Cooperation for Climate and Green Deal Symposium

ONDOKUZ MAYIS UNIVERSITY
ATATÜRK CONGRESS & CULTURE CENTER
SAMSUN / TURKEY

İklim için İş Birliği ve Yeşil Mütabakat Sempozyumu Özet Kitapçığı

Cooperation for Climate and Green Deal Symposium Book

October 24-26, 2022

Cooperation for Climate and Green Deal Symposium
24-26 Oct'22

İklim için İş Birliği ve Yeşil Mütabakat Sempozyumu Özet Kitapçığı

Cooperation for Climate and Green Deal Symposium Book

October 24-26, 2022

Dear Participants

Our aim is to raise awareness and develop solutions by predetermining the effects that may harm our living conditions and minimizing the negative impact on environmental, social, and economic aspects carrying out its own activities, with the mission of a sustainable university leading the society in a sustainable lifestyle. By taking this aim as a principle, the "Cooperation for Climate Workshop" was held in the first month of 2022, which is the 47th anniversary of Ondokuz Mayıs University. Studies have been carried out for the prevention and adaptation of Climate Change both in the Black Sea region and throughout our country with internal and external stakeholders, and also the subtitles of the Green Deal have been examined.

"Cooperation for Climate and Green Deal Symposium" is going to be held at our university on 24-26 October 2022, and we are planning to convey the knowledge and experience we have gained in the "Cooperation for Climate Workshop" and, more importantly, to discuss and cooperate with National and international scientists and other external stakeholders.

I would like to thank the scientific community, institutions and sponsor companies that contributed to the symposium with their study, and everyone who contributed to the symposium, and hope that the symposium will open new horizons for climate change.

Symposium Honorary President-OMU Rector
Prof. Dr. Yavuz Unal

Dear academician and climate collaborators

Human-induced climate change causes widespread degradation of nature and affects the lives of billions of people worldwide. In the Climate Change report of the Intergovernmental Panel on Climate Change (IPCC), published in 2022, it is clearly emphasized that it is not possible for both humans and the ecosystem to combat these negative effects by addressing the effects, risks and adaptations of climate change. European Green Deal prepared by the European Commission, a series of policies have been developed that aim to make climate neutral, turn climate and environmental challenges into opportunities in all policy areas, and enable the transition to a competitive economy by using resources efficiently. Within the scope of harmonization with the European Green Agreement, Turkey accepted the Paris Agreement and set a net zero emission target for 2050. A Green Deal Action Plan was prepared by the Ministry of Trade in order to contribute to Turkey's transition to a sustainable and resource-efficient economy and to address the effects on industry, agriculture, energy and transportation policies. Main actions under the Action Plan to reach the related goals have been determined as limiting carbon emissions, a green and circular economy, green financing, a clean, economic and safe energy supply, sustainable agriculture, sustainable smart travels, combating against climate change, establishing diplomacy principles and raising awareness regarding the European Green Deal.

Cooperation for Climate and Green Deal Symposium has been accepted as nearly 150 papers, posters and oral presentations from Turkey and the world. In addition, it is aimed to raise awareness by organizing exhibitions and workshops on different topics related to climate change. First of all, I would like to express my deepest gratitude to our Rector, Mr. Yavuz Ünal, who deemed it appropriate to preside over such a symposium, to the organizing committee, to the supporting institutions and to the sponsor companies.

On behalf of the Board of Directors
Prof. Dr. Yuksel Ardali
OMU-ÇEVSAM Manager
Symposium Chairman

Honorary President

Prof. Dr. Yavuz ÜNAL, Ondokuz Mayıs University Rector

Symposium Chairman

Prof. Dr. Yüksel ARDALI, Ondokuz Mayıs University, Environmental Problem Application and Research Center

Symposium Secretary

Dr. Arife ŞİMŞEK, Ondokuz Mayıs University, Black Sea Advanced Technology Research and Application Center

Dr. Melih RÜZGAR, Ondokuz Mayıs University, Faculty of Sciences, Department of Biology

Batuhan ATEŞLİ, Ondokuz Mayıs University, Climate Ambassador

Organizing Committee

Prof. Dr. Ahmet MUTLU, Ondokuz Mayıs University, Faculty of Economics and Administrative Sciences, Department of Political Science and Public Administration

Prof. Dr. Aysun GÜMÜŞ, Ondokuz Mayıs University, Faculty of Sciences, Department of Biology

Prof. Dr. Cevdet YILMAZ, Ondokuz Mayıs University, Faculty of Education, Department of Social Sciences and Turkish Education

Prof. Dr. Feryal AKBAL, Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering

Prof. Dr. Hakan SAĞLAM, Ondokuz Mayıs University, Faculty of Architecture, Department of Architecture

Prof. Dr. Hasan TEMİZ, Ondokuz Mayıs University, Faculty of Engineering, Department of Food Engineering

Prof. Dr. Özen KULAKAÇ, Ondokuz Mayıs University, Faculty of Health Sciences, Department of Nursing

Prof. Dr. Selim AYTAÇ, Ondokuz Mayıs University, Institute of Hemp Research

Prof. Dr. Yusuf DEMİR, Ondokuz Mayıs University, Faculty of Agriculture, Department of Agricultural Structures and Irrigation

Assoc. Prof. Dr. Buğra GENÇ, Ondokuz Mayıs University, Faculty of Veterinary, Department of Basic Science of Veterinary

Assoc. Prof. Dr. Elif Omca ÇOBANOĞLU, Ondokuz Mayıs University, Faculty of Education, Department of Mathematics and Science Education

Assoc. Prof. Dr. Kiraz ERCİYAS YAVUZ, Ondokuz Mayıs University, Faculty of Tourism, Department of Tourism Guidance

Assoc. Prof. Dr. Meral DEMİRTAŞ, Samsun University, Faculty of Aeronautics and Astronautics, Department of Meteorological Engineering

Assoc. Prof. Dr. Metin Mutlu AYDIN, Ondokuz Mayıs University, Faculty of Engineering, Department of Civil Engineering.

Assoc. Prof. Dr. Mevlüt GÜRBÜZ, Ondokuz Mayıs University, Clean Energy Technologies Application and Research Center

Assoc. Prof. Dr. Muhammet BAHADIR, Ondokuz Mayıs University, Faculty of Humanities and Social Sciences,

Department of Geography

Assoc. Prof. Dr. Şahane Funda ARSLANOĞLU, Ondokuz Mayıs University, Faculty of Agriculture, Department of Field Crops

Assis. Prof. Dr. Aslı YÖNTEN BALABAN, Ondokuz Mayıs University, Faculty of Economics and Administrative Sciences, Department of Political Science and Public Administration

Assis. Prof. Dr. Burcu MÜDERRİSOĞLU, Ondokuz Mayıs University, Faculty of Architecture, Department of City and Regional Planning

Assis. Prof. Dr. Gediz UĞUZ, Ondokuz Mayıs University, Faculty of Engineering, Department of Chemical Engineering

Assis. Prof. Dr. Melda GENÇ, Ondokuz Mayıs University, Faculty of Architecture, Department of Architecture

Assis. Prof. Dr. Seden DOĞAN, Ondokuz Mayıs University, Faculty of Tourism, Department of Tourism Guidance

Ekrem ALTAN, Ondokuz Mayıs University, Rector Advisor

Lecturer Halil İbrahim ZENGİN, Ondokuz Mayıs University, Samsun Vocational School, Department of Design

Lecturer Onur ŞEN, Ondokuz Mayıs University, Faculty of Communication, Department of Journalism

Dr. Arife ŞİMŞEK, Ondokuz Mayıs University, Black Sea Advanced Technology Research and Application Center

Dr. Belgin BAL İNCEBACAK, Ondokuz Mayıs University, Application and Research Center Directorate, Project Manager

Dr. Hülya AYKAÇ ÖZEN, Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering

Dr. Melih RÜZGAR, Ondokuz Mayıs University, Faculty of Sciences, Department of Biology

Dr. Selin Ceren TURAN, Ondokuz Mayıs University, Technology Transfer Office

Research Assist. Bilge AYDIN ER, Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering

Research Assist. Dr. İsmail ÇETİN, Ondokuz Mayıs University, Project Development Office

Esin DEMİR, Ondokuz Mayıs University, Technology Transfer Office

Yasemin ÇETİN, Graphic Designer, Ondokuz Mayıs University, Distance Education Application and Research Center

Güllü TURAN, Graphic Designer, Ondokuz Mayıs University, Technology Transfer Office

Serhat KAYA, Graphic Designer, Ondokuz Mayıs University, Corporate Communication Unit

Ömer Faruk DEMİRER, Ondokuz Mayıs University, IT Department-Web Unit

Batuhan ATEŞLİ, Ondokuz Mayıs University, Climate Ambassador

Emre CANDAN, Ondokuz Mayıs University, MSc Student

Science Committee

Prof. Dr. Ali Payidar AKGÜNGÖR, Kırıkkale University, Civil Engineering, Department of Transportation

Prof. Dr. Ali UZUN, Ondokuz Mayıs University, Faculty of Art and Sciences, Department of Geography

Prof. Dr. Ayşegül TANIK, İstanbul Technical University, Department of Environmental Engineering

Prof. Dr. Ayşen KULEYİN, Ondokuz Mayıs University Faculty of Engineering, Department of Enviromental Engineering

Prof. Dr. Azime TEZER, İstanbul Technical University, Faculty of Architecture, Department of City and Regional Planning

Prof. Dr. Başak TAŞELİ, Giresun University, Faculty of Engineering, Department of Environmental

Prof. Dr. David WERNER, Newcastle University, Environmental Systems Modelling

Prof. Dr. Fatih TERZİ, İstanbul Technical University, Faculty of Architecture, Department of City and Regional Planning

Prof. Dr. Gülbin ERDEN, Pamukkale University, Water and Environmental Problems Application and Research Center Manager

Prof. Dr. Gülcan ŞENEL, Ondokuz Mayıs University, Faculty of Arts and Sciences, Department of Biology

Prof. Dr. Gülşen ALTUĞ, İstanbul University, Department of Marine and Inland Water Resources Management

Prof. Dr. Güray SALİHOĞLU, Uludağ University, Faculty of Engineering, Department of Environmental Engineering

Prof. Dr. Hrissi KARAPANAGİOTİ, University of Patras, Department of Chemistry

Prof. Dr. İsmail YÜCEL, Middle East Technical University, Department of Civil Engineering

Prof. Dr. Kenan Sinan DAYISOYLU, Kahramanmaraş Sütçü İmam University, Department of Food Technology

Prof. Dr. Meltem SARIOĞLU, Cumhuriyet University, Faculty of Engineering, Department of Environmental Engineering

Prof. Dr. Murat TERZİ, Ondokuz Mayıs University, Faculty of Medicine, Department of Internal Medicine

Prof. Dr. Nilgün AYMAZ ÖZ, Çanakkale Onsekiz Mart University, Environmental Problems Application and Research Center Manager

Prof. Dr. Nilgün KIRAN CILIZ, Bogazici University, Institute of Environmental Sciences

Prof. Dr. Nuri AZBAR, Ege University, Department of Bioengineering

Prof. Dr. Okan Tarık KOMESLİ, Ataturk University, Faculty of Engineering, Department of Environmental Engineering

Prof. Dr. Oktay ÖZKAN Erciyes University Environmental Problems and Cleaner Production Research and Application Center Manager

Prof. Dr. Ömer Lütfi ŞEN, İstanbul Technical University, Climate and Marine Sciences

Prof. Dr. Robert KALIN, University of Strathclyde Glasgow, Department of Civil and Environmental Engineering

Prof. Dr. Serhan TANYEL, Dokuz Eylül University, Faculty of Engineering, Department of Civil Engineering

Prof. Dr. Soner Mehmet ÖZDEMİR, Mersin University, Faculty of Engineering, Department of Civil Engineering

Prof. Dr. Süleyman YAMAN, Ondokuz Mayıs University, Faculty of Education, Department of Mathematics and Science Education

Prof. Dr. Şule ERTEN ELA, Ege University, Solar Energy Institute, Department of Energy

Prof. Dr. Şule ORMAN, Akdeniz University, Faculty of Agriculture, Department of Soil Science and Plant Nutrition

Prof. Dr. Yetkin BULUT, Ondokuz Mayıs University, Faculty of Tourism, Department of Tourism Management

Prof. Dr. Zekai TARAKÇI, Ordu University, Department of Food Engineering

Prof. Dr. Zerrin TOPRAK KARAMAN, Dokuz Eylul University, Faculty of Economics and Administrative Sciences, Department of Public Administration Local Governments, Department of Urban and Environmental Policy

Prof. Dr. Selim CEYLAN, Ondokuz Mayıs University, Faculty of Engineering, Department of Chemical Engineering

Prof. Dr. Zeynep CEYLAN, Atatürk University, Environmental Problems Research Center

Assoc. Prof. Dr. Ahmet ÖZTÜRK, Ondokuz Mayıs University, Faculty of Agriculture, Department of Garden Plants

Assoc. Prof. Dr. Aktan ACAR, TOBB University of Economics and Technology, Faculty of Architecture

Assoc. Prof. Dr. Ali Ekber ÖZDEMİR, Ordu University, Department of Marine Technology

Assoc. Prof. Dr. Alper BODUR, Ondokuz Mayıs University, Faculty of Architecture, Department of Architecture

Assoc. Prof. Dr. Emre Burcu ÖZKARAOVA, Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering

Assoc. Prof. Dr. Dilek GÜVENÇ, Ondokuz Mayıs University

Assoc. Prof. Dr. Dimitris POTOGLOU, Cardiff University, School of Geography and Planning

Assoc. Prof. Dr. Doğan DURSUN, Atatürk University, Department of City and Regional Planning

Assoc. Prof. Dr. Ece Ümmü DEVECİ, Nigde University, Faculty of Engineering, Department of Environmental Engineering

Assoc. Prof. Dr. Erdem DOĞAN, Kırıkkale University, Department of Civil Engineering

Assoc. Prof. Dr. Faizan ALİ, University of South Florida, Department of Hospitality Marketing

Assoc. Prof. Dr. Fikret USTAOĞLU, Giresun University, Department of Biology

Assoc. Prof. Dr. Mustafa SAĞLAM, Ondokuz Mayıs University, Faculty of Agriculture / Department of Soil Science and Plant Nutrion

Assoc. Prof. Dr. Mine ÇARDAK, Çanakkale Onsekiz Mart University, Department of Fishing Technology

Assoc. Prof. Dr. Nermin DEMİRKOL, Kocaeli University, Department of Metallurgy and Materials Engineering

Assoc. Prof. Dr. Nevzat BEYAZIT, Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering

Assoc. Prof. Dr. Oğuzhan YANAR, Ondokuz Mayıs University, Faculty of Arts and Sciences, Department of Biology

Assoc. Prof. Dr. Özgür BAYTUT, Ondokuz Mayıs University, Faculty of Arts and Sciences, Department of Biology

Assis. Prof. Dr. Abdulaziz ATABANI, Erciyes University, Mechanical Engineering, Department of Energy

Assis. Prof. Dr. Berker FIÇICILAR, Ondokuz Mayıs University, Faculty of Engineering, Department of Chemical Engineering

Assis. Prof. Dr. Derya Betül UNSAL CUCEM, Cumhuriyet University, Renewable Energy Resources Research Center

Assis. Prof. Dr. Emine ÇORUH, Gümüşhane University, Department of Civil Engineering

Assis. Prof. Dr. Meltem SAPLIOĞLU, Süleyman Demirel University, Department of Civil Engineering

Assis. Prof. Dr. Muhammad Sohail KHAN, Gomal University, Faculty of Agriculture, Department of Horticulture

Assis. Prof. Dr. Tuğçe ŞANLI, Ondokuz Mayıs University, Faculty of Architecture, Department of City and Regional Planning

Dr. Antonio SCARFONE, Agri-food Engineering and Transformations, Italy

Dr. Hamed HAGHNAZAR, Utah State University, Department of Watershed Sciences

Dr. Merve GÖRE, Ege University, Faculty of Agriculture, Department of Field Crops

Research Assist. Yeliz EMECEN, Ondokuz Mayıs University, Faculty of Architecture, Department of Architecture

Research Ass. Hilal PARLAKASLAN, Ondokuz Mayıs University, Faculty of Architecture, Department of Architecture

