmaktadır. Fosil yakıtların ömürlerinin sınırlı olması ve fiyatlarındaki artışlar, dünya genelinde yenilenebilir enerji kaynaklarının daha fazla tercih edilir olmasını sağlamıştır. Ancak, yenilenebilir enerji kaynaklarının kullanımında kurulum maliyetlerinin yüksek olması ve sürekli eşdeğer düzeyde enerji üretiminin sağlanamaması sebebiyle, etkin biçimde kullanılmasını sınırlandırmaktadır. Yıl boyunca ihtiyaç duyulan baz yüklerin yenilenebilir enerji kaynaklarından, pik yüklerin ise fosil kaynaklı yakıtlarla karşılanması uygun maliyet ve üretim sürekliliği bağlamında elverişli olarak değerlendirilmektedir. Çalışmamızda yenilenebilir hibrit sistemde, HOMER (Hybrid Optimization Model for Electric Renewable) programı ile uygun kombinasyonun tespiti modellenmesi, simülasyon ve optimizasyon süreçleri değerlendirilmiştir. Bu amaçla Marmara bölgesinde bulunan Balıkesir ili Çavuşköy (40.063583, 27.908583) lokasyonunda oluşturulan dördüz binaların şebekeden bağımsız (off-grid) bir şekilde hem elektrik hem de ısıtma yük (termal yük) ihtiyacının rüzgar ve güneş enerjisinden oluşan hibrit bir sistemle karşılanması için gerekli olan sistem konfigürasyonu kurulmuştur. Kurulan bu sistem ortalama 480 kWh/gün elektrik ve 170,96 kWh/gün termal yük ihtiyacını karşılayacak şekilde tasarlanmıştır. Sistemlerin teknik ve ekonomik analizleri HOMER (Hybrid Optimization Model for Electric Renewables) programı yardımıyla simüle edilerek sonuçları değerlendirilmiştir. Uygulaması gerçekleştirilen sistemde rüzgâr ve güneşten üretilen enerji akülerde depolanacak şekilde tasarlanmıştır. Sistemi oluşturan PV panellerinin ve rüzgâr türbininin ürettiği enerji, akım ve güç değerleri anlık, günlük, haftalık ve aylık olarak, akü grubunun da anlık olarak doluluk durumu ve şarj olma durumu hibrit invertere kaydedilmiş ve değerlendirilmiştir.
Anahtar Kelimeler: Yenilenebilir Enerji, Hibrit Enerji, HOMER

ABSTRACT
In parallel with the increase in the world population, greenhouse gas emissions are also increasing as a result of using fossil fuels to meet energy needs. The limited lifespan of fossil fuels and the increases in their prices have made renewable energy sources more preferred around the world. However, due to the high installation costs of the use of renewable energy resources and the inability to continuously produce equivalent energy, it limits their effective use. It is considered convenient to meet the base loads needed throughout the year from renewable energy sources and the peak loads from fossil fuels in the context of cost-effectiveness and production continuity.In our study, the determination of the appropriate combination, modeling, simulation and optimization processes were evaluated in the renewable hybrid system with the HOMER (Hybrid Optimization Model for Electric Renewable) program. For this purpose, the system required to meet both the electricity and heating load (thermal load) needs of the quadruple buildings built in the Balıkesir province Çavuşköy (40.063583, 27.908583) location in the Marmara region, independently of the grid (off-grid), with a hybrid system consisting of wind and solar energy. configuration has been established This installed system is designed to meet the average 480 kWh/day electricity and 170.96 kWh/day thermal load needs. Technical and economic analyzes of the systems were simulated with the help of the HOMER (Hybrid Optimization Model for Electric Renewables) program and the results were evaluated. In the implemented system, the energy produced from wind and sun is designed to be stored in batteries. The energy, current and power values produced

by the PV panels and wind turbine that make up the system were recorded and evaluated instantly, daily, weekly and monthly, and the instantaneous occupancy and charging status of the battery group were recorded and evaluated in the hybrid inverter.
Key Words: Renewable Energy, Hybrid Energy, HOMER

EVALUATION OF DIGITAL PILLS IN TERMS OF TREATMENT AND ETHICS

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ABSTRACT

Biosensors have been successfully applied for disease identification, prevention, rehabilitation, patient health surveillance and human health management. The latest developments of biosensors in the field of health include ingestible digital pills. Digital Pills are an innovative drug-device technology that allows combining traditional medications with a monitoring system that automatically records patients' physiological data as well as data on medication compliance. Lack of data such as the dose and frequency of patients' use of conventional drugs during the treatment process negatively affects the physician's treatment management. With the data obtained from digital medicines, healthcare professionals provide information about whether the patient is taking the medicines, the dose taken and the duration of treatment. In this way, unnecessary health expenses and abuse of drugs such as opioids are prevented. The world's first ingestible digital medicine with an embedded biosensor to track its use has been approved in the United States. However, such practices, especially towards vulnerable populations, have also brought about ethical problems. Additionally, the risk of data privacy breach is a concern factor with such technologies. Therefore, clinical studies have begun to be conducted on these controversial drugs. Studies demonstrating improvements in drug efficacy and health outcomes have increased the reliability of these systems. In this study, it is aimed to give the current status of the technology, current usage areas, ethical evaluations and clinical studies of ingestible digital pills. Scientific articles published in the last decade about biosensors and ingestible digital pills and the ClinicalTrials.gov database were examined and evaluated. It was concluded that more studies are needed on the efficacy, safety and use of digital pills.

Keywords: Digital pills, biosensors, healthcare systems, ethical concerns, clinical trials.

SEÇİLEN ÜÇ FARKLI NANOPARTİKÜL İLE REAKTİF ORANGE 16 BOYAR MADDESİNİN GİDERİM KİNETİĞİNİN ARAŞTIRILMASI

INVESTIGATION OF THE REMOVAL KINETICS OF REACTIVE ORANGE 16 DYESTUFF WITH SELECTED THREE DIFFERENT NANOPARTICLES

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ÖZET

Toplumsal gelişmeyle birlikte ortaya çıkan endüstriyel gelişme ekosistem üzerinde etkili olan kirlilik problemini de beraberinde getirmiştir. Araştırmacıların üzerinde durduğu kirlilik kaynağı olan endüstrilerden birisi de tekstil endüstrisidir. Çünkü tekstil endüstrisi önemli miktarda su, kimyasal bileşikler ve boya kullanmaktadır. Dolayısıyla ortaya çıkan atıksular da yüksek miktarda organik madde ve yoğun renk içerir. En çok tüketimin görüldüğü bu endüstrilerde azo boyaların yüksek miktarda kullanımından dolayı büyük miktarda renkli atıksular çevresel su kaynaklarına deşarj edilmektedir. Çevre ve insan sağlığı üzerinde olumsuz etkileri olan azo boyaların kontrollü bir şekilde uzaklaştırılması çevresel açıdan oldukça önemlidir. Geleneksel arıtım yöntemleri ile istenilen verimlilikte arıtılamayan renkli atıksular için adsorpsiyon, kimyasal ve elektro koagülasyon, iyon değişimi, membran prosesler, kimyasal oksidasyon, kimyasal çöktürme, elektrokimyasal yöntemler, ozonloma ve biyolojik arıtım yöntemleri gibi sayısız metot kullanılmaktadır. Ancak bu yöntemlerden adsorpsiyon, atıksuda bulunan tehlikeli inorganik ve organik kirleticileri gidermek isteyen endüstrilerin ileri atıksu arıtımının en etkili proseslerinden biridir. Farklı tipteki atık materyaller ile boyaların adsorpsiyonu üzerine hala çok sayıda çalışma yapılmaktadır. Günümüzde pekçok kişi adsorbent olarak nanopartiküllerin kullanımını araştırmaktadır. Nanomateryaller daha yüksek yüzey alanına sahiptir ve bu özellik kirletici gideriminde daha yüksek adsorpsiyon kapasitesine sahip olmamızı sağlar. Bu çalışmada manyetik Fe_3O_4, ZnO ve TiO_2 gibi nanopartiküller ile Reaktif orange 16 (RO 16) azo boyanın adsorpsiyonla giderimi kinetik açıdan izlenmiştir. Kinetik çalışmalar sonucunda verilerin ikinci derece reaksiyon kinetiği modeli ile uyumlu olduğu belirlenmiştir. Ayrıca dengeye ulaşılan 90. dakika sonunda 7,5 g/L adsorbent dozajı ve 25 mg/L RO 16 boya konsantrasyonunda Fe_3O_4, ZnO ve TiO2 nanopartiküller ile sırasıyla %81, %64 ve %40 giderim verimleri elde edilmiştir.

Anahtar Kelimeler: Nanopartikül, azo boya, adsorpsiyon, kinetik

ABSTRACT

Industrial development, which emerged with social development, has brought along the problem of pollution that has an impact on the ecosystem. One of the industries that is a source of pollution that researchers emphasize is the textile industry. Because the textile industry uses significant amounts of water, chemical compounds, and dyes. Therefore, the resulting wastewater also contains high amounts of organic matter and intense color. Due to the high amount of azo dyes used in these industries where the most consumption is seen, large amounts of colored wastewater are discharged into environmental water resources. Controlled removal of azo dyes, which have negative effects on the environment and human health, is very important from an environmental point of view. Numerous methods such as adsorption, chemical and electro-coagulation, ion exchange, membrane processes, chemical oxidation, chemical precipitation, electrochemical methods, ozonation, and biological treatment methods are used for colored wastewater that cannot be treated with the desired efficiency with conventional treatment methods. However, adsorption is one of the most effective processes for advanced wastewater treatment for industries that want to remove hazardous inorganic and organic pollutants in wastewater. There are still many studies on the adsorption of dyes with different types of waste materials. Nowadays, many people are investigating the use of nanoparticles as adsorbents. Nanomaterials have a higher surface area and this property allows us to have higher adsorption capacity for pollutant removal. In this study,

the adsorption removal of Reactive Orange 16 (RO 16) azo dye with magnetic Fe_3O_4, ZnO, and TiO_2 nanoparticles was researched kinetically. As a result of kinetic studies, it was determined that the data were consistent with the pseudo-second-order reaction kinetics model. In addition, after reaching equilibrium at the end of 90 minutes, removal efficiencies of 81%, 64%, and 40% were obtained with Fe_3O_4, ZnO, and TiO_2 nanoparticles at 7.5 g/L adsorbent dosage and 25 mg/L RO 16 dye concentration, respectively.

Keywords: Nanoparticle, azo dye, adsorption, kinetics.

DOĞAL AFETLER SONRASI ÇEVRE YÖNETİMİ

ENVIRONMENTAL MANAGEMENT AFTER NATURAL DISASTERS

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ÖZET

Çeşitli doğa olaylarının sebep olduğu yıkım "afet" olarak tanımlansa da her doğa olayı, insan faaliyeti ya da teknolojik hata afet değildir. Bir olayın afet olabilmesi için yaşamda kötü bir tecrübe bırakması, hayatın olağan akışında bir aksamaya neden olması, sonrasında ekonomik, fiziksel, psikolojik ya da sosyal bir kaybın ortaya çıkması gerekmektedir. Doğal afetler meydana gelme yüzdelerine göre sel (%43), fırtına (%28), deprem (%8), uç sıcaklıklar (%6), heyelan (%5), kuraklık (%5), orman yangınları (%4) ve volanik aktivite (%2) şeklinde sıralanmaktadır. Afetler sonrası ortaya çıkacak sorunlardan birisi de çevre ve halk sağlığı ile ilgili sorunlardır. İlgilenilmediği takdirde içme ve kullanma suyu sıkıntısı, her türlü atık problemi, salgın hastalıklar, temiz gıdaya ulaşımda sorunlar, vektör kontrolü ve konut sanitasyonunda ciddi sıkıntılar ortaya çıkabilir. Çevre sağlığı hizmetlerinde aksamalar yaşanabilir. Deprem ve sel gibi büyük afetlerden sonra oluşan bina yıkıntıları da planlı bir şekilde bertaraf edilmelidir. Bu tarz afetlerde yapı ve yalıtımda kullanılan malzemeler asbest içermesi dolayısıyla üzerinde durulması gereken esas problemdir. Yıkım alanlarında havada radon, asbest, cıva, sülfür, klor gibi solunması sakıncalı gazların varlığı afet sonrası geri dönüşü olmayan çevre sağlığı sorunlarına neden olabilmektedir. Endüstri bölgelerinde yaşanan endüstriyel kazalar sonucu oluşan afetler de, örneğin Çernobil'deki nükleer santral kazası, hala kötü bir tecrübe olarak hafızalarımızdadır. Günümüzde dahi hala etkileri devam etmektedir. Bu amaçla bölgenin, var olan riskleri göz önünde bulundurularak, bir "Çevre Sağlığı Acil Eylem Planı" hazırlanmalıdır. Bu bildiri kapsamında konu hakkında yapılabilecekler ve afetler sonrası yaşanan çevresel sorunlar hakkında bilgi paylaşımı yapılacaktır.

Anahtar Kelimeler: Doğal afet, çevre, halk sağlığı, asbest

ABSTRACT

Although the destruction caused by various natural events is defined as a "disaster", not every natural event, human activity, or technological failure is a disaster. For an event to be a disaster, it must leave a bad experience in life, cause a disruption in the ordinary flow of life, and cause economic, physical, psychological, or social loss. Natural disasters are listed in order of percentage of occurrence as floods (43%), storms (28%), earthquakes (8%), extreme temperatures (6%), landslides (5%), drought (5%), forest fires (4%) and volcanic activity (2%). One of the problems that will arise after disasters is problems related to the environment and public health. If not taken care of, drinking and potable water shortages, all kinds of waste problems, epidemics, problems in access to clean food, vector control, and serious problems in housing sanitation may arise. There may be disruptions in environmental health services. Building debris after major disasters such as earthquakes and floods must also be disposed of in a planned manner. The materials used in construction and insulation may contain asbestos and therefore are the main problem to be addressed. The presence of inhalable gases such as radon, asbestos, mercury, sulfur, and chlorine in the air in demolition areas may cause irreversible environmental health problems after the disaster. Disasters resulting from industrial accidents in industrial zones, such as the nuclear power plant accident in Chornobyl, are still in our memories as a bad experience. Even today, their effects persist. For this purpose, an "Environmental Health Emergency Action Plan" should be prepared considering the existing risks of the region. Within the scope of this paper, information will be shared about what can be done on the subject and environmental problems experienced after disasters.

Keywords: Natural disaster, environment, public health, asbestos.

ZEMİN İNCELEMELERİNDE GEOTEKNİK AÇIDAN GEO-RADAR KULLANIMI

USE OF GEO-RADAR IN GROUND INVESTIGATIONS FROM A GEOTECHNICAL PERSPECTIVE

Murat Karadeniz

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ÖZET

Yerleşim birimlerindeki yapıların giderek artması, mevcut binalar arasında derin kazılar yapma gereksinimi doğmuştur. Dolayısı ile, derin kazıların gerçekleştirilmesinde, sadece zemin özellikleri, kazı boyutları gibi etmenlerin değil, aynı zamanda civarda bulunan mevcut yapıların da dikkate alınmasını konusu zorunlu hale gelmiştir. Kazı civarında bulunan yapıların güvenliği için, dayanma yapıları inşa edilmektedir. Dayanma yapıları, zemin ve arazi koşullarına göre farklı şekilde tasarlanabilmektedir. Geoteknik mühendisleri tarafından projelendirilen derin kazılar ve dayanma yapıları konusunda yönetmelikler bulunmaktadır. Yönetmelikler mevcut koşullara göre sık sık güncellenmekte ve her geçen gün, daha kapsamlı yönetmelikler hizmete sunulmaktadır.

Ancak, daha önceden yapılmış olan yapılarda gerçekleştirilmek istenen bazı çalışmalarda, son yönetmeliklere birebir uygun davranılmasının mümkün olmadığı, sorumlu geoteknik mühendisi tarafından uygun çözümlerin üretilmesi gerektiği durumlar ile karşılaşılabilmektedir. Bu tip durumlarda, geoteknik mühendisleri, tecrübe ve bilgilerinin yanında, jeoloji ve jeofizik gibi yer bilimi ile ilgili farklı disiplinler ile ortak çalışmalar yaparak çözüm bulabilmektedir.

Sunulan bu bildiride, disiplinler arası ortak çalışma esasına dayanan bir vaka analizine yer verilmektedir. Çalışma konusu, mevcut bir ankrajlı perde duvarın performans analizidir. İlgili analizde, yönetmelikte belirtilen çekme testleri, arazi koşulları ve imkanları dahilinde gerçekleştirilememiştir. Öte yandan, geoteknik mühendisi ila jeofizik mühendislerinin ortak çalışmaları sonucu, ankrajların yerleri tespit edilmiş ve gerekli ankraj kontrolleri gerçekleştirilmiştir. Sunulan çalışmada, ankraj konumlarının jeofizik yöntemler ile nasıl tespit edildiği ve hesaplamalara nasıl yansıtıldığı ile ilgili bir saha çalışmasının detayları paylaşılmaktadır.

Anahtar Kelimeler: Ankrajlı Betonarme Perde Duvar, Sismik Ölçüm, Geoteknik

ABSTRACT

Before the structure are built, it is necessary to examine the soil on the land where the structure will be built. After determining the geotechnical properties and identifying possible problems, necessary precautions must be taken. Otherwise, damage caused by the ground may occur in the constructed structure over time. It is very difficult to do any work on ground where buildings have been built. It is even more difficult to carry out these works in a non-destructive way without causing any damage to the structure.

The Geo-Radar scanning method or the method known as Ground Radar helps to map the underground areas close to the surface (up to 40 meters) in a non-destructive way. Geo-radar scanning is carried out through a device called GRP (Ground Penetrating Radar). GRP is a geophysical science-based measurement device. It works with a system in which electromagnetic waves of different frequencies are sent to the surface and the returning waves, either directly, reflected or refracted, are recorded in a recorder. These records form a radargram. The study is interpreted by subjecting it to the Radagram special data-processing program. Since GRP allows non-destructive measurement, it is seen in the literature that it is preferred especially in the examination of historical buildings. It is also used for

purposes such as identifying discontinuities and cracks in the marble bed, and underground mine surveys.

In this study, the Geo-radar scanning method was used, unlike its common use, to obtain data for use in geotechnical studies. The study is a case analysis conducted with the aim of detecting damages to a building and determining the factors causing the damage from a geotechnical perspective.

Keywords: Geo-Radar, GRP, Geotechnics, Damage Detection

MEVCUT ANKRAJ KONUMUNUN JEOFİZİK YÖNTEMLE BELİRLENMESİ

DETERMINATION OF THE ANCHOR LOCATION USING THE GEOPHYSICAL METHODS

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ÖZET

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Anahtar Kelimeler: Ankrajlı Betonarme Perde Duvar, Sismik Ölçüm, Geoteknik

ABSTRACT

The increasing number of buildings in residential areas has created a need for deep excavations between existing buildings. Therefore, when carrying out deep excavations, it has become necessary to take into account not only factors such as ground properties and excavation dimensions, but also the existing structures in the vicinity. For the safety of the structures around the excavation, retaining structures are being built. Retaining structures could be designed differently depending on ground and terrain conditions. There are regulations regarding deep excavations and retaining structures designed by geotechnical engineers. Regulations are frequently updated according to current conditions and more comprehensive regulations are put into service each day.

However, in some works that are intended to be carried out on previously constructed structures, situations may be encountered where it is not possible to comply with the latest regulations exactly and appropriate solutions must be produced by the responsible geotechnical engineer. In such cases, geotechnical engineers, in addition to their experience and knowledge, could find solutions by working together with different disciplines related to earth science such as geology and geophysics.

This paper presents a case analysis based on interdisciplinary collaboration. The subject of the study is the performance analysis of an existing anchored reinforced concrete shear wall. In the relevant analysis, the tensile tests specified in the regulation could not be carried out within the field conditions and possibilities. On the other hand, as a result of the joint work of geotechnical engineers and geophysical engineers, the locations of the anchors were determined and the necessary anchor checks were carried out. In the presented study, the details of a field study on how anchor locations are determined by geophysical methods and how they are reflected in the calculations are shared.

Keywords: Anchored Reinforced Concrete Shear Wall, Seismic Measurement, Geotechnical

UTILIZATION OF LYSOZYME AS A FOOD ADDITIVE IN THE FOOD INDUSTRY

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ABSTRACT

Lysozyme is an antimicrobial that has the ability to inhibit both gram-negative and gram-positive bacteria in human food and animal feed as well. Lysozyme helps to improve the microbial health in the intestinal tract of monogastric such as pigs and poultry. This review seeks to the importance of lysozyme in food, and the factors that affect lysozyme in their process of inhibiting microorganisms in food.

In the food industry, lysozyme has been used to control food spoilage, improve shelf-life and prevent microorganisms' contamination in food. It is not commonly used in the food industry due to the suspicion of being allergic to some people who may consume lysozyme-containing food. However, lysozyme has been proven to be non-allergic to even egg allergic. Therefore, it has been recommended for use in the food industry as an additive to increase shelf-life, and improve microbial quality in processed foods.

Keywords: lysozyme, gram-negative, gram-positive, shelf-life, food processing, allergies

ZONGULDAK BÜLENT ECEVİT ÜNİVERSİTESİ FARABİ KAMPÜSÜ BİLGİ SİSTEMİNİN TASARIMI ve AÇIK KAYNAK KODLU WEB PLATFORMUNDA SERVİS EDİLMESİ

DESIGN OF ZONGULDAK BULENT ECEVIT UNIVERSITY FARABI CAMPUS INFORMATION SYSTEM AND SERVICE ON OPEN SOURCE WEB PLATFORM

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ÖZET

Günümüzde gelişen teknoloji ile her bilgiye kolaylıkla ulaşabilmektedir. Bu çalışmanın amacı, gelişen teknoloji ve uzaktan algılama tekniklerinin bir araya getirilerek, kullanıcılara internet ortamında görsel ve yazılı olarak bir üniversite kampüsü hakkında bilgi sahibi olma fırsatı tanınmasıdır. İlgili kampüsün Üç Boyutlu (3B) olarak görülebildiği; kullanıcıların binalar ve bölümler hakkında temel bilgilere ulaşabildiği bu proje sayesinde özellikle üniversite seçimi döneminde olan adaylar için kolaylık sağlanmaktadır.

Çalışmada kullanılacak yöntemler uzaktan algılama yöntemleridir. Çalışmada, Zonguldak Bülent Ecevit Üniversitesi Farabi Kampüsüne ilişkin kampüs bilgi sistemi modellenip, açık kaynak kodlu WEB platformunda servis edilmesi planlanmıştır. Öncelikle Farabi kampüsünün stereo görüntüleri elde edilmiş, sonra görüntüler Agisoft Metashape programı ile işlenerek nokta bulutu, mesh model, SYM ve ortofoto verileri üretilmiştir. Üretilen mesh model, bölgenin 3B katı modelidir. Çalışmanın görüntüsü mesh modelden oluşmaktadır. Gerekli görsel veriler elde edildikten sonra, çalışma alanına ait öznitelik bilgileri bir arazi çalışması ile kampüsten toplanmıştır. Öznitelik verilerini oluşturan sözel verilerin temin edilmesinden sonra ArcGIS programı yardımıyla, Agisoft Metashape programı ile oluşturulan ortofoto ile çalışma alanındaki binalara ait öznitelik bilgileri eklenmiştir. Öznitelik bilgileri olarak; Bina Adı, Bina Kat Adedi, İnternet Sayfası ve İletişim olarak kullanıcılar 4 farklı bilgiye erişim sağlaması planlanmıştır. ArcGIS programında hazırlanan öznitelik verileri daha sonra FME Desktop programına aktarılarak Lod 1 işlemi yani binaları haritalardaki sınırlarından mevcut yüksekliğe kadar yükseltme işlemi yapılmıştır. Hazırlanan tüm görsel ve sözel verilerin Cesium JS programında çalışabilmesi için FME Desktop ile cesium3DTile formatına dönüşüm yapılmıştır. Cesium JS platformuna verileri ilişkilendirecek kodlar düzenlenerek mevcut platforma aktarılmıştır. Kampüs bilgi sistemini kullanmak isteyen kullanıcı, web platformunda servis edilen kampüsün 3B görseli üzerindeki binaya tıkladığında bina ile ilgili bilgileri görebilme olanağına sahip olmuştur.

Anahtar Kelimeler: Uzaktan Algılama, Kampüs Bilgi Sistemi, Açık Kaynak Kodlu Web Platformu, Cesium JS

ABSTRACT

With today's advanced technology, any information can be easily accessed. The aim of the study is to combine emerging technology and remote sensing techniques to give users the opportunity to learn about a university campus visually and in writing on the Internet. This project, where the campus can be seen as a Three-Dimensional (3B) and users can access basic information about buildings and departments, provides ease, especially for candidates in the university election period.

The methods to be used in the study are remote sensing methods. In the study, the campus information system for Zonguldak Bülent Ecevit University Farabi Campus is planned to be modeled and served on the open source WEB platform. First stereo images of the Farabi campus were obtained, then images

were processed using the Agisoft Metashape program to generate point cloud, mesh model, SYM and orthophoto data. The mesh model produced is the 3D solid model of the region. The image of the study consists of a mesh model. After the necessary visual data was obtained, the attribute information for the study area was collected from the campus through a terrain study. With the help of the ArcGIS program, ortophotography created with the Agisoft Metashape program and property information for buildings in the field were added after the verbal data were provided. It is planned to provide users with access to four different types of information, namely, Building Name, Building Floor, Website and Communication. The attribute data generated in the ArcGIS program was then transferred to the FME Desktop program and the Lod 1 process was carried out, which is to upgrade the buildings from the boundaries of the maps to the current height. FME Desktop has been converted to the cesium3DTile format to enable all visual and verbal data to work in the Cesium JS program. Cesium JS platform has been imported to the existing platform by editing the codes to associate the data. The user who wants to use the campus information system has been able to see information about the building by clicking on the building on the 3D visual of the campus served on the web platform.

Keywords: Remote Sensing, Campus Information System, Open Source Web Platform, Cesium JS

SYNTHESIS AND CHARACTERIZATION OF POLY-O-TOLIDINE USING ELECTROCHEMICAL, SPECTROSCOPIC, AND THERMOGRAVIMETRIC METHODS

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ABSTRACT

We studied the electropolymerization of o-tolidine on a platinum electrode in an organic medium containing 0.2 M Bu_4NPF_6 dissolved in anhydrous CH_2Cl_2. Cyclic voltammetry recordings revealed three oxidation peaks for this monomer. Recurrent scans carried out between 0 and 0.96 V versus the Ag/AgCl reference electrode showed the formation of an electroactive polymer. Additionally, the appearance of a blue deposit on the platinum surface was accompanied by the emergence of new redox systems. The film formed is conductive and oxidizes at a potential less anodic than the monomer. The maximum doping level for this polymer was estimated to be 0.56. This value classifies poly-o-tolidine (POT) among conductive organic polymers, as it is comparable to that of polyaniline and higher than that of polypyrrole. This doping is ensured by the insertion of PF6- ions from the supporting electrolyte, which maintain the film's electroneutrality and contribute to good material conductivity. This was confirmed by Electrochemical Impedance Spectroscopy (EIS). In fact, the charge transfer resistance measured for POT was lower than that recorded for polyterthiophene under the same working conditions. The structure of POT was studied using various spectroscopic methods, including NMR, IR, and XPS spectroscopy. The ATG-ATD thermogram of POT showed the presence of two exothermic peaks in ATD, with maxima at 291°C and 328°C, respectively. The existence of multiple peaks can be explained by the polymer's polydispersity.

Key Words: *O*- Tolidine, Conductive polymer, Electropolymerization, Cyclic voltammetry, ATG-ATD, XPS.

OSCILLATION CRITERIA FOR SECOND-ORDER DIFFERENTIAL EQUATIONS NEUTRAL DELAY EMDEN-FOWLER EQUATIONS

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ABSTRACT
In this article, we construct a new oscillation criteria for a specific class of second-order differential equations known as neutral delay Emden-Fowler equations. By utilizing advanced mathematical techniques, we are able to derive conditions that are more accurate and efficient than previous methods. Furthermore, our results also simplify the process of identifying oscillations in these types of equations. Our findings have important implications for various fields such as engineering, physics, and mathematics, where these equations are widely used to model dynamic systems. Additionally, We have also highlighted some illustrative examples about our results.
Keywords: Oscillation Criteria Emden-Fowler differential equations, Neutral delay Second-order differential equation.

RADYOTERAPİ ENDİKASYONLU PERİAMPÜLLER BÖLGE KANSERLERİNDE FARKLI TPS VERİLERİNİN DOZİMETRİK KARŞILAŞTIRMASI

DOSIMETRIC COMPARISON OF DIFFERENT TPS DATA IN PERIAMPULLAR CANCERS WITH RADIOTHERAPY INDICATION

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ÖZET

Radyoterapi tedavi öncesinde sanal simülasyon imkanı sunan kısaca TPS adı verilen tedavi planlama sistemlerinin hesapladığı radyasyon birim doz miktarını kompleks lineer hızlandırıcı cihazlarında hedef hacme verilmesi ile uygulanır. Hedeflenen doku hacmine verilecek dozun hesaplanması ve uygulanması için, çeşitli tedavi planlama sistemleri kullanılmaktadır. TPS'ler içlerinde çeşitli tedavi planlama algoritmaları barındırmaktadırlar. Bu algoritmalar sayesinde vücuttaki tüm organ ve dokuların alacakları dozların üç boyutlu olarak simülasyonu yapılmakta, elde edilen doz dağılımları ile optimum tedavi planları önceden hazırlanabilmektedir. Farklı tedavi planlama algoritmalarının birbirlerine karşı üstün özellikleri olabilmektedir. Bu amaçla Prowess Panther tedavi planlama sistemi ve Eclipse tedavi planlama sistemlerine aktarılan hasta verileri ile optimum tedavi planları elde edilerek TPS'ler arasında dozimetrik karşılaştırma yapılacaktır. Çalışmamızda, Necmettin Erbakan Üniversitesi Meram Tıp Fak. Radyasyon Onkolojisi Bölümüne periampüller kanseri teşhisi ile gelen 10 hasta ele alınacaktır. Her iki planlama için, ters planlama tekniğiyle yapılan optimizasyon işleminden sonra Prowess Panther tedavi planlama sisteminde Collapse Cone Convolution Süperposition algoritmasıyla, Eclipse tedavi planlama sisteminde ise Pencil Beam Convolution algoritmasıyla üç boyutlu doz dağılımları hesaplanacaktır.

İki tedavi planıyla yapılan karşılaştırma sonucu hastaların tedavi süreleri, plan segment sayıları, MU birim sayısı ve risk altındaki organ dozlarında (OAR) anlamlı farklar tespit edildi. Uluslararası doz kabul kriterlerine bakılarak karşılaştırılan tedavi planlarında risk altındaki organ dozlarında da Prowess TPS 'in tedaviye olumlu katkısı olduğu gözlendi.

Sonuç olarak; farklı algoritmaları içlerinde barındıran tedavi planlama sistemlerinden elde edilen dozimetrik verilerde farklar olabileceği için, tedavi sürelerini kısaltan ve risk altındaki organlara daha az doz veren TPS' ler kliniklerin imkanları dahilinde tercih edilmelidir.

Keywords: TPS, algoritma, segment sayısı, mu.

ABSTRACT

Radiotherapy is applied by giving the radiation unit dose amount calculated by the treatment planning systems, shortly called TPS, which provides virtual simulation before the treatment, to the target volume in complex linear accelerator devices. Various treatment planning systems are used to calculate and apply the dose to the targeted tissue volume. TPSs contain various treatment planning algorithms. Thanks to these algorithms, the doses to be received by all organs and tissues in the body are simulated in three dimensions, and optimum treatment plans can be prepared in advance with the dose distributions obtained. Different treatment planning algorithms may have superior features against each other. For this purpose, dosimetric comparison between TPSs will be made by obtaining optimum treatment plans with patient data transferred to Prowess Panther treatment planning system and Eclipse treatment planning systems. In our study, Necmettin Erbakan University Meram Medical Faculty. 10 patients who came to the Radiation Oncology Department with the diagnosis of periampullary cancer will be discussed. For both planning, three-dimensional dose distributions will be calculated with Collapse Cone Convolution Superposition algorithm in Prowess Panther treatment planning system and Pencil Beam Convolution algorithm in Eclipse treatment planning system after optimization with reverse planning technique.

As a result of the comparison with the two treatment plans, significant differences were detected in the treatment duration, plan segment numbers, number of MU units and doses of organs at risk (OAR). It was observed that Prowess TPS had a positive contribution to the treatment in the doses

of organs at risk in the treatment plans compared by looking at the international dose acceptance criteria.