PROGRAM

24 OCTOBER 2022 - MONDAY	
OPENING – 10:00 / 11: 30	
Symposium Chairman Welcome Speech	
Rector Opening Speech	
Protocol Speeches	
11:30 / 12:30	
OPENING CONFERENCE **Prof. Dr. Güray SALIHOGLU** Uludağ University, Faculty of Engineering, Department of Environmental Engineering **Combating Global Warming: Promises and Facts**	
LUNCH – 13:00 / 14:00	
I. Session	**Saloon 1**
TOPIC: CLIMATE POLITICS-GREEN TRANSFORMATION	
14:00 / 15:20	
Moderator: Prof. Dr. Güray SALIHOGLU, Prof. Dr. Ahmet MUTLU	
Keynote Speaker	**Subtopic**
B. Aylin ALAGOZ, Secretary General at Integrated Reporting Association Turkey	The Climate Crisis and the Future of Sustainability: Responsibilities A waiting Us in the Transition to a Low Carbon Economy
Prof. Dr. Hrissi KARAPANAGIOTI, University of Patras, Department of Chemistry	Using Green Chemistry to fight Climate Change
Prof. Dr. Zerrin TOPRAK KARAMAN Dokuz Eylul University, Faculty of Economics and Administrative Sciences Department of Public Administration Local Governments, Department of Urban and Environmental Policy	Trans-Disciplinary Approach to the Impact of Strong Winds and Storms on Cultural Heritage
Prof. Dr. Cevdet YILMAZ Ondokuz Mayıs University, Department of Geography	The Place and Importance of Cultural Ecology in Combating Climate Change
Coffee Break – 15:20 / 15:40	
II. Session	**Saloon 1**
TOPIC: NATURE-BIODIVERSITY I	
15:40 – 17:20	
Moderator: Prof. Dr. Şule ERTEN ELA, Maren KRINGS	
Keynote Speaker	**Subtopic**
Prof. Dr. David WERNER, University of Newcastle, Environmental Systems Modelling	Carbon off-setting Opportunities by Afforestation of Institutional Land
Assoc. Prof. Dr. Meral DEMIRTAS, Samsun University, Department of Meteorological Engineering	Climate Change and Variability: Effects on High-Impact Weather Events
Prof. Dr. Gülşen ALTUG, İstanbul University, Department of Marine and Inland Water Resources Management	Reading Correctly Global Climate Change and Marine Microbial Responses
Prof. Dr. Yusuf DEMIR Ondokuz Mayıs University, Agricultural Structure and Irrigation	The Impact of Global Climate Change on Agriculture and Water Resources

Prof. Dr. Fisun CELIKEL Ondokuz Mayıs University, Department of Horticulture	Sustainable Postharvest Technologies of Horticultural Products to Reduce Carbon Footprint
Coffee Break – 17:20 / 17:40	
III. Session	**Saloon 1**
TOPIC: NATURE-BIODIVERSITY II	
17:40-19:20	
Moderator: Prof. Dr. Zerrin TOPRAK KARAMAN, Prof. Dr. Aysun GUMUS	
Keynote Speaker	**Subtopic**
Prof. Dr. Robert KALIN, University of Strathclyde Glasgow, Department of Civil and Environmental Engineering	The Only Water Resource for Climate Change Adaptation
Almila Kindan CEBBARI, Blue Flag National Operator, Foundation for Environmental Education in Turkey	Bathing Water Monitoring along Turkish Coasts and International Blue Flag Award Scheme
Maren KRINGS, German Climate Storyteller, Photographer	H is for Hemp (Hemp and Green Deal)
Prof. Dr. Cengiz SANCAK, Ankara University, Faculty of Agriculture, Department of Field Crops	GM Crops and Climate
Prof. Dr. Yüksel ARDALI, Ondokuz Mayıs University, Environment Problems, and Application Center Director	The Threat of Toxicity in Water Resources of Climate Change in Future! Is it Possible to be the Non-toxic Water Sources Promised in the Green Deal?
19:30-23:00	
OPENING DINNER	
25 OCTOBER 2022 - TUESDAY	
I. Session	**Saloon 1**
TOPIC: ENGINEERING-ARCHITECTURE-TECHNOLOGY	
09:30 / 10:50	
Moderator: Prof. Dr. Hrissi KARAPANAGIOTI, Prof. Dr. Ali UZUN	
Keynote Speaker	**Subtopic**
Prof. Dr. Şule ERTEN ELA, Ege University, Solar Energy Institute, Department of Energy	Climate Change and Energy: Sustainable Solutions through Green Technology and Energy Conversation Efficiency
Assoc. Prof. Dr. Aktan ACAR, TOBB University of Economics and, Faculty of Architecture	Acting and Designing for the Climate Empowerment for Children and Young People
Prof. Dr. Aziz EKSI, İstanbul Topkapı University, Department of Gastronomy	Possible Effects of Climate Change on Food Consumption Profile
Prof. Dr. Ali UZUN, Ondokuz Mayıs University, Department of Geography	Climate Change from Past to Present and Its Effects on the Kızılırmak Delta
Coffee Break – 10:50 / 11:10	
ONLINE SESSIONS	
II. Session	**Saloon 1**
11:10-12:30	
Moderator: Prof. Dr. Gülfem BAKAN, Prof. Dr. David WERNER	
Keynote Speaker	**Subtopic**

Prof. Dr. Aysegül TANIK, Istanbul Technical University, Department of Environmental Engineering Access Link: **https://omu.whereby.com/1**	Importance of Alternative Water Resources in Adaptation to Climate Change
Assoc. Prof. Dr. Dimitris POTOGLOU, Cardiff University, School of Geography and Planning Access Link: **https://omu.whereby.com/1**	Studying the Demand for Cleaner Vehicles and Charging Infrastructure: An Overview of Associated Factors and Arising Issues
Prof. Dr. Ömer Lütfi SEN Istanbul Technical University, Eurasia Institute of Earth Sciences Climate Research Group Access Link: **https://omu.whereby.com/1**	Climate Change and Hydrometeorological Disasters in Turkey
Prof. Dr. Candan GOKCEOGLU, Hacettepe University, Department of Geological Engineering Access Link: **https://omu.whereby.com/1**	Landslide: One of the Most Important Natural Hazards of Climate for the Black Sea Region
Assoc. Prof. Dr. Bertrand LARATTE National School of Arts and Crafts Access Link: **https://omu.whereby.com/1**	Life Cycle Assessment: Life Cycle Analysis: A Potential Environmental Assessment Tool. A Tool Between Measurement, Model and Product-Scale Decision Support

ATATÜRK CONGRESS AND CULTURE CENTER		
WORKSHOPS		
11:30-13:00		
Workshop Coordinator	**Workshop Content**	
Prof. Dr. Yuksel ARDALI, Ondokuz Mayıs University, Environment Problems, and Application Center Director **Res. Ass. Bilge AYDIN ER**	Zero Waste Action in Ondokuz Mayıs University (Sustainability and Zero Waste Approach)	**11:30 - 12:00** **Saloon 3**
Prof. Dr. Hrissi KARAPANAGIOTI - Prof. Dr. David WARNER - Maria Maro GALANI University of Patras, Department of Chemistry	Stop Microplastics	**12:00 – 12:30** **Saloon 3**
Assoc. Prof. Dr. Nermin DEMIRKOL, Kocaeli University, Department of Metallurgical and Materials Engineering	Waste to Art	**12:30 – 13:00 Saloon 3**
LUNCH – 13:00 / 14:00		
ORAL PRESENTATION		
I. Session 25.10.2022 / 14:00 – 15:15		
Saloon 1: Climate Change and Energy I		
Moderator: Prof. Dr. Selim CEYLAN, Dr. B. Aylin ALAGOZ		

Hydrogen Energy in the EU Green Deal Harmonization Process (Keynote Speaker) Nuri AZBAR*, Cansu Mayaoğlu Akın Access Link: **https://omu.whereby.com/1**	**14:00 / 14:15**
Collection, Disposal, and Recycling of Waste Batteries (Online Paper) Diyem Özer Portable Battery Manufacturers and Importers Association (TAP) Access Link: **https://omu.whereby.com/1**	**14:15 / 14:30**
The Current Status of Wild Energy in the World and Turkey Kadir Kaya*	**14:30 / 14:45**

Green Energy Management Systems for Edge Computing Applications Canan Şişman Korkmaz*, Alper Terciyanlı, Abdulhameed Aboumadi, Ilayda Aygün	**14:45 / 15:00**
Impact of Clean Coal Technologies on Climate Change Hüseyin Karaca*	**15:00 / 15:15**
Saloon 2: Climate Change and Education	
Moderator: Prof. Dr. Süleyman YAMAN, Assoc. Prof. Dr. Elif Omca COBANOĞLU	
A Review of Global Climate Change in Science Education Curriculum of Turkey Elif Omca Cobanoglu*, Aslı Sarişan-Tungaç	**14:00 / 14:15**
An Examination of Global Climate Change and Environmental Problems in Secondary School Science Textbooks According to The Didactic Transposition Theory İlknur Bozoğlu, Mustafa Ergun*	**14:15 / 14:30**
Investigation of The Importance of Recycling and Energy Saving According to The Internal Didactic Transposition Theory Murat Fakir, Mustafa Ergun*	**14:30 / 14:45**
Qualified Practices from Teachers' Own Educational Approaches (Key) In Improvement of Educational Quality: Environmental Awareness Süleyman Yaman, Belgin Bal-İncebacak, Aslı Sarısan-Tungac*	**14:45 / 15:00**
Investigation of The Impact of Green Chemical Activities on Primary School Students' Awareness of The Environment Şadiye Karaşah-Çakici*, Belgin Bal-İncebacak	**15:00 / 15:15**
Saloon 3: Climate Change and Energy II	
Moderator: Assoc. Prof. Dr. Mevlut GURBUZ, Dr. Gediz UGUZ	
Importance of Sustainable Solar Energy Usage in Environmental Protection Derya Betul Unsal*, Zeynep Ceren	**14:00 / 14:15**
Design and Sizing of Solar Photovoltaic Stand-Alone System of a Typical Household in Nigeria Ismail Muhammad*, Sule Erten Ela, Hamisu Ibrahim, Adewale O. Adeloye, Z. N. Garba	**14:15 / 14:30**
Effects of Jet Fuels Produced from Microalgae on Climate Change Cemil Koyunoglu*	**14:30 / 14:45**
Waste Vegetable Oils to Biodiesel: Using of in EU and Turkey Meltem Sarıoğlu Cebeci*	**14:45 / 15:00**
Bio jet fuel production with downdraft gasifier technology: a literature review Cemil Koyunoğlu*	**15:00 / 15:15**
Coffee Break – 15:15 / 15:30	
II. Session 25.10.2022 / 15:30 – 16:45	
Saloon 1: Green Technology	
Moderator: Prof. Dr. Gulsen ALTUG, Assis. Prof. Dr. Oguzhan YANAR	
Applicability of Lignocellulosic Materials in the Structure of Food Waste in Adsorption Hakan Çelebi*, İsmail Şimşek, Tolga Bahadır, Şevket Tulun	**15:30 / 15:45**
Investigation of Recycled Polymers for Electrochromic Windows Fabrication Özge Akpınar-Sarıhan*, Ibrahim Inanc	**15:45 / 16:00**
Eco-Friendly and Nature-Based Polymer Composites Arife Kübra Yontar*, Sinem Çevik	**16:00 / 16:15**
Conversion from SOx and NOx in Flue Gas into Fertilizer Sevtap Tırınk*, Bahtiyar Ozturk	**16:15 / 16:30**

Suitability Prediction of Some Diphenylamine Derivatives for Application in Dye-Sensitized Solar Cells (DSSCS) using Density Functional Theory (DFT) Ismail Muhammad*, Hamisu Ibrahim, Sule Erten Ela, M. S. Sallau, Z. N. Garba, Adewale O. Adeloye, Yasir Albashir	**16:30 / 16:45**
Saloon 2: Climate Change and Healthy I	
Moderator: Prof. Dr. Murat TERZI, Assoc. Prof. Dr. Mehtap UNLU SOGUT	
Climate Change and Health Ahmet Tevfik Sünter*	**15:30 / 15:45**
Infectious Diseases Perspective on Climate Change Mehtap Ünlü Söğüt*, Merve Eroğlu	**15:45 / 16:00**
One Health Approach and Climate Change Nurcan Coşkun Us*, Zuhal Kayar	**16:00 / 16:15**
Climate Change and Women's Health Sümeyye Bal*	**16:15 / 16:30**
Public Health in the Process of Climate Change Dilek Çelik Eren*	**16:30 / 16:45**
Saloon 3: Climate Change and Healthy II	
Moderator: Prof. Dr. Özen KULAKAC, Prof. Dr. İlknur AYDIN AVCI	
Impact of Climate Change on Maternal and Newborn Health Neşe Karakaya*	**15:30 / 15:45**
Climate Change and Nursing Züleyha Ural Yıldız*, Aynur Ataman Kufacı, İlknur Aydın Avcı	**15:45 / 16:00**
In the City of Amasya Investigation of the Relationship Between Thermal Comfort Conditions and Respiratory Disease Savaş Çağlak*	**16:00 / 16:15**
Climate Change And Artificial Intelligence Sema Gül*, Murat Terzi	**16:15 / 16:30**
Coffee Break – 16:45 / 17:00	
III. Session 25.10.2022 / 17:00 – 18:15	
Saloon 1: Climate Change and Design - Tourism	
Moderator: Prof. Dr. Hakan SAGLAM, Prof. Dr. Yetkin BULUT	
Against Human Abusive Behavior Towards the Environment, the Case of H_2O Zero – Water is a Chemical and One of The Elements of Nature Maria Maro Galani*, Hrissi K. Karapanagioti	**17:00 / 17:15**
Effect of Climate Change on Wave Overtopping Safety of Coastal Structures M. Adil Akgul*	**17:15 / 17:30**
Determination of Ideal Periods for Beach Tourism and Future Forecasts in terms of Thermal Comfort Conditions in Samsun Muhammet Bahadır, Savaş Çağlak*	**17:30 / 17:45**
Evaluation of Plateau Tourism According to the Thermal Comfort Conditions; Çamici Plateau, Niksar/Tokat Savaş Çağlak*	**17:45 / 18:00**
Saloon 2: Zero pollution and Non-Toxic Environment	
Moderator: Assoc. Prof. Dr. Özgur BAYTUT, Assoc. Prof. Dr. Emre Burcu OZKARAOVA	
Impact of Clımate Change to Water Supply: Treatment and Reuse of Grey Water Meltem Sarıoglu Cebeci *, Berk Koker, S. Furkan Selçuk	**17:00 / 17:15**

Sustainability Assessment of Remediation Alternatives for Soils Contaminated by Polycyclic Aromatic Hydrocarbons Hale Demirtepe*	**17:15 / 17:30**
Integration of Stormwater Capture at Flood Management Reservoirs with Managed Aquifer Recharge Emre Burcu Özkaraova*, Robert Kalin	**17:30 / 17:45**
Decolorization and Neutralisation of Local Dyeing Effluents Using Phyto-Adsorbents Materials Yasir Albashir *, S. M Gumel, Sule Erten Ela, Ismail Muhammad	**17:45 / 18:00**
Understanding Biofilm Structure on Anti-Biofouling Coating for chlorella Vulgaris Mehmet Ali Küçüker*, Kaniye Güneş, Uğur Cengiz, Fatma Gulcin Durmaz	**18:00 / 18:15**
Saloon 3: Climate Change and Sustainability	
Moderator: Prof. Dr. Feryal AKBAL, Assoc. Prof. Dr. Nevzat BEYAZIT	
Sustainable and Green Particleboard Manufacturing Aytuğ Tekbas*, Nihal Bektas	**17:00 / 17:15**
Unmanned Aerial Vehicles Design for Climate Change and Environmental Protection Research Studies Derya Betul Unsal*, Busra Beril Kesgin	**17:15 / 17:30**
An Assessment on the Potential of Green Deal Policies for the Well-being of Citizens Deniz Can*, Serap Kayasü	**17:30 / 17:45**
Statıstıcal Overvıew on Clımate Change and The Green Envıronmen in Turkey Mehmet Şirin Ateş*, Erol Terzi, Şahin Değirmenci	**17:45 / 18:00**
Sustainable Waste Management System In Izmir-Karaburun Peninsula Haniyeh Hajatnia, Bora Okan, Hatice Eser Ökten*	**18:00 / 18:15**
Coffee Break – 18:15 / 18:30	
IV. Session 25.10.2022 / 18:30 – 19:30	
Saloon 1: Zero Waste, Recycling and Waste Management	
Moderator: Prof. Dr. Ayşe KULEYIN, Assoc. Prof. Dr. Muhammet BAHADIR	
Zero Waste Management in Universities Mesut Tekbas*, Nihal Bektas	**18:30 / 18:45**
Recovery of Industrial Wastes from The Production of Porcelain Tableware Özlem Özcan-Durdağ*, Dilek Yasar, Barıs Celtikci	**18:45 / 19:00**
The Importance of Nutrient Recovery from Waste in Climate Change Adaptation and the Circular Economy Model Özgecan Madenli*, Ece Ümmü Deveci	**19:00 / 19:15**
Analysis of the Design's Role for Zero Waste in the Case of Product Design Examples Sevcan Ekmekçioğlu*, Deniz Ekmekçioğlu	**19:15 / 19:30**
Saloon 2: Climate Change and Water Pollution	
Moderator: Prof. Dr. Yuksel ARDALI, Assoc. Prof. Dr. Ece Ümmü DEVECI	
Water Quality Criteria for The Evaluation of Treated Wastewater Reuse as Irrigation Water Feryal Akbal*, Emre Burcu Ozkaraova, Ayse Kuleyin	**18:30 / 18:45**
Possible Effects of Climate Change on Wastewater Treatment Systems and Adaptation Studies in the Black Sea Region Aysenur Ayan*, Yuksel Ardalı	**18:45 / 19:00**
Climatic Factors Affecting the Change in Water Quality of The Kızılırmak River Basin Batuhan Ateşli, Bilge Aydın Er*, Yüksel Ardalı	**19:00 / 19:15**
Treatability of Leachates; the Case of Samsun Kasım Atmaca*, Nevzat Beyazıt	**19:15 / 19:30**

Saloon 3: Climate Change and Philosophy - Intelligent Transportation - Safe Food Supply **Moderator:** Prof. Dr. Mustafa AKTAŞ, Prof. Dr. Ahmet Hilmi ÇON	
Philosophical Roots of the Human-centered Environmental Concept Şengül Özdemir*	**18:30 / 18:45**
Multidisciplinary Engineering Education: A Comprehensive Study on Intelligent Transportation Systems (ITS) Metin Mutlu Aydın*, Dimitris Potoglou, Liana Cipcigan, Yasin Çelik	**18:45 / 19:00**
Blockchain Technology in Food Safety and Traceability Volkan Arif Yılmaz*	**19:00 / 19:15**
Prediction of Nutrient Loads in An Industrialized Watershed Under Future Climate Dynamics Meltem Çelen, Mehmet Salim Öncel, Halil Nurullah Oruç*, İsmail Kalafat, Sinem Vural, Meltem Yağcioğlu	**19:15 / 19:30**
26 OCTOBER 2022 - WEDNESDAY	
I. Session 09:00 – 10:30	
Saloon 1: Climate Change and Hemp	
Moderator: Prof. Dr. Selim AYTAC, Prof. Dr. Ali Kemal AYAN	
Climate Change and Hemp Selim Aytaç* Ali Kemal Ayan, Nazlıcan Sönmezışık, Hossein Hajıabaee, Merve Bezmen	**09:00 / 09:15**
Comparison of Various Building Materials Produced with Hemp Fiber and Tows with Traditional Building Materials Fahri Birinci, Ali Kemal Ayan, Selim Aytaç*, Şule Karacalar, Ali Sarıalioğlu	**09:15 / 09:30**
Ecological Footprints of Hemp Ali Kemal Ayan* , Selim Aytaç , Büşra Tik, Mert Arslanbayrak	**09:30 / 09:45**
Hemp as a Sustainable Pharmaceutical Raw Material Source Ozge Balpınar*,Şahane Funda Arslanoğlu	**10:00 /10:15**
Modern Aspects of Hemp Analysis Enes Atmaca*, Orhan Tokur, Abdurrahman Aksoy	**10:15 /10:30**
Pharmacology and Toxicology of Cannabis Abdurrahman Aksoy*, Zeyno Nuhoğlu Öztürk, Enes Atmaca	**10:30 /10:45**
Saloon 2: Climate Change and Mitigation	
Moderator: Prof. Dr. Cevdet YILMAZ, Assoc. Prof. Dr. Bugra GENÇ	
The Effects of Animal Movements in Global Warming Methane Emissions: Past, Present, and Future Bugra Genc*	**09:00 / 09:15**
A Study on The Design and Feasibility of an Innovative Farm-Type Biogas Plant 2 Elif Cura, Yasin Karargoz, Alper Bayrakdar*, Erkan Sahinkaya	**09:15 / 09:30**
Legal Deal with Meal Mustafa Kenan Ustahaliloglu*	**09:30 / 09:45**
Saloon 3: Zero Waste, Recycling and Waste Management I	
Moderator: Prof. Dr. Semra ÇORUH, Assoc. Prof. Dr. Nevzat BEYAZIT	
Benefits of Biogas Usage as a Supplementary Fuel in Solid Waste Combustion Mohammad Safayat Hossain, Bahtiyar Öztürk*	**09:00 / 09:15**
New Developments in Carbon Capture Technologies Bahtiyar Öztürk*, Hülya Aykac Özen, Sevtap Tırınk	**09:15 / 09:30**
Optimizing Waste Management with Geographical Information System (GIS) within the Scope of Zero Waste: The Case in Ataturk University Şahin Korkmaz*, Elif Tuna Pulaş, Cemal Sevindi, Zeynep Ceylan	**09:30 / 09:45**

Coffee Break – 10:45/ 11:00	
II. Session 26.10.2022 / 11:00 – 12:00	
Saloon 1: Zero Waste, Recycling and Waste Management II	
Moderator: Prof. Dr. Aktan ACAR, Assoc. Prof. Dr. Elif Omca COBANOGLU	
Improvement of the Hydrophobic Property of PET Powder Made from Waste Emine Özlem Dengiz*, Mevlüt Gurbuz	**11:00 / 11:15**
Composite Production with Hemp and Banana Fibers Modified with Boric Acid Tugba Mutuk*, Sıla Oral, Kerem Arpacıoğlu, Sevim Alışır, Gökhan Demir	**11:15 / 11:30**
Disaster Management and Global Climate Change in Turkey Afşin Ahmet Kaya*	**11:30 / 11:45**
Saloon 2: Carbon Footprint	
Moderator: Prof. Dr. Guray SALIHOGLU, Assoc. Prof. Dr. Kiraz ERCIYAS YAVUZ	
How Carbon Footprint Matter in Turkstat: A Case Study of Samsun Regional Office Nevra Alhas-Eroglu*, Nuri Er	**11:00 / 11:15**
Calculation of Waste-Sourced Greenhouse Gas Emission (Carbon Footprint) in the Denim Industry Bahar Vayic*, Hülya Aykac Ozen, Semra Coruh	**11:15 / 11:30**
Calculation of İndividual Ecological Footprint Sevde Üstün-Odabaşı*	**11:30 / 11:45**
Eco-Friendly in Agriculture AUAV (Agricultural Unmanned Aerial Vehicles) Derya Ozucan*, Mehmet Cem Elik	**11:45 / 12:00**
Saloon 3: Climate Change and Monitoring	
Moderator: Prof. Dr. Selim CEYLAN, Assoc. Prof. Dr. Meral DEMIRTAS	
Survey on the Challenges of Reducing Carbon Emission Using Renewable Energy Technologies in Nigeria Hauwa Yahaya Umar*, Abdullahi I. D, Sa'adu Ibrahim., Aliyu Usman, Sule Erten Ela	**11:00 / 11:15**
Climate Change Impacts on Extreme Weather Events: 2021 Flash Flooding Events Over the Black Sea Region Meral Demirtaş*	**11:15 / 11:30**
Climate Variability and Change: The 2019 Summer Heatwave Events Over the Euro-Mediterranean Region Meral Demirtaş*	**11:30 / 11:45**
Comparıson wıth Turkey of Envıronmental Statıstıcs in TR83 Regıon Erol Terzi*, Mehmet Şirin Ateş	**11:45 / 12:00**
Coffee Break – 12:00 / 12:15	
III. Session 26.10.2022 / 12:15 – 13:15	
Saloon 1: Climate Change and Adaptation	
Moderator: Prof. Dr. Hasan TEMİZ, Assis. Prof. Dr. Aslı YÖNTEN BALABAN	
Effect of Green Area Index (NDVI) Change on Land Surface Temperature, Evaluation in Terms of Climate Change, Samsun Example Burcu Değerli*, Mehmet Çetin	**12.15 / 12:30**
The Role of Genome Editing in the Response to Climate Change Karam Mostafa, Bayram Ali Yerlikaya, Mohamed Farah Abdulla, Seher Yerlikaya, Musa Kavas*	**12:30 / 12:45**

Indentification of Climate Change Vulnerabilities at Local Level and Strengthening the Resilience of the City to Climate Change Hande Barlın, Pınar Ergenekon, Nihal Bektaş*	**12:45 / 13:00**
Speech on behalf of Turkey's Climate Ambassadors	**13:00/ 13:15**
Saloon 2: Monitoring of Climate Change in Wetlands	
Moderator: Prof. Dr. Yusuf DEMIR	
Wetland Changes and Birds in Turkey Arif Cemal Özsemir*, Berkay Yılmaz	**12.15 / 12:30**
Evaluation of Drought in The Kızılırmak Delta with the Help of Different Indices Yasemin Balka Çağlak*, Murat Turkes, Tamer Ozlu	**12:30 / 12:45**
Plant Biodiversity Resistant to Global Climate Change (Water and Drought) in the Black Sea Region and Their Effect Mechanisms Fergan Karaer*	**12:45 / 13:00**
Effects of Climate Change on Birds Kiraz Erciyas Yavuz*	**13:00/ 13:15**
Effects of Climate Change on Wetlands in Different Geographical Environments: Gediz Delta (Izmir) and Marmara Lake (Manisa) Mehmet Kaya*	**13:15 / 13:30**
ZERO WASTE EXHIBITION **DESIGNER AWARENESS FOR ZERO WASTE** **ELİF KILIÇ** **ATATÜRK CONGRESS AND CULTURE CENTER** **24-25 OCTOBER 2022**	
NATURE ON HEMP EXHIBITION **MAREN KRINGS** **ATATÜRK CONGRESS AND CULTURE CENTER** **24-25 OCTOBER 2022**	
POSTER PRESENTATION	
PP1. Production of Hemp Doped PLA Based Bio-Composite Wound Dressings and Investigation of Their Antibacterial Properties Sevim Alışır	
PP2. Degradation of Azo Dyes Seyhan Öztürk	
PP3.Slope Stability Analysis of Kahramanmaraş-Andırın Wind Power Plant Field Turbine Gökhan Demir	
PP4.Removal of heavy metals from soil sources using natural reagents Mamadou Fadilou Bah, Gediz Uğuz	
PP5.Ammonium Recovery from Leachate in the Form of Fertilizer Omer Yeni, Ayse Kuleyin	
PP6.Fabrication and Characterization of Hemp Fibers as Surgical Sutures Gülsüm Tarim , Pınar Ezgi Bat, Onur Ahad Çokluk, Engin Burgaz	
PP7.Environmental Benefits of Using Tomato Harvest Wastes as Animal Feed Unal Kilic, Mahmoud O.A. Elfaki	
PP8.Determination of the Relationship between Zero Waste Management Approach and Waste Index and Greenhouse Gas Emission Reduction at Ondokuz Mayıs University Arife Şimşek, Yüksel Ardalı	

PP9.Fabrication of Mxene, a New Generation Material, and Investigation of Its Use as an Air Pollution Sensor Mehmet Kuru, Muhammet Samet Aslantürk
PP10.Enhancing the Performance of the Anode Electrode by Surface Modification in Lithium-ion Batteries Eyup Akbulut, Engin Burgaz
PP11.Preparation and Characterization of Magnesium Borate Doped PVDF+HFP Composite Membrane by Electro-Spinning Method as a Separator for Lithium-Ion Batteries Simge Kara, Engin Burgaz
PP12.Investigation of Lubrication Performance of Nano-Particle Added Waste Oils Aleyna Taşkın, Fevzi Şahin, Cengiz Görkem Dengiz
PP13.PLC Controlled Sensor-Less Solar Tracking System Design and Implementation Cenk Gezegin, Hasan Dirik, Mehmet Can Özer
PP14.Graphene Added Li-Ion Batteries Samet Balkaş, Engin Burgaz
PP15. Investigation of Silica Production from Needle Leaves of Pine Tree Başak Mesci Oktay, Feza Geyikçi , Kürşat Furkan Ağırca
PP16.Atmospheric Carbondioxide Sequestration by Algae Özgür Baytut, Ali Ekber Özdemir, Hakan Bülbül
PP17.Effects of Usage of *Cannabıs Satıva L.* As Fiber Reinforcement in Epoxy Composites to Tensile and Impact Strengths Gürkan Kara, Fevzi Şahin, Cengiz Görkem Dengiz, Mevlüt Gürbüz
PP18.α-Fe_2O_3/CdS/g-C_3N_4 Composite Material for Degradation of MB Dye and H_2 Evolution Çağdaş Yavuz, Şule Erten Ela
PP19.Effect of g-C_3N_4 Reınforcement in Bınary ZnO/CdS for Photoanode of DSSC Çağdaş Yavuz, Şule Erten Ela
PP20.Hexagonal Boron Nitride: A Novel Low-Cost Adsorbent For Organic Dye Removal Merve Çoban, Abdülsamet Kavak, Rukan Can Seyfeli, Selim Ceylan
PP21.Deoxygenation of Oleic Acid Using Activated Carbon Supported Bimetallic CoMo/Ac With A Hydrogen Donor Solvent Vuslat İrem Şimşek, İrem Özgenç, Rabia Halezeroğlu, Selim Ceylan
PP22. The Role Of Cell Death İn Pyrethroid Toxicity Sinem İnal, Dilek Güvenç
PP23. The Activated Carbon that was Derived Domestic Hemp Biomass: A Preliminary Investigation on Thermochemical Conversion and Characterization for Supercapacitor Applications Buse Ecevit, Mehmet A. Ilgaz, Görkem D. Karaaslan, Tugba B. Maden, Yıldıray Topcu, Selim Ceylan, Sevim Alışır, Berker Fıçıcılar, Burak Tekin
PP24. Use of Biodegradable Mulch in Vegetable Production Burak Tüzen, Aysun Pekşen, Yüksel Ardalı, Mustafa Sağlam, Serkan İç
LUNCH – 13:00 / 14:00
SYMPOSIUM FINAL SESSION – 14:00 / 15:30 **MODERATOR: PROF. DR. YAVUZ UNAL**

KEYNOTE SPEAKERS

ACTING AND DESIGNING FOR THE CLIMATE EMPOWERMENT FOR CHILDREN AND YOUNG PEOPLE

Aktan ACAR[1]

*[*1] TOBB University of Economics and Technology, Faculty of Architecture and Design, Department of Architecture, Ankara, Türkiye - 0000-0001-7243-3575*

*Corresponding author e-mail: aktanacar@etu.edu.tr

ABSTRACT

Climate, and all the other forces, mechanisms, everything belonging to the very nature of the planet are not against our existence on earth. Even climate change is a result of complex interactions of natural and artificial elements and forces. It is crucial to comprehend that we should be fighting carbon emission rates, gobbling up of natural resources, and consumerism, instead of climate and the other natural forces.

To enhance our and next generations' capability of making that vital distinction, and learn to be in harmony, balance and most importantly mutual communication with planet earth, we need to benefit from art, design and architecture. We must fabricate new ways of creative communication among humanity, its edifices, and nature. We must encourage and empower children and young people to discover the creative communication, adaptation and collaboration skills through design that would help them to recognise and appreciate the planet they live in and interact.

It is also significant to build and enhance the cross-generational and cross-community interactions. They have different knowledge and skills that would be shared and utilized.

In this respect, I will present some examples of our design and built workshops concerning the issues mentioned above. They offer a perspective for the preparation and adaptation strategies of the next generations for the future of our planet.

I will share three workshops in which primary – elementary school children and first-year architecture students collaborate; a design and built activity for architecture students from different years; and novel interdisciplinary material experiment concerning innovative use of concrete for biodiversity and ecosystem services.

Keywords: climate crisis, design learning, creative collaboration, design and build workshops

BATHING WATER MONITORING ALONG TURKISH COASTS AND INTERNATIONAL BLUE FLAG AWARD SCHEME

Almila KINDAN CEBBARI[1]

*[*1]Foundation for Environmental Education in Turkiye, Blue Flag National Operator, Ankara, Turkiye*

*Corresponding author e-mail: mavibayrak@turcev.org.tr

ABSTRACT

Bathing water quality monitoring is one of key instruments for the protection of public health when they are using bathing waters and coastal areas for recreation. It is different than monitoring surface water quality as bathing water quality directly deals with and main focus is human health. In this study, bathing water monitoring quality criteria constituted originally by European Union Bathing Water Quality Management Directive 2006/7/EC repealing Directive 76/160/EEC, as Blue Flag International criteria is based, is to be explained and bathing water monitoring implementations along Turkish coasts will be presented.