As a result; Since there may be differences in the dosimetric data obtained from the treatment planning systems that contain different algorithms, TPSs that shorten the treatment times and give less doses to the organs at risk should be preferred within the possibilities of the clinics.

Keywords: TPS, Algorithm, Number of segments, Mu

ATEROSKLEROZ PATOGENEZİNDE NKILA'NIN BCL-2 VE BAX GENLERİNİN EKSPRESYONUNA ETKİSİ

IMPACT OF NKILA ON THE EXPRESSION OF BCL-2 AND BAX GENES IN ATHEROSCLEROSIS PATHOGENESIS

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ÖZET
Ateroskleroz, kardiyovasküler hastalıkların başlıca sebeplerinden biri olan kronik ve çok faktörlü bir hastalıktır. Düşük yoğunluklu lipoprotein (LDL) partikülleri ve okside LDL (ox-LDL), endotel geçirgenliğini artırarak ve oksidatif değişikliklere yol açarak ateroskleroza sebep olur. Özellikle ROS kaynaklı oksidatif stres, Nükleer faktör kappa B (NF-κB) sinyalini aktive eder ve ardından Bcl-2/Bax oranını azaltarak apoptozu indükler. NF-κB ile etkileşen uzun kodlama yapmayan RNA (lncRNA) (NKILA), NF-κB inhibisyonu yoluyla apoptozu azaltabilir. Bu nedenle, NKILA'nın anti-apoptotik ve pro-apoptotik genlerin düzenlenmesi üzerinde potansiyel bir etkisi olabileceği düşünülmektedir. Apoptozda B hücre lenfoma geni-2 (Bcl-2) ailesi proteinleri, mitokondriyal zarın geçirgenliğini kontrol etmektedir. Bcl-2 ile ilişkili X (Bax), mitokondriyal hasar ve sitokrom c salınım mekanizmalarında rol oynamaktadır. Bu çalışmada, ox-LDL ile muamele edilmiş ve sonrasında NKILA siRNA uygulanmış insan umbilikal ven endotel hücre hattı (HUVEC)'nda pro-apoptotik gen BAX ve anti-apoptotik gen olan Bcl-2 genlerinin ekspresyonları kantitatif revers (ters) transkripsiyon polimeraz zincir reaksiyonu (RT-qPCR) ile incelenmiştir. Bulgularımıza göre, ox-LDL ve NKILA siRNA uygulanan HUVEC hücrelerinde, BAX'ın ekspresyonu 1,34 kat, Bcl-2'nin ekspresyonu ise 2,58 kat azalmıştır. NKILA'nın ox-LDL indüklü endotel hücre apoptozunda dolayısıyla ateroskleroz patogenezinde rol alabileceği düşünülmektedir.
Anahtar kelimeler: Apoptoz, Endotel, Gen Ekspresyonu, NKILA, Ox-LDL

Bu çalışma Sivas Cumhuriyet Üniversitesi Bilimsel Araştırmalar Birimi tarafından T-2022-964 numaralı proje ile desteklenmiştir.

ABSTRACT
Atherosclerosis is a chronic and multifactorial disease, considered a primary cause of cardiovascular diseases. Low-density lipoprotein (LDL) particles and oxidatively modified LDL (Ox-LDL) cause atherosclerosis by increasing endothelial permeability and inducing oxidative changes. In particular, ROS-induced oxidative stress activates the Nuclear factor kappa B (NF-κB) signal and subsequently inducing apoptosis by reducing the Bcl-2/Bax ratio. NF-κB-interacting long non-coding RNA (lncRNA) (NKILA) can reduce apoptosis through NF-κB inhibition. Therefore, it is be thought that NKILA may have a potential effect on the regulation of anti-apoptotic and pro-apoptotic genes. In apoptosis, the B-cell lymphoma-2 (Bcl-2) family of proteins controls the permeability of the mitochondrial membrane. Bcl-2 associated X (Bax) plays a role in mitochondrial damage and cytochrome c release mechanisms. In this study, the expressions of the pro-apoptotic gene BAX and the anti-apoptotic gene Bcl-2 in human umbilical vein endothelial cells (HUVEC) treated with ox-LDL and subsequently transfected with NKILA siRNA were quantitatively examined using reverse transcription polymerase chain reaction

(RT-qPCR). According to our findings, in HUVECs treated with ox-LDL and transfected with NKILA siRNA, the expression of Bax and Bcl-2decreased by 1.34 and 2.58 times, respectively. It is suggested that NKILA may play a role in ox-LDL-induced endothelial cell apoptosis, therefore in pathogenesis of the atherosclerosis.
Keywords: Apoptosis, Endothelium, Gene Expression, NKILA, Ox-LDL

GATES İNTERFEROMETRE PROFİLOMETRİSİNDE FRİNGE FREKANSI VE NESNE BOYUTLARI ARASINDAKİ İLİŞKİNİN İNCELENMESİ

EXAMINING THE RELATIONSHIP BETWEEN FRINGE FREQUENCY AND OBJECT SIZES IN THE GATES INTERFEROMETER PROFILOMETRY

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ÖZET

Günümüzde mikroelektronikten tıbba kadar birçok uygulamada kullanılan 3 boyutlu profilometri sistemleri, özellikle yüzey profiline ihtiyaç duyulduğu durumlarda büyük önem taşımaktadır. Fringe projeksiyon profilometrisinde, hafif bir yol farkına sahip iki farklı ışının girişimiyle bir girişim deseni oluşturulur. Daha sonra bu desen örnek nesne üzerine yansıtılır ve bir görüntü işleme algoritması kullanılarak nesnenin 3 boyutlu yüzey profili elde edilir. Bu çalışmada, Gates İnterferometre Sistemi kullanılarak fringe frekansı ile ölçüm yapılan nesnelerin boyutu arasındaki ilişkinin incelenmesi amaçlanmıştır. Gates İnterferometre Sisteminde, bir lazer kaynağından gelen ışık demeti öncelikle bir ışın ayırıcıdan geçirilerek iki farklı ışına ayrılır. Daha sonra oluşturulan ışık deseni nesnenin yüzeyine yansıtılır. Yüzeyin 3 boyutlu yapısı nedeniyle fringe deseni deforme olur. Daha sonra, üzerinde desen bulunan nesnenin yakalanan resmi, sırasıyla Sürekli Dalgacık Dönüşümü ve bir unwrapping algoritması uygulanarak görüntü işleme prosesine tabi tutulur. Bu işlemden sonra nesnenin 3 boyutlu yüzey profili elde edilir. Nispeten daha küçük boyutlardaki nesneleri incelemek için, ışın ayırıcının eğim açısını büyüterek saçak frekansını arttırmak gerektiği bulunmuştur. Bu işlem iki ışın arasındaki yol farkının artmasına neden olur. Ancak daha büyük boyutlardaki nesneler için, 2π veya 2π'nin katları halindeki faz belirsizliğine neden olmamak için ışın bölücünün eğim açısını azaltarak fringe frekansını düşürme zorunluluğu olduğu görülmüştür.

Anahtar Kelimeler: 3D Profilometri, Fringe Projeksiyonu, Sürekli Dalgacık Dönüşümü.

ABSTRACT

In today's world, 3D profilometry systems used in many applications from microelectronic to medicine have a great importance especially when there is a need for surface profiling. In fringe projection profilometry, an interference pattern of light is generated by interfering two different beams having a slight path difference. Then the pattern is projected onto the sample object and a 3D surface profile of the object is obtained by using a image-processing algorithm. In this study, it is aimed to examine the relationship between fringe frequency and the size of the objects under examination by using the Gates Interferometer System. In the Gates Interferometer System, a light beam that comes from a laser source is firstly split into two different beams by getting passed through a beam splitter. Then the generated light pattern is reflected onto the object's surface. Because of the 3D structure of the surface, the fringe pattern is deformed. Then the captured picture of the object having the pattern on it is image-processed by applying Continuous Wavelet Transform and an unwrapping algorithm respectively. After this procedure, 3D surface profile of the object is obtained. It is found that to examine objects in relatively smaller sizes, it is needed to increase fringe frequency by enlarging the tilting angle of the beam splitter. This procedure causes an increase in path difference between the two beams. For objects in larger sizes however, it is seen that there is a necessity to decrease the fringe frequency by reducing the tilting angle of the beam splitter not to cause a 2π or multiples of 2π phase ambiguities.

Keywords: 3D Profilometry, Fringe Projection, Continuous Wavelet Transform.

KAHRAMANMARAŞ DEPREMLERİNİN ETKİLENEN ŞEHİRLERDEKİ BİNALAR VE YOL AĞLARI ÜZERİNDEKİ ETKİSİNİN OPENSTREETMAP VE OPENAERIALMAP KULLANILARAK DEĞERLENDİRİLMESİ

EVALUATING THE EFFECTS OF TWO EARTHQUAKES IN KAHRAMANMARAS ON BUILDINGS AND ROAD NETWORKS IN IMPACTED CITIES USING OPENSTREETMAP AND OPENAERIALMAP

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ÖZET

Bu çalışmada, 6 Şubat 2023 tarihli Kahramanmaraş depremlerinin, depremden etkilenen şehirlerdeki binalar ve yol ağları üzerindeki etkisini değerlendirmek için OpenStreetMap ve OpenAerialMap'in nasıl kullanılabileceği araştırılmıştır. OpenStreetMap büyük bir vektörel veri kaynağıdır. OpenAerialMap ise yüksek mekansal çözünürlüklü raster görüntüler sağlamaktadır. Bu iki veri kaynağından elde edilen verilerin doğru yöntem ve araçlar ile birlikte kullanımı birçok kolaylık ve imkan sunmaktadır. Bu çalışma kapsamında coğrafi bilgi sistemleri ve uzaktan algılama teknolojileri kullanılarak deprem kaynaklı hasarlar ve çevredeki değişiklikler yol ve bina gibi temel nesneler dikkate alınarak analiz edilmiştir. Makine öğrenimi ve derin öğrenme teknikleri kullanılarak deprem sonrası yol ağının erişilebilirliği ve bağlantı durumu değerlendirilmiştir. Ayrıca makine öğrenimi ve derin öğrenme tekniklerini kullanılarak hasar gören binalar hasar seviyelerine göre sınıflandırılmıştır. Bina analizi sonuçları resmi hasar değerlendirme raporlarıyla karşılaştırıp, en yüksek farklılık ve kırılganlığa sahip bölgeler belirlenmiştir. Ayrıca, OpenStreetMap ve OpenAerialMap'ten elde edilen verileri analiz etmek ve görselleştirmek için histogramlar, saçılma grafikleri, ısı haritaları gibi Python uygulamaları kullanılmıştır. Çalışma neticesinde bu yöntem ve araçların afet müdahalesi ve yönetimi çalışmaları için değerli bilgiler ve rehberlik sağlayabileceği görülmüştür. Sonuçlarımız, OpenStreetMap ve OpenAerialMap'in deprem etkisini değerlendirmek için yararlı ve güvenilir veri kaynakları olduğunu ve resmi veri kaynaklarını tamamlayabileceğini göstermektedir. Ayrıca, afet değerlendirmesi için veri kalitesi, eksiksizliği ve zamanında erişim gibi açık kaynak veri kullanmanın sınırlamaları ve zorlukları hakkında ortaya çıkan zorlukları değerlendirdik. OpenStreetMap ve OpenAerialMap'in Türkiye ve diğer deprem riskli bölgelerde afet yönetimi ve müdahalesi için kullanımını iyileştirmek için öneriler ve yapılması gerekenleri sunduk. Çalışmamızın Türkiye ve diğer deprem riskli bölgelerde afet yönetimi ve dayanıklılığının ilerlemesine katkıda bulunacağına inanıyoruz.

Anahtar Kelimeler: OpenStreetMap, OpenAerialMap, deprem etki değerlendirmesi, GIS

ABSTRACT

In this study investigate how OpenStreetMap and OpenAerialMap can be used to evaluate the impact of the Kahramanmaraş earthquakes on 6 February 2023, on buildings and road networks in affected cities. OpenStreetMap is a large vector data source. OpenAerialMap provides high spatial resolution raster images. The use of data obtained from these two data sources with the correct methods and tools provides many conveniences and opportunities. Within the scope of this study, earthquake-induced damage and changes in the environment were analyzed by considering basic objects such as roads and buildings using geographic information systems and remote sensing technologies. Machine learning and deep learning techniques were used to assess the accessibility and connectivity status of the road network after the earthquake. In addition, machine learning and deep learning techniques were used to classify damaged buildings according to their damage levels. Building analysis results were compared with official damage assessment reports and the regions with the highest difference and fragility were determined. In addition, Python applications such as histograms, scatter plots, and heat maps were used to analyze and visualize the data obtained from OpenStreetMap and OpenAerialMap. As a result of the study, it was seen that these methods and tools can provide valuable information and guidance for

disaster response and management studies. Our results show that OpenStreetMap and OpenAerialMap are useful and reliable data sources for evaluating the impact of earthquakes and can complement official data sources. Furthermore, we evaluated the challenges that emerged regarding the limitations and difficulties of using open source data for disaster assessment, such as data quality, completeness, and timely access. We presented suggestions and actions to improve the use of OpenStreetMap and OpenAerialMap for disaster management and response in Turkey and other earthquake-prone regions. We believe that our study will contribute to the advancement of disaster management and resilience in Turkey and other earthquake-prone regions.

Keywords: urban planning, openstreetmap, openaerialmap, image processing, artificial intelligence

KENTSEL DEĞİŞİMİN ANALİZİ VE GÖRSELLEŞTİRİLMESİ İÇİN METODOLOJİK BİR ÇERÇEVE: MİNSK, BELARUS ÖRNEĞİ

A METHODOLOGICAL FRAMEWORK FOR ANALYZING AND VISUALIZING URBAN CHANGE: A CASE STUDY OF MINSK, BELARUS

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ÖZET

Kentsel alanlar, başarılı şehir planlaması ve çevre yönetimi için sistematik gözlem gerektiren hızlı bir değişimden geçmektedir. Bu makale, Belarus'taki Minsk şehrinin yolları ve binaları üzerine odaklanarak kentsel dönüşümleri analiz etmek ve görüntülemek için metodolojik bir yaklaşım sunmaktadır. Bu metodoloji, kentsel değişim modellerini hassas bir şekilde tanımak için GeoPandas, Matplotlib, Rasterio ve Shapely gibi Python paketlerini kullanarak görüntü işleme, makine öğrenimi ve yapay zeka tekniklerini birleştirmektedir. Çalışma OpenStreetMap (OSM) ve Open Aerial Map (OAM) platformalrndan elde edilen veriler üzerine kurulmuştur.

Metodoloji, belirli bir çalışma bölgesi belirlendikten sonra ilgili bölgeye ait OAM ve OSM verilerinin otomatik olarak elde edilmesi ile başlamaktadır. Ardından veriler JSON/GEOJSON gibi ortak formatlara dönüştürülmekte ve ayrıca elde edilen verilerin doğru bir şekilde çakışmasını sağlamak amacıyla koordinat dönüşümleri yapılmaktadır. Aynı bölgeye ait OAM ve OSM verileri işlenmekte ve görüntü bölütleme, kenar algılama ve öznitelik çıkarma gibi teknikler kullanılarak kentsel unsurlar tespit edilmekte ve ardından farklılıkları tespit etmek için değişim analizi yapılmaktadır.

Yapay Zeka (YZ)'nın yol ve bina tespitinde kullanılması, pikselleri yollar, binalar veya diğer arazi örtüsü öğelerini doğru bir şekilde sınıflandırmak için Convolutional Neural Networks (CNN) ve örnek bölütleme gibi gelişmiş makine öğrenimi algoritmaları kullanılmaktadır. Bu, hava fotoğraflarında karmaşık uzamsal özellikleri tanıma yeteneğini geliştirir.

Değişim haritaları gibi grafiksel temsiller, OpenStreetMap (OSM) verileri ile hava görüntüleri arasındaki farkları vurgulamak için kullanılmaktadır. Zaman serisi grafikleri, kentsel metriklerde zamansal değişimleri göstermek için kullanılmakta ve daha kapsamlı bir bakış açısı kazanılmasına yardımcı olmaktadır.

Bu metodolojinin şehir planlamasında geniş bir alanda kullanımı mümkündür. Örneğin, büyüyen alanları hızla tanımlamak, planlamanın başarısını değerlendirmek ve gelecekteki altyapı gereksinimlerini tahmin etmek gibi çalışmalarda kullanılabilir. Ayrıca, altyapı yönetiminde, gerçek zamanlı izleme, bakımın önceliklendirilmesi ve bozulmanın ölçülmesine yardımcı olur. Ek olarak, kentleşmenin doğal kaynaklar üzerindeki etkisini değerlendirmek ve hava ve su kalitesindeki değişiklikleri izlemek için de kullanılabilir.

Minsk üzerine yapılan kapsamlı bir çalışma, önerilen metodolojinin etkinliğini doğrulamaktadır. OSM ve OAM platformlarından elde edilen verilerin, görüntü işleme, YZ teknikleri ve Python paketlerinin kullanımı ile yollar ve binalardaki değişikliklerin tespit edildiği ve açıklanabildiği gösterilmiştir. Bu metodolojik keşifler, şehir planlaması, altyapı yönetimi ve çevre koruma alanlarında karar verme için büyük değer taşımakta ve bu nedenle sürdürülebilir kentsel büyümeyi teşvik etmektedir.

Anahtar Kelimeler: şehir planlama, openstreetmap, openaerialmap, görüntü işleme, yapay zeka

ABSTRACT

Urban areas are undergoing rapid change, requiring systematic observation for successful urban planning and environmental management. This study presents a methodological approach to analyze and visualize urban transformations, focusing on the roads and buildings of the city of Minsk in Belarus. This methodology combines image processing, machine learning, and artificial intelligence (AI) techniques using Python libraries such as GeoPandas, Matplotlib, Rasterio, and Shapely to precisely

define urban change models. The study is based on data obtained from the OpenStreetMap (OSM) and Open Aerial Map (OAM) platforms.

The methodology starts with the automatic acquisition of OAM and OSM data for the relevant region after determining a specific study area. The data is then converted to common formats, such as JSON/GEOJSON, and coordinate transformations are performed to ensure that the data obtained overlap correctly. OAM and OSM data for the same region are processed, urban elements are detected using techniques such as image segmentation, edge detection, and feature extraction, and then change analysis is performed to identify differences. AI is used to detect roads and buildings, using advanced machine learning algorithms such as Convolutional Neural Networks (CNN) and instance segmentation to accurately classify pixels as roads, buildings, or other elements of land cover. This improves the ability to recognize complex spatial features in aerial photographs. Graphical representations, such as change maps, are used to highlight the differences between aerial images and OpenStreetMap (OSM) data. Time series graphs are used to show temporal changes in urban metrics and provide a more comprehensive perspective.

This methodology can be used in a wide range of urban planning applications. For example, it can be used to quickly identify growing areas, assess planning success, and estimate future infrastructure needs. It can also help in infrastructure management, such as real-time monitoring, prioritizing maintenance, and measuring degradation. In addition, it can be used to assess the impact of urbanization on natural resources and monitor changes in air and water quality.

A comprehensive study in Minsk confirms the effectiveness of the proposed methodology. The data obtained from the OSM and OAM platforms is shown to be able to detect and explain changes in roads and buildings using image processing, AI techniques, and Python libraries. These methodological discoveries have great value for decision making in urban planning, infrastructure management, and environmental protection and, therefore, promote sustainable urban growth.

Keywords: urban planning, openstreetmap, openaerialmap, image processing, artificial intelligence

GENETİK PROGRAMLAMA İLE SERAMİK BÜNYELERİN SU EMME DEĞERLERİNİN MODELLENMESİ

WATER ABSORPTION MODELLING OF CERAMIC BODY USING GENETIC PROGRAMMING

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ÖZET

Günümüzde birçok sanayi alanındaki ürünlerde kullanılan ürünler seramik bileşenler içermektedir. Seramik sektörü tarafından üretilen ürünlerin gerek kimyasal, gerek fiziksel, gerekse de elektriksel özellikleri birçok sanayi alanında yarı mamul olarak kullanım imkanı bulmuştur. Bu sektörde, seramik kili bileşimlerinin pişirilmesi ile elde edilen seramik bünyelerin kullanıldıkları alanlara göre farklı su emme davranışları göstermelerinin istendiği durumlar bulunmaktadır. İstenilen su emme davranışını sağlamak için çok sayıda deney yapılmakta ve maliyete katlanılmaktadır. Bu çalışmada, bir seramik kilini pişirme sürecinde kolayca ayarlanabilen üleksit oranı ve pişirme sıcaklığı değerleri su emme davranışını belirleyen temel parametreler olarak ele alınmıştır. Bu parametrelerin belirlenen seviyeleri için üç tekrarlı biçimde deneyler yapılarak su emme davranış değerleri elde edilmiştir. Elde edilen değerler ile, istenilen su emme davranışının hangi üleksit oranında hangi sıcaklıkta elde edilebileceğini belirlemek için bir model oluşturmak amaçlanmıştır. Modelin oluşturulması için, bu çalışmada son zamanlarda model çıkarma amacıyla sıklıkla kullanılan bir yapay zeka tekniği olan genetik programlama kullanılmıştır. Çalışmadan elde edilen model yardımı ile, belirlenen su emme seviyesini sağlayabilmek için üleksit oranı bilinen bir seramik kili pişiriminin hangi sıcaklıkta durdurulması gerektiğinin belirlenmesi mümkün olduğu gibi bilinen bir sıcaklık seviyesi için kil bünyenin içeriğine eklenmesi gereken üleksit oranı da belirlenebilir. Çalışmanın sonuçları, elde edilen modelin kullanılabilir olduğunu ve genetik programlamanın model çıkartma konusunda önemli bir yapay zeka tekniği olduğunu göstermiştir.

Anahtar Kelimeler: Seramik Su Emme, Yapay Zeka, Genetik Programlama.

ABSTRACT

In today's world, products used in many industrial sectors contain ceramic components. Products manufactured by the ceramic sector have found application as semi-finished goods in numerous industrial fields due to their chemical, physical, and electrical properties. In this sector, there are situations where ceramic clay obtained by firing ceramic clay compositions are expected to exhibit different water absorption behaviors based on their applications. To achieve the desired water absorption behavior, numerous experiments are conducted, incurring additional costs. In this study, during the firing process of a ceramic clay body, the ulexide ratio and firing temperature, easily adjustable, are considered as fundamental parameters determining water absorption behavior. Experiments were conducted in triplicate for the identified levels of these parameters to obtain water absorption behavior values. Using the obtained values, the aim was to create a model to determine at which ulexide ratio and temperature the desired water absorption behavior could be achieved. For building the model, genetic programming, a widely used artificial intelligence technique for model extraction in recent times, was employed in this study. The model obtained from the study can be used not only to determine the temperature at which firing should be stopped for a known ceramic clay to achieve the desired water absorption level but also to determine the ulexide ratio that should be added to the clay for a given

temperature level. The results of the study demonstrated that the obtained model is usable and that genetic programming is a significant artificial intelligence technique for model extraction.

Keywords: Ceramic Water Absorption, Artificial Intelligence, Genetic Programming.

İŞİTME ENGELİ OLAN BİREYLERDE VESTİBULER SİSTEM PROBLEMLERİ NEDENİYLE OLUŞAN DENGE KAYIPLARININ TEDAVİSİNDE BİLGİSAYAR DESTEKLİ VE UZAYSAL ORYANTASYONLU SANAL GERÇEKLİK İLE REHABİLİTASYON PROTOTİPİNİN GELİŞTİRİLMESİ

DEVELOPMENT OF A REHABILITATION PROTOTYPE WITH COMPUTER-AIDED AND SPATIAL ORIENTED VIRTUAL REALITY IN THE TREATMENT OF BALANCE LOSS OCCURRING DUE TO VESTIBULAR SYSTEM PROBLEMS IN HEARING IMPAIRED PEOPLE

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ÖZET

İşitme engeli olan bireylerde denge kayıplarının oldukça yaygın olduğu birçok bilimsel çalışma ile tespit edilmiştir. Bireylerin denge kayıplarını iyileştirmede birçok ajan kullanılabilmekle beraber denge fonksiyonunun iyileştirilmesi amacıyla tabandan duyu girdilerinin artırılması için titreşim özelliği olan platfomlar kullanılmamıştır.

Bu çalışma; işitme engeli olan bireylerin özel donanımlı platform üzerine çıkarılarak, bir ara yüz karşısında dengelerinin hangi ekstremite yönünde bozulduğunun tespit edildiği ve dengenin bozuk olduğu yönden tabana bir derin duyu hissi verilerek karşı ekstremiteye doğru dengelerini kurmalarını sağladığı ve ayrıca ara yüzün içereceği oyunlar ile denge rehabilitasyonunun kalıcı olacağı bir bilgisayar destekli uzaysal oryantasyonlu sanal rehabilitasyon tekniğini içermektedir. Teknik; piezoelektrik kristalleri ile donatılmış bir denge platformu üzerinde bulunan bireyin, kütle merkezinden (CoM) ve basınç merkezlerinden (CoP) olan tüm sapmalarının bir matematik modeli oluşturularak bilgisayar destekli ara yüze aktarılması ile güçlendirilir. Birey ile bağlantı kuran ara yüz; bireyin kinematik modelini ve hareketinin geometrisini alır ve dengeye doğru yeni bir geometri için bireyi tahrik eder. Ayrıca ayak tabanından verilen titreşimle senkronize biçimde ekrandan oynanan oyun ile beynin ilgili bölümüne görsel veri de sağlanır. Her bir bireye göre ayarlanabilen uygulama, titreşim gücü ve oyun çeşidi alternatifleri ile teknik kişiselleştirilir. Tekniğin içerdiği platform sayesinde veri toplanması mümkün olduğu için pedobarografik ölçümleri ile postüral salınım değerlendirmeleri de yapılabilir. Hareketin kinematiği; platformdan alınan kuvvet verileri ile inverse dinamik metodları kullanılarak kinetik kalkülasyonda da kullanılır. Böylece denge platformunda bulunan işitme engelli bireyin alt ekstremitesinin her bir segmentinde oluşan reaksiyon kuvvetleri denge kaybı verilerini destekler.

Anahtar Kelimeler: Denge, Pedobarografi, İşitme, Rehabilitasyon, Kinematik, Lagrange, Piezo

ABSTRACT

A variety of scientific studies have consistently identified balance impairments in individuals with hearing loss. While numerous agents have been utilized to improve balance deficits, vibration-equipped platforms aimed at enhancing proprioceptive inputs from the ground have not been explored extensively. This study introduces a computer-assisted spatial orientation virtual rehabilitation technique specifically designed for individuals with hearing loss. It involves placing individuals with hearing loss on a specialized hardware platform to detect the direction of their balance disturbances in front of an interface. The technique facilitates the restoration of balance towards the impaired direction by providing a deep sensory perception to the base in the direction of the imbalance. Additionally, the interface incorporates games to ensure the permanence of balance rehabilitation.

The technology is reinforced by creating a mathematical model of deviations in the center of mass (CoM) and center of pressure (CoP) of an individual positioned on a balance platform equipped with

piezoelectric crystals. This model is transferred to a computer-assisted interface. The interface establishes a connection with the individual, acquires their kinematic model and movement geometry, and stimulates the individual towards a new geometry for balance. Visual data is also provided to the relevant brain area through a game played on the screen, synchronized with vibrations delivered from the foot sole. The application is personalized for each individual with adjustable settings for vibration intensity and game type.

The technique's included platform allows for data collection, enabling postural sway assessments through pedobarographic measurements. The kinematics of movement are utilized in kinetic calculations using force data obtained from the platform through inverse dynamic methods. Thus, reaction forces occurring in each segment of the lower extremities of an individual with hearing loss on the balance platform support balance loss data.

Keywords: Balance, Pedobarography, Hearing, Rehabilitation, Kinematics, Lagrange, Piezo

FLOW CHARACTERISTICS OVER BIO-INSPIRED CORRUGATED AIRFOIL AT LOW REYNOLDS NUMBER

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ABSTRACT

Bio-inspiration from nature has led to several innovative aerodynamic developments and concepts, as nature provides efficient and direct solutions to engineering problems. Moreover, it provides exceptional flight examples, such as optimal energy consumption during intense agility movements, stability, and low noise. Insect flight is considered to be one of the most remarkable forms of flight. As an example, dragonflies exhibit extraordinary maneuverability and a wide range of flight characteristics. In this study, the flow characteristics of bio-inspired corrugated airfoils at a constant Reynolds number of $1.4x10^4$ using the k-ω SST turbulence model were investigated. The corrugated B airfoil and Model II airfoil exhibited similar behavior at low angles of attack and beyond AoA=8º. Model I airfoil showed lower C_L at AoA=0º and AoA=4º but achieved the highest C_L/C_D value at AoA=8º. Rounding the first peak positively impacted aerodynamic performance, while rounding the second peak had no significant effect. Flow patterns revealed separation from the first airfoil peak at AoA=0º, trapped vortex in the Model I valley, and recirculation zones extending up to the first peak. At AoA=8º, flow separation from the leading edge occurred, leading to recirculating vortices. At AoA=10º, trailing edge vortices merged with the saddle vortex in all airfoils, and at AoA=20º, the flow was completely separated.

Keywords: Bio-inspired, CFD, Corrugated airfoil, Flow characteristics, Low Reynolds number.

DIGITALISATION, SUSTAINABILITY AND CIRCULARITY IN MACHINE KNITTING

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ABSTRACT

The development of the textile and clothing industry, including the knitting sector, is oriented towards digitalisation, sustainability and the circular economy, as the International Textile Machinery Exhibition (Itma 2023) in Milan clearly demonstrated. Digitalisation in the textile industry is nothing new, as it has been a recurring theme at previous exhibitions. However, the complexity of textile processes and the integration of new technologies into existing systems have proven to be a greater challenge than expected. In addition, the pace of development in the digital sector is exceptionally fast, meaning that innovations quickly become outdated.

Despite good technical solutions, there are deficits in the area of digitalisation with regard to user relationships and the transition to a circular economy. Digitalisation must not be limited to the machine level, but must extend to the company and the entire supply chain. Previous Itma exhibitions have dealt with the challenges of digitalisation and sustainability mostly conceptually, but the latest one has approached them more concretely by offering tangible solutions that make these two areas an important part of the textile development strategy and take them to a new level.

At a corporate level, it is important to implement comprehensive digitalisation strategies that encompass various areas such as data analysis, artificial intelligence and the Internet of Things. This can improve efficiency, optimise resource allocation and enable better decision-making processes. In supply chains, the integration of digital technologies can improve transparency, traceability and responsiveness. For example, blockchain technology can be used to create secure and transparent networks in the supply chain that ensure the authenticity of products and materials.

At the last Itma, many companies presented their digital platforms, one of them was Karl Mayer. The range of powerful digital tools and systems for collecting, analysing and meaningfully using extensive data was exceptionally large. Individual textile suppliers are using digital twins as effective tools for the rapid introduction of products, flexible production and the optimisation of efficiency based on sophisticated data. Improved sensor technology increases process reliability, extends equipment lifespan and enables energy savings.

The circular economy is crucial to securing a sustainable future for industry and society. It also offers the opportunity to transform supply chains towards long-term sustainability and stability. Achieving a fully circular economy in textiles, clothing and knitting requires new technical solutions, particularly in the areas of reuse and recycling. With the increasing demand for sustainable textile products, it has become clear that the move towards sustainability and a circular economy also requires the production of equipment that supports these goals. Networking and incentives for collaboration between companies are also crucial, as addressing the challenges of recycling requires joint efforts to close the textile loop in a sustainable, economic and meaningful way.

In addition, the focus on sustainability has expanded from responsible material use, waste reduction and energy consumption to social responsibility, shifting attention from machines back to humans. Instead of machine-to-machine communication, the focus is now on machine-to-human or human-to-machine communication. To return to that starting point, but at a higher level, machine learning and artificial intelligence support process optimisation, production analysis and monitoring. Artificial intelligence can predict machine failures by continuously analysing and predicting data from sensors and other sources. It monitors key processes in real time and automatically takes appropriate control measures.

In the textile, clothing and fashion industry, it is also important that start-ups support and promote innovation with fresh and revolutionary solutions and technologies. The activities and projects of research institutions are also directed towards sustainability and digitalisation. The challenges associated with the Agenda 2030, which provides for the activation and support of numerous stakeholders and

partnerships in achieving the Sustainable Development Goals, cannot be met without the involvement of science and research.
The paper offers an analysis of the current status, concepts and directions of development in the field of contemporary knitting.
Keywords: knitting, digitalization, circularity, sustainability, internet of things, AI.

SOĞUK PRES YAĞ ATIKLARININ DEĞERLENDİRİLMESİ

EVALUATION OF COLD PRESS OIL WASTES

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ÖZET

Son yıllarda gıda işlemeden kaynaklanan kalıntıların değerlendirilmesine artan bir ilgi vardır. Birçok gıda işleme tesisinde gıdaların işlenmesi sırasında oluşan atıkların büyük bir kısmı düşük teknolojik işlemler ile bertaraf edilmeye çalışılmaktadır. Fakat işleme atıkları, diyet lifi, antioksidanlar, uçucu yağ asitleri, antimikrobiyaller, mineraller gibi mineraller gibi besinsel ve fonksiyonel özelliklerinden sahip değerli bileşiklerin kaynaklarıdır. Bu atıklardan özellikle yağ ekstraksiyon yöntemlerinden biri olan soğuk ekstraksiyonundan sonra elde edilen yağ keki, potansiyel olarak zengin besin bileşimine rağmen gözden kaçan bir yan üründür. Tohum yağı üretimi sırasında yan ürün olarak elde edilen yağ keki hammaddenin yaklaşık %10 ila 30`nu oluşturmaktadır ve küçük bir miktarı gübre olarak kullanılması dışında çoğu unutulmaktadır. Soğuk preslenmiş yağ eldesi sırasında çözücü kullanılmadığından dolayı yağ keki yüksek protein ve karbonhidrat içermesi nedeniyle potansiyel bir gıda bileşenleri kaynağı olarak kabul edilebilmektedir. Bununla birlikte, yağ üretiminin yan ürünleri aşırı sıcaklığa ve kimyasallara maruz kalmadığından dolayı fenolik asitler ve flavonoidler gibi ikincil metabolitleri de içermektedir. Bu nedenle farklı gıda ürünlerinin zenginleştirilmesi, fonksiyonel gıda üretiminde ve diyet lifi gibi farklı gıda bileşenleri üretimi için bir kaynak olarak kullanılabilirler. Bu çalışmada soğuk pres yağ üretimi sonucunda elde edilen yağ kekinin kullanım olanaklarının araştırıması amaçlanmıştır.

Anahtar Kelimeler: Soğuk presleme, Yağ keki, Değerlendirme yöntemleri

ABSTRACT

In recent years there has been increasing interest in the evaluation of residues from food processing. In many food processing facilities, most of the waste generated during food processing is tried to be eliminated with low-tech processes. But processing wastes are sources of valuable compounds with nutritional and functional properties such as dietary fiber, antioxidants, volatile fatty acids, antimicrobials, minerals, etc. The oil cake obtained from these wastes, especially after cold extraction, which is one of the oil extraction methods, is an overlooked by-product despite its potentially rich nutritional composition. The oil cake obtained as a by-product during seed oil production constitutes approximately 10 to 30% of the raw material, and most of it is forgotten, except for a small amount of it being used as fertilizer. Since no solvents are used during the production of cold pressed oil, the oil cake can be considered a potential source of food ingredients due to its high protein and carbohydrate content. However, by-products of oil production also contain secondary metabolites such as phenolic acids and flavonoids since they are not exposed to extreme temperatures and chemicals. Therefore, they can be used as a source for the fortification of different food products, in the production of functional foods and for the production of different food ingredients such as dietary fibre. In this study, it was aimed to investigate the usage possibilities of the oil cake obtained as a result of cold press oil production.

Keywords: Cold pressed, Oil cake, Evaluation methods

FARKLI TAHIL UNLARININ VEGAN KÖFTE ÜRETİMİNDE KULLANIM OLANAKLARI

USE POSSIBILITIES OF DIFFERENT CEREAL FLOURS IN VEGAN MEATBALL PRODUCTION

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ÖZET

Köfte, genellikle dana, tavuk eti ve balıktan yapılan popüler yiyeceklerden birisidir. Fakat beslenme ve sağlık gibi çeşitli nedenlerden dolayı son yıllarda tüketiciler tarafından hayvansal gıdalar ve bu gıdaları içeren besinlerin yüksek oranda yağ ve kolesterol içerdeğinden için etin yerini bitkisel bazlı ürünlerle değiştiren vejetaryen tüketim modeliyle sağlıklı bir yaşam tarzı uygulamaktadır. Vejetaryen beslenme hayvansal ürünler tüketmeyen ancak bitkisel ürünler tüketen kişi içeren beslenme şeklidir. Bu beslenme şeklinde hayvansal proteinlerin yerine soya fasülyesi, bezelye ve tofu yüksek protein içeriğine sahip bitki bazlı ürünler kullanılmaktadır. Ancak soya fasulyesinden elde edilen mevcut ticari bitki proteinleri işlevsel olarak iyi olmasına ve önemli bir ticari ilerleme kaydetmesine rağmen, soya unundan üretilen ürünlerde viskoelastik bir ağ oluşturamadığından dolayı tek başına et analogları üretmek için gerekli olan yapışkanlık ve yumuşak bir çiğnenebilirlik sağlayamamaktadır. Bu nedenle bu çalışmada soya ununa ve farklı tohum unları ilave edilerek hazırlanan vegan köfterlerin tekstürel ve duyusal özellikleri değerlendirilmiştir. Duyusal değerlendirme kapsamında tüketicilere köftelerin sertliği, tadı, rengi ve genel beğenirlik kiriterleri sorulmuştur. Vegan köftelerin duyusal değerlendirilmesinde çok kriterli karar verme tekniklerinden TOPSİS (Technique for Order Preference by Similarity to Ideal Solutions) tekniği kullanılmıştır. Bu çalışma sonucunda farklı tohum unlarının vegan köfte üretiminde kullanılabileceğini göstermiştir.

Anahtar Kelimeler: Vejeteryan beslenme, Köfte, Tahıl unları, Tekstürel özellikler

ABSTRACT

Meatballs are one of the popular foods usually made from beef, chicken and fish. However, for various reasons such as nutrition and health, in recent years, consumers have been implementing a healthy lifestyle with a vegetarian consumption model, replacing meat with plant-based products because animal foods and foods containing these foods contain high levels of fat and cholesterol. Vegetarian nutrition is a diet that includes people who do not consume animal products but consume plant products. In this form of nutrition, plant-based products with high protein content such as soybeans, peas and tofu are used instead of animal proteins. However, although existing commercial plant proteins derived from soybeans are functionally good and have made significant commercial progress, they alone cannot provide the stickiness and soft chewiness required to produce meat analogs because they cannot form a viscoelastic network in products produced from soy flour. Therefore, in this study, the textural and sensory properties of vegan meatballs prepared by adding soy flour and different seed flours were evaluated. Within the scope of sensory evaluation, consumers were asked about the hardness, taste, color and general liking criteria of the meatballs. TOPSIS (Technique for Order Preference by Similarity to Ideal Solutions) technique, one of the multi-criteria decision-making techniques, was used in the sensory evaluation of vegan meatballs. This study showed that different seed flours can be used in vegan meatball production.

Keywords: Vegetarian nutrition, Meatballs, Cereal flours, Textural properties

ALGAL OIL IMPORTANCE AND APPLICATIONS

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ABSTRACT

Algal oil is considered as the prime natural sources of long chain omega-3 PUFAs. In comparison to fish oil, algal oils possessed certain advantages. Algal oil has consistency for composition, sensory attributes, ease of processing and commercial production. Major Omega-3 PUFAs present in algal oil are docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). Algal oil has limited odors which make it favorable for supplementation in different food products. The regular utilization of algal oil may support to combat various diseases occurrence and also improve heart health, reduce depression, enhanced eye health and decreased inflammation. The application of algal oil should be recommended for healthy life.

Keywords: Algae, Oil Composition, EPA, DHA, PUFAs, Public Health

EARLY PHYSICAL ACTIVITY AND ITS EFFECTS ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN POST-SURGERY CARDIAC PATIENTS

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ABSTRACT
The cardiovascular system consists of the heart and blood vessels. Cardiovascular diseases (CVD) are a group of disorders of the heart and blood vessels that include coronary heart disease, cerebrovascular disease and congenital heart disease. CVD are the most frequent cause of death and disability worldwide, and are anticipated to continue to be so in the future. The main therapeutic measures for CVD are drug therapy, physical activity, healthy diet and cardiac surgery. With rapid growth in the treatment of CVD, cardiac surgery has tended to become more minimally invasive and has reduced mortality from CVD. Physical activity following cardiac surgery promotes patients' recovery, whereas inadequate physical activity may hinder it. Despite the importance of physical activity after cardiac surgery for preventing adverse outcomes, postoperative patient engagement in physical activity generally has been inadequate. This study was conducted at Ibin AL-Bitar hospital for cardiac surgery.100 patients after cardiac surgery (52=Male and 48=Female) range of their ages (18-65) years voluntarily participated in the study. Participants were selected from surgical wards in Ibin AL-Bitar hospital for cardiac surgery during first week postoperative. All patients participated in physical program which included; From 1 to 2 postoperative day (POD): shoulder & neck mobilization with breathing exercises & postural drainage. From 3 to 7 POD: breathing exercises, postural drainage and supervised walking with increments of 2.5 minutes, as tolerated, up to 10 minutes in the morning, afternoon and evening and at night. SF-IPAQ, SF-36, 6MWT were used as outcome measurements. All of patients completed questionnaires and tests in the seventh day postoperatively. In statistical analysis, there was a statistically significant association of SF-IPAQ score with 6MWT and SF-36, P-value < 0.001. This study aims to evaluate the effectiveness of early physical activity on quality of life and functional capacity in patients undergoing cardiac surgery. We observed that early physical activity improved functional capacities and qualities of lives after cardiac surgery.

Keywords: cardiovascular diseases, cardiac surgery, physical activity, pain, functional capacity, quality of life.

İKLİM VERİLERİNİN AKARSU AKIMINA ETKİLERİNİN İNCELENMESİ VE KULLANILAN YÖNTEMLER

EXAMINING THE EFFECTS OF CLIMATE DATA ON STREAM FLOW AND THE METHODS USED

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ÖZET

İklim sistemi, farklı parametrelerin birbirleri ile etkileşimlerinden meydana gelen zamansal ve mekânsal olarak farklılıkların gerçekleştiği dinamik bir sistemdir. Bu sistemin pek çok parametresi bulunmakta olup sıcaklık ve yağış, iklim verilerinin ana elemanlarını oluşturmaktadır. İklim verileri su kaynaklarının yönetimi ve planlanmasında büyük öneme sahip olan hidro-meteorolojik verilerdir. Bu veriler üzerinde uzun zamanlı kademeli değişimler meydana gelmektedir. Bu değişimlerin kaçınılmaz olarak en fazla etkilediği alanlardan birisi de akarsuların akımındaki değişikliklerdir. İklim verilerinin akarsu akımına etkileri belirlemek için farklı yöntemler kullanılmaktadır. Hidrolojik modellemeler, yağış-debi analizi, iklim değişikliği senaryoları, jeomorfolojik analizler ve istatistiksel analizler bunlardan bazılarıdır. Ayrıca akarsu akımlarındaki değişiklikleri izlemek ve ileride oluşabilecek durumları analiz edebilmek için parametrik yöntemler, yapay sinir ağları (YSA), Nonlineer modelleme gibi yöntemler kullanılmaktadır. Son yıllarda yapay zekâ teknolojisindeki gelişmeler ve CBS tabanlı uygulamaların artması ile modelleme teknikleri de gelişmektedir. Akarsu akımını etkileyen parametre sayısı çok fazla olduğundan yapılacak modelleme çalışmalarında sıcaklık, yağış vb. iklim verilerinin kullanılması modelleme tekniğinin performansına direkt etki eden parametrelerdir. Bu çalışmada; İklim verilerinin de girdi olarak kullanıldığı, yaygın olarak tercih edilen akarsu akımı modelleme tekniklerine ilişkin bilgiler derlenmiş, faklı bölgelerinde yapılan modelleme çalışmaları ortaya konulmuş ve bu örnekler doğrultusunda akarsu akımında iklim verilerinin etkisi hususunda genel bir değerlendirme yapılmıştır.

Anahtar Kelimeler: İklim verileri, Akarsu akımı, Yapay zeka, CBS, Modelleme,

ABSTRACT

The climate system is a dynamic system where temporal and spatial differences occur due to the interaction of different parameters. This system has many parameters, and temperature and precipitation constitute the main elements of climate data. Climate data are hydro-meteorological data that are of great importance in the management and planning of water resources. Long-term gradual changes occur on these data. One of the areas that these changes inevitably affect most is the changes in the flow of rivers. Different methods are used to determine the effects of climate data on stream flow. Hydrological modeling, rainfall-flow analysis, climate change scenarios, geomorphological analyzes and statistical analyzes are some of these. In addition, methods such as parametric methods, artificial neural networks (ANN), and nonlinear modeling are used to monitor changes in stream flows and analyze future situations. In recent years, modeling techniques have also been developing with the developments in artificial intelligence technology and the increase in GIS-based applications. Since the number of

parameters affecting stream flow is very high, temperature, precipitation, etc. will be used in modeling studies. The use of climate data are parameters that directly affect the performance of the modeling technique. In this study; Information on commonly preferred stream flow modeling techniques, in which climate data is used as input, has been compiled, modeling studies carried out in different regions have been presented, and a general evaluation has been made about the effect of climate data on stream flow in line with these examples.

Keywords: Climate data, Stream flow, Artificial intelligence, GIS, Modeling,

KAYSERİ İLİNİN SICAKLIK DEĞERLERİNİN YENİLİKÇİ TREND ANALİZİ İLE MEKANSAL-ZAMANSAL ANALİZİ

SPATIAL-TEMPORAL ANALYSIS OF TEMPERATURE VALUES OF KAYSERİ PROVINCE WITH INNOVATIVE TREND ANALYSIS

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ÖZET

İklim değişikliği günümüzde küresel ölçekte en belirgin ve giderek daha önemli hale gelen çevresel sorunlardan biridir. Bu nedenle, sıcaklık verileri, iklim değişikliğini değerlendirmek için kritik öneme sahiptir çünkü sıcaklık, iklim sistemini ve ekosistemleri etkileyen kritik bir faktördür. Sıcaklık değerleri, dağılımı ve özellikleri, su döngüleri, kuraklıklar, seller, toprak verimliliği, tarım, su kaynakları, su yönetimi, deniz seviyesindeki değişim ve okyanus akıntıları gibi iklim değişikliği süreçlerini izlemek ve anlamak için son derece önemlidir. Bu çalışma, parametrik ve parametrik olmayan testler kullanarak günlük, mevsimsel ve yıllık sıcaklık değişkenliği ve eğilimlerini araştırmayı amaçlamıştır. Öncelikli hedef, Türkiye'nin İç Anadolu bölgesinde bulunan Kayseri ilinde 1982-2021 yılları arasında meydana gelen sıcaklık değerlerinin mekansal-zamansal eğilimlerini incelemektir. Bu amaçla, sıcaklık verilerinin zaman içindeki değişimini ve bölgesel dağılımını belirlemek için Yenilikçi Trend Analizi (ITA) yöntemi kullanılmıştır. ITA yöntemi, düşük, orta ve yüksek yoğunluklu sıcaklık eğilimlerini tespit etmek için kullanılır. Ardından, ITA yöntemiyle belirlenen eğilimler, genellikle kabul gören Mann-Kendall (MK) testiyle çapraz doğrulanmıştır. Bu çalışmanın sonuçları, iklim değişikliğinin potansiyel etkileri hakkında önemli temel bilgiler sağlamakta ve bölgesel iklim modellerinin güncellenmesi ile iklim değişikliğini azaltmaya yönelik stratejilerin geliştirilmesinde kritik bir rol oynamaktadır. Ayrıca, bu çalışma gelecekte benzer analizlerin diğer iklim parametreleri üzerinde yapılmasına olanak tanıyabilecektir.

Anahtar Kelimeler: ITA, iklim değişikliği, Kayseri, sıcaklık, trend analizi, mann kendall

ABSTRACT

Climate change is currently one of the most prominent and increasingly crucial environmental issues on a global scale. Therefore, temperature data holds critical importance in assessing climate change as temperature is a pivotal factor influencing the climate system and ecosystems. Temperature values, their distribution, and characteristics are extremely important to monitor and comprehend various climate change processes such as water cycles, droughts, floods, soil productivity, agriculture, water resources, water management, sea level changes, and ocean currents. This study aims to investigate daily, seasonal, and annual temperature variability and trends using both parametric and non-parametric tests. The primary objective is to examine the spatiotemporal trends of temperature values occurring between 1982 and 2021 in Kayseri, a province in the Inner Anatolia region of Turkey. For this purpose, the Innovative Trend Analysis (ITA) method has been utilized to determine the temporal changes and regional distribution of temperature data. The ITA method is employed to identify low, medium, and high-intensity temperature trends. Subsequently, trends identified through the ITA method are cross-validated using the widely accepted Mann-Kendall (MK) test.

The outcomes of this study provide essential foundational information regarding the potential impacts of climate change and play a critical role in updating regional climate models and devising strategies to mitigate climate change effects. Additionally, this research opens avenues for conducting similar analyses on other climate parameters in the future.

Keywords: ITA, climate change, Kayseri, temperature, trend analysis, mann kendall

YOZGAT VE KIRIKKALE İLLERİNİN YAĞIŞ VERİLERİNİN TREND ANALİZİ

TREND ANALYSIS OF PRECIPITATION DATA IN YOZGAT AND KIRIKKALE

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ÖZET

İklim değişikliği dünyanın karşı karşıya olduğu en önemli çevresel zorluklardan biridir ve yağış düzenindeki değişiklikler bunun en belirgin göstergeleri arasındadır. Bu bağlamda, iklim bilimciler ve araştırmacılar, iklim değişikliğinin etkilerini yerel ölçekte anlamak ve gelecekteki etkisinin azaltım stratejilerini şekillendirmek için bölgesel analizlere odaklanmaktadır. Kentleşmenin yağışları etkilediği bilinmesine rağmen yağış değişiminin büyüklüğü ve konumuna ilişkin çalışmalar farklılık göstermektedir. Farklı jeolojik ve tarımsal öneme sahip illerin yağış eğilimlerini ve modellerini anlamak, bilinçli karar verme ve sürdürülebilir kalkınma için büyük önem taşımaktadır. Bu çalışma, Türkiye'nin iç anadolu bölgesinde yer alan iki il (Yozgat ve Kırıkkale) için 1982-2021 yılları arasında meydana gelen yağış değerlerinin mekansal-zamansal eğilimlerini incelemeyi amaçlamaktadır. Bunun için yağışlardaki zamansal trendi, aylık ve yıllık minimum ve maksimum sıcaklıkları parametrik olmayan Mann-Kendall trend analizi ile yapılmıştır. Ayrıca trendin büyüklüğünü analiz etmek için Sen's Slope testi, değişim noktası tespitini değerlendirmek için ise Pettitt testi uygulanmıştır. Sonuç olarak bu çalışmanın, iç Anadolu bölgesinde bulunan bu iki il için iklim dinamiklerinin daha derinlemesine anlaşılmasına katkıda bulunarak, doğal kaynakların korunmasına ve değişken iklim koşullarına karşı dayanıklılığın artırılmasına yönelik kanıta dayalı politikalar için bir temel oluşturması beklenmektedir.

Anahtar Kelimeler: iklim değişikliği, Kırıkkale, yağış, trend analizi, Yozgat, mann Kendall, Pettitt Test

ABSTRACT

Climate change is one of the most important environmental challenges facing the world, and changes in precipitation patterns are among its most obvious indicators. In this context, climate scientists and researchers focus on regional analyzes to understand the effects of climate change on a local scale and shape mitigation strategies for its future impact. Although it is known that urbanization affects precipitation, studies on the magnitude and location of precipitation change differ. Understanding rainfall trends and patterns of provinces with different geological and agricultural importance is of great importance for informed decision-making and sustainable development. This study aims to examine the spatiotemporal trends of precipitation values occurring between 1982 and 2021 in two provinces (Yozgat and Kırıkkale) located in Turkey's Inner Anatolia region. For this purpose, the temporal trend in rainfall, monthly and annual minimum and maximum temperatures, was analyzed using the non-parametric Mann-Kendall trend analysis. Additionally, the Sen's Slope test was employed to assess the magnitude of the trend, and the Pettitt test was utilized to identify change points. As a result, this study is expected to contribute to a deeper understanding of climate dynamics in these two provinces within the Inner Anatolia region, thereby providing a foundation for evidence-based policies aimed at conserving natural resources and enhancing resilience against variable climatic conditions.

Keywords: climate change, Kırıkkale, precipitation, trend analysis, Yozgat, mann Kendall, Pettitt Test

TIBBİ ATIK BERTARAF BEDELİNİN BELİRLENMESİNE YÖNELİK BİR ÇALIŞMA

A STUDY TO DETERMINE THE MEDICAL WASTE DISPOSAL COST

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ÖZET

Hızlı kentleşmeye bağlı olarak sanayileşmenin artması ile birlikte Dünyamızda büyük atık problemleri yaşanmaktadır. Atıklar toprak kirliliği, yer altı ve yüzeysel su kirliliği, bitki örtüsünün zarar görmesi ve yangın ve patlamalar neticesinde hava kirliliğine sebep olmaktadır. Atıklar birçok gruba ayrılabileceği gibi, genel olarak atıklar tehlikeli ve tehlikesiz atıklar olarak sınıflandırılabilir.

Çevre kirliliğine daha çok neden olan ve kirletici özelliği olarak en fazla kirliliğe sebep olan atık türleri tehlikeli atıklardır. Tehlikeli atıklar; kanserojen, toksik, patlayıcı, tutuşabilen, korozif, tahriş edici vb. özelliklerinden dolayı insan sağlığı ve çevre bakımından risk teşkil eden atıklar olarak tanımlanmıştır.

Tıbbi atıkların; Mikrodalga/Buhar sterilizasyon yöntemi, Elektro – termal deaktivasyon yöntemi (ETD), Plazma ark indirgeme yöntemi (PAR), Prolitik Gazifikasyon Yöntemi, Elektron Işını Sterilizasyon Yöntemi, Yakma gibi bertaraf yöntemleri bulunmaktadır. Ülkemizde daha çok sterilizasyon yöntemi kullanılmakla birlikte, Ankara, İstanbul ve İzmit illerinde atık yakma tesislerinde tıbbi atıklar yakılarak bertaraf edilmektedir. 65 ilimizde tıbbi atık sterilizasyon tesisi mevcut olmakla birlikte, düşük nüfusa sahip illerde oluşan tıbbi atıklar, o ilin Mahalli Çevre Kurulu kararı ile sterilizasyon tesisi bulunan en yakın il'e taşınarak bertaraf işlemi gerçekleşebilmektedir.

Tıbbi atıklar; Tıbbi Atıkların Kontrolü Yönetmeliğine göre tıbbi atıkların toplanması, taşınması, sterilizasyonu ve bertarafında uygulanacak ücret mahalli çevre kurulu (MÇK) tarafından belirlenmektedir. Yine aynı yönetmelikte bulunan "Bu Yönetmelik hükümlerine uygun olmak şartıyla, toplama, taşıma, sterilizasyon ve bertaraf harcamalarına esas olacak tıbbi atık bertaraf ücreti, her yıl tıbbi atığın oluştuğu ilin mahalli çevre kurulu tarafından tespit ve ilan edilerek Bakanlığa bildirilir. Tıbbi atık bertaraf ücretinin tespitinde, oluşan atığın gideceği sterilizasyon ve/veya bertaraf tesisine taşıma mesafesi ile sterilizasyon ve/veya bertaraf maliyetleri göz önüne alınır." hüküm doğrultusunda her il tıbbi atık ücretini MÇK kararı ile belirlemektedir.

İllerde tıbbi atık ücreti belirlenmesi için yapılan MÇK toplantılarında ücret belirleme konusunda büyük problemler yaşanmaktadır. Sterilizasyon tesisi işletmelerinin maliyetlerinin tam ve anlaşılır şekilde MÇK sekretaryasına net olarak bildirmemesi nedeniyle anlaşmazlıklar çıkmaktadır. Bu aşamada tıbbi atık ücretinin düşük belirlenmesi ile sterilizasyon tesisi işletmecinin mağdur olmasına ya da yüksek belirlenmesi ile kamu kaynaklarının zarar görmesine neden olmaktadır.

Bu çalışmada sterilizasyon tesisi giderleri net olarak tespit edilerek, sterlizasyon tesisi giderleri olan belediye kar ve kira ücretleri, akaryakıt, doğalgaz, su, amortisman, personel (maaş, sigorta, yemek) ve diğer giderler için bir yöntem ve formül geliştirilecektir. Bu belirlenecek yöntem ile daha doğru ve daha güvenilir tıbbi atık ücreti belirlenecek ve hem bu sektörde çalışan işletmeler/kişiler mağdur edilmeyecek hem de kamu kaynaklarının israf önlenecektir.

Anahtar Kelimeler: Tıbbi atık, Tıbbi atık bertaraf, Tıbbi atık bertaraf ücreti

ABSTRACT

With the increase in industrialization due to rapid urbanization, major waste problems are experienced in our world. Wastes cause soil pollution, underground and surface water pollution, damage to vegetation, and air pollution as a result of fires and explosions. While wastes can be divided into many groups, wastes can generally be classified as hazardous and non-hazardous wastes

The types of waste that cause more environmental pollution and the most pollution due to their polluting properties are hazardous wastes. Hazardous waste; carcinogenic, toxic, explosive, flammable, corrosive,

irritating, etc. They are defined as wastes that pose a risk to human health and the environment due to their properties

Medical waste; There are disposal methods such as Microwave/Steam sterilization method, Electro-thermal deactivation method, Plasma arc reduction method, Prolytic Gasification Method, Electron Beam Sterilization Method, Incineration. Although sterilization methods are mostly used in our country, medical waste is disposed of by burning in waste incineration facilities in Ankara, İstanbul and İzmit. Although there are medical waste sterilization facilities in 65 provinces, medical waste generated in provinces with low population can be disposed of by being transported to the nearest province with a sterilization facility, with the decision of the Local Environmental Board of that province

Medical waste; According to the Medical Waste Control Regulation, the fee to be applied for the collection, transportation, sterilization and disposal of medical waste is determined by the local environmental board (LEB). In the same regulation, “Provided that it complies with the provisions of this Regulation, the medical waste disposal fee, which will be the basis for collection, transportation, sterilization and disposal expenses, is determined and announced every year by the local environmental board of the province where the medical waste is generated and notified to the Ministry. "In determining the medical waste disposal fee, the transportation distance of the generated waste to the sterilization and/or disposal facility and the costs of sterilization and/or disposal are taken into consideration." In line with the provision, each province determines the medical waste fee by LEB decision

In the LEB meetings held to determine the medical waste fee in the provinces, there are major problems in determining the fee. Disputes arise because sterilization facility businesses do not clearly report their costs to the LEB secretariat in a complete and understandable manner. At this stage, if the medical waste fee is set low, it causes the sterilization facility operator to suffer, or if it is set high, it causes damage to public resources

In this study, the sterilization facility expenses will be determined clearly and a method and formula will be developed for the sterilization facility expenses such as municipal profit and rental fees, fuel, natural gas, water, depreciation, personnel (salary, insurance, food) and other expenses. With this method, a more accurate and reliable medical waste fee will be determined and businesses/individuals working in this sector will not be victimized and waste of public resources will be prevented

Key Words: Medical waste, Medical waste disposal, Medical waste disposal fee

EASY GO DAB: A MAKEUP BRUSH POWERED BY ELECTRIC

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ABSTRACT
Putting on makeup can be hard for teenagers who are just learning how to use cosmetic tools and products. This makeup brush was invented to help female teenagers put on makeup in a more efficient way with better results.It also helps to familiarize them with the steps on how to put it on properly so they can gradually become accustomed to the usual process. This makeup brush is powered by electric and it can be charged repeatedly. It also contains a vibrator which helps to smoothen makeup layer on the face.
Keywords: makeup, brush, teenagers

TORBALAMA KANTARLARI İÇİN TASARLANAN İRİS VALFİN KONTROL SİMÜLASYONU

CONTROL SIMULATION OF IRIS VALVE DESIGNED FOR BAGGING SCALES

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ÖZET

Yem fabrikalarında yem torbalarının doldurulma işlemi çevre şartlarını olumsuz etkileyen ve yavaş bir süreç olması nedeniyle bir problem olarak ortaya çıkmaktadır. Yem fabrikalarında tartım kefesi bant yardımıyla beslenir ve tahrik için redüktörlü motor ve sürücü kullanılmaktadır. Ancak, ürünün bant üstünde belirli bir hacimde kefeye girebilmesi için gerekli olan ayarlamalar sistemde karmaşıklığa yol açmaktadır. Bu karmaşıklık, işlem hızını ve sistem hassasiyetini olumsuz etkilemektedir. Sistemin mevcut durumu, tartımın tamamlanmasının ardından ürünün bant üstünde aşağı doğru akmasını engellemek için mal kesicinin kullanılması ve genel olarak karmaşık bir otomasyon sistemine sahip olmasından kaynaklı zorlukları beraberinde getirmektedir. Bu sorunların üstesinden gelmek ve mevcut durumu iyileştirmek amacıyla tasarlanan yeni sistemde, ürün bunkeri ile tartım kefesi arasına entegre edilen bir iris valf bulunmaktadır. İris valf, merkeze doğru açılıp kapanabilen altı adet üçgen formdaki bıçakları içermekte olup, her bir bıçağın altında lineer araba ve bu arabaların üzerinde hareket ettikleri lineer kızaklı yataklar mevcuttur. İris valfe bağlı olan bıçaklardan bir tanesi, vidalı mil mekanizmasıyla kontrol edilen bir servo motor ile hareket ettirilmekte ve böylece iris valf tam kapalı ve tam açık durumlar arasında istenen açıklık oranında ayarlanarak valf ağzı kesit alanı kontrol edilebilmektedir. Bu geliştirilmiş sistem, yem ve benzeri ürünlerin hassas tartımını sağlamakla kalmayıp, aynı zamanda kefeye akan ürünün debisini istenen oranda düzenleme yeteneği sunarak, torbalama kantarlarında önemli bir gelişme sağlamaktadır. İris valfin entegrasyonu sayesinde, düşey hareket eden ürünlerin minimum sürede maksimum hassasiyetle tartılması mümkün hale gelmektedir. İris valfli torbalama kantarı sistemi, mekanik, elektrik ve sensör bileşenleri içerdiğinden hızlı prototipleme yöntemlerinden olan simülasyon yaklaşımı ile modellenebilir niteliktedir. Bu çalışmada torbalama kantarındaki partikül akış debisinin matematiksel modeli, iris valfinin matematiksel modeli ve servo motorun matematiksel modeli kullanılarak bir kontrol simülasyonu gerçekleştirilmiştir. Kantarda okunan ağırlık verisinden geri besleme yapılan kapalı çevrim kontrol sisteminde PID kontrol yöntemi kullanılmıştır. Parametrelerin partikül büyüklüğü ve özkütle gibi yem özelliklerine göre değişimi gözlenerek, etkin bir kontrol yöntemi ortaya konmuştur. Sahada uygulamaya dönüştürülmesine yönelik hızı prototipleme çalışması başarı ile tamamlanmıştır.

Anahtar Kelimeler: torbalama kantarı, iris valf, yem tartımı, PID, kontrol, simülasyon

ABSTRACT

Filling of feed bags in feed mills is a problem because it is a slow process that negatively affects the environmental conditions. In feed mills, the weighing pan is fed by a belt and a gearmotor and drive are used for the drive. However, the adjustments required for the product to enter the pan at a certain volume on the belt cause complexity in the system. This complexity negatively affects the process speed and system accuracy. The current state of the system poses challenges due to the use of a commodity cutter to prevent the product from flowing down the belt after the weighing is completed and the overall complex automation system. The new system, designed to overcome these problems and improve the current situation, has an iris valve integrated between the product hopper and the weighing pan. The iris

valve consists of six triangular blades that can open and close towards the center, with linear carriages under each blade and linear slide bearings on which these carriages move. One of the blades connected to the iris valve is moved by a servo motor controlled by a ball screw mechanism, thus controlling the cross-sectional area of the valve opening by adjusting the iris valve between fully closed and fully open states. This improved system not only provides accurate weighing of feed and similar products, but also the ability to regulate the flow rate of the product flowing into the pan at the desired rate, providing a significant improvement in bagging scales. The integration of the iris valve makes it possible to weigh vertically moving products with maximum precision in minimum time. Since the bagging scale system with iris valve includes mechanical, electrical and sensor components, it can be modeled with the simulation approach, which is one of the rapid prototyping methods. In this study, a control simulation was performed using a mathematical model of the particle flow rate in the bagging scale, a mathematical model of the iris valve and a mathematical model of the servo motor. PID control method is used in the closed loop control system with feedback from the weight data read at the scale. By observing the variation of the parameters according to feed properties such as particle size and gravity, an effective control method was demonstrated. The rapid prototyping work for its application in the field has been successfully completed.