International Blue Flag Programme is one of the main data processor of bathing water monitoring results and seeks for excellent bathing water quality framed with 5 different criteria set including sampling, analyzing, assesment standards as well as risk asssesment of bathing areas named as bathing water profiles stated in above mentioned 2006/7/EC Directive adopted to Turkish directive as Yüzme Suyu Kalitesinin Yönetimine Dair Yönetmelik issued in the year 2019.

This oral presentation will also include general view of statistical data covering the number of bathing water sampling water points, pollution monitoring points, excellent ones and Blue Flag awarded sites.

Keywords: Bathing water quality, Blue Flag

IMPORTANCE OF ALTERNATIVE WATER RESOURCES IN ADAPTATION TO CLIMATE CHANGE

Ayşegül TANIK[1]

*[*1]Istanbul Technical University, Faculty of Civil Engineering, Department of Environmental Engineering, Istanbul, Türkiye- ORCID ID: 0000-0002-0319-0298*

*Corresponding author e-mail: tanika@itu.edu.tr

ABSTRACT

As water resources are getting limited due to increase of population, urbanization efforts, mass housing and lessening of clean receiving water bodies together with the effect of climate change; searching for alternative water resources have accelerated all around the world especially in countries/regions experiencing water scarcity and shortage. The common alternatives of concern in adaptation to climate change are mainly rainwater harvesting, greywater reuse, reuse of treated wastewater and desalination of seawater. In the presentation, all these four alternatives will be introduced and defined based on their advantages and disadvantages. The oldest technology known among these alternatives is rainwater harvesting and storing rainfall in cisterns, and later use it for any domestic needs including drinking and cooking. The main weakness of this technology is that equal precipitation is not experienced everywhere; therefore, rainy regions form the luckiest areas in collecting this cleaner water resource. Greywater is the domestic wastewater excluding the septic/toilet water forming the weakly polluted part of domestic discharges. This water resource can easily be treated within the building where it is being collected and reused especially for flushing water which almost constitutes 25-30% of domestic water uses. Moreover, this water resource may even be used in cleaning the indoor environment, as laundry water or for garden irrigation and car washing as an outdoor application. Domestic consumption may decrease by around 50% through greywater reuse and rainwater harvesting leading to high water savings. Treated wastewater is commonly used in irrigation of different types of crops that have already been stated in many national legislations including Turkey. Thus, high amounts of irrigation water may be reduced via the reuse of treated water. The final resource is preferred at the coastal countries and regions, as it is the saltwater purification by means of membranes. Through this advanced technology, water at drinking water quality may be obtained and served to coastal regions particularly in the water deficient coastal areas. All these referred alternatives have started to attract the interest of the world through facing freshwater decreases due to climate change.

Keywords: Desalination of seawater, rainwater harvesting, greywater reuse, reuse of treated water, alternative water resources

CLIMATE CHANGE AND POSSIBLE EFFECTS ON FOOD CONSUMPTION PROFIL

Aziz EKŞİ[1]

*[1]İstanbul *Topkapi University, Facuulty of Finearts, Design and Architechture, Department of Gastronomy and Culinary Arts,* İstanbul,Turkey

ORCID ID: 0000-0002-8769-4476

Corresponding author e-mail: azizeksi@topkapi.edu.tr

ABSTRACT

Climate change is defined as one of the most important problems facing humanity. Backwards, this problem is caused by global warming, and global warming is caused by greenhouse gas emissions (GHGEs). Therefore, different alternatives are discussed for reducing HGG emissions. One of these alternatives is to change the current food consumption profile (shifting diet), and the other is to increase the consumption of novel food (insect, artificial meat, etc.).

In general, GHG emissions per kg of protein are higher in animal foods than in plant foods. Likewise, ruminant animals (cattle etc.) have more GHSE than other animals (such as poultry). On the other hand, in order to be protected from the negative effects of climate change, it is also necessary to reduce the water used for food production, and the water requirement for plant foods is lower than for animal ones.

Therefore, a shift in the daily diet is expected from red meat to poultry, from animal protein to vegetable protein. However, this is likely to lead to nutritional deficiencies (in terms of essential amino acids and minerals). It is also estimated that people will not be able to give up their red meat consumption easily.

Due to the possibility of this nutritional deficiency, novel foods such as insects and artificial meat have come to the fore. Although more than 2000 edible insect species are mentioned, and artificial meat production has also started in the laboratory, it is not clear whether these foods will be accepted by most of the world's population.

Keywords:climate change, food consumption, shifting diets, novel foods, food security

THE CLIMATE CRISIS AND THE FUTURE OF SUSTAINABILITY: RESPONSIBILITIES AWAITING US

IN THE TRANSITION TO A LOW CARBON ECONOMY

B. Aylin Alagöz

*[1]*Integrated Reporting Association Turkey (ERTA)*

*Corresponding author e-mail: aylin@entegreraporlamatr.org/aylin.zeren@boun.edu.tr

ABSTRACT

All the countries are going through a period in which the global economy and trade rules are being shaped around a "carbon-neutral future" aimed at "sustainable" economic growth. According to WEF Global Risks Report 2022; environment related risks such as climate action failure and extreme weather events were recognized as the top 10 global risks. IPCC 6th Assessment Report also warns that if global warming exceeds 1.5 degrees, "human and natural systems will face additional serious risks, including some that are "irreversible".

In this direction, the European Union (EU) announced that it would reshape all its policies on the axis of climate change with the EU Green Deal announced in 2019, and set the goal of being a carbon-neutral continent by 2050. With the EU's announcement of its green transformation goals, Carbon Border Adjustment Mechanism and "Fit for 55" Package; the policies in the field of combating climate change gained momentum in many countries such as Turkey, which have commercial relations with EU.

With Turkey's signing of the Paris Climate Agreement and setting net zero targets, followed by the published "Green Deal Action Plan of Turkey" in 2021, "Climate Summit 2022", the enactment of Turkey's Sustainability Reporting Standards Law and the preparation of Turkey's Taxonomy and Turkish Climate Law; the governmental and regulatory institutions have begun to focus more on sustainability.

In this transition, it is very critical to develop a sustainable ecosystem that supports a low-carbon, resource-efficient economy for Turkey through the promotion of the use of circular economy applications, renewable energy technologies, sustainable supply chain management and digital technologies.

Keywords: Circular economy, climate change, green deal, low carbon.

LANDSLIDE: ONE OF THE MOST IMPORTANT NATURAL HAZARDS OF CLIMATE CHANGE FOR THE BLACK SEA REGION

Candan Gokceoglu

Hacettepe University, Engineering Faculty, Department of Geological Engineering, Ankara, Turkey ORCID ID : 0000-0003-4762-9933

Corresponding author e-mail: cgokce@hacettepe.edu.tr

ABSTRACT

Landslides are one of the important natural hazards in Türkiye. Earthquakes and rainfall are the natural triggers for landslides. Especially, in the Black Sea Region of Türkiye, rainfall-triggered landslides are common. Depending on climate change, the rainfall regime also changes, and short-term intense rainfall contributes to the occurrence of landslides. In this presentation, a general review of the rainfall-induced landslides is performed and some examples of meteorological catastrophes resulting in landslides are given. Climate change is evident and hence, some unexpected and severe rainfalls are unequivocal in the Black Sea Region of Türkiye. As a result of climate change, landslides are undisputable. This is extremely important for the Black Sea Region of Türkiye. In order to reduce the loss of life and economic damage caused by landslides, public education is a fundamental requirement.

Keywords: Blacksea, climate change, landslide

GM CROPS AND CLIMATE

Cengiz SANCAK[1], Sebahattin ÖZCAN[2]

*[*1] Ankara University, Faculty of Agriculture, Ankara, Türkiye- ORCID 0000-0002-3091-2639*

[2] Ankara University, Faculty of Agriculture, Ankara, Türkiye - ORCID 0000-0001-5127-1482

*Corresponding author e-mail: sancak@ankara.edu.tr; cengiz.sancak@gmail.com

ABSTRACT

The cultivation area of genetically modified (GM) crops has exceeded 190 million hectares worldwide. In most of this cultivation area, herbicide-tolerant soybean and rapeseed, and insect-resistant cotton and corn are produced. In addition to these main GM plants, transgenic sugar beet, alfalfa, potato, squash, papaya, apple, pineapple and eggplant species have also been commercially produced in many countries. With the production of transgenic plants, an increase in yield is achieved and significant returns are obtained in terms of environment and health. As a result of the production of plants tolerant to herbicides, soil cultivation can be reduced as well as obtaining optimal yield. Less tillage reduces greenhouse gas emissions and erosion and gives less damage to the soil structure. By producing insect-resistant GM crops, farmers can control insects without using chemical pesticides. With this production, greenhouse gas emissions can be reduced as a result of not using agricultural machinery for insecticide spray. In addition, the increase in yield obtained by the cultivation of transgenic plants will reduce the need for new agricultural areas, thus helping to reduce CO_2 emissions.

The increase in temperature, drought and floods that occur with global warming not only causes yield loss, but also reduces the seed setting rate of plants, grain quality and weight, and germination and growth. Moreover, these changes disrupt the physiological and metabolic functions of plants from planting to maturation. In recent years, important studies have also been carried out to develop GM crop plants that are tolerant to environmental stress conditions such as drought and high temperature in many plant species such as wheat, corn, rice, tobacco, soybean, sugarcane, cotton and potato, and significant results have been obtained. With the introduction of these plants into production, the negative effects of drought and high temperature can also be reduced.

Keywords: Transgenic plants, stress tolerance, global warming, CO_2 emission

THE ROLE AND IMPORTANCE OF CULTURAL ECOLOGY IN COMBATING CLIMATE CHANGE

Cevdet Yılmaz[1*]

Ondokuz Mayıs University, Department of Geography,Samsun

*Corresponding author e-mail: cyilmaz@omu.edu.tr

ABSTRACT

In the thousands of years that passed until the 19th century, human beings survived to the extent that they adapted to the natural environment in which they lived, otherwise they perished. In the last two centuries, people have gained superiority over their environment with industrialization and the technical possibilities it brings, and have changed it rapidly. In the meantime, it used fossil fuels abundantly and created many environmental problems, especially global climate change, and transformed the world into a place with pathological disorders. One of the biggest problems encountered on a global scale is climate change. There are numerous research and publication activities related to this problem, and new ones are added every day. One of the areas to be considered among these is the cultural ecology approach.

This branch of science, which focuses on how people benefit from their environment without harming it, can bring some solutions to global climate change problems, albeit partially. Namely; Although not at the current level, human beings have always encountered natural disasters such as drought, flood, frost, and extreme cold, mostly related to climate, in order to survive, they have learned to cope with these problems and developed numerous skills in this direction. Today, in rural areas where technology has not yet entered with all its elements, people can adapt to their environment by using many methods without consuming fossil fuels and polluting the atmosphere, and they can survive without disturbing the natural balance. For example; In today's cities, the amount of energy consumed for cooling houses in summer and heating in winter is quite high. However, with the application of summer and winter floors in traditional Turkish houses, people have lived the most efficient life with the least fuel, and have been able to realize a sustainable lifestyle without destroying their environment. Likewise, many people today are faced with quite heavy bills by storing them in electric coolers to extend the shelf life of foods. However, for thousands of years, our people living in the rural areas of Turkey have been able to develop very important methods for preserving their food and extending their shelf life without benefiting from exhaustible energy sources.

As a result, we can also benefit from traditional knowledge and methods in solving the global problems we face today. We can benefit from on-site solutions to the problems that human beings have experienced and encountered. We can learn from them. More importantly, while scientists are looking for solutions on a global scale, people who are experiencing these problems, such as those facing the threat of sea level rise, can follow what kind of solutions they come up with to survive in their current environment. The solutions they find can guide us in saving our world. For all these, the human-nature relationship should be looked at more closely, and the solutions determined in the context of cultural ecology should be developed as suggestions for the solution of global problems by spreading them out.

Keywords: Culture, Ecology, Climate change

coforclimate.omu.edu.tr

STUDYING THE DEMAND FOR CLEANER VEHICLES AND CHARGING INFRASTRUCTURE:

AN OVERVIEW OF ASSOCIATED FACTORS AND ARISING ISSUES

Dimitris Potoglou[1], Rongqiu Song[1], Emma Hopkins[1]

*[*1]Cardiff University, School of Geography and Planning, Cardiff, Wales, UK - ORCID ID: 0000-0003-3060-7674*

*Corresponding author e-mail: potogloud@cardiff.ac.uk

ABSTRACT

This paper provides an overview and critical assessment of the published literature in two research areas: demand for cleaner vehicle technologies - with emphasis on electric vehicles - and the emerging stream of studies related to the demand for electric-vehicle charging. Consumer-demand for cleaner vehicles has been based on two approaches: 'psychological measurement of consumer intentions to buy cleaner cars' and 'econometric approaches' looking at the consumers' trade-offs between purchase price and other vehicle characteristics including range between recharging. The paper argues for the use of stated choice methods as they allow for the development of 'what if' scenarios and the valuation of a range of vehicle attributes. The paper further discusses choice-based (revealed and stated choices) studies aimed at capturing consumer choices for public charging of electric vehicles focusing on site characteristics, sources of individual taste heterogeneity and potential areas of future research. Finally, the paper defines the concept of 'social equity' in the context of electric-vehicle infrastructure deployment, it argues on the importance of social equity on charging infrastructure and considers best practices for its future deployment.

Keywords: cleaner vehicle demand, electric vehicles, electric vehicle charging infrastructure, social equity

SUSTAINABLE POSTHARVEST TECHNOLOGIES OF HORTICULTURAL PRODUCTS TO REDUCE CARBON FOOTPRINT

Fisun G. Çelikel

Ondokuz Mayıs University, Agricultural Faculty, Department of Horticulture, Samsun, Türkiye
ORCID ID https://orcid.org/0000-0002-4722-2693

e-mail: fgcelikel@omu.edu.tr

ABSTRACT

Unfortunately, we lose a significant part of produced horticultural crops after harvest. The lost product has a huge carbon footprint. The most important postharvest factor in maintaining quality and preventing losses of perishable products is temperature. The cut flowers, fruits and vegetables that are not sensitive to chilling injury should be stored close to 0°C. This, however, requires more energy for cooling and thus needs the use and development of sustainable cooling principles. One obvious solution for storage facilities is the use of solar power. Various systems have been developed to store surplus energy during the daytime in the form of an ice buffer that can be used during the night to keep the product cool. Other smart cooling principles such as the Quest technology runs on reefer containers. These aid in saving energy and lowering the carbon footprint during refrigerated transport. Cut flowers and other horticultural products should be transported at low temperatures to keep them fresh from grower to consumer. However, refrigerated trucks use about 25% more fuel than non-refrigerated ones. Shipping containers by sea is a more sustainable alternative to conventional airfreight and overland transport with significantly smaller CO_2 emissions. Eco-friendly treatments are another important issue in sustainability of horticultural industry. After harvest, cut flowers and some other horticultural crops are commonly treated with a range of compounds with the aim to improve the storage performance and to prolong the vase or shelf life. Eco-friendly and sustainable treatments should be preferred to maintain the postharvest quality of horticultural products. Plastics are being replaced by biodegradable packaging, ecofriendly renewable and recyclable materials, new heat-sealable, fiber-based materials from sustainably managed or certified forests, and other sustainable coatings. Novel procedures based on temperature treatments under controlled atmospheres (CATT) can replace the use of harmful chemicals in insect disinfection. Finally, advanced control of the distribution chain from grower till consumer can assure that product losses are minimized, contributing to the sustainability of the value chain for horticultural and agricultural products.

Keywords: temperature, cooling, transport, storage, packaging

READING CORRECTLY GLOBAL CLIMATE CHANGE AND MARINE MICROBIAL RESPONSES

Gülşen Altuğ

*Istanbul University, Faculty of Aquatic Sciences, Department of Marine Biology, Istanbul, Turkiye - ORCID ID 0000-0003-3251-7699

*Corresponding author e-mail: galtug@istanbul.edu.tr

ABSTRACT

Marine bacteria have crucial roles in ecosystem cycles and marine ecosystem functions. This situation necessitates that microorganisms, which are the invisible majority, should be taken into consideration more in all matters affecting ecosystem functioning, especially in global climate change. While international guidelines such as the green deal against the global climate change problem offer suggestions, in this study we focused it to be known that the importance of marine bacteria in ecosystem cycles and as a sources of bio-based innovative methods.