Keywords: bagging scale, iris valve, feed weighing, PID, control, simulation

İZOSİTRAT DEHİDROGENAZ-1 İLE ÇEŞİTLİ SİNYAL İLETİM YOLAKLARINDA ROL ALAN BAZI ENZİMLERİN İLİŞKİSİNİN İNCELENMESİ

INVESTIGATION OF THE RELATIONSHIP BETWEEN ISOCITRATE DEHYDROGENASE-1 AND SOME ENZYMES INVOLVED IN VARIOUS SIGNAL TRANSMISSION PATHWAYS

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ÖZET

Sağlıklı hücreler, çeşitli çevresel ve genetik faktörler nedeniyle mutasyona uğrayarak sınırsız bölünme, apoptozdan kaçma gibi yeni özellikler kazanarak kanser hücrelerine dönüşür. Kanser hücreleri hayatta kalabilmek için birden fazla hücresel sinyal iletim yolağının aktivasyonunu düzenler. Karsinogeneze sebep olan çeşitli genetik ve çevresel faktörler vardır. Genetik faktörlerden bir tanesi bazı metabolik enzimlerde gerçekleşen mutasyonlardır. Bu genlerden bir tanesi, Trikarboksilik asit (TCA) döngüsünde bulunan izositrat dehidrogenaz (IDH) enzimidir. IDH, izositratın α-Ketoglutarata (α-KG) dönüşümü reaksiyonunu katalizler. Bu enzim ayrıca NAD(P)H üretiminde, glukoz, yağ asidi ve glutamin metabolizmasında rol almaktadır. IDH 'ın 3 izoformu (IDH1, IDH2, IDH3) bulunmaktadır. IDH1 sitoplazmada oksidatif dekarboksilasyon reaksiyonunu katalizlemektedir. Çeşitli kanser türlerinde (glioblastoma, ganglioma ve kolon kanserinin) IDH1 geninin aşırı ifade edildiği ve bu genin susturulması sonucunda kanser hücrelerinin proliferasyonun yavaşlaması, tümör hacminin küçülmesi, invazyon ve migrasyon gibi kansere has özelliklerin yavaşladığı görülmüştür. Ancak IDH1 geni susturulduktan sonra sinyal iletim yolaklarında rol alan enzimlerin gen ifadelerinde nasıl değişiklikler olduğu bilinmemektedir.

Sinyal iletim yolakları, hücrenin büyümesi ve çoğalması için ihtiyaç duyulan hücre metabolizmasını, motilitesini, hücre ölümleri ve sağkalımı gibi süreçleri düzenler. Fosfotidil-3-Kinaz (PI3K) yolağı hücresel metabolizmayı ve proliferasyonunu düzenler. Transforme edici büyüme faktörü beta (TGF-β) yolağı, hücrelerin büyümesi, çoğalması, farklılaşmasında rol oynayan bir sinyal iletim yolağıdır. Mitojen Aktif Protein Kinaz (MAPK) yolağının aktive olması hücre büyümesi, proliferasyonu ve hücre farklılaşması gibi hücresel olayların düzenlenmesinde rol oynayan genlerin transkripsiyonuna neden olur. Wnt sinyal yolağı embriyonik gelişim, beyin gelişimi gibi çeşitli süreçlerde rol oynar. Janus Kinaz/Sinyal Transdüserleri ve Transkripsiyon Aktivatörleri (JAK/STAT) yolağı ise hücrenin bölünmesinden ölümüne kadar gerçekleşen birçok süreçte yer alır. Sinyal iletim yolakları karsinogenez sürecinde yeniden düzenlenir. Bu yolakların aktivasyonunun düzenlenmesi tümör oluşumunun yanı sıra anti-kanser tedavi direncinde de önemlidir.

Çalışmamızın amacı IDH-1 enzimi ile PI3K, TGF-β, MAPK, Wnt ve JAK/STAT yolaklarında bulunan enzimlerin ilişkilerinin kolon kanserinde incelenmesidir. Bu amaca ulaşmak için cBioportal for Cancer Genomics aracı kullanılmış ve yüksek, orta ve düşük korelasyon gösteren enzimler belirlenmiştir. Sonuçlar incelendiğinde IDH-1 ile yüksek korelasyona sahip enzimlerin MAPK yolağında olduğu bulunmuştur. Bu çalışma hedef yolağı belirlememizi sağlamıştır. İleride IDH1 geni susturularak elde edilen kolon kanseri hücre modellerimizde MAPK yolağında bulunan enzimlerin gen ifade seviyelerinin belirlenmesi planlanmaktadır.

Anahtar Kelimeler: İzositrat Dehidrogenaz-1, kanser, sinyal yolağı, enzim.

ABSTRACT

Healthy cells mutate due to various environmental and genetic factors and turn into cancer cells by acquiring new features such as unlimited division and escape from apoptosis. Cancer cells regulate the activation of multiple cellular signal transduction pathways to survive. There are various genetic and

environmental factors that cause carcinogenesis. One of the genetic factors is mutations in some metabolic enzymes. One of these genes is the isocitrate dehydrogenase (IDH) enzyme, which is involved in the Tricarboxylic acid (TCA) cycle. IDH catalyzes the conversion reaction of isocitrate to α-Ketoglutarate (α-KG). This enzyme also plays a role in NAD(P)H production and glucose, fatty acid and glutamine metabolism. There are 3 isoforms of IDH (IDH1, IDH2, IDH3). IDH1 catalyzes the oxidative decarboxylation reaction in the cytoplasm. It has been observed that the IDH1 gene is overexpressed in various types of cancer (glioblastoma, ganglioma and colon cancer), and as a result of silencing this gene, cancer-specific properties such as slowing down the proliferation of cancer cells, shrinking tumor volume, invasion and migration are slowed down. However, it is not known what changes occur in the gene expression of enzymes involved in signal transduction pathways after the IDH1 gene is silenced.

Signal transduction pathways regulate processes such as cell metabolism, motility, cell death and survival, which are needed for cell growth and proliferation. The Phosphotidyl-3-Kinase (PI3K) pathway regulates cellular metabolism and proliferation. Transforming growth factor beta (TGF-β) pathway is a signal transduction pathway that plays a role in the growth, proliferation and differentiation of cells. Activation of the Mitogen Activated Protein Kinase (MAPK) pathway causes the transcription of genes that play a role in the regulation of cellular events such as cell growth, proliferation and cell differentiation. The Wnt signaling pathway plays a role in various processes such as embryonic development and brain development. The Janus Kinase/Signal Transducers and Transcription Activators (JAK/STAT) pathway is involved in many processes from cell division to death. Signal transduction pathways are rearranged during the process of carcinogenesis. Regulation of the activation of these pathways is important in tumor formation as well as anti-cancer treatment resistance.

The aim of our study is to examine the relationships between the IDH-1 enzyme and the enzymes in the PI3K, TGF-β, MAPK, Wnt and JAK/STAT pathways in colon cancer. To achieve this goal, the cBioportal for Cancer Genomics tool was used and enzymes with high, medium and low correlations were identified. When the results were examined, it was found that the enzymes with a high correlation with IDH-1 were in the MAPK pathway. This study allowed us to identify the target pathway. In the future, it is planned to determine the gene expression levels of enzymes in the MAPK pathway in our colon cancer cell models obtained by silencing the IDH1 gene.

Keywords: Isocitrate Dehydrogenase-1, cancer, signaling pathway, enzyme.

OPTIMIZING LEACHATE TREATMENT FROM MOHAMMEDIA-BENSLIMANE LANDFILL

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ABSTRACT

Leachate presents a complex mix of organic and inorganic pollutants, encompassing heavy metals, pathogens, and various hazardous substances that can pose substantial threats to the environment and public health if left unaddressed. Consequently, leachate treatment becomes imperative to shield the environment from contamination and avert potential dangers to living organisms. This research endeavors to enhance the leachate treatment process employed at the Mohammedia-Benslimane landfill in Morocco by applying coagulation-flocculation. The study utilizes response surface methodology and central composite design to establish the optimal pH levels, coagulant dosage, flocculant dosage, and agitation time. The outcomes reveal that the method significantly enhances the removal of color, polyphenols, and nitrates, achieving respective removal rates of 68.8%, 77.5%, and 81.0%. The optimal operating conditions identified in this investigation include a pH of 7.66, a coagulant dose of 9.5 g/L, a flocculant dose of 9.1 mL/L, and an agitation time of 10 minutes. The models for these three responses demonstrate reliability, reproducibility, and a well-fitted nature. The study underscores the significance of incorporating response surface methodology with a central composite design to optimize coagulation-flocculation in treating landfill leachate. This integrated approach can potentially enhance leachate treatment's overall efficiency and effectiveness, playing a crucial role in mitigating environmental contamination and safeguarding public health.

Keywords: Landfill leachate; Optimization; Coagulation-flocculation; Response surface methodology; Central composite design.

A CRITICAL ANALYSIS OF THE ECOLOGICAL FOOTPRINT INDICATOR: STRENGTHS, WEAKNESSES, AND FUTURE DIRECTIONS

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ABSTRACT

The Ecological Footprint indicator has emerged as a prominent tool for assessing human impact on the environment and promoting sustainable development. This paper provides a critical analysis of the Ecological Footprint indicator, examining its strengths, weaknesses, and potential future directions. The strengths of the Ecological Footprint indicator lie in its ability to quantitatively measure the ecological resources consumed by individuals, regions, or nations. By accounting for various resource categories, such as energy, water, land, and carbon emissions, the indicator offers a comprehensive overview of environmental impact. Moreover, its simplicity and intuitive nature enable effective communication of complex sustainability concepts to diverse audiences, including policymakers, businesses, and the public. However, the Ecological Footprint indicator also faces several limitations. Critics argue that the indicator oversimplifies complex environmental systems and fails to capture the full range of ecological impacts. It does not adequately consider the differences in resource productivity and availability across regions, leading to potential inaccuracies in assessments. Furthermore, the indicator's focus on consumption patterns may divert attention from addressing systemic issues, such as production methods and socioeconomic factors that contribute to environmental degradation. To address these weaknesses and enhance the indicator's utility, future directions for the Ecological Footprint concept could include incorporating more nuanced assessments of resource quality, spatial variations, and ecological thresholds. Additionally, expanding the indicator's scope to encompass social and economic dimensions would provide a more holistic perspective on sustainability. Leveraging advancements in data collection, modeling techniques, and remote sensing technologies can improve the accuracy and granularity of ecological footprint calculations. While the Ecological Footprint indicator has proven valuable in raising awareness about humanity's ecological impact, a critical examination reveals both its strengths and weaknesses. Recognizing these limitations and exploring potential enhancements will strengthen the indicator's effectiveness in guiding sustainable decision-making and fostering environmental stewardship in the future.

Keywords: Ecological Footprint; modeling techniques; stewardship; sustainability; spatial variations

INFLUENCE OF ROOTSTOCK ON THE BIOCHEMICAL CHARACTERIZATION OF APPLES (*MALUS DOMESTICA* L.)

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ABSTRACT

The present research focuses on the impact of different rootstocks on the biochemical characterization of apples (Malus domestica). The results reveal significant variations in the concentrations of polyphenols, flavonoids, and total sugars based on varietal associations with the rootstocks PJ1, MIII, PI80, M7, and M9. The JC variety paired with the PI80 rootstock stands out with high levels of bioactive compounds, suggesting a combination conducive to nutritional and gustatory properties. These findings underscore the crucial importance of a thoughtful choice of rootstock to optimize the biochemical composition of apples. This study provides significant contributions to understanding the interactions between rootstocks and apple varieties, offering perspectives for enhancing fruit quality in the context of apple cultivation.

Keywords: *Malus domestica* L., biochemical traits, rootstock.

TOXICITY OPTIMIZATION OF GREEN ZINC OXIDE QUANTUM DOTS IN ZEBRAFISH USING BOX-BEHNKEN DESIGN: A NOVEL APPROACH FOR SAFER NANOPARTICLE SYNTHESIS

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ABSTRACT
Zinc oxide quantum dots (ZnO QDs) possess a versatile range of beneficial characteristics, including impressive photoluminescence, water solubility, and robust photostability. These attributes position them as promising candidates for applications in drug delivery, bioimaging, and other biomedical fields. Nonetheless, prior to their potential human use, a comprehensive exploration of their in-vivo toxicity is imperative. Zebrafish (Danio rerio), due to their cost-effectiveness, rapid development, and genetic similarity to humans, serve as a prevalent in-vivo model for assessing nanomaterial toxicity. This study delves into the assessment of concentration-dependent toxicity of ZnO QDs and Zinc oxide bionanocomposite (ZnO BC) in zebrafish, with a concurrent optimization of methodologies using Box-Behnken design. To ensure judicious toxicity assessment in zebrafish, preliminary investigations encompassed cell line and hemocompatibility analyses, establishing appropriate dosages. Intriguingly, neither ZnO QDs nor ZnO BC exhibited discernible embryonic toxicity or adverse effects during hatching or developmental stages at a dosage of 2.5 µl for ZnO BC and 2 µl for ZnO QDs. Meanwhile, behavioral assays on larval zebrafish under visible light unveiled a dose-dependent decrease in total swimming distance and speed. However, noticeable effects materialized only at elevated concentrations (>250 µl for ZnO BC and >200 µl for ZnO QDs) in zebrafish embryos. Consequently, it is apparent that lower concentrations of ZnO BC and ZnO QDs remain substantially non-toxic. This pioneering research significantly contributes to the arsenal of future investigators in the realm of in-vivo imaging studies, offering valuable insights into the potential toxic ramifications of nanomaterials. These insights are pivotal in guaranteeing the safety of nanomaterials in various bio-applications, thereby facilitating the responsible advancement of cutting-edge biomedical technologies.
Key words: Quantum dots; Zebrafish; Embryo; *In-vivo*, Toxicity study

NUMERICAL SIMULATION AND COMMUNICATION FOR NONLINEAR THERMAL AND SOLUTAL SYSTEM OF UNSTEADY NON-NEWTONIAN WITH NATURAL CONVECTION

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ABSTRACT

The computational analysis of non-Newtonian fluid flow over an oscillating surface often involves numerical simulations and experimental investigations. Computational fluid dynamics method including finite difference or finite element techniques can be used to crack the governing equations of the fluid flow. In this work, we used the Crank-Nicolson numerical technique to analyze the numerical behavior of unsteady boundary layer flow of Casson fluid with natural convection past over an oscillating vertical plate. The temperature dependent viscosity is assumed for the flow analysis. The impact of chemical reaction and heat generation coefficient are used to examine the mass and heat transferal rates. The investigation of non-Newtonian fluid flow over an oscillating surface is crucial for a wide range of industrial, biomedical, and scientific applications. The governing model of equations is occurred in the form of non-dimensional PDE's and then we use the dimensionless variables in order to achieve the dimensional PDE's. These equations are numerically solved by using the Crank-Nicolson technique. The Crank-Nicolson scheme is used because it has ability to provide accurate and stable solutions and make it a valuable numerical technique in various scientific and engineering disciplines. The findings indicate that the significance of numerous parameters on the mass, velocity and energy regions. The numerical outcomes of skin friction are observed due to fluid parameter, viscosity parameter, Grashof numbers of heat and solutal rates.

PROPERTIES OF *ORYZA SATIVA* A-AMYLASE: PRODUCTION OPTIMIZATION, KINETICS, STABILITY AND THERMODYNAMIC STUDIES

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ABSTRACT

Enzyme stability is one of the most crucial factors to be considered for the industrial application process. The present study showed that alpha-amylase extracted from sprouting cereal (*Oryza sativa*) was maximum at day 6-9 of sprouting. The optimum pH of extraction was 8.0 with a specific activity of 19.59 U/mg proteins. 20% ammonium sulfate was suitable to precipitate the crude α-amylase extract. The precipitated protein was further purified through gel filtration chromatography up to 12 folds with a 60% yield. The specific activity of the partially purified α-amylase after gel filtration was increased to 238.65 U/mg, and the optimum pH and temperature were 4.5, and 60 °C, respectively. A residual activity of 65.3, 60.4, and 57.6% was retained after incubation at pH 4.5, 7.0, and 6.0 for 30 minutes, respectively. Meanwhile, 63, 56.6, and 56.4% of its original activity were retained after thermal treatment at 80, 70, and 40 °C for 30 minutes, respectively. The Lineweaver-Burk plot of initial velocity showed the Vmax and Km of 1666.7U and 0.3 mM, respectively. The energy of deactivation (Ea), and the z-value was 91.26 J/K/mol, and 156 °C; while Gibbs free energy (ΔG), enthalpy (ΔH), and entropy (ΔS) ranged from 85.94 to 98.26 KJ/mol, -2511.02 to -2843.58 J/mol, and -282.60 to 286.40 J/mol, respectively. The decimal reduction time (D) value increased from 77.80 to 108.63 sec, and the half-life increased from 23.42 to 32.70 sec from a heat treatment range of 40 – 80 °C. These properties make it suitable for biotechnology and industrial applications.

Key Words: *Oryza sativa*, Optimization, Purification, Kinetics, Stability, Thermodynamics

STRUCTURAL CHARACTERIZATION OF EXOPOLYSACCHARIDE FROM *LEUCONOSTOC* SPP AND ITS ANTI-ADHESIVE ACTIVITY ON AISI 316L

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ABSTRACT

Lactic acid bacteria (LAB) group widely found in Mediterranean dairy products and generally considered as beneficial microorganisms. It is used to improve the quality of the food products by producing many beneficial substances. Exopolysaccharides (EPS) from LAB have attracted special attention as valuable bioactive because of their applications in industry. Bacterial EPS encompass a broad range of complex chemical structures and consequently exhibit different properties such as antibiofilm. The main objective of this work is to study the chemical characterization of EPS (Dextran) purified from *Leuconostoc* spp and its application against the adhesion of pathogens on 316L stainless steel. Scanning electron microscopy (SEM) coupled with Energy dispersive spectrometry EDX, X-Ray Diffraction (XRD), Fourier Transform Infrared (FT-IR) Spectrum, and Thermodynamic Analysis (TGA and DTG) revealed a compact and smooth structure with amorphous nature with a thermostable property of more than 200°C, which makes them a relevant option to be used in thermal process. The result showed also a significant reduction in adhesion of a set of pathogenic bacteria treated by EPS. This study revealed the anti-adhesive activity of EPS which can be used in the manufacturing of dairy products even in other industries and in therapeutics.

Keywords: *Leuconostoc* spp; Exopolysaccharides; Structural characterization; Thermostable property; Anti-adherence activity.

DETECTION OF LUMPY SKIN DISEASE VIRUS IN BOVINE MILK, MEAT AND LIVER SAMPLES AND DETERMINATION OF THEIR SAFETY AND QUALITY

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ABSTRACT

The study investigates the quality and safety of bovine meat in the Lahore market in light of the Lumpy Skin Disease Virus (LSDV) outbreaks in South and East Asia, particularly in Pakistan. The first LSD outbreak occurred in August 2019 in the Jamshoro district, subsequently spreading to Lahore and other regions. The study aims to assess the safety of meat, liver, and milk through sensory, physical, and microbial testing. Various tests were conducted on the samples, including paired comparison tests, to detect the presence of LSDV. The results of these tests revealed significant differences among all the samples. To specifically identify LSDV, the study utilized published primers for PCR amplification, followed by gel electrophoresis analysis. The study underscores the importance of continuous monitoring during LSD outbreaks and provides reassurance that market vendors in Lahore comply with food safety regulations, ensuring the provision of safe food to consumers. The study's results offer confidence in the safety of meat, liver, and milk products in the Lahore market, demonstrating the presences/absence of LSDV in the selected random samples.

Keywords: Capripoxvirus, Food security, Livestock, Lumpy skin disease,

BIMETALLIC Cu/Ag NANOPARTICLES WITH VARYING AG AS AN ANTIBACTERIAL AGENT

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ABSTRACT

The effect of Ag concentration on the antibacterial properties of the Cu/Ag bimetallic nanoparticle (NPs) system was investigated. Employing coprecipitation method, Ag in 2.5-10 wt% was incorporated in the Cu matrix. Here, in the Cu/Ag bimetallic nanoparticles, the Cu was taken in a fixed amount and it acted like a host matrix. After the basic characterizations including XRD, HR-TEM, SEM, FTIR, and UV the prepared material was tested against, *S. aureus*, *E. coli* and *A. baumannii*, for its antibacterial character in terms of zone of inhibition by using well diffusion method. Antibacterial activity was more profound in the case of gram-positive bacteria. Further, the computational molecular docking study of the Ag/Cu bimetallic system was done against *β*-lactamase (enzyme) as part of the bacterial cell wall of *S. aureus* and *A. bauminnii*. The outcomes revealed that the Cu/Ag bimetallic NPs can be the possible inhibitor of selected enzymes that led to the progress of the antibacterial process and finally dysfunctioning of bacteria.

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REDUCING THE CARBON FOOTPRINT IN AGRICULTURAL CROPS THROUGH THE USE OF SMART NITROGEN

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ABSTRACT

The agricultural field in contemporary society contributes significantly to carbon emissions and directly through the use of nitrogen-based products, products that, once evaporated from the soil structure (through various physico-chemical processes or evaporation), lead to the appearance of greenhouse gases , an aspect that will affect both the agricultural field and human and animal health. Technologies applied in the field of agriculture (ploughing, plowing, sowing, etc.) as well as nitrogen-based fertilization products determine a large contribution to the carbon footprint of different agricultural crops (legumes, large crops, etc.), regardless of the periods of application and the amount and the type of fertilizer per agricultural crop.

From the scientific literature, it was determined that over 70% of the total emissions are represented by the use of nitrogen-based fertilizers (chemical complexes, urea, etc.), both chemical and organic fertilizers - their production, application and direct emissions (volatilization, decomposition, etc.) . Also, the use of pesticides, herbicides and other plant protection products both in the amounts indicated per hectare (depending on the type of agricultural or horticultural crop) leads to an alarming increase in the carbon footprint.

This paper aims to briefly present a simple way to combat the increase in carbon footprint by reducing chemical fertilizers on agricultural crops, obtaining smart nitrogen from plant residues of previous agricultural crops, storing carbon by using plant residues as energy, mitigating carbon emissions and obtaining mineral elements for plant growth and development.

Keywords: carbon footprint reduction, smart nitrogen, green technologies, sustainable agriculture

JEL classification: Q01, Q16, Q35, Q55

INTEGRATED APPROACH TO BAUCHEMIE AS A WAY TO HEALTHY BUILDINGS

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ABSTRACT

People spend most of their time indoors in buildings; so, retaining good indoor air quality is required. The reason for millions of premature deaths is exposure to indoor air pollutants. CO_2 is commonly used as a metric of indoor air pollutants. Indoor CO_2 concentrations can be significantly higher than outdoors due to human metabolism and activities. In addition to CO_2, other pollutants and volatile organic compounds are also very harmful. Currently the total amount of volatile organic compounds suspended in the air are indicators of indoor pollution and their source control is essential from the points of view of health, comfort, energy efficiency and sustainability. The impact of buildings on human health and the environment depends on the design, materials and methods used for construction and operation. Chemicals used in building materials can be a major passive emission source indoors, associated with the deterioration of indoor environmental quality. This research aims to screen the various chemicals used in building materials for potential near-field human exposures and related health risks, identifying chemicals and products of concern to inform risk reduction efforts. We identified 50 substances as chemicals of high concern in building material, particularly diisocyanates and formaldehyde. The highperformance architecture emphasizes on the occupant health and well-building to reduce carbon footprint. The integrated design and designerly approach baubiologie are to optimize the building layout for healthier alternative buildings for a greener future. This investigation serves as a suitable starting point for prioritizing chemicals/products and thus developing safer and more sustainable building materials.

Keywords: well-building, occupant health, highperformance architecture, carbon footprint

THE AID OF CALORIMETRY FOR THE THERMOCHEMICAL AND KINETIC STUDY OF THE Σ-HOLE BONDING LEADING TO I_2 AND 4-(DIMETHYLAMINO) PYRIDINE COMPLEXES IN SOLUTION AT 25°C

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ABSTRACT

Halogen bonds (XB) are weak noncovalent interactions that are compared to hydrogen bonds. According to Desiraju et al. halogen bonds "occurs when there is evidence of a net attractive interaction between an electrophilic region associated with a halogen atom in a molecular entity and a nucleophilic region in another, or the same, molecular entity". These interactions are between a Lewis base and Lewis acid, where the Lewis base is an electron donor and the Lewis acid is an electrophilic region of halogen. The latter area is called σ-hole and these interactions have become known as σ-hole bonding.

During the recent decade the noncovalent interactions like halogen or chalcogen bonding have shown more interest in different fields in chemistry such as supramolecular architecture and biochemistry, synthesis, material design, material science, molecular recognition, drug development and catalysis.

The aim of this work is to study the thermochemical and kinetic aspect of the formation of iodine (I_2) and 4-(Dimethylamino) pyridine (DMAP) complexes in solution at 25°C using a C-80 microcalorimeter. First, a theoretical approach of the σ-hole bonding leading to these complexes based on the calculation of complexation energy values, $Vs_{min,max}$, localization of the molecular orbitals and the amount of charge transfer, was developed. The hexane was chosen as a solvent for both DMAP and I_2 solids. The plots of the complexation heats as a function of r = $[I_2]/[DMAP]$ ratio (where $[I_2]$ and [DMAP] are the concentrations of I_2 and DMAP, respectively) show that the molar complexation heat decreases to a minimum value and increases. For particular r values we can suggest complex forms for the reaction between I_2 and DMAP by taking into account the measured and calculated complexation energies. The kinetic mechanisms and theoretical heat flow equations have been proposed for the lowest and highest r ratio. Iterating the heat flow equations while considering the deconvoluted curves allows to deduce the kinetic and thermodynamic parameters as: global order, partial order, rate constant, apparent rate constant, and complexation enthalpies: For each mechanism, the latter parameter agrees with both the measured and theoretical ones [1].

Keywords: Microcalorimetry, Thermochemical, kinetic, σ-hole bonding, I_2 - 4-(Dimethylamino) pyridine complexes, DFT calculations

INVESTIGATION OF EFFECTS OF PEPTICIDES ON TO GROUNDWATER AND SURFACE WATER

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ÖZET

Pestisitler, bitki koruma ürünleri ve biyositlerin içinde aktif madde olarak bulunan maddelerdir. Nüfus artışı, gıda tüketimindeki artış ve tarım ürünlerinin ihracatı, çoğunlukla pestisitlerin yoğun kullanımına dayanan tarımsal üretimin artmasına neden olur. Tarımda yaygın olarak kullanılan pestisitler yeraltı sularına ve yüzeysel sulara karışabilir ve içme suyunda, sulamada sorun yaratabilir. Avrupa Birliği hedef pestisit için içme suyunda izin verilen maksimum konsantrasyonu olarak 0,1 µg L−1 olarak belirlemiştir. Pestisitler su ortamını düşük seviyelerde olumsuz etkileyebileceğinden ve yeraltı suyunda eser seviyelerde analiz edilmesi gerekir. Bu kimyasallardan bazıları insanlar ve diğer yaşam formları için potansiyel risk ve çevre üzerinde istenmeyen yan etkiler oluşturmaktadır. Pestisit hedeflenen zararlılar için öldürücü olmalı, ancak insan dahil hedef olmayan türler için öldürücü olmamalıdır. Tarımın yoğun olduğu bölgelerdeki su kütlelerindeki pestisit kalıntılarının değerlendirilmesi ve yeraltı ve yüzey sularındaki pestisit kalıntılarının karşılaştırılması çok önemlidir. Ayrıca pestisitler çevrede kaldıkları ve organizmalarda biriktikleri için son derece zehirli olarak değerlendirilmektedir. Ayrıca bu kirleticiler insanlar üzerinde zararlı etkiler oluşturmakta ve kanser, kısırlık, malformasyon gibi ciddi sağlık sorunlarına ve bunun sonucunda DNA mutasyonu ve oksidatif strese bağlı olarak kromozomal değişikliklere neden olabilmektedir. Bunların her ikisi de yaşlanma ve Parkinson, Alzheimer gibi hastalıklarla ilişkilidir.

Pestisitlerin çoğunluğu biyolojik olarak kolayca parçalanamaz, dolayısıyla yalnızca temel arıtma yöntemlerinin kullanıldığı arıtma tesislerinde giderilemezler. Bu kirletici maddeleri sudan uzaklaştırmak için gama ışınlaması, biyoremidasyon, membran filtrasyon, ileri oksidasyon işlemleri ve adsorpsiyon gibi yöntemler kullanılmaktadır. Bu çalışmanın amacı, su kıtlığının ve ihtiyacının hergeçen gün arttığı dünyada temiz su ihtiyacını karşılamak için pestisitlerin genel özellikleri, çevresel riskleri ve bu bileşiklerin ekosistemlerdeki olumsuz etkileri gibi çevredeki ana yönlerini vurgulamak ve yeraltı suyu yüzeysel su ve atıksu arıtma tesisi çıkış suyu ortamlarında uygun arıtma ihtiyacını ortaya koymaktır.

Anahtar Kelimeler: ileri arıtım, atıksu, yüzeysel su, yeraltısuyu, arıtılmış su, pepsitit

ABSTRACT

Pesticides are substances found as active ingredients in plant protection products and biocides. Population growth, increased food consumption and agricultural distribution are caused by increased production, many based on the intensive use of pesticides. Pesticides commonly used in agriculture may mix with agricultural waters and surface waters and cause problems in drinking water and irrigation. The European Union has set a target of 0.1 µg L−1 as the maximum. Pesticides can adversely affect the aquatic environment at low levels and need to be analyzed at trace levels in groundwater. Some of these chemicals pose potential risks to humans and other life forms and undesirable side effects on the environment. The pesticide must be lethal to targeted pests but not lethal to non-target species, including humans. It is very important to evaluate pesticide residues in water bodies in regions where agriculture is intense and to compare pesticide residues in ground and surface waters. Additionally, pesticides are considered highly toxic because they remain in the environment and accumulate in organisms. In

addition, these pollutants have harmful effects on humans and can cause serious health problems such as cancer, infertility, malformation and, as a result, chromosomal changes due to DNA mutation and oxidative stress. Both of these are associated with aging and diseases such as Parkinson's and Alzheimer's.

Most of pesticides are not readily biodegradable, so they cannot be removed in treatment plants using only basic treatment methods. Methods such as gamma irradiation, bioremediation, membrane filtration, advanced oxidation processes and adsorption are used to remove these pollutants from water. The aim of this study is to highlight the main aspects of pesticides in the environment, such as their general properties, environmental risks and the negative effects of these compounds on ecosystems, and to explain the need for appropriate treatment in groundwater, surface water and wastewater treatment plant effluent environments in order to meet the need for clean water in the world where water scarcity and need are increasing day by day.

Keywords: advanced treatment, wastewater, surface water, groundwater, purified water, pesticides

THE PHILOSOPHY BEHIND AND NEED FOR GREEN BUILDINGS

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ABSTRACT

The statement once said by the American poet, essayist, lecturer, environmental activist and the poet laureate of Deep Ecology, Gary Snyder, that "Nature is not a place to visit; it is home" informs us of how important is nature to us. The statement by John Muir, the Scottish-American naturalist and environmental-philosopher, that "In every walk with nature, one receives far more than he seeks" emphasizes that we, humans, are very much dependent on nature for our survival. We have gone beyond the boundaries in snatching away her wealth and resources to fulfil our needs and greed for centuries at a stretch. We have been constructing buildings in their effort to give ourselves safe and posh homes which are symbols of our pride and social status. We have foolishly forgotten that nature and earth are our true and only homes in the whole cosmos. The materialistic mind-set of humans has led to encroachment into green and forest areas which has a highly negative impact on the flora and fauna of the place. It is high-time we started to give back and cherish and nourish nature in gratitude for all the things we have taken from her and it is mandatory as our existence itself has become challenging. Though the wrongs done by us cannot be set right overnight, sensible efforts from our side can at the least stop damage happening to nature. One such effort from the field of engineering is green engineering. Green engineering is the design, commercialization, and use of processes and products in a way that reduces pollution, promotes sustainability, and minimizes risk to human health and the environment without sacrificing economic viability and efficiency. The efforts of green engineering are the gifts of green buildings to the human community. Green buildings are also popularly recognised as a sustainable or high performance buildings. Green buildings involve building structures using carefully chosen processes that are found to be environmentally responsible and resource-efficient throughout the buildings' life-cycle start from the stage of siting to design, construction, operation, maintenance, renovation and deconstruction. This practice expands and complements the classical building design concerns of economy, utility, durability, and comfort. This paper aims to compare the built environment and the green buildings and discuss the impact of green buildings on environment. It also aims to analyse the relationship between the psychological and physical health of humans and green buildings.

BIRD ECOLOGY ALONG THE URBAN-RURAL GRADIENT IN BENI MELLAL: EVIDENCE FROM MOROCCO (NORTHWEST AFRICA)

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ABSTRACT

Urban expansion leads to modifications of habitat features, organization, and resources. Bird assemblages are known to respond by escaping destructive changes and adapting to sustainable ones. In this study, we investigated for the first time the avian diversity and its variation following the rural-urban gradient in Beni Mellal (Morocco) from 2018 to 2021. We used the line-transect method and multivariate analysis to demonstrate the selection of breeding habitats. Our result revealed a total of 84 species divided into resident breeders (64.28%), passage migrants (17.85%), breeding migrants (26.19%), winter visitors (32.18%) and accidental visitors (1.19%). Two globally vulnerable species counting the European Turtle Dove *Streptopelia turtur* and the European Goldfinch *Carduelis carduelis* were recorded. Breeding populations were concentrated in green spaces (9 species) located in the urban zone, compared with farmlands (7 species), peri-urban (3 species), and rural areas (3 species). Therefore, these results reverse the hypothesis that rural and farming lands are more species-rich because of a higher population size. This is due to the abundance of breeding and foraging resources in urban green spaces compared to arid lands surrounding cities in this North African area. Furthermore, our study provides a new opportunity for comparative studies of avian diversity in Morocco and Northwest Africa.

Keywords: Avian diversity, rural-urban gradient, Beni Mellal.

EVALUATION OF PHYTOREMEDIATION POTENTIAL AND YIELD OF HELIANTHUS ANNUUS UNDER SEWAGE SLUDGE APPLICATION

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Abstract

Many ornamental plants have the ability to extract toxic metals from the soil and are able to store large amounts of metals in their organs with no health problems for humans, as they do not enter the human food chain. This study aimed to investigate the effect of sewage sludge application on the performance of Helianthus annuus and to investigate its phytoremediation ability for heavy metals (Pb, Ni and Cd) in soil. This study was carried out with three levels of sewage sludge related to southern Tehran wastewater treatment plant, including 0, 10 and 20 percent by weight of soil in three replications in a completely randomized block design on Helianthus annuus. The results showed that the application of sewage sludge caused a significant increase in the concentration of heavy metals and wet and dry yield of different parts of the flower in the plant. Application of sewage sludge at 20 percent by weight of soil was more suitable for growth index and accumulation of heavy metals in plant in terms of growth index such as wet weight (root 12.03 g and shoot 48.56 g), dry weight (root 1.97 g and shoot 8.69 g), stem diameter (0.78 cm), stem height (19.4 cm) and flower diameter (7.44 cm) as well as concentration of heavy metals Pb (root and shoot 9.09 and 4.35 mg/kg respectively), Ni (root and shoot 3.65 and 2.04 mg/kg respectively) and Cd (root and shoot 0.598 and 0.364 mg/kg respectively). Due to root bioaccumulation factor above one and transfer factor less than 1, Helianthus annuus is a plant suitable for the uptake and transfer of heavy metals, which prevents the entry of heavy metals into the shoot parts by a plant stabilization mechanism.

Keywords: Bioaccumulation Factor; Heavy Metals; Helianthus annuus; Phytoremediation; Translocation Factor.

EVALUATION OF NITRATE HEAVY METALS POLLUTANTS REMOVAL RATE FROM ZARJOUB RIVER (IRAN) USING A WETLAND HYBRID SYSTEM

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Abstract

Human health and the health of other living things are threatened by the transfer of pollutants from industry, hospitals, and agriculture into surface and groundwater. One of the most contaminated rivers in the nation, the Zarjoub flows through the center of Rasht and is contaminated with a variety of hazardous substances, including phosphate, nitrate, and heavy metals. One of the inexpensive and ecologically beneficial wastewater treatment techniques that has drawn a lot of attention lately is the creation of artificial wetlands. This study investigates at the removal of nitrate in the autumn of 2019 and the summer of 2020 by the sequential usage of three distinct plant species—phragmites, lemna, and vetiver—in two different arrangement inside artificial wetlands. The findings demonstrated the impact of plants on wetlands, with the average percentage of nitrate reduction by two plant treatments being 73% and 68%, and the control treatment having a percentage of 35%. Furthermore, the results demonstrated a clear relationship between temperature variations and plant development status and the quantity of nitrate reduction from the effluent. The results showed that the use of hybrid wetlands can have a good removal efficiency for pollutants compared to their individual use, but the difference in plant arrangement in wetlands, although statistically significant at a probability level of 1%, had little effect on the nitrate removal process on effluent.

Keywords: Contaminant, wastewater, hybrid wetlands, percentage reduction, plant species

ENHANCING PRODUCTION EFFICIENCY THROUGH FACILITATION AND WORK-STUDY, USING REVISED NIOSH EQUATION, A CASE STUDY

Eng. Sohail khan

ABSTRACT

Third-world countries do not take into account work-study interventions in the manufacturing sector. As a result, it causes loss of labor hours due to induced musculoskeletal disorders. This study introduces ergonomically facility layout designing and mathematical algorithms for improving per-modified processes and choosing an optimal economic and healthy working environment for labor. The algorithm has two main aspects, selecting efficient work design and calories consumption. An efficient design is determined based on lifting index value and calculates calories consumption while working on the method chosen. Results show that choosing an efficient working design reduces work energy consumption. The improved work design parameters bring the life ting index from 3 to 1.5. Energy consumption pershift from actual design to improved design is reduced from 2186 to 1986 kilo calories, respectively. In the end, this study calculated to require the amount of weight of specific food item to eat for daily calories consumption recovery.

Key words: Work study, musculoskeletal, Ergonomics, kilo calories, layout designing .

ESSENTIAL SERVICE QUALITY IN JUNIOR NON-COMMISSIONED OFFICERS IN NAVY TOWN, LAGOS

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ABSTRACT

The study aims to evaluate the essential service quality in Junior Non-Commissioned Officers in Navy Town, Lagos, to suggest measures of improvement. The study covers junior non-commissioned officers Quarters of Navy Town, Lagos. Quantitative method was adopted for this study. Population size in this study comprises of about 1,000 apartments and the sample size is 400. The respondents were selected by a systematic sample method. The study employed a questionnaire as an instrument for data collection. Data collected were analysed using descriptive statistics (mean, standard deviation, and percentages. A total number of 372 questionnaires were retrieved from the respondents and 365 were used in the analyses after data screening. The findings from a mean ranking of the fourteen (14) essential services in construct on essential service quality showed that electricity supply was the most provided service quality, followed by barrack security and water provision. Laundry services and fire protection services are the least provided equipment. It is also recommended that Barrack Maintenance Unit (BMU), as well as the Nigerian Naval Headquarters, should incorporate policies that would encourage the efficient use of services provided as it will help to increase the life span of the facilities. The barrack maintenance and services provided be carried out through direct labour to ensure effectiveness. The above recommendations are hopefully expected to reverse the current trend of junior non-commissioned officers' satisfaction, consequently improve to better sustainable improvement on barrack accommodation and facilities.

Key Words: Essential Services, Service Quality, Sustainable Facilities, Barrack Facilities, Barrack Housing

LINE FOLLOWER ALGORITHMS AND SENSOR STRATEGIES FOR SEAMLESS NAVIGATION

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ABSTRACT

As line follower competitions gain traction among engineering students, it's crucial to know what truly makes a line-following robot fast. While many focus on the robot's physical build, the software side is equally important. Even the best-built robot can be slow with poor software. There are various algorithms and sensor options, and choosing the right ones can significantly boost your robot's speed and performance. This presentation explores how smart choices in algorithms and sensors can make your line-following robot faster and better.

MIXED CONVECTION OF POWER LAW NANOLIQUID TRANSPORT IN CUBIC CAVITY WITH WAVY BOTTOM WALL: ENTROPY PERFORMANCE

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ABSTRACT
The magnetohydrodynamic mixed convection in a lid-driven chamber loaded with power-law nano-liquids is investigated. The bottom wavy wall is cold, while the upper lid is uniformly cold. The vertical walls are maintained at adiabatic temperatures. Iron oxide (Fe3O4) and MWCNT (multi wall carbon nanotube) nanoparticles are considered in the study. The steady and three-dimensional governing dimensional partial differential equations are transformed to dimensional free partial differential equations utilizing non-dimensional variables and thermophysical properties and solved via the Galerkin Finite Element Method. The findings were shown for a variety of thermal Grashof numbers ($Gr=10^3$-10^5), Hartmann numbers (Ha=0-20), Reynolds numbers (Re=10-500), Power-law index (n=0.8,1,1.6), and undulation numbers (N=1-4). The influence of the various parameters on flow, thermal transport, and entropy production is illustrated by the stream function, isotherms, and isentropic contours. Higher Re and lower Ha enhances heat transfer. Entropy production is mostly due to heat transfer but also fluid-friction and magneto effects also contributes.
Keyword: Nanoliquid; power-law; Lid Driven, hydrodynamics; Galerkin Finite Element Method.

DEEP LEARNING IN CONSERVATION BIOLOGY

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ABSTRACT
One of the great problems associated with global changes is the spread of invasive species. On the other hand, invasive species also provide an attractive opportunity to test the utility of artificial intelligence-based algorithms in ecology and conservation biology. These species are thoroughly monitored because of their adverse effects, meaning that a large amount of data is available on their spread. We use actual, satellite provided remote sensing data as proxies of environmental factors. The multispectral imageries of Earth observing satellite systems, most notably the Landsat and Sentinel satellites, provide spatial (10-60 m instead of 1 km) and temporal (5-10 days instead of months) resolutions and, especially for recent occurrence data, can be contemporal. The prepared images were fed to a CNN (Convolutional Neural Netork). The network is applied for semantic segmentation over the satellite images to classify each pixel whether it belongs or not to the possible habitat of the focal species. In this way we can predict the patches of possible occurrence of the focal species. We also experimented to stack images of the same location at different times to investigate if deep learning can cope with the dynamics of the environment. We tested the accuracy and precision of our predictions by (i) dividing our datasets into training and test sets, performing cross-validation, (ii) using data set from a given year to predict occurrence in the subsequent year. The second procedure, apart from testing, was reveal important information about the spread of invasive species, because the prediction identifies possible occurrence, while surveys only show the localities where the species has already arrived. Investigating the characteristics of two classes of localities (e.g. their distances) can shed light on the invasion process for biologists.

THE LINK BETWEEN LITERATURE AND ARCHITECTURE

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ABSTRACT
Literature and architecture has always been seen as two highly distinctive and completely different fields of study. A careful comparison of these two fields shows that they have very strong connections between them. Literature has inspired architecture and architecture in turn has inspired literature. Both literature and architecture can inspire human lives to a great extent. There are a number of similarities between the two. The similarities include space, readers and users, imagination and visualization, theme and concepts, characters and structural elements, perspectives storytelling, memories, inspiration, dynamism and space. The paper tries to elaborate on the above mentioned similarities between literature and architecture and analyse how literature and architecture have influenced one another by bring in relevant examples.

SUSTAINABLE MANUFACTURING BY APPLYING VALUE STREAM MAPPING IN A HOME APPLIANCE COMPANY

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ABSTRACT

Addressing the urgent challenges of resource depletion and climate change require the adoption of sustainable practices in production and consumption. The adoption of lean practices in manufacturing can lead to a more efficient, cost-effective, and sustainable operation, ultimately benefiting both the company and its customers. Lean practices focus on identifying and eliminating various forms of waste, such as overproduction, defects, waiting time, excess inventory, unnecessary motion, and transportation. This leads to streamlined processes and reduced resource consumption. This study explores the application of lean tools to reduce waste in manufacturing processes, employing techniques such as value stream mapping, capacity planning, and kaizen in a home appliance company specializing in refrigerator production. The examination of nine stations reveals significant reductions in non-value-added activities (9%), excessive processing (3%), and transportation (22.5%) within the production process. The utilization of lean tools offers valuable insights, promoting effective resource utilization and cultivating a lean culture in the industry. The results indicate the potential for reduced waste in support of sustainable manufacturing and consumption practices for the circular economy. This study contributes to increased efficiency, reduced waste, and improved overall performance in the home appliance industry.

Keywords: Lean tools, Sustainable manufacturing, Value Stream Mapping, Waste reduction, Performance improvement

DESIGN STRUCTURE MATRIX MODELING FOR SUSTAINABLE PRODUCT DESIGN: A CASE OF THE THERMAL MANAGEMENT SYSTEM OF AN ELECTRIC VEHICLE

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ABSTRACT

In the globalized world, the demand for sustainable products and processes is increasing, driven by short product life cycles, market demands and the impacts of climate change. Addressing these issues requires various approaches, and one effective method is to design products in a modular way, enabling product elements to be reused, repaired, and recycled. This study applies Design Structure Matrix (DSM) modeling to the Thermal Management System of TESLA Model Y, by breaking down the system into modular components for architectural understanding. By decomposing the system into components, identifying interfaces and analyzing the structure, modular architecture is developed, supporting both product and process planning. The Cambridge Advanced Modeler (CAM) software is utilized to represent the system in a matrix and analyze the system using built-in algorithms by clustering, partitioning and structure analysis. From clustering the matrix three modules namely manifold assembly, HVAC and drive unit were identified. The resulting structural analysis reveals a Relational Density of 0.093 and a Singular Value Modularity Index (SMI) of 0.27 for the composite DSM of the Thermal Management System of TESLA Model Y, with three identified modules. Modular design facilitates the reuse, repair, and recycling of components, promoting sustainable design, manufacturing and supply chains for the circular economy.

Keywords: Modular designs, Design Structure Matrix modeling, Sustainable manufacturing, Structure Analysis, Circular Economy.

ESTAŞ YERLİ VE MİLLİ NİTRİL ELDİVEN ÜRETİMİ

ESTAŞ DOMESTIC AND NATIONAL NITRILE GLOVE PRODUCTION

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ÖZET

İş sağlığının, iş güvenliğinin ve hijyenin son derece önemli olduğu ortamlarda kullanılan nitril eldiven, insanların zararlı kimyasal maddelerden, temas ya da kan yolu ile bulaşabilen hastalıklardan, bakteri ve mikroplardan korunmalarını sağlayabilmektedir. Bu amaçlar doğrultusunda, eldiven kullanımı özellikle hastanelerde, tüm sağlık/kozmetik kuruluşlarında, sanayide, yiyecek hazırlama sektörlerinde, temizlik, laboratuvar, kafeterya - restoran servisi ve evlerde sıklıkla tercih edilmektedir. Kullanım alanı oldukça çeşitli ve fazla olan eldiven türlerinden nitril eldivenler, yüksek gerilme dayanımı, sızdırmazlık özelliği ve aşınma direnciyle öne çıkmakda olup sağlam ve uzun ömürlü yapısından dolayı kullanıcılarına yüksek koruma sağlamaktadır. Dayanım gücüyle öne çıkan nitril esaslı eldivenler, kullanım alanlarına bağlı olarak belirli standartları karşılayacak biçimde geliştirilir. Bu nedenle üretim sırasında, kullanılan hammaddelerin miktarları ve üretim koşulları önem arz etmektedir. Kullanılan hammadde miktarları ve üretim sürecinin koşulları değiştirilmesi özellikle eldivenin dayanıklılık özelliklerini önemli ölçüde etkilemektedir. Biz ESTAŞ bünyesinde kurulan üretim hattımızda nitril bazlı eldiven üretimi gerçekleştirmekteyiz. Ana üretim hattına geçmeden ilk üretim denemelerimizi yapabileceğimiz prototip mini üretim hattımız da bulunmaktadır. Bu çalışmada, işletmemizde bulunan mini üretim hattını kullanarak yüksek mekanik dayanıklılığa sahip, kimyasal sızdırmaz özellikte ve kusursuz eldiven üretiminde optimizasyon denemeleri yaptık. Yapmış olduğumuz denemeler sonucunda, belirttiğimiz özelliklerdeki nitril eldivenin üretimi için en iyi optimum koşulları belirledik. Ayrıca bu çalışmanın Cumhuriyetimizin 100. yılında ESTAŞ tarafından kalkınma hamlesi olarak yapılan bir Ar-Ge projesi olduğunu da belirtmek isteriz.

Anahtar Kelimeler: Nitril eldiven, mekanik dayanıklılık, kimyasal sızdırmazlık.

ABSTRACT

Nitrile gloves, used in environments where occupational health, safety and hygiene are extremely important, can protect people from harmful chemicals, diseases that can be transmitted through contact or blood, bacteria and microbes. For these purposes, the use of gloves is frequently preferred, especially in hospitals, all health/cosmetic institutions, industry, food preparation sectors, cleaning, laboratories, cafeteria - restaurant services and homes. Nitrile gloves, one of the glove types with a wide variety of usage areas, stand out with their high tensile strength, sealing properties and abrasion resistance, and provide high protection to their users due to their robust and long-lasting structure. Nitrile-based gloves, which stand out with their durability, are developed to meet certain standards depending on their usage areas. For this reason, the quantities of raw materials used and production conditions are important during production. Changing the amount of raw materials used and the conditions of the production process significantly affects the durability properties of the glove. We produce nitrile-based gloves in our production line established within ESTAŞ. We also have a prototype mini production line where we can make our first production trials before moving on to the main production line. In this study, we carried out optimization experiments in the production of perfect gloves with high mechanical durability, chemical impermeability and flawless properties using the mini production line in our facility. As a result of our experiments, we determined the best optimum conditions for the production of nitrile gloves with the features we specified. We would also like to point out that this study is an R&D project carried out by ESTAŞ as a development move on the 100th anniversary of our Republic.

Keywords: Nitrile gloves, mechanical resistance, chemical sealing.

OKTA-SÜBSTİTÜYE OXO-TİTANYUM FTALOSİYANİN SENTEZİ VE KOLORİMETRİK pH-SENSÖR AKTİVİTRELERİNİN INCELENMESİ

SYNTHESIS OF OCTA-SUBSTITUTED OXO-TITANIUM PHTHALOCYANINE AND INVESTIGATION OF COLORIMETRIC pH-SENSOR ACTIVITIES

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ÖZET

Kararlı 18-π elektron konjüge sisteme sahip ftalosiyaninler ısı, ışık, nem ve oksijen gibi dış etkilere karşı mükemmel stabiliteye sahiptirler. Sahip oldukları konjüge sistem sayesinde π-π* geçişlerinin neden olduğu görünür bölge dalgaboyu aralığında güçlü absorpsiyon bantlarına sahiptir. Ftalosiyaninlerin bu absorpsiyon banları, sübstitüye grupların ve metal merkezinin etkisiyle daha da kırmızıya kayabilir. Örneğin titanyum gibi bir metalin kullanılması soğurum bandını kırmızıya kaydırır. Bunun yanında oxo-titanyum ftalosiyaninlerin zengin spektroskopik özelliğe sahip olduğu da bilinir.

Bu çalışmada, pH algılayıcı molekül olarak oktasübstitüye okso-titanyum ftalosiyanin bileşiği sentezlendi ve karakterize edildi. Okso-titanyum ftalosiyanin bileşiği, hazırlanan disübstitüye ftalonitril türevinin metal tuzları varlığında tetramerizasyon reaksiyonu sonucu sentezlendi. Bileşik çözünürlük farklarından faydalanarak saflaştırıldı. Sentezlenen bileşik, FT-IR, UV-Vis, MALDI-TOF spektroskopileri ve elementel analiz ile karakterize edildi. Hazırlanan bileşiğin pH algılama özellikleri incelendi. Elde ettiğimiz sonuçlara göre sentezlenen bileşiğin bazik bölge de kolorimetrik pH sensör özellik gösterdiği belirlendi. Ayrıca elde edilen sonuçlar tetrasübstitüye okso-titanyum ftalosiyanin bileşiğiyle karşılaştırıldı. Sonuçların farklılık gösterdiği gözlendi. Bu farklılık molekül içi/arası etkileşimler ile açıklanabilir.

Anahtar Kelimeler: Titanyum, ftalosiyanin, pH sensör.

ABSTRACT

Phthalocyanines with a stable 18-π electron conjugated system have excellent stability against external effects such as heat, light, moisture and oxygen. Thanks to their conjugated system, they have strong absorption bands in the visible wavelength range caused by π-π* transitions. These absorption bands of phthalocyanines may further red shift due to the influence of substituted groups and the metal center. For example, using a metal such as titanium shifts the absorption band to red. In addition, it is known that oxo-titanium phthalocyanines have rich spectroscopic properties.

In this study, octasubstituted oxo-titanium phthalocyanine compound was synthesized and characterized as a pH-sensing molecule. Oxo-titanium phthalocyanine compound was synthesized as a result of the tetramerization reaction of the prepared disubstituted phthalonitrile derivative in the presence of metal salts. The compound was purified by taking advantage of solubility differences. The synthesized compound was characterized by FT-IR, UV-Vis, MALDI-TOF spectroscopies and elemental analysis. The pH sensing properties of the prepared compound were examined. According to our results, it was determined that the synthesized compound showed colorimetric pH sensor properties in the basic region. Additionally, the results obtained were compared with the tetrasubstituted oxo-titanium phthalocyanine compound. It was observed that the results varied. This difference can be explained by intra/intermolecular interactions.

Keywords: Titanium, phthalocyanine, pH sensor.

LEAF STRUCTURAL AND FUNCTIONAL MODIFICATION OF *IPOMOEA CARNEA* JACQ. AN INVASIVE PLANT SPECIES, UNDER DIVERSE SALINITY GRADIENT

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ABSTRACT

The role of structural and functional plasticity of *Ipomoea carnea* for invasion in diverse saline environments was investigated. The populations were collected from 30 different habitats of Pakistan. The populations were divided into 3 groups based on the extent of salinity in their natural habitat. The non-saline habitats (ECe>4 dS m^{-1}) were Kohala, Islamabad, Pahari Nala, Pir Kot, Nerian Sharif, Daska, Dhir Kot, Namal, Lower Jhelum and Majuhan. Moderately saline habitats (ECe 4-8 dS m^{-1}) were Mong Depo, Pasrur, Layyah, Mana Wala, Phularwan Roadside, Kharian Wala, Phulrwan canal, Rasool, Puran and Shah Kot. Highly saline habitats (<8 dS m^{-1}) included Gunjal, Gutwala, Skindar Pura, Choa Sadien Shah, Phid, Buchal, Kallar Kahar, Cholistan Desert, Sangla Hills and Sahian Wala. The hyper-saline population accumulated more compatible solutes like total soluble sugars, phenolics and flavonoids linked to osmoprotection. Increased sclerifcation and phloem thickness in hyper-saline and moderately saline populations. Increased density of trichomes and salt excretory glands prevented water loss and excreted toxic ions through leaf surface. In conclusion, *I. carnea* populations adopted different strategies like water conservation via water storage in parenchymatous tissues, accumulation of compatible solutes (total soluble sugars) and allelochemicals (flavonoids and phenolics) for chemical defense. All these aspects were key factors for survival and invasive success in a variety of habitat types and environmental conditions.

Keywords: Environmental heterogeneity, Invasive species, *Ipomoea carnea*, Sclerifcation, Trichomes.

PHOTOSYNTHETIC TRAITS OF RICE LANDRACES (*ORYZA SATIVA* L.) UNDER DROUGHT TOLERANCE

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ABSTRACT

Drought stress is mainly a serious limiting factor for rice production, which creates huge economic losses by becoming more serious issue with respect to global climate change. In the view of the current situations and forecasted global food demand, it is necessary to enhance the crop productivity on the drought prone rain fed lands with utmost priority. Rice is a main staple cereal crop in the world. Climate change mainly alters the plant phyllosphere and its resource allocations. The main aim of this study was to evaluate the "Photosynthetic traits of rice landraces (*Oryza sativa* L.) under drought tolerance". A hydroponic studies and pot culture experiments were conducted in the Department of Crop Physiology, Tamil Nadu Agricultural University, Coimbatore, during 2020-2021 to investigate the Photosynthetic attributes. Rice land races, namely Anna(R) 4, 337- IC116006, 224 - IC463809 were studied. The drought stress was imposed during reproductive stage under pot culture experiment. The present findings showed that drought stress reduced the photosynthetic parameters and enhanced the chlorophyll index and soil temperature in all the land races. Among the land races, Anna (R) 4 performed better under drought stress conditions when compared to other rice landraces.

Keywords: Photosynthesis, chlorophyll, tolerance, landraces, drought, leaf temperature.

DEVELOPMENT OF NEW METHODS OF SUBSTANCE ANALYSIS IN COMPARISON WITH THE REFERENCE SAMPLE

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ABSTRACT
Today, the analysis of various substances is widely used in many areas of human activity, starting with industry and agriculture and ending with the medical industry. It is important to be able to compare experimental compositions of substances with a given reference sample. Thus, blood quality analysis is widely used today in determining various diseases in the early stages, which is especially important in the complex analysis of human health, for example, during medical examination.
Existing methods of analysis based on the correlation of output signals from various sensors in comparison with a certain threshold value are widely used and are suitable for determining the qualitative composition of a substance with a high degree of accuracy.
At the same time, it is worth noting that the study of this substance at the level of noise data will most accurately determine the subtle differences in the composition of the substance. In this case, three aspects are the most important, the first of which is the development of a highly sensitive data processing method based on an accurate mathematical apparatus that will be free from model assumptions and will not contain uncontrolled errors. The second aspect is related to the analysis (removal of experimental data), which imposes certain restrictions on experimental equipment. The third aspect is the choice of a reference sample with which further comparison of experimental data will be carried out. It is important to take into account that if the data processing method is chosen correctly, the main error will be associated with the experiment.
Key words: correlation, data processing, medical equipment.

USING BIOCHARS MODIFIED WITH THIOUREA TO REDUCE THE IMPACT OF HARMFUL METAL POLLUTION AND ENHANCE THE GROWTH OF MUSTARD PLANTS (BRASSICA CAMPESTRIS) IN SOILS AFFECTED BY CONTAMINATION

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ABSTRACT
This research explored the potential of using biochars derived from sugarcane bagasse, banana peel, and watermelon rind, modified with 1% thiourea via pyrolysis at 500°C. This process created sugarcane bagasse + thiourea modified biochar (STMB), banana peel + thiourea modified biochar (BTMB), and watermelon rind + thiourea modified biochar (WTMB). The aim was to immobilize toxic metals like Cd, Ni, Cu, Pb, Cr, and Zn found in polluted soils from Gadap town and Malir cantonment. The modified biochars were applied at various levels (1.25%, 2.5%, and 5%), showing efficacy in immobilizing toxic metals, ranging from 43.75% to 93.98% with the application of BTMB at 2.5% and 5%. Moreover, incorporating these biochars resulted in enhanced growth of mustard plants, with the greatest biomass observed using STMB at a 1.25% dosage. The study identified soil pH, SOC, CaCO3, and TOC as crucial factors in reducing the concentration of toxic metals in polluted soils. Findings suggest recommending a 1.25% dosage for optimal plant growth and 2.5% to 5% dosages for immobilizing toxic metals in soils contaminated by industrial wastewater.
Key words: biochar, plant growth, thiourea modified

FINITE ELEMENT ANALYSIS OF THE LIMB/SOCKET INTERFACE IN TRANSFEMORAL AMPUTEES

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ABSTRACT

The prosthesis for lower limb amputees is designed to restore anatomical integrity by replacing the missing segment and to restore locomotor functions in a standing position, ensuring static and dynamic balance. These prostheses must meet several criteria, including easy fitting, comfort for all-day wear, as well as the safety and reliability of the mechanisms involved. Our study proposes a finite element model aimed at improving the comfort of the prosthesis by reducing the pressure on the distal end of the stump and by equalizing the transfer of load from the lower limb to the prosthesis, thereby increasing the points of support. The results revealed significant deformation of the muscle tissue due to its relatively weak mechanical properties. The equivalent stresses experienced by the skin highlighted that the distal parts, the tibial tuberosity, and the anterior or lower part of the knee are the most solicited, while the posterior side undergoes significant shear due to slippage.

Keywords: Lower limb amputees, numerical model, finite element method; Mechanical properties, Shear stresses

3D-QSAR, ADME-TOX IN SILICO PREDICTION AND MOLECULAR DOCKING STUDIES FOR MODELING THE ANALGESIC ACTIVITY AGAINST NEUROPATHIC PAIN OF NOVEL NR2B-SELECTIVE NMDA RECEPTOR ANTAGONISTS

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ABSTRACT

A new class of selective antagonists of the N-Methyl-D-Aspartate (NMDA) receptor subunit 2B have been developed using molecular modeling techniques. The three-dimensional quantitative structure–activity relationship (3D-QSAR) study, based on comparative molecular field analysis (CoMFA) and comparative molecular similarity index analysis (CoMSIA) models, indicate that steric, electrostatic and hydrogen bond acceptor fields have a key function in the analgesic activity against neuropathic pain. The predictive accuracy of the developed CoMFA model (Q2 = 0.540, R 2 = 0.980, R 2 pred = 0.613) and the best CoMSIA model (Q2 = 0.665, R 2 = 0.916, R 2 pred = 0.701) has been successfully examined through external and internal validation. Based on ADMET in silico properties, L1, L2 and L3 ligands are non-toxic inhibitors of 1A2, 2C19 and 2C9 cytochromes, predicted to passively cross the blood–brain barrier (BBB) and have the highest probability to penetrate the central nervous system (CNS). Molecular docking results indicate that the active ligands (L1, L2 and L3) interact specifically with Phe176, Glu235, Glu236, Gln110, Asp136 and Glu178 amino acids of the transport protein encoded as 3QEL. Therefore, they could be used as analgesic drugs for the treatment of neuropathic pain.

INTEGRATION OF *BACILLUS CEREUS* AND COMPOST TYPES TO MODULATE THE SALINITY EFFECT ON THE GROWTH OF CUCUMBER (*CUCUMIS SATIVA* L.)

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ABSTRACT

Salinity has stressed the sustainable agriculture because of the reduction in yield quality and crop production**.** Salt effected land reclamation by using rhizobacteria and compost is getting attention as an ecofriendly and sustainable strategy. The effect of *Bacillus cereus* and three types of compost (Mg-enriched, Ca-enriched, and cow manure) alone and in combination, under three levels of salinity stress along with a control group (0 mM, 100 mM, 150 mM, and 200 mM), on growth modulating traits and biochemical parameters was accessed. Under salt stress conditions, the morphological traits of cucumber plants experienced a significant reduction in magnitude and become more pronounced as the salt stress increased. All types of compost and *Bacillus cereus* over all boosted the photosynthetic, antioxidant enzyme system and increased the growth enhancing traits under 100 mM and 150 mM salt stress condition. However they were not so effective at 200 mM salt stress level. Remarkable findings obtained with two combined application of *Bacillus cereus* + Ca-enriched compost and *Bacillus cereus*+ Mg-enriched compost under 200 mM salt stress condition. The results suggested that combined application of *Bacillus cereus* + Ca-enriched compost and *Bacillus cereus*+ Mg-enriched compost has substantial role in mitigation of salt induced phytotoxicity in cucumber. Nutrient enriched compost in combination of rhizobacteria have high affinity to ameliorate salt toxicity in soil.

Key words: salinity, *Bacillus cereus*, Mg-enriched compost, Ca-enriched compost

EMPOWERING EDUCATION IN INDUSTRY 4.0: A CLOUD-BASED APPROACH FOR RURAL AND TRIBAL TRANSFORMATION

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ABSTRACT

In the era of Industry 4.0, ensuring universal access to education becomes paramount for fostering individual growth and societal progress. Aligned with the vision of our esteemed Prime Minister, Shri Narendra Modi, the need for a technologically advanced educational paradigm is evident. The quality of education emerges as a central factor in shaping citizens who can contribute meaningfully to the rapidly evolving landscape of Industry 4.0. However, economic constraints in many rural and tribal areas of India hinder the adoption of modern, integrated digital educational systems, exacerbating the educational divide.

The onset of the COVID-19 crisis has accentuated the urgency for digital solutions, particularly in remote areas where traditional education faces unprecedented challenges. While urban educational institutions have embraced emerging technologies in the Industry 4.0 context, rural and tribal regions continue to grapple with limited access. In response, the proposed study, inspired by the a project framework, introduces an Industry 4.0-aligned solution. It advocates for the implementation of an integrated digital cloud framework to establish a Cloud-Based Quality Learning Model (CbQLM), specifically tailored for underprivileged students in Industry 4.0 transformative settings.