The definition of heterotrophic metabolic changes is important in understanding the local and global importance of microorganisms in climate change biology. Marine bacterial isolates can develop different responses to environmental stress conditions to which they are exposed. It seems inevitable to read these developed answers correctly for each region and to make definitions based on bacterial predictions for understanding ecosystem functioning. That is, possible changes in microbial diversity including pathogens and activities affect the resilience abilities of other organisms and thus their ability to respond to climate change.

While the conditions brought about by global climate change are a additional component in triggering formations such as mucilage in marine environments, bacteria also play a critical role in the fate of these formations. Additionally, because of antibiotic resistant bacteria, aquatic areas appear to reservoirs for global distribution of bacterial resistivity. Bacterial heavy metal/oil hydrocarbon resistance constitute the opportunity dimension of the issue and are important in terms of being a model for environmentally friendly methods in this regard.

In this study, the topics to be considered in reading bacterial responses to environmental changes were evaluated regarding our provious studies with bacteria isolated from the Turkish Seas, and the risks associated with climate change and bacterial opportunities related to green agreement were defined.

Keywords: Marine bacteria, microbial responses, bio-based approach**,**

COMBATING GLOBAL WARMING: PROMISES AND FACTS

Güray Salihoğlu[1]

*[1]Bursa Uludag University, Engineering Faculty, Environmental Engineering Department, Bursa, TÜRKİYE- ORCID ID: 0000-0003-0714-048X

*Corresponding author e-mail: gurays@uludag.edu.tr

ABSTRACT

The climate has changed since the pre-industrial era, mainly caused by human activities. About 1.1°C of global warming above the pre-industrial level is announced, which will likely increase to unlivable levels soon if the current patterns continue. The fact of climate change started to be realized and acknowledged in 1979 when the first world climate conference was held in Geneva. Since then, many meetings have been organized to pursue efforts toward climate change mitigation. In 1988, the Intergovernmental Panel on Climate Change (IPCC) was set up to provide scientific knowledge. In 1992, the United Nations Framework Convention on Climate Change (UNFCCC) was adopted. UNFCC went into force in 1994. The Kyoto protocol, which introduced an emission trading mechanism, was adopted in 1997. The twenty-first UNFCC conference (COP-21) was held in Paris in 2015, which brought an agreement to limit the global temperature increase to 2°C by 2100 and pursue efforts to limit the increase to 1.5 °C. Although there is an abundance of conferences, agreements, and promises, there is growing evidence confirming that current mitigation efforts and future emissions commitments are not sufficient to achieve the temperature goals set by the Paris agreement. Although the dangers of climate change require urgent, large-scale, and systemic changes, the current efforts do not seem to meet such properties. There appears to be a disappointing gap between countries' promises about climate change and their actions. This study aims to analyze the gaps between those promises and the realities. Several concepts and issues, such as European Green Deal, circular economy, packaging waste routes, plastics, electronic waste, recycling, electric vehicles and raw materials, nuclear energy and European taxonomy, the Ukrainian war, and overconsumption, will be critically discussed.

Keywords: UNFCC, Agreements, Circular Economy, European Green Deal, Packaging Waste

USING GREEN CHEMISTRY TO FIGHT CLIMATE CHANGE

Hrissi Karapanagioti[1]*

[1]University of Patras, Department of Chemistry, Patras, Greece - ORCID ID

*Corresponding author e-mail: karapanagioti@upatras.gr

ABSTRACT

Economic development relies heavily on the development of Chemistry. This has led to many benefits but there are also many unexpected consequences. Green chemistry was developed by chemists that realized that there are problems related to the way chemical industry works and shows that several points can be done better. For example, materials and processes can be developed that will be safer for people and more environmentally friendly and at the same time economical. Climate change is one of the problems that can be partially combatted with Green Chemistry. Three (3) out of the twelve (12) principles of green chemistry can be related to climate change: Prevention, Design for Energy Efficiency, and Catalysis. Processes and materials can be used that directly affect the production of carbon dioxide such as the use of renewable energy forms, alternative fuel development such as hydrogen, biomass, biodiesel, and biofuels including first (food source), second (non-food source), third (algae), and fourth (capturing and storing CO_2) biofuel generation. In addition, material that require processes with lower energy consumption are also possible, e.g., the use of more efficient detergents that can be effective at low temperatures. The use of supercritical carbon dioxide for dry cleaning is another example that has a double benefit both on lower energy needs but also on trapping carbon dioxide from the atmosphere. Paints also contain petroleum products which can also be substituted by green alternatives such as recycled PET or soybean oil. All of the above are technical developments that should be evaluated for their suitability and other side effects. For example, it is not desirable to use food resources for energy or chemical industry. At the same time, informed consumers can make a difference by demanding green products and the development of better products and processes.

Keywords: Green Chemistry, biodiesel, generations of biofuels, energy efficiency

CARBON OFF-SETTING OPPORTUNITIES BY AFFORESTATION OF INSTITUTIONAL LAND

Jiaqian Wang[1], David Manning[2], David Werner[3,*]

[1]Jiangsu University, School of the Environment and Safety Engineering, Zhenjiang, P.R.China - ORCID ID 0000-0002-0381-2616

[2]Newcastle University, Faculty of Science, Agriculture & Engineering, School of Natural and Environmental Sciences, Newcastle upon Tyne, United Kingdom

[3]Newcastle University, Faculty of Science, Agriculture & Engineering, School of Engineering, Newcastle upon Tyne, United Kingdom - ORCID ID 0000-0002-6741-1256

*Corresponding author e-mail: david.werner@newcastle.ac.uk

ABSTRACT

Universities in the United Kingdom (UK) and beyond have declared a climate emergency and committed to net zero by 2030 or 2040. It is unlikely that all fossil fuel usage by universities can be phased out within such a short timeframe, and off-setting of difficult to abate carbon emissions such as those from the heating of historic buildings will likely be required. Universities feature amongst the largest landowners in the UK and could take advantage of this land to increase terrestrial carbon storage for carbon off-setting. Newcastle University manages two research farms, where current terrestrial carbon amounts to 103,619 tonnes: 98,050 tonnes of carbon in the top 90 cm of soil, and 5,569 tonnes in the biomass of trees. This carbon is equivalent to 16 years of Newcastle University's scope 1 and 2 carbon emissions at current rates (6,406 tonnes of CO_2-C per year). By changing land use at its farms, Newcastle University could off-set up to 50% of these emissions for a period of 40 years. Converting one of the research farms into a carbon sequestration site with mixed woodland (50% conifers and 50% broadleaved trees) could capture 1,856 tonnes of carbon per year to offset 29% of emissions for a period of 40 years. Reverting land use to increase permanent pastures in line with past land use as shown on a map of one farm from around 1900 (84% pastures, and 16% arable land) could offset 64% of emissions for a period of 5 years. We also considered alternatives such as increasing the number of trees on the university campus, or incorporating biochar into blue-green spaces of a new campus development. Such measures would be desirable from a biodiversity and stormwater management perspective, but are not sufficient to off-set tangible amounts of Newcastle University's carbon emissions.

Keywords: Carbon offsetting, carbon sequestration, agriculture, forestry, universities

LIFE CYCLE ASSESSMENT: A TOOL BETWEEN MEASUREMENT, MODEL AND PRODUCT-SCALE DECISION SUPPORT

Laratte Bertrand[1]*

*[*1]Arts et Métiers Institute of Technology, University of Bordeaux, CNRS, Bordeaux INP, INRAE, I2M Bordeaux, F-33400 Talence, France- ORCID 0000-0002-9169-4305*

*Corresponding author e-mail: bertrand.laratte@ensam.eu

ABSTRACT

The life cycle analysis (LCA) is a tool that aims to assess the potential environmental impacts of a product. This approach is based on different principles (notably the concept of life cycle and multi-criteria) and the exploitation of its results should help in the eco-design of products and services. One of the most important indicators of this method relates to global warming, however the LCA approach does not relate to a global vision of the impact but to the product studied. The idea is therefore to identify the source of the impact and help designers to reduce environmental impacts.

It is important to understand that the LCA is based on calculation models and not on analytical measurements and that the evaluation relates to simple products and not to factories or systems of large scales, it is a useful tool at the product level.

Keywords: Life Cycle Assessment, IPCC, product evaluation

GROUNDWATER: THE KEY WATER RESOURCE FOR CLIMATE CHANGE MITIGATION AND ADAPTATION

Robert M. Kalin[1,*]

[1]Strathclyde University, Department of Civil and Environmental Engineering, Glasgow, Scotland, UK

*Corresponding author e-mail: robert.kalin@strath.ac.uk

ABSTRACT

Groundwater consitutes 98 percent of all of the available freshwater on the planet, and ranges in age from a few months to over 50,000 years. River baseflow is a key component for sustaining ecological balance along the course and in wetlands. Global agriculture and food security is heavily dependant on groundwater resources, and given a generally good water quality, groundwater underpins health and well being for much of the worlds population. The past two decades have witnessed an increasing variability of climate, and with it challenges of water resources management that depends on conjunctive use and management of surface and groundwater resources. Given the time-averaging hysteresis of groundwater systems, they offer not only a unique opportunity to 'smooth-out' variations, but also adaptation resilience if managed with appropriate consideration of the time scales at play. It is a worrying trend that over exploitation of groundwater resources, in particular in low yield arid and semi-arid regions, may exacerbate climate change impacts on economic, energy, and food security. However, given the global volume of groundwater, it is the time-averaged cycle of groundwater recharge and discharge that provides the greatest potential mitigate the effects of an increasing climate variability.

Keywords: Groundwater, Climate Change, Water Resources Management

CLIMATE CHANGE, CLIMATE VARIABILITY: EFFECTS ON HIGH IMPACT WEATHER EVENTS

Meral Demirtaş[1]

*[*1]University of Samsun, Faculty of Aeronautics and Astronautics, Department of Meteorological Engineering, Samsun, Turkey - 0000-0002-3026-9276*

*Corresponding author e-mail: meral.demirtas@samsun.edu.tr

ABSTRACT

Climate gives the statistics of weather for typically over a 30-year period. Climate change may be described in terms of spatial scales (regionally and globally), in the temporal mean of a given atmospheric parameter (e.g., wind, pressure, temperature, precipitation) or in its variability. Changes in climate mean and in variability may lead to the high impact weather events, which can be unusual and extreme than average weather conditions, such as intense heatwaves, severe droughts, heavy precipitation and flash-floods. Since the warmer atmosphere can hold more moisture, it can pave the way for the extreme precipitation events. The Black Sea region is prone to intense precipitation events due to its highly complex topography which makes predictability of intense precipitation difficult. In the summer of 2021, both the eastern and western parts of Black Sea region experienced high impact flash flooding events. In Kastamonu, for example, measured rainfall amounts were close to 500-mm in 48-h, causing fatalities, damages and economical losses of EUR 425 million. The eastern Black Sea region experienced severe flash-floods, which led to some casualties and damages. The 48-hour total precipitations of Güneysu (24- mm), Çayeli (246 mm) and Rize centre (205 mm) were well above July climatological average (158 mm). As well as extreme precipitation events, heatwaves are also very frequent in recent years. It was reported that the global mean surface air temperature for 2015–2019 was approximately 1.7°C above pre-industrial period and 0.3°C warmer than the previous 5-year period. For example, the global mean temperature of 2019 was noted to be approximately 1.1 ± 0.1°C above the 1850–1900 baseline and noted as the second warmest on record. The total number of heatwave days varied from 3 to 48 days for June-July-August 2019 over the Euro-Mediterranean region, which were resulted from 1-6 major heatwaves.

Keywords: climate variability and change, high impact weather, flash-floods, Black Sea region

HYDROGEN ENERGY IN THE EU GREEN DEAL HARMONIZATION PROCESS

Nuri Azbar[1*], Cansu Mayaoğlu Akın[2]

*[*1]Ege University, Engineering Faculty, Bioengineering Department, Izmir, Turkey- 0000-0002-9520-924*

[2] Prongen.Tech A.Ş. Bornova-Izmir, Turkey

*Corresponding author e-mail: nuri.azbar@ege.edu.tr

ABSTRACT

Climate change and environmental degradation in parallel are an existential threat to whole world. To combat and overcome these challenges, the European Green Deal has taken a radical action to transform the EU into a modern, resource-efficient and competitive economy, ensuring: no net emissions of greenhouse gases by 2050; economic growth decoupled from resource use; no person and no place left behind. In order to realize the target to be Europe climate neutral by 2050, the Commission proposed the European Climate Law, which also sets more ambitious net greenhouse gas emissions reduction target of at least -55% by 2030, compared to 1990 levels. This dictates a groundbreaking change in energy consumption habit of humankind. In this regard, hydrogen seems to be a great game changer with its endless production potential and zero emissions after use.

Keywords: Green deal, net zero carbon, renewable energy, hydrogen, carbon footprint

CLIMATE CHANGE AND HYDROMETEOROLOGICAL DISASTERS IN TÜRKİYE

Ömer Lütfi Şen[1]

*[*1]Istanbul Technical University, Eurasia Institute of Earth Sciences, Istanbul, Turkey- ORCID ID 0000-0002-8186-8594*

*Corresponding author e-mail: senomer@itu.edu.tr

ABSTRACT

Global warming has been causing significant impacts on the components of the climate system. Glaciers and sea ice are melting, sea level is rising, and precipitation patterns are shifting. In addition to these primary impacts, it is also causing extreme climate events to be more intense, longer duration and/or more frequent. During recent years, it has become common to hear about severe climate events inflicting severe damage to natural and human systems that are at unprecedented scales. The Pakistan flooding last summer triggered by torrential monsoon rains and a heatwave induced glacier melt caused nearly 2000 deaths and left tens of thousands of people homeless. More recently, the category 4 hurricane Ian left a trail of death and significant destruction in Puerto Rico, Cuba and the state of Florida. Recent years, different parts of Türkiye have also experienced destructive climate events, including wildfires, floodings and landslides. In 2021 summer, for instance, a severe flooding event in Kastamonu province triggered by torrential convective rainfall caused more than 100 deaths and significant damage to the settlements along the river. In this study, we explore the historical and possible future changes in the daily and sub-daily annual maximum rainfall in Turkey that could cause disastrous flooding and landslides. The historical data come from 63 stations from 1970 to 2015. In general, the historical changes show an increasing tendency in the sub-daily extreme rainfall all around Türkiye, but the increases in Black Sea, Marmara and Aegean regions are more pronounced for the very short duration extremes (i.e., 2 hours and less), and those in Mediterranean region are more remarkable for the longer duration extremes (i.e., 12 hours). The climate change projections indicate that the increasing trend will continue in the future, however, the sub-daily rainfall in the Black Sea region will get more intense. Given the fact that this region is already prone to frequent severe flooding and landslide events, we may expect them to be more catastrophic in the future as a result of climate change.

Keywords: Global warming, Sub-daily rainfall, floods, landslides

CLIMATE CHANGE AND ENERGY: SUSTAINABLE SOLUTIONS THROUGH GREEN TECHNOLOGY AND ENERGY CONVERSION EFFICIENCY

Şule Erten Ela[1]

[1]*Institute of Solar Energy, Ege University, Izmir, Turkey - 0000-0001-9512-4919*

*Corresponding author e-mail: sule.erten@ege.edu.tr

ABSTRACT

Sector activities such as energy, industry, agriculture and transportation negatively effect the environment. These can be a regional and an ultimately global in nature and pollute air, water and soil resources. In recent years, environmental pollution and climate change, caused by greenhouse gas emissions, are among the most important problems that concern the whole world. In particular, the increase in energy use and energy-related activities and dependence on fossil resources cause an increase in greenhouse gases, which brings along the problems of global warming and climate change as a general result. In the development of countries, it is necessary to consider the effects of energy on the environment and take steps to protect the environment. Energy and the environment are important for economic development. One way to eliminate the negative effects of fossil fuels is to increase investments in renewable energy. Solar energy investments need to be increased in terms of renewable energies. The fact that the sun is sustainable as a clean and continuous energy source should be encouraged to increase research and studies in this field.