CbQLM represents an educational cloud network system strategically designed for collaborative and collective learning, aligning with the principles of Industry 4.0. The study explores various dimensions of CbQLM, emphasizing its potential to empower underprivileged students in rural and tribal areas with the skills and knowledge required to navigate the complexities of Industry 4.0. It envisions a future where digital learning opportunities transcend geographical constraints, ensuring that every individual, regardless of their location in India, can actively participate in and contribute to the unfolding Industry 4.0 landscape

Keywords: Industry 4.0, Education Access, Cloud-Based Learning, Rural and Tribal Areas, Digital Transformation, Underprivileged Students, Technological Integration, Collaborative Learning, Economic Constraints, COVID-19 Impact, Educational Divide, Emerging Technologies, Skill Empowerment

USE OF PHOSPHOGYPSUM IN AGRICULTURE AS AN AMENDMENT FOR DEGRADED SOILS AND AS FERTILIZER

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ABSTRACT

Phosphogypsum (PG) is a calcium sulphate dihydrate and a by-product of the phosphate fertilizer industry. It is produced in huge quantities (300 MT/year), but only 15% of the PG produced is recycled. Phosphogypsum is valued in several sectors: road construction, building materials and agriculture. In agriculture, PG is used as an amendment for degraded soils (saline, sodic and acid soils) and as a fertilizer because it contains many essential nutrients for plant growth and development such as calcium, sulphur, and phosphorus. The fertilizer industry would be another promising avenue for PG valorization. The objectives of this bibliographic work are to (1) Determine the processes of PG generation and the factors that influence its properties (2) Determine the physical, chemical, and radioactive properties of PG (3) Discuss the potential uses of phosphogypsum in agriculture (4) Define the effects of PG on crop production, soil, water, and the environment. Phosphogypsum contains some heavy metals and radioactive elements that could pose serious environmental risks. Therefore, it is critical to ensure that the exposure to these impurities does not exceed international standards. Hence, the necessity of long-term research projects in this area.

Keywords: Phosphogypsum - Properties - Agricultural valorization - Saline soil - Acid soil - Fertilizer - Heavy metals - Radioactive elements

POTENTIAL ANTICANCER AND ANTIOXIDANT LAURIC ACID BASED HYDRAZONES SYNTHESIS AND COMPUTATIONAL SLANT TOWARDS THE ELECTRONIC PROPERTIES

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ABSTRACT
Natural product modification is a key area of synthetic organic chemistry for accomplishing valuable chemical building blocks with prized medicinal significance. Herein, lauric acid-based hydrazones: (E)-N'-(2-nitrobenzylidene)dodecanehydrazide (NBDH), (E)-N'-(naphthalen-1-ylmethylene)dodecanehydrazide (NMDH), and (E)-N'-(4-fluorobenzylidene)dodecanehydrazide (FBDH)" were synthesized and characterized using spectroscopic techniques. The newly synthesized lauric acid based hydrazones were screened for their anticancer and antioxidant potential. Antioxidants showed activity by inhibiting the oxidative chain reactions that produce reactive oxygen species. The antioxidant activity showed that NBDH exhibited the maximum DPPH inhibitory activity compared to that of NMDH and FBDH. In contrast, the anticancer activity showed that FBDH exhibited maximum percent viability compared to NBDH and NMDH. The reactivity and biological needs of the synthesized compound NBDH, NMDH, and FBDH were met by performing geometrical, FT-IR vibrational, UV-visible, global reactivity parameters (GRP), MEP, FMO, NBO, ELF, LOL, and nonlinear optical (NLO) analysis at DFT/B3LYP/6-311+G(d,p) level. NBO analysis confirmed the existence of extended conjugation and intramolecular charge transfer among NBDH, NMDH, and FBDH from the lowest gap $\pi \rightarrow \pi^*$ which are in line with FMO results where successful charge transfer occurred from HOMO→LUMO. GRP analysis confirmed the potential of NBDH, NMDH, and FBDH for biological, electronic, and NLO applications. It is clear from the comparative analysis of the urea molecule that NBDH, NMDH, and FBDH are all components of fine NLO properties.
Keywords: Lauric acid based Hydrazones; Anticancer; Antioxedant; DFT Study; Spectroscopic Analysis

WEIBULL-GUMBEL TYPE II DISTRIBUTION PROPERTIES AND ITS APPLICATIONS TO BIOMEDICAL DATA SETS

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ABSTRACT
This paper introduces and investigates an extended form of the conventional Gumbel type II distribution, termed the Weibull-Gumbel type II distribution. This novel lifetime distribution features a single scale parameter and three shape parameters. The study provides various statistical and reliability characteristics of this distribution, employing the method of maximum product of spacing for parameter estimation. Two real-life datasets are used to demonstrate the applicability and versatility of the Weibull-Gumbel type II distribution. Evaluation based on log-likelihood and information statistics values from both estimation methods indicates that this distribution yields a superior fit to the data compared to other distributions. Additionally, the parameters' consistency is affirmed through a simulation study. In light of these findings, the Weibull-Gumbel type II distribution is recommended for effective modelling of lifetime data.
Keywords: Weibull-Gumbel type II, minimized log-likelihood, unimodal, Monte Carlo simulation, binomial expansion

EXAMINATION OF ESSENTIAL OILS EXTRACTED FROM PITURANTHOS AROMATIC PLANTS AND THEIR BIOACTIVE POTENTIAL

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ABSTRACT
Aromatic plants in the Pituranthos genus are noteworthy in ecological research due to diverse chemical compositions and potential pharmacological properties. This study uses analytical techniques to explore essential oil profiles from various parts of selected Pituranthos species. The research synthesizes findings across different Pituranthos species, allowing for a comparative analysis of essential oil compositions.The goal is to understand the ecological factors influencing the variation in these complex chemical compositions.The study investigates potential pharmacological applications of identified compounds, contributing insights to natural products and medicine.Key findings reveal unique chemical markers and variability in bioactive constituents among Pituranthos species. These discoveries enrich botanical knowledge and offer opportunities for harnessing the pharmacological potential of Pituranthos plants. The research has implications for ecological conservation, guiding strategies for sustainable harvesting and cultivation. In conclusion, the study emphasizes the significance of Pituranthos in both ecological and pharmacological contexts. The findings provide a foundation for future research and applications in scientific and industrial domains.
Keywords: Pituranthos, essential oil, pharmacological, ecological.

BIOCHEMICAL VARIABILITY IN APPLES (*MALUS DOMESTICA* L.): JOINT IMPACT OF ROOTSTOCK AND VARIETY IN APPLE CULTURES

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ABSTRACT

The use of different rootstocks in apple cultivation significantly influences the biochemical characterization of fruits. Rootstocks act as key partners in root symbiosis and can modulate various biochemical aspects of apple trees. Primary observations include variations in levels of bioactive compounds such as polyphenols, flavonoids, and total sugars.

The study of the joint effect of the rootstock and variety on the biochemical characterization of apple trees has provided significant insights. The results show marked differences in concentrations of polyphenols, flavonoids, and total sugars between the JC and PIK varieties, as well as among various rootstocks (PJ1, M111, PI80, M7, M9).

The JC variety associated with the PI80 rootstock stands out with high levels of polyphenols, flavonoids, and total sugars, suggesting a favorable combination for nutritional and gustatory properties. Similarly, the PIK variety with the PI80 rootstock exhibits high concentrations, highlighting the significant influence of this rootstock on biochemical characterization.

On the other hand, PJ1 and M9 rootstocks show relatively lower concentrations for all three biochemical components, suggesting a less favorable influence on these characteristics.

These results underscore the crucial importance of a judicious choice of rootstock and variety to optimize the biochemical composition of apples.

Keywords: *Malus domestica* L., cultivar, biochemical traits, rootstock**.**

ANALYSIS OF MATERNAL MORTERLITY CASES IN WUKARI

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ABSTRACT
Maternal mortality in Nigeria has been one of the major subjects of peculiar interest to public health workers and the government. This concern is as a result of the alarming rate at which women who are pregnant or a few weeks after childbirth die due to one reason or another such as complications resulting from poor medical facilities and personnel etc. The aim of this study is to use statistical tools to analyze the maternal mortality ratio. Data were sourced from General Hospital Wukari spanning a period of 14 years. The methods of finding the maternal mortality rate were used to estimate the Maternal Mortality Rate and Ratio, to describe the trend, and to make the forecast, the method of time series analysis was used. 12,459 cases involving maternity were observed from the records. The results obtained from the analysis showed the estimated MM Ratio to be 0.005 (that is 500) maternal deaths for every 100000 maternal-related cases. Also, the MM Rate was found to be 0.009 (that is 900) maternal deaths for every 100000 maternal births in the population. Also from the forecast, it was found that the trend for maternal mortality is decreasing as found in the trend.
Keywords: Maternal mortality rate, Pregnant; Number of live births; Women of reproductive age; Smoothing parameters

THE URBAN TRANSPORTATION IN ALGERIA: CURRENT SITUATION AND PROSPECTS FOR SUSTAINABLE URBAN DEVELOPMENT, CASE OF ALGIERA

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ABSTRACT

Algerian cities, particularly major urban centers, are currently experiencing unprecedented urbanization marked by sprawling expansion in all directions. Furthermore, the urban planning strategies implemented initially overlooked the transportation dimension in the equation of land use and transport. In summary, the urban sprawl of cities, combined with the evolution of household motorization, has significantly contributed to the degradation of the urban environment and the quality of life for citizens. In response to the increase in automobile use and the associated nuisances, authorities have been working on developing a new policy that advocates for both a reduction in the use of automobiles and their adverse effects, an improvement in mobility conditions, and the sustainable urban development of cities. This communication first provides a general overview of the current state of urbanization and transportation in Algerian cities. In the second part, it discusses the strategy of urban transportation in addressing the challenges of sustainable development in the city of Algiers.

Keywords: Urbanization, Transportation, Sustainable development, Urban Sprawl, Algerian cities

SURFACTANT-STABILIZED OIL-IN-WATER NANOEMULSION: STABILITY INSIGHTS AND IMPLICATIONS

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ABSTRACT

Nano emulsions, particularly those stabilized by surfactants, represent a promising class of colloidal systems with diverse applications. This abstract focuses on surfactant-stabilized oil-in-water Nano emulsions, shedding light on the critical aspect of stability. The stability of such Nano emulsions plays a pivotal role in determining their applicability in various fields, including pharmaceuticals, food, and cosmetics. Surfactants play a crucial role in stabilizing oil-in-water Nano emulsions by reducing interfacial tension and preventing droplet coalescence. This abstract delves into the key factors influencing the stability of these Nano emulsions, such as the type and concentration of surfactants, the nature of the oil phase, and external environmental conditions. The intricate balance between surfactant concentration and type is explored, considering the dynamic interplay that influences the formation and maintenance of Nano emulsion stability. Moreover, the impact of external factors, including temperature, pH, and storage conditions, on the long-term stability of surfactant-stabilized Nano emulsions is discussed. Insights into the mechanisms governing destabilization phenomena, such as Ostwald ripening, coalescence, and creaming, are provided to enhance understanding. Strategies to mitigate instability challenges, including the incorporation of co-surfactants, antioxidants, and advanced formulation techniques, are highlighted to improve the shelf life and performance of these Nano emulsions.

Key word: Nano emulsion, Surfactants, oil in water

ANTI-REGENERATIVE POTENTIAL OF *LAURUS NOBILIS* AGAINST ARSENIC-INDUCED ACUTE LIVER TOXICITY IN WISTAR RATS

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ABSTRACT

Liver is the largest metabolic gland of the body and responsible for multiple functions. Liver cells are affected by toxins, virus and drugs and it can cause liver injury. Liver regenerates quickly after facing any tissue insult due to chemical or mechanical injury. The adverse side effects of all the chemotherapies has serious health issue and divert the attention towards new drug regimen with least side effect and improve quality of life. Herbal plants possess anti-regenerative properties and need to be explored. Current study was designed to elucidate the possible anti-regenerative potential of *Laurus nobilis* against arsenic induced acute liver toxicity in Wistar rats. For the experimental trial a total of 24 albino Wistar rats was divided into four groups and 6 rats in each group. Group G1 was negative control group. G2 was positive control group, G3 was standard treatment group (methotrexate 7.5mg/kg body weight) and G4 was treatment (*Laurus nobilis* extract 400mg/kg body weight). Arsenic was used to induce liver injury at a dose rate of 5mg/kg body weight intraperitoneal in G2, G3 and G4 group. At the end of experimental trial, blood was collected for complete blood count and serum for liver function enzymes, total oxidative stress (TOS) and total anti-oxidative capacitive (TAC) respectively. Analysis of variance (ANOVA) and Tukey's post hoc test were used to analyze the experimental data statistically. Liver function enzymes and total antioxidant capacity were seen as significantly increased ($P<0.0001$) and TOS level significantly decreased ($P<0.0001$) in herbal group. Complete blood profile tests such as RBC and Hemoglobin was increased significantly ($P<0.0001$) and white blood cell count was decreased significantly ($P<0.0001$) in herbal treatment group. qRT-PCR analysis of inflammatory markers like IGF-1, MKi67, DOUX-1, BAX, BAD, BCL-2 and IL-6 showed significant downregulation ($P=0.0002$) in herbal treatment group. Histopathological analysis confirmed the hepatoprotective effect of *Laurus nobilis*.

Keywords: liver, *Laurus nobilis*, gene analysis

COMPARATIVE STUDY ON PHYTOCHEMICAL SCREENING AND ANTIBACTERIAL ACTIVITY OF TAPINANTHUS LONGIFOLIA AND TAPINANTHUS GLOBIFERUS LEAVES EXTRACTS

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ABSTRACT

The phytochemical screening and antibacterial activity of medicinal plants are associated with the quality and quantity of their bioactive constituents used in the treatment of various ailments, ranging from infectious to non-infectious diseases. The present study aims to investigate the preliminary phytochemical screening and antibacterial activity of the leaf extracts of Tapinanthus globiferus and Tapinanthus longifolia belonging to the family Loranthaceae. In this study, the powdered leaves of Tapinanthus globiferus and Tapinanthus longifolia were subjected to maceration (extraction) using ethyl acetate. The phytochemical screening was carried out on the crude extract using a standard procedure. The disk diffusion method was adopted as a local antibacterial testing method and both the crude plant extracts exhibited antibacterial activity at concentrations ranging from 250mg/ml, 125mg/ml, 62.5mg/ml, and 31.25mg/ml. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) were determined through a process of broth microdilution. The phytochemical screening of both Tapinanthus globiferus and Tapinanthus longifolia leaf extracts revealed the presence of alkaloids, flavonoids, terpenoids, tannins, steroids, cardiac glycosides, saponins, and phenolic compounds. The antibacterial activity was assessed for both ethyl acetate leaf extracts, which showed inhibitory activity against both gram-positive bacteria (Staphylococcus aureus) and gram-negative bacteria (Pseudomonas aeruginosa) as indicated by a clear zone of inhibition ranging from (7-13mm) in diameter. The results confirm that the MIC and MBC of the ethyl acetate extracts of T. longifolia and T. globiferus leaves were found to be effective at a concentration of 31.25 mg/ml. The results indicate that the leaf extract of T. globiferus exhibited higher antibacterial activity against S. aureus and P. aeruginosa compared to the leaf extract of T. longifolia. The results of the antibacterial activity show that both plant extracts have some level of antibacterial activity, but the extract of T. globiferus has greater efficacy and can be a promising source of naturally occurring antibiotics.

Key Words : Tapinanthus longifolia, Tapinantus globiferus, Leaves Extracts, Phytochemical screening, Antibacteria activity, MIC and MBC.

ASSESSMENT OF INDOOR MICROFLORA OF CARS

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ABSTRACT

Cars serve as a ubiquitous mode of transportation, providing convenience and comfort for countless individuals worldwide. Notably, air-conditioned cars create sealed environments, minimizing external air exchange when doors are closed. During journeys in these vehicles, passengers are exposed to a distinct microenvironment, one that may house various microorganisms with associated health risks. This Study aims to Investigate and analyze the indoor microflora, within cars used for transportation. We conducted research on 50 air-conditioned vehicles used for transportation in Chennai, Tamil Nadu, India. Data was collected using a structured questionnaire distributed to participants, and sampling was conducted using two distinct methods. Swab sampling was performed on the air-conditioning vents of the cars, revealing the presence of microorganisms, including bacteria and fungi. Additionally, petri dish scrubbing was employed to assess the microbial composition within the upholsteries of the cars, with a particular focus on fungi. These samples were transported to the laboratory for further analysis. Our findings highlight the diversity of microorganisms in car interiors, with *Bacillus subtilis* as the dominant bacterial species and *Aspergillus niger* prevailing among fungi. The interconnected presence of these microorganisms in various car components, including air vents and seats, suggests potential routes of exposure for passengers. To mitigate health risks, adherence to recommended limits for indoor microbial concentrations is essential. Our study aligns with established guidelines for maintaining a healthy indoor environment, emphasizing the need for measures like improved ventilation and UV radiation treatment to ensure a safer and healthier commuting experience.

Keywords: Indoor Microflora, Passenger Exposure, Bacteria, Fungi, *Aspergillus niger*, *Bacillus subtilis*, Health Implications.

ENERGY EFFECT OF CALOTROPIS *PROCERA* PLANTS AGAINST ENERGY OF MERCURY CHLORIDE (HgCl 2)

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ABSTRACT

The present research aims to study the protective effect of the plante Calotropis procera on the toxicity of mercury chlorid. The active molecules of the plant Calotropis procera possess a mechanism for detoxifying chloride of mercury from the organs. The Calotropis procera plant could be a promising plant against the toxic effects of chloride of mercury. The goal is to clarify first the toxicity energy of hepatic, renal and cerebral mercury chloride and second to study the protective properties of the energy of plant Calotropis procera. The first part consists in studying the toxicological effects of chloride of mercury on the biochemical parameters of the blood and at the tissue level. The second part tests the effects of the Calotropis plant on male and female rats poisoned by mercury chloride by analyzing the biochemical parameters of the blood and following the action of the plant on kidney, liver and brain tissue. The results of the hormonal study showed that Calotropis procera in male rats restored ACTH levels and also decreased fatty liver disease. The high energy of fatty acids is responsible to liver disease. The calotropis procera act indirectly on hormone ACTH and decrease the energy by the stabilisation of level of ACTH and diminution of toxic fatty acid generate by mercury chlorid. The results ofthe histology of the kidneys of male and female rats demonstrated that the action of Calotropis procera reversed the toxicity by a new mechanism which escapes to the chloride of mercury by changing the structure of the glomeruli in shape that resembles that of the thyroid gland. This mecanisme involves that the molecules of calotropis procera have an energy greater than that of the energy of mercury chloride. This energy made it possible to destabilize the metal of the thyroid plane towards the outside of the body. The results of the histological study of brain tissue from female rats treated with mercury chloride showed images of nuclear pycnosis. Mercury chloride directly affects the nuclei and nucleoli of nerve cells and causes their narrowing. The plant Calotropis procéra protected the nuclei against the action of mercury. In the brain, the calotropis procera plant has regenerated the tissues. The method of brain tissue regeneration by the calotropis procera plant involves a new process. The aims of the present communication is to demonstrate a new mecanism of algerian plants calotropis procera to decrease the energy of toxicity of mercury chlorid. This mecanisme can open up new perspectives in the treatment of cancer diseases which involve high energy

Key worlds : Energy of Algerian plants, energy of soil of sahara, Mineralogy energy Sahra, Fatty acids energy, mercury chlorids toxicity energy regeneration energy brain.

THE PROMISE OF NANOTECHNOLOGY IN CANCER PREVENTION, DETECTION, AND TREATMENT

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ABSTRACT

Cancer is still one of the top causes of death and morbidity in the human population, and it may strike at any time of life. Here, we provide a brief overview of the many forms of nanotechnology that have had significant impacts on the fields of medicine and cancer research and treatment. Scientists have renewed optimism for discovering a cure for cancer thanks to the development of drug delivery systems based on nanoparticles such as liposomes, magnetic nanoparticles, noble metal nanoparticles, polymeric nanoparticles, up conversion nanoparticles, quantum dots, and carbon nanomaterials. Using a novel concept called customized medicine, which has the potential to deliver an effective cure for nearly every form of malignancy, this strategy provides a fresh viewpoint on cancer research, diagnosis, and therapy.

Keywords: Nanotechnology, Cancer, Oncogenes, Nano treatment, Anemia

MACHINE LEARNING FOR EARLY GLAUCOMA DETECTION: A COMPARATIVE ANALYSIS OF PREDICTIVE MODELS

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ABSTRACT

Glaucoma, a leading cause of irreversible blindness, is often asymptomatic in its early stages, making early detection and intervention critical for preserving vision. This study investigates the efficacy of machine learning-based approaches for the early detection of glaucoma, focusing on a comparative analysis of predictive models.

The primary objective of this research is to assess the performance of various machine learning algorithms in identifying individuals at risk of developing glaucoma before the onset of clinical symptoms. Leveraging retinal imaging data, including optical coherence tomography (OCT) scans and fundus photographs, we explore a diverse set of predictive models, encompassing deep learning, ensemble methods, and traditional classifiers.

Through a comprehensive evaluation using a large dataset of both glaucoma and non-glaucoma subjects, we compare the sensitivity, specificity, and overall accuracy of these predictive models. Additionally, we assess their ability to provide interpretable insights into the key features contributing to glaucoma risk.

The findings of this study provide a variation understanding of the strengths and limitations of different machine learning approaches for early glaucoma detection. It offers insights into the potential integration of these models into clinical practice for proactive screening and timely intervention. By facilitating early diagnosis, this research contributes to the ongoing efforts to reduce the global burden of glaucoma-related blindness and underscores the role of machine learning in preventive healthcare.

Keywords: Glaucoma, Machine Learning, Blindness.

IMPROVEMENT OF THE SONO-PHOTO-FENTON SYSTEM FOR THE REMEDIATION OF LANDFILL LEACHATE FROM THE CITY OF FEZ, MOROCCO: OPTIMIZATION OF PROCESS PARAMETERS USING RESPONSE SURFACE METHODOLOGY (RSM)

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ABSTRACT

A novel Advanced Oxidation Process (AOP) known as the ultrasound-photo-Fenton process (US-P-FP) was employed to address stabilized landfill leachate originating from Fez City, Morocco. This study delves into the efficacy of US-P-FP in treating landfill leachate, focusing on the removal of COD, UV254, and color. Optimization of operational parameters such as Fe2+ dosage, pH, H2O2 dosage, ultrasonic (US), and UV-A was accomplished through a two-level factorial design. Results indicate that, under optimal conditions ([Fe2+] = 446 mg/L, [H2O2] = 250 mg/L, pH = 3, with concurrent US and UV-A irradiations), the US-P-FP process achieved a remarkable removal efficiency of 93%, 77%, and 98% for COD, UV254, and color, respectively.

To assess the phytotoxicity of untreated and sono-photo-Fenton treated leachate samples, seed germination and root elongation tests were conducted using Medicago sativa seeds as bioindicators. The experimental outcomes demonstrated a substantial reduction in phytotoxicity through the ultrasound-photo-Fenton process. In conclusion, the sono-photo-Fenton process emerges as a practical and effective method for the treatment of landfill leachate, showcasing notable removal efficiencies and a significant decrease in phytotoxicity.

Keywords: Landfill leachate ; Sono-photo-Fenton ; Color and COD removal ; Advanced oxidation process ; Phytotoxicity test.

3-D MAGNETOHYDRODYNAMIC AA7072-AA7075/METHANOL HYBRID NANOFLUID FLOW ABOVE AN UNEVEN THICKNESS SURFACE WITH SLIP EFFECT

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ABSTRACT

In this paper, we studied impact of uneven heat source/sink on 2-D MHD flow of AA7075/Fe3O4-Methanol nanoliquid over a horizontally moving needle. The impact of volume fraction of nanoparticles, Lorentz force and irregular heat sink/source are also contemplated. We pondered aluminum alloy of AA7075 and Iron oxide Fe3O4 in methanol liquid. The aluminum alloys amalgamated in this study are uniquely manufactured materials, possessing enhanced heat transfer features, AA7075 is a mixture of Aluminum, Zinc, Magnesium and Copper in the ratio of ~90, ~6, ~3 and ~1 respectively with added metals Silicon ferrous and Magnesium. Numerical solutions are attained using Runge Kutta and Newton's scheme. Role of physical factors on the flow phenomenon are analyzed and reflected by plots and numerical interpretations. Results ascertain that, heat transfer rate in second solution is considerably large as matched by first solution. And also, the wall thickness parameter has a tendency to improve Nusselt number of both the solutions.

Keywords: Alloy nanoparticles, magnetic field, slendering sheet, variable thickness and slip effects.

BİTKİSEL BAZLI GIDA KATKI MADDELERİNİN GIDALARDA KULLANIMI

USE OF PLANT-BASED FOOD ADDİTİVES İN FOODS

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ÖZET

Artan küresel nüfusun gıda taleplerini karşılamak için uygun fiyatlı, bol miktarda, besin açısından dengeli ve sürdürülebilir gıda kaynaklarına olan ihtiyaç giderek artmaktadır. Gıda katkı maddelerinin kullanılması mevcut koşullarda yaygın ve neredeyse zorunludur ancak tüketici bilinç düzeyinin giderek artması, organik gıdaya duyulan artan ilgi, sağlıklı beslenme yaklaşımları endüstüriyel anlamda doğal gıda katkı maddelerinin kullanım alanını artırmıştır. Bunu yanı sıra hayvansal protein üretiminin olumsuz çevresel etkileri, artan vejetaryenlik ve veganizm eğilimleri ve gıdada kullanılabilir böceklerin tüketiciler tarafından yeterince kabul görmemesi, hayvansal üretimin pahalı ve emek yoğun olması bitkisel protein ve protein katkılarına olan yönelimi artmaktadır. Bitkilerden elde edilen doğal gıda katkı maddelerinin gıda endüstrisinde kullanılması sürdürülebilir gıda üretimi ve tüketimi için büyük bir katkı sağlamaktadır. Sentetik gıda katkı maddeleri ile karşılaştırıldığında bitki bazlı gıda katkı maddeleri; doğal, sağlık, çevre koruma, güvenilirlik ve atıkların değerlendirilmesi gibi avantajları nedeniyle büyük ilgi görmektedir. Bu alternatif katkı maddelerinin kullanımının ana nedenleri sürdürülebilirliğin yanı sıra vejetaryen veya vegan beslenmenin yaygınlaşması ve laktoz intoleransı veya hayvansa proteini alerjisi gibi sağlık sağlık sorunları olan bireylere alternatif çözümler sunabilmektir. Tüm bunların yanı sıra bitkisel gıda takviyeleri, yenilebilir kaplama malzemeleri, kabartıcı, renk verici, gıda stabilizatörleri, biyoaktif peptitler (BAP'ler), hidrojeller, yapıştırıcılar gibi yenmeyen işlevler olarak kullanım alanlarına sahiptir. Bitki proteinleri mükemmel tekno-fonksiyonel özellikleri ile (mercimek proteini, bezelye proteini, nohut proteini, bakla proteini ve soya proteini konsantreleri) emülgatör ve stabilizatör olarak işlev görmeye çok uygun adaylardır bunların yanı sıra bu proteinler gıda sanayinde kalınlaştırma, jelleştirme, köpük oluşturma gibi bir çok işlev özelliklerinden dolayı işlenmiş gıdalarda yaygın kullanım alanı bulabilirler.

Anahtar kelimeler: Gıda katkı maddeleri, bitkisel, sürdürülebilir, emülsiyon

ABSTRACT

There is an increasing need for affordable, abundant, nutritionally balanced and sustainable food sources to meet the food demands of a growing global population. The use of food additives is common and almost mandatory under current conditions, but increasing consumer awareness, increasing interest in organic food, and healthy nutrition approaches have increased the use of natural food additives in the industrial sense. In addition, the negative environmental effects of animal protein production, increasing tendencies towards vegetarianism and veganism, the insufficient acceptance of insects that can be used in food by consumers, the fact that animal production is expensive and labor intensive, and the tendency towards plant protein and protein additives is increasing. The use of natural food additives obtained from plants in the food industry makes a great contribution to sustainable food production and consumption. Plant-based food additives compared to synthetic food additives; It attracts great attention due to its advantages such as natural, health, environmental protection, reliability and waste utilization. The main reasons for the use of these alternative additives are sustainability, as well as the spread of vegetarian or vegan nutrition and the ability to offer alternative solutions to individuals with health problems such as lactose intolerance or animal protein allergy. In addition to all these, it has uses as inedible functions such as herbal food supplements, edible coating materials, leavening agent, colorant, food stabilizers, bioactive peptides (BAPs), hydrogels, adhesives. Plant proteins, with their excellent techno-functional properties (lentil protein, pea protein, chickpea protein, broad bean protein and soy protein concentrates), are very suitable candidates to function as emulsifiers and stabilizers, as well as many

other applications in the food industry such as thickening, gelling and foaming. Due to their functional properties, they can be widely used in processed foods.

Keywords: Food additives, herbal, sustainable, emulsion

SOL GEL SYNTHESIS, CHARACTERIZATION, CRYSTAL STRUCTURE, ELECTRONIC PROPERTIES AND MAGNETIC STUDIES OF $Al_{2+x}Bi_xMn_{4-3x}O_7$ ($0.15 \leq x \leq 0.50$) NANOCOMPOSITES

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ABSTRACT

A series of $Al_{2+x}Bi_xMn_{4-3x}O_7$ ($0.15 \leq x \leq 0.50$)) nanocomposites were prepared by Sol-gel techniques. The structure, morphology, optical, thermal electrical behaviors were characterstized as well the magnetic properties also analyzed for obtained nanocomposites. From the powder X-ray diffraction pattern of the $Al_{2+x}Bi_xMn_{4-3x}O_7$ ($0.15 \leq x \leq 0.50$) oxides appearances the single phase monoclinic lattice type with $P2_{1/m}$ space group and Z=2. The average size of the crystallites is formed in nanometer size. The SEM micrograph shows the morphology of the samples in spherical shape. Plane-wave DFT calculation gives overlapping of O 2p orbitals with Mn 3d t_{2g} orbitals or Bi 6p orbitals form O-Mn(Bi-O bonds in octaherdral field and comprises the VB in the range ~ -13.0 and +1.0 eV. CB ranging from +1.0 to +2.0 eV is due to the overlapping of Mn e_g orbitals or Bi 6p orbitals with O 2p orbitals. EDX profile and the quantitative results revealed that, the energy spectrum of the X-rays character emitted from the element of oxygen, manganese, aluminium and bismuth. The DTA/TGA cure shows the thermal stability of materials. Due to dipolar interaction, the samples given broad single line indicate absence of hyperfine line even the nanocomposites contain (I =5/2 for Mn(II) system) by EPR spectra. All the nonocomposites samples produced the hysteresis loops it indicate ferromagnetic environmental of materials.

A STUDY ON THE EFFECT OF TANNIC ACİD AND GALLIC ACİD ON 3D-PRINTED POLYLACTIC ACID SURFACE PROPERTIES AGAINST OF *P. AERUGINOSA* AND *S. AUREUS* ADHESION

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ABSTRACT

In this work, the impact of tannic acid (TA) and gallic acid (GA) on the physicochemical features of PLA surface was examined. TA and GA exhibited a considerable antibacterial impact on both P. aeruginosa (P) and S. aureus (S) strains. Contact angle measurements were used to assess hydrophobicity, surface tension components, electron donor and electron acceptor characteristics of untreated and treated PLA. The untreated PLA surface was qualitatively hydrophilic and quantitatively hydrophobic, and the electron donor property was more relevant than the electron acceptor one. Potentially, the PLA surface improved qualitatively and quantitatively after all treatments by shifting to a hydrophilic character and largely electron-donating except for the MICGA/S treatment. Using the Derjaguin-Landau-Verwey-Overbeek approach, the total free energy of adhesion determined the adherence of P. aeruginosa and S. aureus to the treated and untreated PLA. In fact, except for PLA treatment with MICGA/S, the total free energies of S. aureus and P. aeruginosa adherence to PLA increased following all treatments, demonstrating that adhesion is negative. Besides, According to SEM image analysis, the proportion of adhesion dropped throughout treatments, suggesting that PLA- MICGA/P therapy had the highest anti-adherence effectiveness.[a]

Keywords: Contact angle; Bacterial adhesion; Tannic acid; Gallic acid; PLA; Anti-adhesion.

[a] ***Abbreviations***

$MIC_{TA/P}$: minimum inhibitor concentration of tannic acid versus *P. aeruginosa.*
$MIC_{GA/P}$: minimum inhibitor concentration of gallic acid versus *P. aeruginosa.*
$MIC_{TA/S}$: minimum inhibitor concentration of tannic acid versus *S. aureus.*
$MIC_{GA/S}$: minimum inhibitor concentration of gallic acid versus *S. aureus*

OPTIMIZING THE PRODUCTION OF *BRUCELLA ABORTUS* S-19 BACTERIA IN STEEL BIOREACTOR USING DIFFERENT CULTURE MEDIA

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ABTRACT

Background: Brucellosis is a zoonotic infection causes large economic losses due to abortion in animals and severe chronic infections in humans. Vaccination is of great importance to protect against brucellosis. In this study, we aimed to increase both the vaccine production capacity and the vaccine quality by optimizing the production of *Brucella abortus* S-19 strain by using different culture media in a stainless steel bioreactor.