With this aspect, new generation solar cell technologies are interesting because of their increasing efficiency every day. The development of dye-sensitized solar cells, organic solar cells, solid-state dye-sensitized solar cells, perovskite solar cells are undoubtedly the most studied research topics in the world. Compared to other technologies, recycling processes can be carried out easily without harming the environment. Here, the studies carried out in the world on this subject and the results of the studies carried out in our Institute will be shared, and our cooperation with important institutions in this field over the world and the support we have given to the development of technology will be discussed.

Keywords: Energy, climate change, renewable energy, new generation solar cells, DSSC, OPV, Perovskite solar cells

THE IMPACT OF GLOBAL CLIMATE CHANGE ON AGRICULTURE AND WATER RESOURCES

Yusuf Demir[1]

1Univercity of Ondokuz Mayıs, Agricultural Faculty Agricultural Structures and irrigation department, Samsun, Turkey. 0000000177344678

*Corresponding author e-mail: yusufdd@omu.edu.tr

ABSTRACT

The climate change experienced in the world in recent years shows an increasing effect in our country as well. The increase in meteorological events, changes in the precipitation regime, and increases in sea water temperature directly affect our quality of life. It is a known fact that climate change shows its most important effects on water and water resources. The fact that the waters experience changes in time and space directly affects and concerns all humanity. Climate change, along with the impact of water resources, also affects agriculture. The increased risk of drought, especially from the equator to the poles, triggers the shift of agricultural production towards the poles, making sustainable production difficult.

Keywords: Climate change, agriculture, water

THE THREAT OF TOXICITY IN WATER RESOURCES OF CLIMATE CHANGE IN THE FUTURE!
IS IT POSSIBLE TO BE NON-TOXIC IN WATER SOURCES?

Yüksel Ardalı[1*]

*[*1]University of Ondokuz Mayıs University, Faculty of Engineering Faculty, Department of Environmental Engineering, Samsun, Türkiye- https://orcid.org/0000-0003-1648-951*

*Corresponding author e-mail: yuksel.ardali@omu.edu.tr

ABSTRACT

This study identifies key threats to water resources and estimates their impact on water availability and water quality as a result of climate change and human activities in the coming years. The main risks to water availability are climate change and variability, water regulation and extraction, stopping activities such as small water collection dams, land use change and forest regeneration after forest fires, as well as human activities and the limitation of use of water resources from past to present. Since 2000, in parallel with the gradual decline in storage levels due to the inability of water to be absorbed by the soil despite high precipitation, environmental water as a result of human activities such as hydroelectric power plants has resulted in a significant impact on the environment from reduced runoff and allocations to protect drought havens for plants and animals. More severe and expanded water restrictions for towns will affect households, industry and society, and recreational activities. Additional impacts on crops and pastures occur due to declining water quality for domestic and stock use and irregular rainfall. There are longer-term restrictions on unregulated river and groundwater systems. Increased use of groundwater as an emergency water source and reduced groundwater recharge will pose problems. It is the decrease or impossibility of usability of water resources as a result of pollution as a result of human activities. In addition, the decrease in the amount of water with climate change will increase the concentration of pollutants, and the disasters caused by the climate crisis and the decrease in the conservation of resources pose a threat for us in the future.

Keywords: climate change, water resources, hazardous waste, water availability, Black Sea Region.

TRANS-DISCIPLINARY APPROACH TO THE IMPACT OF STRONG WINDS AND STORMS ON CULTURAL HERITAGE

Prof. Dr. Zerrin Toprak Karaman[1]

[1]*Dokuz Eylul University Faculty of Economic and Administrative Sciences, Department of Public Administration*

*Corresponding author e-mail: zerrin.toprak@deu.edu.tr

ABSTRACT

Due to the triggering effect of climate change, meteorological issues such as strong winds, storms and tornadoes have become visible also in Turkey in the 2000s. The negative environmental impacts and service disruptions caused by weather events, including the deadly consequences in nature, have increased and have become frightening. There seems to be no issue that is not affected by the phenomenon of strong winds and storms that have spread throughout the country. When the records taken from the General Directorate of Meteorology are evaluated, it is seen that the speeds of winds around Turkey have reached the limit that causes them to be categorized as storms. In addition to the winds, the phenomenon of fire has put the issues of human-induced accidents and terrorism on the agenda. Although to this date, the author accepted the "protection from people" approach on which the principles of "protection of cultural assets" are based, this article focuses on the connection of the "storm phenomenon" and "effects on cultural assets" in Turkey in its entirety. Problem solving methodology involves an interdisciplinary approach.

Keywords: Storm, Disaster Administration, Cultural Heritage, Trans-disciplinary, Interdisciplinarity

PAPER PRESENTATION

PHARMACOLOGY AND TOXICOLOGY OF CANNABIS

Abdurrahman AKSOY[1], Zeyno NUHOĞLU ÖZTÜRK[1], Enes ATMACA[1]

*[*1]Ondokuz Mayıs University, Faculty of Veterinary Medicine, Department of Veterinary Pharmacology and Toxicology, Samsun,Turkey- 0000-0001-9486-312X-0000-0002-1080-2926-0000-0002-8978-3755*

*Corresponding author e-mail: abaksoy@gmail.com

ABSTRACT

Cannabis (*Cannabis sativa*), origins dating back to antiquity, has been used for thousands of years worldwide in various fields such as food, clothing, construction, textiles, paper, and medicine. Cannabis, most commonly used as medicine, is also one of the most abused plants. Cannabis contains many cannabinoids, especially D^9-tetrahydrocannabinol (THC) and cannabidiol (CBD). In recent years, the characterization of cannabinoid receptors and uncovering the role of second-messenger systems at the cellular level have primarily understood the mechanism of action of these compounds. Cannabinoids exert pharmacological effects by binding to the cannabinoid receptor subtypes CB_1 and CB_2. These receptors, along with endogenous cannabinoids and the association, oxidation, reduction, and cleavage reactions of these cannabinoids, are referred to as the endocannabinoid system. Toxic effects associated with cannabis are divided into acute and chronic toxicity. Acute toxicity studies in animals often focus on THC, the main psychoactive component of cannabis. Chronic toxicity studies, on the other hand, draw attention to the effects on various animal tissues and systems due to long-term exposure to this compound. These effects include respiratory and pulmonary lesions, neurotoxicity, tolerance, addiction problems, immune and endocrine system disorders. Cannabinoids found in cannabis are used to treat many diseases and symptoms. Cannabinoids play an essential role in the symptomatic treatment of nausea, vomiting, pain, insomnia, post-traumatic stress disorder, anxiety, anorexia, Tourette syndrome, and epilepsy. Research on cannabis demonstrates its medicinal value. Although the use of the plant has been banned in many countries for many years, this plant, whose value is appreciated every day, is being legalized for the treatment of various diseases that affect both human and animal health. In this presentation, the history, chemical content, pharmacokinetics and pharmacodynamics, toxicological evaluation and clinical use of the cannabis plant are presented.

Keywords: Cannabinoids, cannabidiol (CBD), D^9-tetrahydrocannabinol (THC), endogenous cannabinoids, cannabinoid receptors.

DISASTER MANAGEMENT AND GLOBAL CLIMATE CHANGE IN TURKEY

Afşin Ahmet KAYA

Ondokuz Mayıs University, Disaster Education and Management Application and Research Center, Samsun, Türkiye- 0000-0003-2082-6478

*Corresponding author e-mail: afsinahmet.kaya@omu.edu.tr

ABSTRACT

Disasters are the results of events that disrupt daily life with many aspects such as social, economic and cultural, exceed the local possibilities and leave them in need of national and international assistance, and cause deaths and destructions due to overcapacity. So disaster is a result. It is not a stand-alone event. All of the studies carried out to minimize vulnerability in disasters are a management strategy and require a multidisciplinary approach. This management is called disaster management. The aim of the integrated disaster management, which carries out risk and crisis management together, is to keep the risks caused by the identified hazards at the most reasonable level. Because it is not possible to reset the risk.

Studies on climate in our country have come to the fore with the United Nations Framework Convention signed in 2004 and the Kyoto Protocol signed in 2009. The Paris Climate Agreement, signed in 2016, passed the approval of the Turkish Grand National Assembly (TBMM) in 2021 and includes important sanctions on behalf of Climate. The Ministry of Environment and Urbanization changed its name to Ministry of Environment, Urbanization and Climate Change. "Turkey Climate Change Strategy/IDES (2010-2023)", which includes planning and future steps within the scope of combating climate change. It is the first climate change strategy document of our country. Later, the document "Republic of Turkey Climate Change Action Plan/IDEP (2011-2023)" was published. Turkey's Climate Change Adaptation Strategy and Action Plan (2011-2023) aimed to combat the effects of climate, reduce greenhouse gas emissions and adapt to the climate.

Keywords: Disaster Management, Global Climate Change, Risk Reduction

CLIMATE CHANGE AND HEALTH

Ahmet Tevfik SÜNTER[1]

*[*1]Ondokuz MayisUniversity, Faculty of Medicine, Department of ublic Health, Samsun, Türkiye- ORCID ID0000000272649760*

*Corresponding author e-mail: asunter@omu.edu.tr

ABSTRACT

Climate change is the single biggest health threat facing humanity, and health professionals worldwide are already responding to the health harms caused by this unfolding crisis. The climate crisis threatens to undo the last fifty years of progress in development, global health, and poverty reduction, and to further widen existing health inequalities between and within populations. Climate change is already impacting health in a myriad of ways, including by leading to death and illness from increasingly frequent extreme weather events, such as heatwaves, storms and floods, the disruption of food systems, increases in zoonoses and food-, water- and vector-borne diseases, and mental health issues.

Between 2030 and 2050, climate change is expected to cause approximately 250 000 additional deaths per year from malnutrition, malaria, diarrhoea and heat stress alone. The direct damage costs to health are estimated to be between US$ 2–4 billion per year by 2030. Areas with weak health infrastructure – mostly in developing countries – will be the least able to cope without assistance to prepare and respond.

WHO supports countries in building climate-resilient health systems and tracking national progress in protecting health from climate change, as well as in assessing the health gains that would result from the implementation of the existing Nationally Determined Contributions to the Paris Agreement, and the potential for larger gains from more ambitious climate action. WHO's work plan on climate change and health includes; advocacy and partnerships, monitoring science and evidence, supporting countries to protect human health from climate change and building capacity on climate change and human health.

Keywords: Climate change, health, climate-resilient

DECOLORIZATION AND NEUTRALISATION OF LOCAL DYEING EFFLUENTS USING PHYTO-ADSORBENTS MATERIALS

***Albashir Yasir[1,2,3], S. M Gumel[2], Sule Erten Ela[3], Ismail Muhammad[3,4]**

[1]Federal University Dutsinma, Faculty of Physical Sciences, Applied Chemistry Department, Dutsinma, Nigeria

[2]Bayero University Kano, Faulty of Physical Sciences, Pure and Industrial Chemistry Department, Kano, Nigeria

[3]Solar Energy Institute, Ege University, Bornova/Izmir, Turkey

[4]Umaru Musa Yar'adua University Katsina, Ibrahim Shehu Shema Centre for Renewable Energy Research, Katsina, Nigeria

*Corresponding Author email address: ayasir@fudutsinma.edu.ng

ABSTRACT.

Access to clean water is among the most critical issues for global health and development. According to the United Nations Development Program, 2.6 billion people lack access to clean water, and around 40 developing countries provide clean water for less than 70 % of their population. Access to clean water that can be used and consumed without risk of acute or long-term impact on health and the environment is important for sustainable development and poverty reduction. The environmental issues associated with untreated dyeing effluents that are discharged directly to waterways are aesthetic and can also disturb photosynthesis and affect aquatic life. Adsorbents are substances that attract other materials or particles to their surfaces, the extent of adsorption depends on the nature of the adsorbent, especially its porosity and surface area. In this research, cost-effective and environment-friendly adsorbents were used to decolorize and neutralized the local dyeing effluent, thus; managing the effluent to save our environment. The maximum percentage decolorization and neutralization of the local dyeing effluent by different adsorbents (un-powdered) were obtained at an optimum contact time of 48 hours and 72 hours with an optimum adsorbent dosage of 15g and 20g. The powdered adsorbents were obtained at an optimum contact time of 12 hours and 18 hours with an optimum adsorbent dosage of 5g and 7.5g. The result shows that Phyto-adsorbent materials can be used to pre-treat effluents from the dyeing process prior to discharge into waterways to save the environment.

Keywords: Effluents, Adsorbents, Environment, Water Treatment, decolorization.

ECOLOGICAL FOOTPRINTS OF HEMP

Ali Kemal AYAN [1] , Selim AYTAÇ [2] Büşra TİK [1] Mert ARSLANBAYRAK[1]

[1] Ondokuz Mayıs University, Faculty of Agriculture, Department of Field Crops, Samsun,Türkiye*

0000-0001-7981-6288/ 0000-0002-6104-6585/ 0000-0002-9584-6564

[2] Ondokuz Mayıs University, Hemp Research Institute, Samsun,Türkiye

0000-0002-6544-8717

*Corresponding author e-mail: akayan@omu.edu.tr

ABSTRACT

In our world, the decrease and pollution of natural resources has led industries and scientific circles to seek more sustainable and renewable products.

Cannabis, originating from Central Asia, has formed a history of approximately 3500 years by adapting to soil, climate and ecological conditions in Anatolia. On the basis of cultivation of the cannabis plant, its ecological footprints show much cleaner production compared to other fibrous plants with its oxygen production, carbon dioxide assimilation, conscientious use of water, being an ideal alternation plant, its resistance to diseases, pests and weeds. Also, Hemp is a good candidate for phytoremediation of heavy metal-contaminated soils in terms of absorbing and accumulating heavy metals due to its very high biomass.

Eco-friendly, low-cost, easy-to-process and high-value-added renewable products with high mechanical properties can be produced from hemp. Textile, Automotive, Construction, cosmetics and medical etc. exhibiting antistatic, antiallergic, antimicrobial and biological behavior besides traditionally produced products. new generation products are being developed.

On the basis of hemp agricultural activities and industrialization, the low carbon and water footprint and the development of edible new generation products create hope for sustainable and clean production. In this article, we examine the belief that this ecological and economic structure will have positive effects on climate change that threatens the world.

Keyword: Hemp, Sustainability, Footprint, Climate change

WETLAND CHANGES AND BIRDS IN TURKEY

Arif Cemal Özsemir[1], Berkay Yılmaz[2]

*[*1]Ondokuz Mayıs University, Bafra MYO, Samsun, Türkiye- 0000-0002-2593-8826*

[2] Balıkesir University, Sosyal Bilimler Enstitüsü, Balıkesir, Türkiye- 0000-0003-4907-3588

*Corresponding author e-mail: acemal.ozsemir@omu.edu.tr

ABSTRACT

Wetlands are a collection of intertwined natural systems containing many sensitive ecosystems, home to an estimated 12% of all animal species that have remained intact as genetic reservoir areas. There are a total of 95 wetlands in Turkey, 14 of which are Ramsar, 59 of which are of national importance and 22 of which are of regional importance. The total protected area is approximately 868.939 ha. of the 494 bird species identified in Turkey, 364 (approximately 74%) have been observed in the Kızılırmak Delta, and 155 (approximately 32%) of these species that can only survive in wetlands. Wetlands in Turkey, as in the whole world, tend to shrink and disappear. The biggest effect that triggered this extinction stands out as anthropogenic effects. Unsustainable use of water in agriculture, construction of dams on streams without determining the effects on wetlands, pollution of wetlands by domestic and industrial wastes, and implication of foreign fish species without examining the biology of fish species living in wetlands are among the factors that trigger extinction.

According to the results of the mid-winter water bird censuses carried out in January and February for many years in Turkey, it has been observed that there is a decreasing trend in the number of waterfowl counted in wetlands in some species. Especially in the Konya Closed Basin, with the increase in irrigated agriculture, the groundwater feeding the wetlands has been used much more, and after the dry winters, the Meke and Akşehir lakes have completely dried up. Birds such as Flamingo and Angıt, which use the area the most, and dozens more have left the area.

As a result, instead of accepting water as a cheap and accessible resource, we should consider it as a difficult and expensive resource and determine sustainable agricultural policies.