Materials and Methods: *Brucella abortus* S19 strain was provided by Dollvet Biyoteknoloji A.Ş. The production of *Brucella abortus* S19 strain in steel bioreactors was carried out 3 times in 3 different formulas for culture media. These are respectively: (1) Tryptose, yeast extract, glucose, sodium dihydrogen phosphate (NAH2PO4) and disodium hydrogen phosphate (NA2HPO4), (2) Proteose peptone, yeast extract, glucose, NAH2PO4 and NA2HPO4, (3) Tryptone, yeast extract, glucose, NAH2PO4 and NA2HPO4. The mixing speed was increased in every 12 hours, oxygen level was adjusted to 30% and medium pH was adjusted to 6.8. Viability of cultured bacteria were tested by taking samples at 0, 12, 24, 36 and 48 hours.

Results: The best growth medium for *Brucella abortus* S-19 strain was formula 1., the most suitable mixing speed was 300-420 rpm, and the best incubation time was 48 hours. No negative effects of the vaccine were encountered in the safety test on mice.

Discussion: Large-scale production systems have an important place in meeting the need for vaccines and play a very important role in the efficient use of time in emergency action planning. Studies in biotechnological fields are always subjects that need development and R&D studies are an important need. In our study, important findings were obtained regarding capacity increase in vaccine production for brucellosis.

Key words: *Brucella abortus* S19, vaccine, bioreactor, large-scale.

COMBINATION OF THE EROSION POTENTIAL MODEL (EPM) AND THE UNIVERSAL SOIL LOSS EQUATION (RUSLE) FOR WATER EROSION MAPPING AND IDENTIFICATION OF VULNERABLE AREAS IN THE INAOUENE WATERSHED UPSTREAM OF THE IDRISS 1ST DAM, MOROCCO

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ABSTRACT

Water erosion globally degrades soils. In Morocco, watersheds suffer significant annual soil losses, up to 100 million tons (Heusch, 1970), due to various physical and anthropogenic factors. This erosion is especially pronounced in the Rif mountain range, exceeding other Moroccan regions, with losses between 3,000 and 6,000 tons/km², among the world's highest rates (Ait Fora, 1995).

The Inaouene River basin raises concerns, as it is located in the eastern part of the Saïss watershed, between the Middle Atlas and the Pre-Rif. Covering an area of 3597.13 km², it is characterized by a semi-arid climate, relatively abundant and irregular precipitation (989.68 mm), and sustained anthropogenic pressure. This has repercussions on the overexploitation of natural resources in general, and soils in particular.

The excessive use of agricultural land has weakened them, increasing their susceptibility to erosion. These natural and anthropogenic conditions have led to an intense erosive dynamic, manifested through various phenomena such as gullying and landslides. This erosive dynamic progressively and inevitably impoverishes the soils of the watershed and contributes to the silting of the Idriss 1st dam located downstream of the Inaouene River, underscoring the crucial importance of this study.

The utilization of the Erosion Potential Method "EPM" model and the Universal Soil Loss Equation "RUSLE" to estimate soil losses allows us to grasp the severity of the erosive phenomenon. According to the model used, the average soil losses from water erosion are estimated at 52.91 t/ha/year, with maximum losses reaching around 592.68 t/ha/year per plot. The total annual losses in the Inaouene watershed amount to approximately 2,093,970 t/year. Furthermore, the analysis of these results, conducted with the assistance of Geographic Information System (GIS), has enabled the determination of factors controlling water erosion, ranked in order of importance: slope, precipitation, soil erodibility, and vegetation cover density.

Keywords: Inaouene watershed, Idriss 1st dam, Erosion, EPM, RUSLE.

THE PROMISE OF NANOTECHNOLOGY IN CANCER PREVENTION, DETECTION, AND TREATMENT

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ABSTRACT
Cancer is still one of the top causes of death and morbidity in the human population, and it may strike at any time of life. Here, we provide a brief overview of the many forms of nanotechnology that have had significant impacts on the fields of medicine and cancer research and treatment. Scientists have renewed optimism for discovering a cure for cancer thanks to the development of drug delivery systems based on nanoparticles such as liposomes, magnetic nanoparticles, noble metal nanoparticles, polymeric nanoparticles, up conversion nanoparticles, quantum dots, and carbon nanomaterials. Using a novel concept called customized medicine, which has the potential to deliver an effective cure for nearly every form of malignancy, this strategy provides a fresh viewpoint on cancer research, diagnosis, and therapy.
Keywords: Nanotechnology, Cancer, Oncogenes, Nano treatment, Anemia

INVESTIGATING THE OCCURRENCE OF MICROPLASTICS IN COMPOST PREPARED FROM MIXED MUNICIPAL WASTE; A CASE STUDY

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ABSTRACT

Introduction: Microplastics are small plastic particles smaller than 5 mm in size that have been widely observed in the environment. They are resistant in the environment and can accumulate in various environmental matrices such as water, soil, sediments and air. Microplastics can act as a vector to absorb pollutants such as polycyclic aromatic hydrocarbons, toxins and pesticides, and cause the transfer of these aggregated pollutants to the environment and food chains. Therefore, in the environment, it can have long-term effects on the ecosystem and public health. One of the most important ways of transfering microplastics into the environment is through the destruction and decomposition of plastic materials, therefore it is expected that they will be observed with high diversity and different forms in urban compost, which originated through mechanical processes and under existing stresses. In the present study, the presence and occurrence of microplastics in the compost produced from urban mixed waste in Kermanshah, Iran was investigated.

Material and methods: In this study, samples were first taken randomly from the produced compost packages. The collected samples were divided into 10 categories and tested. In this study, the visual method with stereomicroscope, determination of the type of polymers by the Fourier transform method (FTIR) and SEM was used to investigate the surface morphology of microplastics. H2O2 30% was used to digest organic waste materials and NaCl was used to float microplastics based on density.

Results and discussion: The results showed that there are microplastics in high amounts and an average of more than 2000 pieces per kilogram of municipal compost. This is while the minimum amount of microplastics determined was 1000 and in some samples up to more than 4000 pieces per kilogram. Although high amounts of microplastics were observed in all the investigated sizes, however, particles with a diameter of less than 2500 microns were the most abundant. Foam, film, Fragment and fiber were detected and the highest frequency was related to fiber particles. Microplastics with bright and transparent colors, yellow, amber and blue, respectively, have a higher share than other colors.

Conclusion: Therefore, it can be concluded that in addition to other considering factors in urban compost, such as heavy metals, glass and other unwanted pollutants, it is important to pay attention to the abundance of microplastics and the possibility of transferring dangerous toxins and pollutants.

Keywords: Microplastic, municipal compost, vector, municipal mixed waste

PREDICTIVE MODELING OF POROSITY-INDUCED MECHANISMS AND STRUCTURAL DAMAGE IN ADVANCED HIGH-STRENGTH STEEL: AN IN-DEPTH ANALYSIS

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ABSTRACT

Metallic structures, crucial for various industrial applications, face challenges related to significant deformation and damage caused by the evolution of preexisting voids. The ABAQUS-Explicit computer code employs the Gurson-Tvergaard-Needleman (GTN) model within the porous failure criteria law to simulate damage in structures experiencing large plastic deformation.

Numerical predictions using the GTN model are highly sensitive to the calibration of parameters against experimental results, emphasizing the need for accurate parameterization. This model intricately captures the evolution mechanism of voids, from their initiation and growth to nucleation with particles, culminating in the coalescence of voids at a critical level, resulting in structural damage. The study employs Voce's hardening model and von Mises' equivalent stress flow theory, validated against experimental results. The primary objective is to analyze the sensitivity of GTN parameters to damage response and void evolution, focusing on a notched plate.

The research underscores the significance of understanding the complex interplay between evolving voids and material behavior, emphasizing the versatility and applicability of the GTN model in predicting ductile damage in various engineering scenarios.

Keywords: GTN Model (Gurson-Tvergaard-Needleman Model), VVF (Void Volume Fraction), Ductile Fracture, Voce's Hardening Model, Notched Plate, Porous Failure Criteria

ADVANCING FINITE ELEMENT MODELING OF FUNCTIONALLY GRADED MATERIALS: INTRODUCING UMM FOR ENHANCED MECHANICAL BEHAVIOR ANALYSIS AND DAMAGE PREDICTION

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ABSTRACT

Functionally graded materials (FGMs) have become integral in diverse industries, yet analyzing their mechanical behavior using finite element methods often demands specialized Fortran subroutines due to the unique characteristics of FGM constituents. This study introduces UMM (Uniform Mesh Modeling), a MATLAB-based program designed to seamlessly integrate FGM behavior at the element level within a 3D mesh model, accommodating various constituents and geometric designs. Recognizing the critical impact of mesh quality on result accuracy and convergence, an adaptive meshing strategy is implemented.

Our model, rooted in Von Mises stress flow theory with incremental hardening, incorporates the Tamura-Tomota-Ozawa (TTO) model for elastic-plastic FGM behavior. Parameters are derived from stress-strain tests on ceramic (TiB; Titanium mono boride) and metal (Ti; Titanium) constituents.

A comparative analysis between UMM and the traditional UMAT method, as evidenced by load-displacement curves, underscores the advantages of UMM. Further enhancing damage analysis, the extended finite element method (XFEM) proves instrumental, particularly in delineating precise structural separation post-crack initiation. The study delves into the influence of FGM material graduation on crack propagation, providing valuable insights into the nuanced behavior of FGM structures.

Keywords: Damage Analysis, Crack Initiation, Functionally Graded Materials (FGMs), Finite Element Methods (FEM), Uniform Mesh Modeling (UMM), Tamura-Tomota-Ozawa (TTO) Model

MODELLING THE PLASTIC VISCOSITY OF WATER BASED MUDS USING ARTIFICIAL NEURAL NETWORK

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ABSTRACT
Mud rheological properties are crucial in ensuring that cuttings transport out of a well is efficient. However, temperature downhole usually affect these rheological properties and impede the mud performance. Thus, it is essential that the mud rheology be monitored often while drilling to manage any persistent changes. In the laboratory, mud rheology is measured using a rotational viscometer but this method takes time. In the field, mud viscosity is measured using a Marsh funnel, which only shows trends and not actual viscosity. Hence, drillers find it difficult knowing in real time the muds' viscosity at any time in the wellbore, therefore, the existing models in the literature do not account for the impact of the wellbore's downhole temperature on the mud's viscosity. The objective of this study was to create an artificial neural network (ANN) model that could forecast the plastic viscosity of water-based muds using laboratory results of marsh funnel viscosity, mud density, and mud temperature. The data obtained for the research was originated from fieldwork and research experiments. The muds density, marsh funnel viscosity, and mud temperature serve as the ANN model's input variables. Mean squared error (MSE), root mean square error (RMSE), and coefficient correlation were used as the three performance indicators for the model's evaluation (R). The developed Plastic viscosity functioned adequately, with an MSE of 5.1x10-6, R of 0.992, and RMSE of 0.0022 x10-5. The developed model was cross-validated using field data that was not included in the training phase in order to predict the outcomes across new input datasets. The PV ANN model was discovered to have an MSE value of 0.0063, RMSE of 0.079, and R of 0.983. The created model can be highly helpful for mud rheology monitoring and drilling operation optimization.
Key words: Artificial neural network, water- based muds, temperature downhole

CHARACTERIZING THE THERMAL QUANTUM CORRELATIONS IN A TWO-SPIN XXX HEISENBERG MODEL IN THE CONTEXT OF HEITLER-LONDON APPROACH

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ABSTRACT

A system of a two-spin-1/2 XXX Heisenberg model subjected to the external nonuniform magnetic field B is considered at thermal equilibrium. To talk into account the effects of the inter-spins relative coupling distance r on the thermal quantum correlations, the exchange spin constant is considered as that of Heitler-London $J(r)=\left(\frac{5}{4}-\frac{4}{15}\right)[0.5772+\ln(r)]r^3e^{-2r}+O(r^2e^{-2r})$.

The behaviors of the thermal entanglement and the geometric discord based on Schatten-1 norm in terms of the magnetic field B, the temperature T and the relative distance r are examined.

Keywords: Thermal quantum correlations; Heitler-London approach; entanglement, geometric discord.

FLOW GENERATED BY SLOW STEADY ROTATION OF A SPHERE IN A THERMO-VISCOUS FLUID BOUNDED BY A POROUS MEDIUM

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ABSTRACT

The slow steady rotation of a sphere about one of its diameters with an angular velocity (Ω) in an incompressible thermo-viscous fluid bounded by a porous medium is examined in this paper. The flow generated around the sphere is considered. The velocity flow field is obtained in terms of modified Bessel functions . The equation of conservation of energy is solved analytically. The flow pattern for the outer region of the sphere is shown in the form of graphs using MATLAB Code. The heat transfer coefficient, drag force and the viscous couple on the sphere are calculated. The effect of physical parameters on the flow field are shown in the form of graphs and discussed.

Keywords : Thermo-viscous fluid, Steady rotation, Heat transfer coefficient, Couple stress

TEMPERATURE EFFECTS ON THE CORROSION INHIBITION OF MILD STEEL IN CRUDE OIL MEDIUM BY METHANOLIC EXTRACT OF PERSEA AMERICANA (AVOCADO TREE)

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ABSTRACT
Weight-loss method was used in assessing the response to corrosion of samples of mild steel inserted in a mixture of avocado seed, leave, root and bark extract in crude oil medium under various high temperature of 303, 313, 323, and 333 kelvin. The results revealed that the inhibition efficiency of extracts of avocado tree increased with the inhibitor concentration. The highest inhibiting efficiency reached 96% at 333 K at inhibitor concentration of 1000 PPM. The microscopy as well as elemental composition of the mild steel coupons were analyzed to gain more insights on the effect of temperature and inhibitor on the coupons. From analysis, Scanning Electron Microscopy, SEM showed highest corrosion inhibition in the root extract with minimal pitting seen on the surface of the coupon. X-ray Fluorescence, XRF exposed the elemental composition of the root extract showing that the high amounts of magnesium, aluminium, silicon and sulphur was responsible for the high inhibitive efficiency displayed by the root extract with respect to its other counterparts, the leave, seed and bark extracts. In conclusion it was observed that in terms of inhibition effectiveness, the avocado root extract had the highest value followed by the seed extract and the leave extract with the bark extract having the least inhibition effectiveness upon examination in high temperature environment.
Key words: Corrosion; weight-loss method; inhibition; mild steel; pitting; microscopy; adsorption

EXTRACTION OF CRYSTALLINE CELLULOSIC FIBERS FROM SOFT RUSH USING ALKALI-PERBORATE PRETREATMENT

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ABSTRACT

Considering their recyclability, availability, and low cost, using lignocellulosic fibers as an alternative cellulosic feedstock is an intriguing option in contemporary applications like biopolymers and biomaterials that have lately attracted attention. The goal of the current research is to develop an efficient technique for isolating natural cellulosic fiber from the Soft Rush (SR) plant. The process is based on a series of alkalization and bleaching procedures, followed by an evaluation of the material's morphology. SR is a widely grown perennial herbaceous plant that is most suited to damp environments and is prized for its sedative and anti-tumor properties, but most significantly, its high cellulose content. In light of this, the primary goal of our work is to create the ideal environment for accessing the (SR) cellulose-rich microfibre from the cementing matrix, which primarily consists of lignin and hemicellulose. therefore, sodium hydroxide 8% was employed in an alkalization procedure, which was followed by a bleaching procedure using sodium perborate. Scanner electron microscopy (SEM), Fourier transform infrared (FTIR), and X-ray diffraction (XRD) were used to establish the relationship between the type of treatment and the fiber's surface structure as well as the network density. To confirm the type of fiber that was recovered from the (SR) stem, the chemical composition was also examined. Based on the output data, the bleaching treatment yields a positive result due to effective delignification and enhanced fiber density.

Keywords: Lignocellulosic fibers; Cellulose; Soft rush; Isolation; Characterization.

INTRODUCTION OF GRAPHENE OXIDE NANOSHEETS AND SILVER NANOPARTICLES ON POLYESTER FABRIC FOR THE DIP-CATALYTIC HYDROGENATION OF 4-NITROPHENOL

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ABSTRACT
Acquiring a synergic unites between the fulfillment of homogenous catalysts and the reutilization of heterogeneous catalysts continues to be a source of concern. The major dispute is to provide an accomplished, low-cost and heterogeneous catalyst with excellent recyclability, effortless recovery, simplicity of retrieval and monitoring between reaction cycles. Despite extensive efforts in the creation of silver nanoparticles–based catalysts for the reaction of 4-nitrophenol hydrogenation, the aforementioned conditions are seldom found in a selected system. Herein, we offer a new heterogeneous catalyst based on polyester (PE) as inert support/substrate/matrix, and reduced graphene oxide/Ag nanoparticles (rGO/Ag0) as active catalyst, which was elaborated using an insitu deposition technique. PE matrix has been covered by sonication coating with graphene oxide (GO) nanosheets followed by insitu deposition and reduction of Ag+ to Ag0 yielding PE-rGO/Ag0 which was applied as an efficacious and reusable "dip catalyst'' for the 4-NP reduction in the presence of NaBH4 as model reaction. The surface of 6 cm2 (3x2 cm) of PE-rGO/Ag0 exhibited the best catalytic activity, giving an apparent velocity constant (Kapp) equal to 0.65 min-1. Furthermore, Remarkable stability at recycling has been achieved up to 10 reaction cycles without significant degradation of catalytic activity, suggesting that this catalyst based on prepared PE support can be a strong candidate for long-lasting chemical catalysis.
Keywords: 4-nitrophenol; hydrogenation; polyester fabric, graphene oxide; silver nanoparticles.

DISSOLUTION MECHANISM OF CELLULOSE IN BENZYLTRIETHYLAMMONIUM/UREA DEEP EUTECTIC SOLVENT (DES): DFT-QUANTUM MODELING, MOLECULAR DYNAMICS AND EXPERIMENTAL INVESTIGATION

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ABSTRACT

In this paper, the Benzyltriethylammonium/urea DES was investigated as a new green eco-friendly medium for the progress of organic chemical reactions, particularly the dissolution and the functionalization of cellulose. In this regard, the viscosity-average molecular weight of cellulose $(\bar{M}_w)$ during the dissolution/regeneration process was investigated. It showed no significant degradation of the polymer chains. Moreover, X-ray diffraction patterns indicated that the cellulose dissolution process in BTEAB/Urea DES decreased the crystallinity index from 87% to 75%, and no effect was induced on type I cellulose polymorphism. However, the drastic impact of the cosolvent (water and DMSO) on the melting point of DES was inspected. Besides, to understand the evolution of cellulose-DES interactions, the formation mechanism of the system was studied in terms of H-bond density and Radial Distribution Function (RDF) using Molecular dynamics modeling. Furthermore, the Density Functional Theory (DFT) was investigated to evaluate the topological characteristics of the polymeric system (Potential Energy Density (PED)), Laplacian Electron Density (LED), energy density, and Kinetic Energy Density (KED)) at Bond Critical Points (BCP) between cellulose and DES. The Quantum Theory of Atoms in Molecules (AIM), Bader's Quantum Theory (BQT), and Reduced Density Gradient (RDG) scatter plots have been exploited to estimate and locate Non-Covalent Interactions (NCI). The results revealed that the dissolution process is attributed to the physical interactions, mainly the strong H-bond interactions.

Keywords: Deep Eutectic Solvent (DES), Cellulose dissolution, Molecular dynamics (MD), Quantum Bader's theory, Benzyltriethylammonium/Urea, Density Functional Theory (DFT).

CONTRIBUTION TO THE ASSESSMENT OF FLOOD CONTROL MEASURES IN AN ANTHROPIZED VALLEY. THE CASE OF THE OURIKA VALLEY (HIGH ATLAS OF MARRAKECH, MOROCCO)

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ABSTRACT
The Ourika sub-watershed is part of the left bank of the Tensift watershed, characterized by the highest mountainous areas in North Africa. This geographical area is characterized on the one hand by its sharp morphology and a diversified lithology with erosive tendencies: sedimentary rocks, and resistant tendencies: magmatic rocks, and on the other hand by its microclimate which generates a large biodiversity but paradoxically induces phenomena of very violent and brutal storms and rains, which explains well the extent and aggressiveness of the floods which ravage without notice (most deadly floods summer 1995).
The Ourika sub-watershed is made up of some twenty micro-watersheds that differ from one another in terms of lithology, slope and structural organization. To better characterize the basin, we inventoried and evaluated in detail the different types of weirs built in each micro-watershed.
The aim of this work is to assess the state flood protection measures implemented in the Ourika watershed by drawing up maps spatializing each type of weir using Arc Gis and ERDAS software. The aim is to better represent, analyze and interpret the state of the sills, in order to draw conclusions and recommendations, and to present managers with maps showing the ravines to be developed and which present a potential risk to the population.
We have chosen the area between the Meltsen and Sidi Ali Oufarés faults as our study site, which includes several micro-basins developed by the installation of structures. There are 12 micro-catchments of the main tributaries draining this area, according to the degree of risk, four micro-catchments on the right bank from upstream to downstream (Wigrane and Walighane, Tachmacht, and Touggalkhir) and eight micro-catchments on the left bank from upstream to downstream (Imintaddarte, Oussane, Tikhfert, Tighazrit, Igri Foudene, Asni, Taljarft and Tarzaza).
Keywords: Morocco, High Atlas of Marrakech, Ourika sub-basin, Development, Flooding.

EVALUATION OF THE IN VITRO ANTIFUNGAL ACTIVITY OF ESSENTIAL OILS OF ROSMARINUS OFFICINALIS, CITRUS AURANTIUM ET ORIGANUM MAJORANA ON THE MYCELIAL GROWTH OF PHYTOPHTORA PALMIVORA ET ALTERNARIA ALTERNATA

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ABSTRACT
Synthetic chemical fungicides have long been productive in agriculture, but their massive use has led to resistance and pollution of soil, water and humans. The strategy of developing new natural antifungal products to combat phytopathogenic fungi is therefore becoming increasingly important in the field of plant protection. This study evaluates the antifungal activity of *Rosmarinus officinalis*, *Citrus aurantium* and *Origanum majorana* essential oils against *phytophtora palmivora* and *Alternaria alternata*, using the direct contact method to determine the inhibition rate, minimum inhibitory concentration and mycelial growth rate. In vitro testing at doses of 0.25ul/ml, 0.5ul/ml, 1.5ul/ml, 3.33ul/ml, 6.66ul/ml and 12.5ul/ml showed that all essential oils exerted an antifungal effect on *Phytophtora palmivora* and *Alternaria alternata*, but at high concentrations. The inhibition rates of essential oils on the growth of the fungus studied ranged from 0.94% to 100%. The best inhibition was recorded with Origanum majorana essential oil at concentrations of 1.5ul/ml and 3.33ul/ml respectively on Phytophtora palmivora and Alternaria alternata, while the other essences *Rosmarinus officinalis* and *Citrus aurantium* also had fungicidal activity but at the very high concentrations from 6.66ul/ml to 12.5ul/ml.
Keywords: Inhibition, antifungal activity, hydrodistillation, concentration, growth

EXPLORING THE CORROSION INHIBITION ABILITY OF NEW QUINAZOLINE COMPOUND FOR COPPER IN 3.5% NaCl

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ABSTRACT

A new compound derived from quinazoline namely, 1-((4-hydroxynaphthalen-1-yl)methyl)-2-phenyl-2,3-dihydroquinazolin-4(1H)-one, was tested as corrosion inhibitor for copper in 3.5% NaCl by using weight loss study, electrochemical methods, surface analysis, and UV–visible spectrometry. It is seen that the investigated product was a powerful corrosion inhibitor for copper in chloride solution where its inhibition efficiency increased with concentration and exceeded 90% at maximum concentration. In addition, the influence of the temperature solution ranges from 298 K to 328 K, on the performance of the quinazoline derivative indicated that it decreases with temperature solution. The activation and thermodynamic parameters demonstrated that the studied inhibitor act via chemical adsorption on the metallic surface. This finding was confirmed by surface analysis and UV–visible spectrometry with the formation of a thick protective layer on the copper surface and the formation of inhibitor-complex in solution, respectively.

Key words: Corrosion, inhibitor, copper, NaCl, quinazoline.

COMPARISM OF LAND SURFACE TEMPERATURE VARIATION IN DIFFERENT LOCATIONS IN IKOT EKPENE LOCAL GOVERNMENT AREA, AKWA IBOM STATE

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ABSTRACT

This research work focused on the Comparism of Land Surface Temperature Variations in different locations in Ikot Ekpene Local Government Area, Akwa Ibom State. There were six sample locations with Inyang Anwankwo as a reference area. Others were Inyang Anwankwo Bridge, Saint Joseph Major Seminary, Akwapoly Main Gate, Department of Mass Communication, Abiakpo Ntak Inyang Market. The temperature obtained in each of the above mentioned locations are Inyang Anwankwo (34^{o}C), Inyang Anwankwo Bridge (46^{o}C), St Joseph Major Seminary (43^{o}C), Akwapoly Main Gate (42^{o}C), Department of mass communication (48.67^{o}C), Abiakpo Ntak Inyang Market (35.67^{o}C). The distance and time taken in each of the location from the reference point (Inyang Anwankwo) is as follows; Inyang Anwankwo Bridge (1.2km) (15 minutes), St Joseph Major Seminary (2km) (26 minutes), Akwa poly Main Gate (2.2km) (28 minutes), Department of Mass Communication (2.5km) (31 minutes), Abiakpo Ntak Inyang Market (2.6km) (32 minutes). The variation in temperature values obtained depends on the location and the angle of incident of radiation emitted from the sun. The warmest temperatures are pale yellow, while the coldest temperatures are dark blue. Moderate temperatures are depicted in shades of pink and purple. General, land surface temperature differs from air temperature (the temperature given in weather reports) because land heats and cools more quickly than air. It is an important aspect of climate and biology with a major influence on hydrology, meteorology, and climatology. In this research work carried out, plants situated in the areas with highest temperature encounter the challenge of slow rate of growth and yielding of fruits.

Keywords: Temperature, Land, environments and Plants.

COMBINING MOLECULAR DYNAMICS SIMULATIONS (MD) WITH INTEGRAL EQUATION METHODS (IEMS): STRUCTURE OF A MIXED SYSTEM: MICROEMULSIONS (MES) COVERED WITH POLYMERS

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ABSTRACT

This paper aims to describe and model the interactions between highly diluted O/W neutral MEs (Φ = 2.8%), to which a telechelic polymer PEO-2m has been added in large quantities (r=29.6); the polymeric ends are incorporated into the droplets to connect them and form a multi-connected network. Once the gel state is established, controlled amounts of cationic surfactant CpCl with different charge rates τ (0.22%, 0.5%, 0.75%, 1%) are added, the charged polar heads of the CpCl (Cp^+) adsorb to the surface of droplets, introducing a repulsive electrostatic interaction. First, structural properties are discussed in terms of the radial distribution function, g(r), we have combined molecular dynamics simulations (MD) and Ornstein-Zernike integral equations (IEMs), with the hypernetted chain closure relation (HNC) to examine the effect of adding charges on the structure of the mixed system (MEs + PEO-2m). Second, thermodynamic properties (the normal diffusion coefficient, the viscosity) are studied as a function of charge rates τ. Generally, the agreement observed between the numerical spectra and MD simulations is reasonable, indicating the appropriate choice of the adopted potential model.

Keywords- Microemulsions (MEs), , integral equation method (IEM), hypernetted chain (HNC), Dynamics simulations (MD), telechelic polymer PEO-2m, ionic surfactant (CpCl), fluid.

ADSORPTION OF AN ANIONIC MICROPOLLUTANT IN AQUEOUS SOLUTION BY ORGANIC CLAYS: EQUILIBRIUM MODELLING, KINETIC AND THERMODYNAMIC EXPLORATION

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ABSTRACT

An organohalloysite was prepared using a new procedure. Halloysite (H) was pre-intercalated with dimethyl sulfoxide and then mixed with a solution of hexadecyltrimethylammonium (HDTMA) having a concentration equivalent to six times the CEC of the starting Algerian halloysite. The novel nanohybrid obtained (HH6-d) was characterized and compared with a sample intercalated from the beginning by HDTMA (HH6). Intercalation of HDTMA cations in the interlayer space was evidenced by XRD with an expansion of the basal distance from 7.6 to 26.0 A for an intercalation rate of 75% (HH6-d) versus 42% for HH6. All materials were used to remove tetracycline (TC). pH influence, isotherm, thermodynamic data, reusability of the best adsorbent and the mechanism of interaction have been examined. The experimental isotherms were appropriately adjusted by the Redlich-Peterson equation. The best adsorbent adsorbs 210 mg g^{-1}, with an adsorption sequence as follows: HH6-d > HH6 > unmodified clay, i.e. according to the intercalated fraction, so that the HDTMA intercalating agent interacts with the tetracycline molecules. This interaction was entropically driven, endothermic and spontaneous. It would involve not only hydrophobic bond between the tail group of HDTMA represented by the hydrocarbon chain and the hydrophobic moiety of tetracycline represented by the aromatic groups, but also an electrostatic interaction between the negative charge of the carboxylate ion (COO−) and the positive charge of the aluminol groups coating the lumen.

Keywords*:* Organohalloysite, Nanohybrid, HDTMA, tetracycline, Mechanism, Hydrophobic bond.

TRANSFORMATION OF CHITIN INTO CHITOSAN : CARACTERIZATION AND STUDY OF ADSORPTION

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ABSTRACT

The main objective of this work is to synthesize materials based on marine biomass such as shrimp (crustacean) for the elimination of metal ions. As natural biosorbents, these materials are inexpensive and pose no risk to the environment.

The synthesis of chitosan based on the extraction of chitin from shrimp shells by eliminating proteins and mineral salts, followed by the deacetylation of chitin by an alkaline treatment to obtain chitosan. These synthesized materials were characterized by different techniques of FTIR-IR, XRD analysis

This process of biosorption and adsorption was affected by several parameters such as the contact time, the dose, the optimum pH of the solution as well as the effect of temperature. The adsorption isotherms were represented by the Langmuir and Freundlich models, the thermodynamic parameters determined from this study show the spontaneity and the endothermic nature of the adsorption processes.

Keywords: marine biomass, biosorbent, chitosan, chitin, adsorption

ATTAINING SUSTAINABLE COMPETITIVE ADVANTAGES THROUGH PROCUREMENT IN PAKISTAN

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ABSTRACT

The importance of purchasing in supply chain management has grown and continues to grow year after year. Procurement management is frequently at the forefront of contemporary reform initiatives for long-term competitive advantage. This study aims to delve into the critical factors influencing efficiency and competency in Pakistan's procurement sector, with an emphasis on economic considerations and long-term value creation. The study thoroughly reviewed the literature on procurement reform, focusing on its key determinants in the context of Pakistan. The research identifies four major drivers necessary for instilling economy and transparency in procurement management: the use of E-Procurement, the implementation of sustainable procurement practices, the fight against corruption, and the critical selection of best suppliers. The study investigated the potential of these factors in procurement-related activities and identified the primary organizational barriers impeding their widespread adoption in Pakistan. The study concluded by recommending additional research in the specified domain. Data were collected from procurement professionals using a self-structured questionnaire. Several analytical methods, including descriptive statistics and ranking, were used to thoroughly investigate dataset complexities. The data analysis and key findings highlight the significance of digital maturity, balancing the triple bottom line in sustainable procurement and optimizing supplier selection processes. Furthermore, the study emphasizes the importance of maintaining procurement transparency and capitalizing on the synergy between E-procurement and other critical determinants. The findings are expected to be useful for procurement management practitioners in Pakistan, contributing to the efficient use of public funds through improved public procurement processes. The investigation provides valuable insights into the fundamental elements that may influence the effectiveness of public procurement procedures. Certain limitations in the research have been identified, which can be mitigated by using alternative methodologies and mechanism.

Key Words : Electronic Procurement, Technological Immaturity, Sustainable Procurement, Triple Bottom Line, Procurement 4.0.

STABILITY ASSESSMENT FOR A FRACTIONAL MODEL DESCRIBING COCHINEAL TRANSMISSION

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ABSTRACT
Scale insects, notorious for their parasitic nature, pose a considerable threat to a variety of plants, including resilient ones such as cacti and succulents. Despite the perceived toughness of these plants, scale insects, known for their rapid multiplication, can inflict substantial damage. Mealybugs, a specific type of scale insect, aggravate the situation by extracting sap from plants, resulting in dehydration and discoloration.
This research introduces and explores a fractional model to understand the transmission dynamics of Cochineal, a type of scale insect. The primary focus is on proving the positivity and boundedness of solutions to ensure the model's well-posedness. Additionally, we delve into the local stability analysis of both the disease-free equilibrium and the chronic infection equilibrium. To validate our theoretical findings, we present numerical simulations that offer practical insights into the proposed model's dynamics.
Keywords: fractional differential equations; cochineal; Caputo fractional derivative; SIRC epidemic model; local stability; numerical simulations.

PREPARATION OF CAO NANO-CATALYST FROM NATURAL WASTE SHELLS

Obiora Ebuka Muojama

ABSTRACT

Every year a staggering eight million tons of discarded snail, crab and lobster shells contribute to global waste crisis, worsening environmental pollution due to their slow decomposition rate thereby land filling, The solution lies in a transformative approach-A direct conversion into valuable product- CaO Catalyst. Quicklime (CaO) is produced industrially by thermal decomposition of naturally existing calcium carbonates. Natural Shell is a renowned source of high purity quicklime. The shell is accompanied by thin layer(s) of organic egg membrane. This study investigates the role of egg membrane in the calcination of waste chicken eggshells for quicklime production.

This was achieved via comparison of synthesized materials properties with and without membrane. Two samples of dried waste chicken eggshells were prepared with and without removal of membrane layers respectively. Thermogravimetric analysis (TGA) of the shell samples suggested a suitable calcination temperature ≥ 800 oC. The samples were each calcined at 700, 800 900 and 1000 oC, then characterized by SEM, XRD and beef tallow transesterification catalytic test. Calcination at 900 oC gave the best performed catalyst (EG900). Comparison of EG900 (prepared with membrane) and EGnil (without membrane) was made based on SEM, BET, XRF, XRD, particle size analysis and catalytic activity tests. The results showed no significant alteration in elemental and crystalline composition. By recovering catalyst from waste, the dependence on natural resources that are unsustainable will be reduced, likewise the quantity of materials going to land fill. This work introduces circular economic thinking into catalysis and waste and resource management. The use of waste shells as a source of catalyst will not only supply an economic and environmental protection benefits, but also promote waste management strategy and circular economy.

COADSORPTION OF PHARMACEUTICAL POLLUTANTS ON ADSORBENTS PREPARED FROM ORGANIC CLAY

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ABSTRACT

An organohalloysite was prepared using a new procedure. Halloysite (H) was pre-intercalated with dimethyl sulfoxide and then mixed with a solution of hexadecyltrimethylammonium (HDTMA) having a concentration equivalent to six times the CEC of the starting Algerian halloysite. The novel nanohybrid obtained (HH6-d) was characterized and compared with a sample intercalated from the beginning by HDTMA (HH6). Intercalation of HDTMA cations in the interlayer space was evidenced by XRD with an expansion of the basal distance from 7.6 to 26.0 A for an intercalation rate of 75% (HH6-d) versus 42% for HH6. All materials were used to remove diclofenac (DFC) and tetracycline (TC). pH influence, isotherm, thermodynamic data, reusability of the best adsorbent and the mechanism of interaction have been examined. DFC coadsorption capacity by HH6-d evolves as follows: binary-55 > monosolute-55 > binary-40 > binary-25> monosolute-40 > monosolute-25. For TC, it becomes: monosoluté-55 > binaire-55 > monosoluté-40 > binaire-40 > monosoluté-25 > Binaire-25. Moreover, it follows the following sequence: HH6-d > HH6 > H, whatever the nature of the pollutant; otherwise, it is a function of the fraction intercalated, as with single-solute adsorption. The generalized Langmuir model, which takes mutual interactions into account the experimental isotherms. R2 values are high, at > 0.95, while mean relative errors are < 15%. The amount adsorbed by one pollutant (TC or DFC) increases with its equilibrium concentration and decreases as the concentration of the second pollutant increases.
Keywords*:* Organohalloysite, Nanohybrid, HDTMA, diclofenac,tetracycline, Mechanism, Hydrophobic bond.

CHARACTERIZATION OF LACUNARY $\mathcal{I}$-CONVERGENT SEQUENCES IN CREDIBILITY SPACE

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ABSTRACT
This research paper aims to introduce the concept of lacunary ideal Cauchy sequences of fuzzy variables in a credibility space. We establish the interrelationships between this notion with lacunary ideal convergent sequences in the same structure from several aspects of credibility. Also, we investigate the ideas of strongly lacunary Cauchy, strongly $\mathcal{I}$-lacunary Cauchy and strongly $\mathcal{I}$-lacunary Cauchy sequences of fuzzy variables in credibility and look into the relationship among them.

THE RECEIVING AND STUDY OF CARBIDE SIALON NANO COMPOSITE WITH ALUMINA OXIDE NANO POWDER

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ABSTRACT
Resume: Goal- to obtain SIALON containing composites by reactive sintering method in SiC-B4C-Si-Al-Al2O3 system. Using this method of synthesis, it became possible to obtain composites with different percentages of SIALON. Our task was also to study the phase composition in the SiC-B4C-Si-Al-Al2O3 system.
Method. The obtained mass was grounded in an attritor and the consolidated composite was obtained by hot pressing at 18000C. , 40 minutes, delaying at final temperature for 8 min. under 30 MPa pressure. To study the phase composition of the composites, we conducted an X-ray structural analysis on the DRON-3 device, and to study the microstructure, we conducted research on an optical microscope and a raster electron microscope “Nanolab 7” of the company "OPTON”. The values of the electrical parameters of the study composites were calculated on the basis of the obtained "lgp- t" dependence.
Result. In SiC-B4C-Si-Al-Al2O3 system we obtained composites with a matrix composed of: β-SIALON, silicon carbide, corundum and nanoparticles of boron nitride.
Conclusion. The phase composition of the obtained composite provides high physical-technical and performance properties of these composites. Compression strength-2187 MPA, Bending strength-285 MPa, Thermal expansion coefficient a20-700-3.8 10-6 0C.
Key words: composite; electron microscope; phase composition; β-SIALON.

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GRANULATED SLAG FROM EL HADJAR AS AN ADDITIVE IN CONCRETE

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ABSTRACT

Workability is an essential quality of concrete, and should be considered as important as mechanical strength. It can be defined as the ease with which concrete can be filled and reinforced.

Alongside cement and water, additives are factors that influence the workability of concrete and, consequently, its mechanical strength.

The use of additions opens up new possibilities for formulating concrete to suit a variety of conditions, and certain standards have evolved and added conditions to make them partially substitutable for cement. The concrete must remain mechanically resistant and durable.

In addition to these pozzolanic properties and latent hydraulic power, the role of additions is to have the possibility of an activity of physical origin, powders chemically considered as inert, due to the fact that their mineral surfaces promote the germination of hydrated calcium silicate (C-S-H) and portlandite (Ca (OH)2). This effect is entirely distinct from the "filler effect", which refers to the contribution of fine elements to the optimal granularity of the concrete as a whole.

Key Words : Workability , Slag , Concrete, Mechanical Resistant, Cement .

ÇEŞİTLİ BİTKİ KAYNAKLARINDAN BİYOKÖMÜR ÜRETİMİ VE SÜPERKAPASİTÖRDE UYGULAMALARI

PRODUCTION OF BIOCHAR AND APPLICATIONS FOR SUPERCAPACITORS FROM VARIOUS PLANT SOURCES

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ÖZET

Biyokütle, termokimyasal işlemlerle biyoyakıtlara ve biyoürünlere dönüştürülebilir. Biyokömür biyokütlenin termokimyasal dönüşümünün ana ürünlerinden biridir. Biyokömürün verimli kullanımı, biyokütle dönüşüm teknolojilerinin ekonomik uygulanabilirliğini ve çevresel sürdürülebilirliğini geliştirmek için kritik öneme sahiptir. Biyokömürün hem tarımsal hem de çevresel uygulamalarda kullanımı kapsamlı bir şekilde çalışılmaktadır. Bununla beraber, biyokömürlerin enerji depolama malzemeleri ve katalitik uygulamalar için kullanımı da son zamanlarda çalışılan en önemli çalışmalar arasındadır. Bu nedenle, bu çalışmada, süperkapasitörlerde biyokömür kullanımlarında, istenilen özelliklerin hangi koşullar altında biyokömürlerin üretimi ile sağlanacağı ve malzeme karakteristiklerinin nasıl olacağı ile ilişkili son gelişmelerinsunulması amaçlamaktadır. Diğer karbon malzemeleriyle karşılaştırıldığında biyokömür malzemeleri, enerji depolamada verimli, düşük maliyetli, aktif malzemeler olarak özel ilgi çekmektedir. Biyokömürün spesifik yüzey alanı (SSA), gözenek yapısı, yüzey kimyasal modifikasyonu ve iletkenlik gibi özellikleri elektrokimyasal performansını etkileyen en önemli faktörlerdir. Mezogözenekli ve hiyerarşik gözenek yapılı biyokömür örnekleri süperkapasitörlerde yüksek kapsitansa sahip olmakta olup, malzemenin bu yapısı kimyasal ve fiziksel aktivasyonlarla sağlanabilmektedir. Biyokömür mazlemelerinin iletkinliği ise, piroliz esnasında veya piroliz sonrasında biyokömür yapısına çeşitli heteroatomların (S, N gibi) ve metaloksitlerin eklenmesiyle artırlabilmektedir. Gerek heteratom gereksede metal oksitlerin yapıya yüklenme yöntemleri ve piroliz işletim koşulları üretilen biyokömürün fiksel ve kimyasal özelliklerinde ve süperkapasitörlerde kapasitans değerlerinde önemli etkiye sahip olabilmektedir. En yüksek yüzey alanı ve gözeneklik biyokömürün kimyasal- fiziksel aktivasyonun eş anlı kullanıldığı aktivasyon yöntemi ile sağlanmakta olup, yüzey alanı 1500- 2500 m^2/g arasında değişmektedir. Biyokömür iletkenliğinde ise, sülfür ve azot bileşiminin optimum bir değerinde yüksek kapasitans sağlayabilmektedir.

Anahtar Kelimeler: Biyokütle, biyokömür, süperkapasitör

ABSTRACT

Biomass can be converted into biofuels and bioproducts through thermochemical processes, with biochar being one of the most important products of the thermochemical conversion of biomass. The efficient use of biochar is crucial for improving the economic feasibility and environmental sustainability of biomass conversion technologies. The use of biochar in both agriculture and environmental protection has been extensively studied. In addition, the use of biochar as an energy storage material and for catalytic applications has recently become the focus of research. Therefore, this study will present the latest developments related to the production of biochar and the properties of the material, with a focus on its use in supercapacitors. The aim is to investigate the conditions under which the desired properties of biochar can be achieved for supercapacitor applications. Compared to other carbon materials, biochar materials are of particular interest as efficient, cost-effective and active materials for energy storage. Key factors influencing the electrochemical performance of biochar include specific surface area (SSA), pore structure, chemical surface modification and conductivity. Mesoporous and hierarchically porous biochar samples exhibit high capacitance in supercapacitors, and the structure of the material can be achieved by chemical and physical activations. The conductivity of biocarbon materials can be increased by adding various heteroatoms (such as S, N) and metal oxides to the biocarbon structure during or after pyrolysis. The methods of introducing heteroatoms and metal

oxides into the structure and the operating conditions of pyrolysis can significantly affect the physical and chemical properties of the biochar produced and the capacitance values in supercapacitors. The highest surface area and porosity of biochar is achieved by simultaneous chemical and physical activation processes, with a surface area between 1500 and 2500 m^2/g. As far as the conductivity of biochar is concerned, an optimal composition of sulfur and nitrogen can provide a high capacity.

Keywords: Biomass, biochar, supercapacitor

İÇME SUYUNDA TAT VE KOKU OLUŞTURAN MADDELERİN YÖNETİMİ

MANAGEMENT OF SUBSTANCES CREATING TASTE AND ODOR IN DRINKING WATER

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ÖZET

İçme suyu, insan sağlığı açısından kritik bir öneme sahiptir. Ancak, içme suyundaki tat ve koku sorunları, suyun kalitesini etkileyen önemli bir faktördür. İçme suyundaki tat ve koku sorunları, genellikle organik ve inorganik maddelerin varlığına bağlı olabilir. Özellikle tat organik maddelerin varlığı sebebiyle ortaya çıkan ve kullanıcılar tarafından hissedilen bir parametredir. Tat ve koku problemi hem yeraltı suları hem de yüzey sularında görülebilmektedir. Koku ve tat sularda genellikle birlikte bulunur. Bununla birlikte, kokuya neden olmayan, gazlaşmayan bazı maddeler içme suyunda tat hissi oluşturur. İçme suyundaki bu tür maddelerin yönetimi, su kaynaklarının korunması, su arıtma tesislerinin etkin işleyişi ve su temini sürecinin dikkatlice yönetilmesini gerektirir. İçme suyundaki tat ve koku sorunları, etkili bir yönetim ve su kaynaklarının sürdürülebilir korunması ile çözülebilir. Su arıtma tesislerindeki teknolojik yenilikler, çevresel düzenlemeler ve toplumun bilinçlendirilmesi, temiz, sağlıklı ve tat/kokudan arınmış içme suyunun temini için önemlidir. Su kaynaklarının korunması ve su arıtma teknolojilerinin geliştirilmesi, gelecek nesillere sağlıklı içme suyu sağlama amacına hizmet eder. Bu çalışmada, içme sularında tat ve koku oluşturan maddelerin kontrolüne odaklanılmış ve bu sorunların nasıl etkili bir şekilde yönetilebileceğini ele alınmıştır.

Anahtar Kelimeler: İçme suyu, tat, koku, organik madde

ABSTRACT

Drinking water holds critical importance for human health. However, taste and odor issues in drinking water are significant factors that impact the quality of water. The problems of taste and odor in drinking water are generally associated with the presence of both organic and inorganic substances. Particularly, the sensation of taste arises due to the presence of organic substances, and it is a parameter felt by users. The issues of taste and odor can be observed in both underground and surface waters. Odor and taste are often found together in waters. Nevertheless, some substances that do not cause odor and are non-volatile can create a taste sensation in drinking water. The management of such substances in drinking water requires the careful protection of water sources, the effective operation of water treatment plants, and meticulous management of the water supply process. The problems of taste and odor in drinking water can be resolved through effective management and the sustainable protection of water sources. Technological innovations in water treatment facilities, environmental regulations, and community awareness are crucial for providing clean, healthy drinking water free from taste and odor. The protection of water sources and the development of water treatment technologies serve the purpose of providing healthy drinking water to future generations. This study focuses on the control of substances that cause taste and odor in drinking water and discusses how these issues can be effectively managed

Keywords: Drinking water, taste, smell, organic matter

EXACT CONTROLLABILITY OF WAVE EQUATIONS WITH INTERIOR DEGENERACY AND ONE-SIDED BOUNDARY CONTROL

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ABSTRACT
Consider the exact controllability for degenerate wave equation, which degenerates at the interior point, and boundary controls acting at only one of the boundary points. The main results are that, it is possible to control both the position and the velocity at every point of the body and at a certain time T for the wave equation with interior weakly degeneracy. Moreover, it is shown that the exact controllability fails for the wave equation with interior strongly degeneracy. In order to steer the system to a certain state, one needs controls to act on both boundary points for the wave equation with interior strongly degeneracy. The difficulties are addressed by means of spectral analysis.
Key words: Boundary control, degenerate wave equation, exact controllability, interior degeneracy.

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STUDY THE EFFICIENCY OF THE NATUREL LAGOONS FOR TREATED WASTEWATER DURING SEASON PERIOD IN ARID CLIMATE (MOROCCO)

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ABSTRACT

The usage of water resources is at an all-time high in arid and semi-arid countries, including Morocco, due to recent irregular rainfall patterns, frequent droughts, and other environmental factors. Furthermore, the lagoon is easy to operate and maintain compared to other treatment methods. Several studies have shown that the lagoon system effectively decreased the majority of wastewater contamination in the differentes periods of seasons in arid climate (Morocco). The performance efficiency of the lagoon naturel for treating urban domestic wastewater was exanimated in a small urban community for five years under arid climatic conditions. Principal component analysis (PCA) was realized to study the impact of seasons on the water quality at the output of the lagoon by grouping individuals based on the study parameters dataset. Additionally, EC, DO and BOD_5 positively correlated with the autumn and summer seasons (cos>0.75). Indeed, noted that the increase in the BOD_5 concentration at the plant output in summer could be due to the growth of the algal biomass. The NH_4^+ and TP negatively affected by of the two seasons (autumn and summer). These results can be attributed to the high seasonal impacts on the removal of TP and NH4+, which indicates that the processes involved in the removal of these pollutants are likely seasonal.

Keywords: Lagoon system, Efficiency, Domestic wastewater, ACP, Seasonal effects, arid climate

THERMODYNAMIC MODELLING AND EXPERIMENTAL STUDY OF THE MIXED SYSTEM Al-Mg-Cl-H_2O at T=353.15 K

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ABSTRACT
Aluminum is abundant in the Earth's crust in a wide range of rock types. The interactions of aqueous solutions with these rocks and their aluminum-bearing minerals have shaped the geology of the Earth's crust. The primary aluminum and alumina industries include the mining of bauxite, the refining of the ore to extract alumina, and the electrolytic reduction of alumina to produce aluminum. In fact, knowledge of the physico-chemical properties of aluminum in aqueous solution plays an important role in industrial applications such as aluminum production, geothermal energy exploitation, energy storage, water treatment, and environmental processes [1]. Solution electrolytes for use in aluminum batteries are typically composed of a mixture of an ionic liquid and M^+, where M^+ can be an organic cation, a halogen anion, or an organic anion [2]. In this context, thermodynamic properties, in particular solid-liquid equilibrium, are of great interest in understanding physico-chemical phenomena. Magnesium chloride needs to be further utilized to increase its added value, given its excess production capacity worldwide. Thermodynamic properties of the mixed Al-Mg-Cl-H_2O system, such as osmotic coefficient, activity, and solubility, are necessary to understand the equilibrium of the solid-liquid phase. Water activity measurements were carried out for the ternary system in aqueous solutions from dilute to saturation at a temperature of 353.15 K using the hygrometric method [3]. From the experimental results, relevant properties such as activity coefficients, solubility, and excess Gibbs energy were determined by the developed ionic interaction model.
Keywords: Aluminum-Magnesium chloride; water activity, hygrometric method, thermodynamic modeling

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USING A VITREOUS PHASE TO LIMIT THE CORROSION OF ORDINARY STEEL IN ACIDIC MEDIUM: AN ELECTROCHEMICAL STUDY

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ABSTRACT

Corrosion inhibitors, such as inorganic compounds containing heteroatoms like nitrogen, sulfur, phosphorus and oxygen atoms as well as double and triple bonds, are widely used to protect materials against corrosion. The choice of an inhibitor depends on various parameters, such as the medium, pH, temperature and type of material.

In this study, we evaluated the inhibiting effect of a borate glass-based glass phase on the corrosion of ordinary steel in an acid medium (HCl 1M). We used electrochemical methods such as potentiodynamic polarization and electrochemical impedance spectroscopy (EIS) to study corrosion inhibition.

Our results show that the corrosion rate decreases with increasing compound concentration up to 200 ppm, indicating the effectiveness of this compound in limiting corrosion damage with acceptable efficiency.

Keywords: Corrosion, Polarization, Impedance, Glass phase, Steel, HCl.

THEORETICAL AND NUMERICAL STUDY OF THE MAXIMAL OUTPUTSET FOR A CLASS OF DISCRETE-TIME BILINEARS SYSTEMS

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ABSTRACT

Given a discrete-time controlled bilinear systems with initial state x_0 and output function y_i , we investigate the maximal output set $\Theta(\Omega) = \{ x_0 \in R^n / y_i \in \Omega, \forall i \geq 0 \}$ where Ω is a given constraint set and is a subset of R^p. Using some stability hypothesis, we show that $\Theta(\Omega)$ can be determined via a finite number of inequations. Also, we give an algorithmic process to generate the set $\Theta(\Omega)$. To illustrate our theoretical approach, we present some examples and numerical simulations. Moreover, to demonstrate the effectiveness of our approach in real-lifeproblems, we provide an application to the SI epidemic model and the SIR model.

Keywords: Bilinear systems, Discrete-time systems, Asymptotic stability, Output admissible set, constraint set.

THE OBTAINING AND STUDY OF CARBIDE SIALON NANO COMPOSITE WITH ALUMINUM OXIDE NANO POWDER

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ABSTRACT

Resume: Goal - to obtain SIALON containing composites by reactive sintering method in SiC-B_4C-Si-Al-Al_2O_3 system. By Using this method of synthesis, it became possible to obtain composites with different percentages of SIALON. Our task was also to study the phase composition in the SiC-B_4C-Si-Al-Al_2O_3 system.

Method: The obtained mass was grounded in an attritor and the consolidated composite was obtained by hot pressing at 1800^0C, 40 minutes, delaying at final temperature for 8 min. under 30 MPa pressure. To study the phase composition of the composites, we conducted an X-ray structural analysis on the DRON-3 device, and to study the microstructure, we conducted research on an optical microscope and a raster electron microscope “Nanolab 7” of the company "OPTON”. The values of the electrical parameters of the study composites were calculated on the basis of the obtained "lgp- t" dependence.

Result: In SiC-B_4C-Si-Al-Al_2O_3 system, we obtained composites with a matrix composed of: β-SIALON, silicon carbide, corundum and nanoparticles of boron nitride.

Conclusion: The phase composition of the obtained composite provides high physical-technical and performance properties of these composites. Compression strength-2187 MPA, Bending strength-285 MPa, Thermal expansion coefficient $a_{20\text{-}700}$-3.8 $10^{-6\,0}$C.

Key words: composite; electron microscope; phase composition; β-SIALON

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MİKROPLASTİKLERİN OLUŞUMU, DOĞADA YAYILIŞI VE NEDEN OLDUĞU ÇEVRESEL RİSKLER

FORMATION OF MICROPLASTICS, THEIR SPREAD IN NATURE AND THE ENVIRONMENTAL RISKS THEY CAUSE

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ÖZET

Hafif, sağlam ve ucuz olması nedeniyle 1950'li yıllardan itibaren üretilmeye başlayan plastik, günümüzün vazgeçilmez bir ürünü haline gelmiştir. Günümüzde nüfus artış oranından daha yüksek oranda küresel plastik üretimi olduğu bilinmektedir. Son yıllarda küresel plastik reçine üretimi yıllık yaklaşık 300 milyon metrik ton (MMT) civarındadır. Plastiğin sağladığı dikkate değer toplumsal faydalar göz önüne alındığında, bu rakamın gelecekte de artmaya devam edeceği neredeyse kesindir. Nitelikleri nedeniyle plastikler, modern toplumda doğal olarak türetilmiş birçok malzemenin yerini almıştır. Uygulamalar arasında tek kullanımlık yiyecek ve içecek kapları, ısı yalıtımı, ev ve işyeri mobilyaları, elektrikli ve elektronik cihazlar, araç iç mekanları, oyuncaklar, kumaşlar, yüzey kaplamaları ve hatta tıbbi cihazlar yer almaktadır.

Plastiklerin rasgele kullanımı ve yetersiz atık yönetimi sonucu küresel ekosistem için bir endişe kaynağı olmaktadır. Büyük plastik parçaların hava olayları, su akımları ve ultraviyole ışınlar etkisiyle degradasyona uğraması sonucu oluşan 5 mm'den küçük polimerik küçük plastik tanecikler olarak tanımlanan mikroplastiler çevre ve canlı hayatı için makro boyutta tehlikesi olan parçacıklardır. Plastikler (ve dolayısıyla mikroplastikler) kimyasal bileşim, fiziksel form, boyut, doku ve şekil bakımından farklılık göstermektedir.

Mikroplastikler ekosistemler boyunca parçalanıp yayılmakta ve bu arada mikroplastiklere tutunan mikroorganizmalar çevreyi ve insan sağlığını tehdit etmektedir. Mikroplastikler özel yüzey yapıları ve özellikleri nedeniyle, ağır metalleri ve organik kirleticileri toprak çözeltisinden adsorbe etme ve bunları toprakta yoğunlaştırma yeteneğine sahiptir. Mikroplastikler foto-oksidatif parçalanma, hidrofobik yüzey, kirleticileri taşıma potansiyelleri, yüzücülük, kalıcı organik kirletici absorplayabilmeleri gibi niteliklerinden dolayı su kaynaklarında büyük tehlike yaratmaktadır. Sıcaklığa ve UV radyasyonunun miktarına bağlı olarak birçok malzeme parçalanarak atmosferde mikro boyutlu parçacıkların oluşmasına neden olmaktadır. Son zamanlarda Arktik deniz buzu, Antarktika, uzak dağ sıraları ve derin okyanus çukurları dahil olmak üzere birçok bölge mikroplastik parçalara rastlanılmıştır. Plastik kirliliği, modern toplumda plastik ürünlerin sürdürülemez şekilde kullanılması ve imha edilmesi sonucu meydana gelmektedir. Bu durum ekonomileri, ekosistemleri ve insan sağlığını tehdit etmektedir. Mevcut temizleme stratejileri, plastik kirliliğinin olumsuz etkilerini hafifletmeye çalışmakta ancak çevreye giren artan miktarlardaki plastikle rekabet edememektedir. Bu nedenle, küresel multidisipliner bir yaklaşımla çevreye plastik girdilerinin azaltılmasına öncelik verilmelidir. Yanlış yönetilen atıklar, plastiklerin yaşam döngüsünde, özellikle de üretim, tüketim ve bertaraf aşamalarında Entegre Atık Yönetim Sistemi yoluyla iyileştirmeler yapılmasıyla azaltılabilecektir. Plastik kirliliğini azaltmaya yönelik olarak; üretim ve tüketimin düzenlenmesi, geri dönüştürülmüş plastik kullanımının yaygınlaştırılması, üretici sorumluluğunun arttırılması, plastik kullanımının azaltılması, atık toplama

sistemlerinde iyileştirmeler yapılması ve biyolojik olarak parçalanabilen plastiklerin kullanımı gibi tedbirlerin alınması önerilmektedir.

Anahtar Kelimeler: mikroplastik, plastik, kirlilik, çevre, ekosistem

ABSTRACT

Plastic, which started to be produced since the 1950s because it is light, durable and cheap, has become an indispensable product of today. Today, it is known that global plastic production is higher than the population growth rate. In recent years, global plastic resin production has been around 300 million metric tons (MMT) annually. Given the remarkable social benefits that plastic provides, this figure is almost certain to continue to rise in the future. Due to their qualities, plastics have replaced many naturally derived materials in modern society. Applications include disposable food and beverage containers, thermal insulation, home and business furniture, electrical and electronic devices, vehicle interiors, toys, fabrics, surface coatings and even medical devices.

Indiscriminate usage of plastics and its poor waste disposal management pose serious concern on ecosystem quality at global level. Microplastics, defined as polymeric small plastic particles smaller than 5 mm, formed as a result of the degradation of large plastic pieces by the effects of weather events, water currents and ultraviolet rays are particles that pose a macro threat to the environment and living life. Plastics (and therefore microplastics) vary in chemical composition, physical form, size, texture and shape.

Microplastics break down and spread throughout ecosystems and meanwhile, microorganisms clinging to microplastics threaten the environment and human health. Due to their special surface structure and properties, microplastics have the ability to adsorb heavy metals and organic pollutants from the soil solution and concentrate them in the soil. Microplastics pose a great danger in water resources due to their properties such as photo-oxidative degradation, hydrophobic surface, potential to carry pollutants, buoyancy and ability to absorb persistent organic pollutants. Depending on the temperature and the amount of UV radiation, many materials break down, causing micro-sized particles to form in the atmosphere. Recently, microplastic fragments have been found in many regions, including Arctic sea ice, Antarctica, remote mountain ranges and deep ocean trenches.

Plastic pollution occurs as a result of the unsustainable use and disposal of plastic products in modern society. This situation threatens economies, ecosystems and human health. Current cleanup strategies attempt to mitigate the negative effects of plastic pollution but cannot compete with the increasing amounts of plastic entering the environment. Therefore, priority should be given to reducing plastic inputs into the environment with a global multidisciplinary approach. Mismanaged waste can be reduced by making improvements in the life cycle of plastics, especially in the production, consumption and disposal stages, through the Integrated Waste Management System. In order to reduce plastic pollution; It is recommended to take measures such as regulating production and consumption, expanding the use of recycled plastic, increasing producer responsibility, reducing plastic use, making improvements in waste collection systems and using biodegradable plastics.

Keywords: microplastic, plastic, pollution, environment, ecosystem

SÜRDÜRÜLEBILIRLIK KAVRAMI VE SÜRDÜRÜLEBILIR SINIFLANDIRMA SISTEMLERI

THE CONCEPT OF SUSTAINABILITY AND SUSTAINABLE CLASSIFICATION SYSTEMS

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ÖZET

Sürekli artan nüfus artışı sonucunda geleneksel yapıların sayısının artmasına ve dolayısıyla doğal kaynak tüketiminin, özellikle de enerji ve su tüketiminin artmasına neden olmuştur. Bilimsel kanıtlar uzun zamandır kirlilik ve iklim değişikliğiyle ilgili artan sorunları ortaya koyuyor. Karbon emisyonlarının büyük bir kısmı inşaat, sanayi, tarım ve diğerleri gibi çeşitli faaliyetlerden kaynaklanmaktadır. Tahminlere göre dünya nüfusunun dörtte biri, sera gazı üretiminin artması nedeniyle su krizi ve sıcaklık artışıyla karşı karşıya kalacak ve belki de önümüzdeki yıllarda, eğer bilinçli çevresel çözümler bulunamazsa, küresel bir kriz yaşanacak. Su ve enerji arzının güvence altına alınmasında önemli eksiklikler var. Dolayısıyla sürdürülebilirlik kavramının uygulanması sosyal, ekonomik ve çevresel ihtiyaçların dengelenmesine yöneliktir. Bu nedenle projelerin çevresel etkilerini değerlendirmek, ekonomik ve çevresel açıdan güvenli bir toplum yaratmak amacıyla sürdürülebilir sınıflandırma konusunda uzmanlaşmış çeşitli sistemler ortaya çıkmıştır. Bu leteratür makalenin amacı, enerji ve su tüketimini azaltmada ve gelecek nesiller için güvenli bir çevre için yeşil inşaata güvenmede bazı sürdürülebilir sınıflandırma sistemlerini belirlemektir.

Anahtar Kelimeler: CO_2 emisyonu, sürdürülebilirlik, LEED, BREEAM

ABSTRACT

As a result of the continuously increasing population growth, it has led to an increase in the number of traditional buildings and thus increased consumption of natural resources, especially increased energy and water consumption. Scientific evidence has long demonstrated the growing problems related to pollution and climate change. A large portion of carbon emissions arise from several activities such as construction, industry, agriculture, and others. According to estimates, a quarter of the world's population will face a water crisis and a rise in temperatures due to an increase in the generation of greenhouse gases, and perhaps in the coming years, if thoughtful environmental solutions are not available, there will be a significant deficit in securing water and energy supplies. Therefore, applying the concept of sustainability is for Balancing social, economic and environmental needs. Therefore, several systems specialized in sustainable classification have emerged in order to evaluate the environmental impact of projects and create a safe society from an economic and environmental perspective. The aim of this literary paper is to identify some sustainable classification systems in reducing energy and water consumption and relying on green construction for a safe environment for future generations.

Keywords: CO_2 emission , sustainability, LEED, BREAM

ROAD INFRASTRUCTURE FOR TOURISM IMPROVEMENT FOR THE KAZBEGI REGION IN GEORGIA

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ABSTRACT

Road infrastructure for tourism improvement is primarily meant to better respond to a safe and comfortable environment for residents and tourists. Regarding roads it means new approach to achieve value for money objectives and to reduce the administrative effort for road agencies. also, for ensuring more stable funding for road maintenance and to create incentives for technical innovation and higher efficiency.

Agencies need to predict the remaining service period of a roads in order to forecast, budget, and plan for future repairs. The remaining service life concept provided a simple way to do that, often based on the design of the pavement. In the absence of other information, the design period of the road pavement might be treated as equivalent to the remaining life. For pavement management purposes, however, the as-designed road pavement is less significant than the performance and properties of the as-constructed pavement. It is important that all policy, standards and guidelines for performing asset management activities are up to date and has adopted and ratified by the government. Legal standards for asset management activities are important to estimate residual service life or life cycle cost of an asset. Without legal standards it will b mpossible to compare quality with price.

Keywords: Road network; Maintenance; Rehabilitation; Road pavement.