Keywords: Wetland, Birds, Anthropogenic effect, sustainable agriculture

ECO-FRIENDLY AND NATURE-BASED POLYMER COMPOSITES

Arife Kübra Yontar[1,3], Sinem Çevik[2,3]

*[*1]Ondokuzmayıs University, Yeşilyurt Demir-Çelik Vocational School, Arms Industry Technician Program, Samsun, Atakum- 0000-0003-1486-9332*

[2] Ondokuz Mayıs University, Department of Metallurgical and Materials Engineering, Samsun, Atakum- 0000-0002-3506-7892

[3] Ondokuz Mayıs University, Department of Nanoscience and Nanotechnology, Samsun, Atakum

*Corresponding author e-mail: kubra.demirbas@omu.edu.tr

ABSTRACT

Recently, climate change and environmental pollution have become a big problem and therefore the demand for natural and environmentally friendly products has increased. The green production and development of materials have been an important issue. Plant extracts have recently been used in areas such as cosmetics, health, energy and food, and products have been provided with more natural content. Apart from this, carbon emissions can be reduced by increasing the production and use of plants. Similarly, the production and use of bio-containing, biodegradable and non-toxic polymer materials have also increased. PVA (Polyvinyl Alcohol) has started to be used in many fields such as filaments, plasters, coatings and photocatalytic materials as a biocompatible, water and nature-soluble polymer with low toxic effects. Accordingly, in this study, PVA composite films were modified with natural plant extracts. The produced composite films have Shore-D hardness values higher than neat samples. The presence of elements, such as K, Mn, Ca and P in the films were determined by Semi-quantitative chemical analysis (SEM) and Energy Dispersive Spectroscopy (EDS) analyses. With these composite films, it will be possible to produce high-strength products with natural content, harmless to the environment and human health, and low carbon emissions.

Keywords: Plant Extracts, Bio-Based composite, PVA, Composites

POSSIBLE EFFECTS OF CLIMATE CHANGE ON WASTEWATER TREATMENT SYSTEMS AND ADAPTATION STUDIES IN BLACK SEA REGION

Ayşenur Ayan[1], Yüksel Ardalı[2]

*[*1] Ondokuz Mayıs University, Engineering Faculty, Environmental Engineering Department, Samsun, Turkey- ORCID ID 0000-0003-4832-6264*

[2] Ondokuz Mayıs University, Engıneering Faculty, Environmental Engineering Department, Samsun, Turkey - ORCID ID 0000-0003-1648-951X

*Corresponding author yuksel.ardali@omu.edu.tr:

ABSTRACT

There is a very new awareness of the necessity of wastewater treatment in the Black Sea Region of Turkey. In addition to being a structure that includes many residential and industrial areas from east to west, which is the Black Sea coast, fisheries and marine ecosystem are used. On the other hand, until very recently, only Samsun and Ordu centers have advanced biological treatment and Zonguldak secondary treatment wastewater treatment, other provinces and districts discharge their wastewater into the sea with deep sea discharge systems. There is another danger that awaits the Black Sea region, where such a development is taking place, both deaths and economic losses increase as a result of floods and disasters due to the interaction of both environmental deformation and climate change. In addition, environmental damage will increase with the fragility of infrastructure and treatment systems. Wastewater treatment systems provide a critical service to society and vulnerability to the effects of climate change. puts the health and sanitation of many communities at risk. The impacts of climate change on wastewater systems are numerous and can have a wide variety of consequences over varying time periods.

In this study, first of all, the direct climate-related effects on the wastewater system element (including networked wastewater systems, in-plant wastewater systems and treatment plants) in all cities in the Black Sea Region were examined. Floods and odor problems of the wastewater network, deterioration of water quality and damage to infrastructure due to uncontrolled discharges will be priority problems. More research is needed on specific processes to develop plans for effective adaptation to climate change. Our study is to systematically determine the main effects of climate change on wastewater systems and to determine the direct or indirect social, cultural, environmental and economic consequences. After these studies, infrastructure is generally the development of decision-making principles for local governments. How effluent characteristics will change under climate change will depend on the type and design of WWTP processes. Depending on how these can cope with changes in inlet water quality (e.g., changing water temperature, water use/conservation measures and nutrient enrichment (eutrophication) and eventual reduction in the receiving environment's capacity to assimilate pollutant loads, it will have potentially adverse effects on the receiving environment.

Keywords: wastewater, treatment, climate change, adaptation, urban.

SUSTAINABLE AND GREEN PARTICLEBOARD MANUFACTURING

Aytuğ TEKBAŞ[1], Nihal BEKTAŞ[2]

*[*1]Gebze Technical University, Faculty of Engineering, Environmental Engineering Department, Kocaeli , Türkiye- https://orcid.org/0000-0002-5794-661X*

[2] [1]Gebze Technical University, Faculty of Engineering, Environmental Engineering Department, Kocaeli , Türkiye -0000-0002-8257-9452

*Corresponding author e-mail: a.tekbas@gtu.edu.tr

ABSTRACT

From the start of civilization, wood is the most used natural materials for many purposes by different industries such as building, furniture, and packing. There are many benefits in using wood use because it is renewable resource, regenerative fuel, good-looking, low weight, high insulation capacity, extensive availability as well as flexible in applications. Engineered wood products are widely used in home and as exterior furniture in these days and particleboard is the most wood product used in modern woodworking industry since it is low-cost and more uniform than conventional wood.

Particleboard can be defined as a panel product manufactured from wood lignocellulosic materials by combining with resin and wax, then it is cured under pressure and heat to form into sheets. The particles used to manufacture particleboard include waste wood materials such as wood shavings, flakes, wafers, chips, sawdust, strands, slivers and wood wool.

In this century, there is a huge pressure of the society to reduce environmental effects of all type of production. Climate change will also affect every aspect of our daily lives. Green manufacturing (GM) gives minimal negative impact on the natural environment by using less energy, raw materials reduce pollution and waste, recycle and reuse materials, and moderate emissions in their processes. Also IPCC recommends replacement of energy intensive products such as iron, steel and plastic with the wood-based products with concerns over climate change. Due to these huge demands on particleboard industry, there is an urgent need to develop particleboard production in green and sustainable ways.

In this presentation, particleboard production process will be detailed and green and sustainable option of manufacturing process will also discuss according to principles of sustainability and EU Green Deal to avoid climate change occurs and affects globally.

Keywords: Particleboard, Climate change, Green deal, Green manufacturing (GM) and Sustainablity

CALCULATION OF WASTE-SOURCED GREENHOUSE GAS EMISSION (CARBON FOOTPRINT) IN DENIM INDUSTRY

Bahar Vayiç[1], Hülya Aykaç Özen[2], Semra Çoruh[3]

*[*1,2,3]Ondokuz Mayıs University, Engineering Faculty, Environmental Engineering Department, Samsun, Turkey*

[1]ORCID ID: 0000-0003-4996-062X

[2]ORCID ID: 0000-0003-4990-6682

[3]ORCID ID: 0000-0002-8306-1890

*Corresponding author e-mail: bhrvayic@gmail.com

ABSTRACT

Global warming and climate change issues take an important place in the world agenda and studies on these subjects are increasing day by day. Turkey also signed the Paris Agreement to reduce carbon emissions, which are the triggers of global warming and climate change and prepared an action plan for the European Green Agreement. Therefore, in recent years, the concept of "carbon footprint" has started to come to the fore more and more in order to calculate emissions that cause greenhouse gasses. Especially in sectors with high greenhouse gas emissions such as textiles, carbon footprint calculation is of great importance in order to reduce carbon emissions and the negative effects of climate change. The aim of this study is to determine the waste-derived carbon footprint of the textile industry, which carried out 1 237 500 kg denim washing in 2021. All the data required for the calculation were taken from the textile company where the study will be conducted. Emission factors were obtained using standards published by Department for Environment Food & Rural Affairs (DEFRA). The equivalent CO_2 calculated as a result of the waste generated in the denim washing company in 2021 was found to be 54.26 tons. This study, which has an important role in the carbon footprint assessment of textile factories, clearly shows the effect of carbon footprint resulting from waste.

Keywords: Carbon footprint, textile, greenhouse gas, waste

CLIMATIC FACTORS AFFECTING THE CHANGE IN WATER QUALITY OF THE KIZILIRMAK RIVER BASIN

Batuhan Ateşli[1], Bilge Aydin Er[2], Yuksel Ardali[3]

[1] Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering, Samsun, Turkey-

*[*2] Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering, Samsun, Turkey- 0000-0002-6546-0089*

[3] Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering, Samsun, Turkey- 0000-0003-1648-951X

*Corresponding author e-mail: bilge.aydiner@omu.edu.tr

ABSTRACT

Climate change causes significant changes in the frequency, severity, spatial distribution, length and timing of extreme weather and climate events, regardless of whether they are global or regional. The potential effects of climate change, which are known to have some global and regional effects; it focuses on clean water resources, agriculture, forest, sea level, energy, human health and biodiversity. The decrease in water resources, which is one of the most important results, reaches dimensions that prevent sustainable life. The significance of water and water resources grows as a result of climate change, which has both direct and indirect effects on them. The protection of water resources depends on the establishment of a good water management system. The water management system covers a wide area from the protection and use of water resources, and from pollution after use to the purification of water again. It is also very important to examine the change in water quality while water management is being carried out. While examining the relationships between physical, chemical and biological parameters in water quality, water quality indexes were revealed by monitoring some parameters. The data of the water quality factors were used to create the water quality index. The National Sanitation Foundation Water Quality Index is the most popular and well-known water quality index (NSF-WQI). According to the data collected from the waters, a classification of the water quality is formed, and practical solutions are developed. In this study, temperature, pH, turbidity, dissolved oxygen, biochemical oxygen demand, total phosphate, total nitrate and total solids analyzes were made in surface water samples taken seasonally from the Kızılırmak River Basin between 2013-2014 and NSFWQI (National Sanitation Foundation Water Quality Index) method, the water quality index was calculated and evaluated from an ecological point of view.

Keywords: Water quality, climate change, NSF-WQI, Kızılırmak River Basin

THE EFFECTS OF ANIMAL MOVEMENTS IN GLOBAL WARMING METHANE EMISSIONS: PAST, PRESENT AND FUTURE

Buğra Genç[1]

*[*1] Ondokuz Mayis University, Facult of Veterinary Medicine, Departmen of Laboratory Animals, Samsun, Türkiye - ORCID ID 0000 0002 7561 4993*

Corresponding author e-mail: bugragenc@omu.edu.tr

ABSTRACT

Due to the increase in the world population, there is a global increase in livestock movements in line with the increasing demand for quality animal protein. Especially the red meat demand is met by raising livestock. However, ruminants cause a serious methane emission. The methanogen archaea found in the natural flora of the digestive system of ruminants play an active role in global warming as shown by several studies conducted in the last 50 years. The researches on reducing methane emissions from livestock focus on changing the feeding regime, breeding animal breeds, vaccination, use of hydrogen traps, pasture management practices and genetic studies. Up today, there has not been enough success in solving the current problem by using these methods. Although many studies have been conducted on the biological structures and functions of methanogenic archaea which form an area in biological classification, it is thought that there are still many unidentified methanogenic archaea species today. New researches with advanced genetic methods need to be made to better understand the functions of archaea which are very difficult to detect and be reproduced by in vitro methods. By this way, it is considered that more effective solutions can be reached in reducing methane emissions from livestock. In this study, the types of archaea, which form a separate area from bacteria and eukaryotes in biological classification, their methanogenic effects, their role in global warming and the way they have been taken from the past to the present and the precautions to be taken for the future are discussed. In the light of the findings, it has been concluded that it is necessary to apply new genetic methods, to update animal feeding and breeding policies, and to make global cooperation in livestock policies to reduce animal-sourced methane emissions.

Keywords: Archaea, methanogens, global warming, animal movement

EFFECT OF GREEN AREA INDEX (NDVI) CHANGE ONLAND SURFACE TEMPERATURE, EVALUATION IN TERMS OF CLIMATE CHANGE, SAMSUN EXAMPLE

Burcu Değerli[1], Doç. Dr. Mehmet Çetin[2]

[1]Kastamonu Üniversitesi, Mühendislik-Mimarlık Fakültesi, Peyzaj Mimarlığı Bölümü Phd. Burcu DEĞERLİ, Samsun, Türkiye burcu.degerli@omu.edu.tr, ORCID ID 0000-0001-5152-6406

[2]Kastamonu Üniversitesi, Mühendislik-Mimarlık Fakültesi, Peyzaj Mimarlığı Bölümü Doç.Dr. Mehmet ÇETİN, Kastamonu, Türkiye, mcetin@kastamonu.edu.tr, ORCID ID 0000-0002-8992-0289

Corresponding author e-mail : burcu.degerli@omu.edu.tr

ABSTRACT

The quality, continuity and integrity of green spaces in cities play a critical role in mitigating land surface temperatures. In this study, the effect of Normalized Difference Vegetation Index (NDVI), which is one of the environmental parameters, on the Land Surface Temperature (LST) was investigated. The reason for the increase in LST is unplanned urbanization, unplanned development, decrease or fragmentation of green (permeable) areas, increase in impermeable surface coatings, high construction. The increase in LST, causes the temperature in the city to increase gradually, and the warming of the cities is one of the main causes of climate change. Surface-based solutions can help mitigate and adapt to climate change. In the study, the change between the years 2000-2020 was determined using both remote sensing and statistical techniques to analyze the dynamics between environmental variables. As a result of the analyzes made, the amount of green space decreased by 14.1% between 2000 - 2020 in the study area, which includes the central districts of Samsun, İlkadım and Atakum, and the rural areas of Bafra. It has been observed that this rate is shared as 7.1% in built up areas and 7.33% in bare soil areas. Considering the effect of the decrease in green areas on LST values, it is seen that while LST was 41.75 °C in 2000, it increased to 43.44 °C in 2020. LST affects the distribution of energy between soil and vegetation and determines the surface air temperature. In order to demonstrate this effect, algorithms have been applied to the raw data of Landsat 8 and Landsat 7 satellite images by using remote sensing technologies, using Arc Gis 10.2 and Q Gis 3.16 utilities. NDVI and LST obtained from satellite images were compared and evaluated in terms of climate change.

Keywords: Remote Sensing, Land Surface Temperature, NDVI, Climate Change

NEW DEVELOPMENTS IN CARBON CAPTURE TECHNOLOGIES

Bahtiyar Öztürk[1], Hülya Aykaç Özen[2], Sevtap Tırınk[3]

*[*1]Ondokuz Mayıs University, Engineering Faculty, Samsun, Turkiye-0000-000-3385-0701*

[2]Ondokuz Mayıs University, Engineering Faculty, Samsun, Turkiye-0000-0003-4990-6682

[3]Iğdır University, Vocationl school of Health Services, Iğdır, Turkiye-0000-000-0123-0054

*Correspondingauthor e-mail: bozturk061@gmail.com

ABSTRACT

Global warming, climate change, extreme weather events, ocean warming, sea level rise, narrowing of the north pole and increase in the acidity of the oceans and seas as a result of the increase in atmospheric CO2 concentration due to human activities have become one of the most important problems that the world has to deal with in the 21st century. In this regard, carbon capture and storage (CCS) seems to be a promising technology in reducing atmospheric carbon dioxide concentration. There are three methods for CCS: pre-combustion capture, oxy-fuel process and post-combustion capture. Among them, post combustion capture technology is the most widely used technology today, due to its flexibility in application, easy installation in older plants, and lower initial investment and operating costs. Absorption, adsorption, cryogenic distillation and membrane separation can be applied as post-combustion carbon capture technologies. In this article, technologies used to reduce carbon emissions will be discussed compatively.

Keywords: Carbon capture, pre-combustion, oxy-combustion, post-combustion

GREEN ENERGY MANAGEMENT SYSTEMS FOR EDGE COMPUTING APPLICATIONS

Canan Şişman Korkmaz[1], Alper Terciyanlı[1], Abdulhameed Aboumadi[2]

[1] Endoks R&D Department, Ankara, Türkiye

[2] Inavitas R&D Department, Ankara, Türkiye

*Corresponding author e-mail: canan.korkmaz@endoks.com

ABSTRACT

Carbon dioxide (CO2) is the main greenhouse emission emitted through human activities and is present within the atmosphere as a part of the Earth's carbon cycle. The increase in carbon use has many negative effects such as causing climate change. Many factors play a role in the increase in this worldwide carbon emission especially the structures that emerge with the development of technology, such as data centres, which has an important role in increasing carbon emissions. Carbon emissions caused by data centres exceeds 200 million metric tons per year. ECO-Qube project focuses on edge data centres since they are important because of their energy-saving potential. Several Key Performance Indicators (KPIs) are considered to evaluate the energy efficiency of the data centres and their environmental sustainability. ECO-Qube project determines an assessment methodology for data centres following ASHRAE TC 9.9 2021, EN50600 Standard Series, and EU Code of Conduct. The main KPIs used in this project are Power Usage Effectiveness (PUE), Renewable Energy Factor (REF), Energy Reuse Factor (ERF), Primary Energy Savings (PES), CO2 Savings, and performance Per Watt (PPW). These KPIs are sufficient for the live assessment of data centres within this project and can give a good idea about any improvements. Digital technologies such as EMSs (Energy Management Systems) are part of the solution to reduce energy consumption, as they enable more efficient use of resources. From this perspective, an EMS has been designed in the scope of this project to track the energy demand, operate the energy supply in cooperation with building/district's EMS, and calculate the project's KPIs which enables precise evaluation of a data centre's current state and the effects of upgrades done to a data centre.

Keywords: Data centres, Carbon footprint, EMS

* This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 956059.

EFFECTS OF JET FUELS PRODUCED FROM MICROALGAE ON CLIMATE CHANGE

Cemil Koyunoğlu[1]

*[*1]Yalova University, Engineering Faculty, Department of energy engineering, Yalova, Turkey*

[2] University, Faculty, Department, City, Country

*Corresponding author e-mail: cemil.koyunoglu@yalova.edu.tr

ABSTRACT

Petroleum-based jet fuel is essential for the aviation sector since it is the most efficient energy carrier. A growing number of people are interested in alternative fuels due to economic and environmental concerns. Diversification of energy sources produced from natural resources is required. These materials need to be affordable and sustainable. There is currently great worry over the environmental impacts of fossil fuels on climate change and global warming. The fluctuation in oil prices and the requirement for a sustainable fuel supply have a significant impact on the economy of fuel consumers as well. Microalgae-derived jet fuel is one of the aviation industry's alternatives that is getting a lot of interest since it can diversify energy sources. There are many different types of microalgae species that can produce lipids; they don't require a lot of land, freshwater, or special growing conditions; they can grow in saltwater or wastewater; they grow quickly; and the oil they produce doesn't threaten the security of the world's food supply. Similar to this, due to the fuels' low carbon footprint, the effects of climate change and global warming brought on by the generation of greenhouse gases (GHG) from petroleum jet fuel can be considerably reduced. In order to create a fuel that is more effective, aviation fuels made from algae can be viewed as an alternative to conventional fuels. On the other hand, the main difficulty is that many algae species have reduced lipid content. Costly upstream methods are used to turn microalgae oil into jet fuel as well as the harvesting and drying processes. Algae biofuels are now minor participants in the aviation sector, but there is potential for growth. This paper examines some potential or existing methods for obtaining aviation fuel from microalgae oil, along with those routes' advantages and disadvantages, present trends, and potential conceptual approaches.

Keywords: Microalgae base jet fuel, climate change effetcs, biofuel technology

BIO JET FUEL PRODUCTION WITH DOWNDRAFT GASIFIER TECHNOLOGY: A LITERATURE REVIEW

Cemil Koyunoğlu[1]

[1]Yalova University, Engineering Faculty, Department of energy engineering, Yalova, Turkey- 0000-0002-9903-2816

[2]Inonu University, Engineering Faculty, Department of chemical engineering, Malatya, Turkey-0000-0002-0543-8947

*Corresponding author e-mail: cemil.koyunoglu@yalova.edu.tr

ABSTRACT

The rising cost of fossil fuels, as well as worries about national security and the economy, have led to a rise in the use of fuels derived from biomass. Gasoline, diesel, heating fuel, jet fuel, synthetic natural gas, and oxygenates are just a few of the many fuels and chemicals that can be created from biomass. The complex mixture of paraffins, isoparaffins, aromatics, and naphthenes that makes up aviation turbine fuels (ATFs) ranges in size from C8 to C17. They are currently made by distilling the kerosene portion of petroleum and hydro-processing the heavier portion of petroleum. The manufacturing of ATF from shale, coal, and tar sands has received a lot of attention in recent decades. Using aviation engines for testing and demonstration, JP-4 generated from shale was proven to have no negative effects.

Keywords: Aviation turbine fuels, biomass to liquid, aromatics

AN ASSESSMENT ON THE POTENTIAL OF GREEN DEAL POLICIES FOR THE WELL-BEING OF CITIZENS

Deniz Can[1], Serap Kayasü[2]

*[*1]Middle East Technical University, Faculty of Architecture, Department of City and Regional Planning, Ankara, Turkey- 0000-0003-2681-526X*

[2] Middle East Technical University, Faculty of Architecture, Department of City and Regional Planning, Ankara, Turkey – 0000-0001-8477-0632

*Corresponding author e-mail: denizcan2805@gmail.com

ABSTRACT

The first two decades of 21st century have marked critical global problems that kept on growing, exceeding the limits of ecological, economic and social thresholds in different scales ranging from individual to societal or to national and global. The conventional systems that tried to relieve the emerging crises and tackle the problems through de facto policies and planning approaches did not provide sustainable solutions. The unequal distribution of resources, increasing inequalities in accessing urban services (housing, transportation, green infrastructure, social amenities) and the growing gap between different income groups increased vulnerabilities within societies while anthropogenic effects on ecosystem services, environmental deterioration, consumption of non-renewable energy sources, excessive GHG emission and pollution consequently led up to long term problems of climate change (climate crisis). Today, triple crisis of economic, social and environmental problems points out to a potential systemic tipping point, in which new solutions are searched for in political, academic and planning agenda. Under these circumstances European Green Deal emerged as a response to the global challenges and crises that are dominating diverse aspects of current ecological, social and economic systems. While urban areas and people are the main generators of aforementioned crises, they are also the ones that are vastly affected by the consequences. In this framework, this paper aims to analyze transformative paradigm shift that vastly impact urban areas and unravel the parallels between Green Deal policies and citizen well-being. The concept of well-being aims to re-establish a harmonious relationship between society and nature, ensuring a fair distribution of resources and providing prosperous living conditions in flexible communities. In order to sustain well-being; objective and subjective factors, hedonic and eudaimonic approaches, and individual and community levels should be supported. This paper assesses the potential of the European Green Deal to encompass a collective well-being approach through a transformative paradigm shift.

Keywords: Green Deal, Well-being, Crises, Sustainability

UNMANNED AERIAL VEHICLES DESIGN FOR CLIMATE CHANGE AND ENVIRONMENTAL PROTECTION RESEARCH STUDIES

Derya Betul UNSAL[1,2,3], Busra Beril KESGIN [2,3,4]

*[*1]Cumhuriyet University, Department of Energy and Technology Engineering, Sivas, Turkey- ORCID ID: 0000-0002-7657-7581*

[2] Cumhuriyet University, Renewable Energy Research Center, Sivas, Turkey

[3] Cumhuriyet University, Coordination of Sustainability Office, Sivas, Turkey

[4]Cumhuriyet University, Department of Defense Industry Technologies and Strategies, Sivas, Turkey

*Corresponding author e-mail: dbunsal@cumhuriyet.edu.tr

ABSTRACT

In recent years, The World has come to a tipping point with the side effects of technological developments. Global temperatures continue to rise in parallel with the increasing use of technology, with serious consequences for the sustainability of many things which accept as natural. This study focuses on discussing the advantages of unmanned aerial vehicles (UAVs) on sustainability and renewability, which are important in technological developments. Since unmanned aerial vehicles (UAVs) are at the forefront of the technological revolution, they can evolve to collect data for environmental protection projects. UAVs, which contain technology that can support the work of climate change and environmental researchers, play a key role in the implementation of sustainable solutions, and serve the renewable energy infrastructure, can do all of these better, easier, faster, cheaper and more safely. UAVs can be used in the sky in many areas such as increasing the efficiency of solar power plants or photovoltaics (PVs) and wind power plants (WPP), supporting the use of clean energy, increasing efficiency in agriculture, remotely monitoring endangered animal species, supporting the work of scientists all over the world. It is critical to design and use UAV' provide renewable energy companies with a powerful productivity tool and to help researchers prepare for the complex effects of climate change and environmental degradation.

Keywords: Unmanned Aerial Vehicles, Sustainability, Renewable Energy, Climate Change.

IMPORTANCE OF SUSTAINABLE SOLAR ENERGY USAGE IN ENVIRONMENTAL PROTECTION

Derya Betul UNSAL[1,2,3], Zeynep CERAN[1,2,3]

*[*1]Cumhuriyet University, Department of Energy and Technology Engineering, Sivas, Turkey- ORCID ID: 0000-0002-7657-7581*

[2] Cumhuriyet University, Renewable Energy Research Center, Sivas, Turkey

[3] Cumhuriyet University, Coordination of Sustainability Office, Sivas, Turkey

*Corresponding author e-mail: dbunsal@cumhuriyet.edu.tr

ABSTRACT

Day by day, humanity has facing more and more problems such as greenhouse effect, energy crisis, warming and pollution, increasing linearly with the use of technology which cause of the increasing population. For this reason, the use of alternative and renewable energy sources instead of traditional energy sources in energy production, transmission and investments has become a necessity, not a choice. However, there are many parameters to be considered even when producing environmentally friendly and climate change-resistant energy thanks to green and sustainable energy sources. The parameters mentioned vary even in the energy production in solar power plants, which can be considered as the most harmless to nature among renewable energy sources. In this study, by emphasizing the fact that every renewable energy source is not sustainable. The points to be considered for more efficient and more environmentally friendly solar energy production will be examined, and solutions will be made on how solar power plants can be more sustainable, climate and environmentally friendly while increasing their efficiency. .

Keywords: Sustainability, Energy Generation, Renewable Energy, Photovoltaics Efficiency.

ECO-FRIENDLY IN AGRICULTURE AUAV (AGRICULTURAL UNMANNED AERIAL VEHICLES)

Derya Özücan[1], Mehmet Cem Elik[1]

[1]MCEM Informatics and Nanotechnologies Limited Company

e-mail: d.ozucan@mcem.com.tr

ABSTRACT

While the world population is increasing day by day,the need for food is also increasing day by day in parallel with this. Agriculture is one of the keystones for national economies. The use of traditional methods in agriculture is no longer sufficient to bring the production amount to an adequate level. They are of no use because most of the time the crop is over-treated with pesticides or used when there is no need. While such wrong agricultural practices disrupt the balance of the ecosystem, they also negatively affect agriculture to agreat extent.

After adverse climatic conditions, the most important factors affecting production in agriculture are pests, diseases, insufficient soil conditions and damage to beneficial organisms. The use of advenced technology unmanned aerial vehicles in agriculture allows us to keep these negative factors to a minimum.

The use of digital measurement Technologies provides the opportunity to collect instant data from the field and to monitor and intervene at every stage of production.

This study was carried out as MCEM Informatics and Nanotechnologies company. It is a compilation of applications and other scientific studies, the benefits provided by the use of unmanned aerial vehicles are discussed..

Keywords: Agricultural Technologies, AUAV, Pesticides

PUBLIC HEALTH IN THE PROCESS OF CLIMATE CHANGE

Dilek ÇELİK EREN[1]

*[*1]Ondokuz Mayis University, Faculty of Health Sciences, Department of Nursing Samsun,Türkiye*

*Corresponding author e-mail: dilek.celik@omu.edu.tr

ABSTRACT

Climate change is the rise in global temperature and the change in average climate values, with the increase in the concentration of greenhouse gases in the atmosphere, mainly as a result of human activities. Awareness of climate change in the world started in the 1980s. In 1988, the United Nations General Assembly adopted a resolution stating that "Climate change is a common concern of humanity". Climate change has many national and international economic, social, environmental and health effects. Observed and predicted changes in climate are problems such as decrease in water resources, forest fires, erosion, changes in agricultural productivity, drought and related environmental degradation, deaths due to heat waves and increases in vector-borne diseases. In addition to the direct effects of climate change such as being under the influence of temperature extremes, changes in the frequency or severity of extreme weather events and sea level changes, ecological system disorders, changes in the distribution and effectiveness of vector and infectious diseases, air pollution, decrease in food production due to cultivation areas and insect ecology, There are also indirect effects such as immigration and causing mental illnesses. In the determination of sustainable practices and environmental policies at the national level, they should first educate themselves, then individuals, families and society for waste management practices, healthy lifestyle behaviors, awareness of the effects of climate change and struggle in the institutions they work at individual level.

Keywords: Climate change, health, public health

COLLECTION, DISPOSAL AND RECYCLING OF WASTE BATTERIES

***Diyem Özer**

[*] Portable Battery Manufacturers and Importers Association

*Corresponding author e-mail: diyem.ozer@tap.org.tr

ABSTRACT

Today, with the increase in technological studies, battery-operated devices have become an important part of life. In this study, an introduction is made about battery types, battery-operated devices, and the studies carried out in Turkey on the collection, transportation and disposal/recycling of batteries after they have completed their life and become waste. TAP Association is the only non-profit organization authorized by the Ministry of Environment, Urbanization and Climate in 2004 for the collection, transportation, disposal/recycling of waste batteries in Turkey. In this context, awareness-raising, information and waste battery collection activities carried out by our association for the last 18 years in various public or private institutions/organizations are also mentioned.

Keywords: Battery, Waste Battery, Recycling, Collection

EFFECTS OF CLIMATE CHANGE ON WETLANDS IN DIFFERENT GEOGRAPHICAL ENVIRONMENTS: GEDIZ DELTA (IZMIR) AND MARMARA LAKE (MANISA)

Mehmet Kaya[1]

*[*1]Doga Dernegi, Izmir, Turkiye - 0000-0003-3639-4817*

* mehmet.kaya@dogadernegi.org

ABSTRACT

Climate change can be defined as changes that occur in the average state of the climate, which may be short-term or may last for many years. Regardless of the duration and causes of these changes, they have some effects on the earth. Although these effects do not show a homogeneous distribution over the entire earth, different results are seen in different geographical environments.

In this study, it is aimed to monitor and determine the changes in two wetlands in two different geographical environments, coastal and terrestrial environments, over the years.

The boundaries of the Gediz Delta Key Biodiversity Area and the Lake Marmara Key Biodiversity Area were used as the boundaries of the study area. Landsat satellite image data and remote sensing and geographic information systems methodologies were used to detect changes in these areas. By obtaining the relevant images, the water surfaces were determined with the modified normalized difference water index (mNDWI), and the changes in these water surfaces over the years were determined.

As a result of the studies, it was observed that between 1985 and 2020, the sea waters intruded on the shores of the Gediz Delta Key Biodiversity Area for an average of 1.5 km and in places 3 km, and the Gediz Delta lost area. In the Lake Marmara Key Biodiversity Area, Lake Marmara, which had an area of approximately 44 km² in 1985, was completely disappeared in August 2022.

The effects of climate change on different geographical environments are different. While the sea level rising in Gediz Delta; in the Lake Marmara, which is located in the interior, drought and drying have occurred. In addition to climate change, human factors such as inaccurate agriculture and water policies and urbanization accelerate the negative effects of climate change; It damages wetlands at least as much as climate change.

Keywords: wetlands, key biodiversity areas, remote sensing, geographical information systems.

A STUDY ON THE DESIGN AND FEASIBILITY OF AN INNOVATIVE FARM-TYPE BIOGAS PLANT

Elif Cura[1], Yasin Karagoz[2], Alper Bayrakdar[3], Erkan Sahinkaya[4]

[1]Medeniyet University, Faculty of Engineering, Bioengineering Department, Istanbul, Turkey

[2]Medeniyet University, Faculty of Engineering, Mechanical Engineering Department, Istanbul, Turkey-0000-0002-9193-3011

*[*3]Izmir Institute of Technology, Faculty of Engineering, Environmental Engineering Department, Izmir, Turkey-0000-0003-2015-8799*

[4]Medeniyet University, Faculty of Engineering, Bioengineering Department, Istanbul, Turkey, 0000-0002-9898-9173

*Corresponding author e-mail: alperbayrakdar@iyte.edu.tr

ABSTRACT

The demand for energy has been increasing due to the rapid increase in population and industrialization activities as a result of technological advances. Since existing energy sources cannot meet the demand, renewable energy sources are seen as an alternative. In addition, from an environmental point of view, in managing problems caused by animal waste, anaerobic digestion resulting in biogas production can be considered an alternative solution in terms of energy recovery.

Biogas can be shown as an important alternative among renewable energy sources. The heating and electricity needs can be provided by biogas production. Besides, with the anaerobic digestion process, digested organic material can also be used as an organic fertilizer. Hence, the rate of preference is increasing day by day.

In the first part of this study, energy needs and resources in the World and in Turkey have been determined and a detailed examination of renewable energy sources has been made.

Then, a photo was taken about the amount of biogas that can be produced from animal waste in Turkey. The mobile commercial biogas systems have been examined and compared with the system designed in this study.

In the last part of the study, calculations and designs for the farm-type biogas system have been carried out. The feasibility study of the developed innovative biogas system has been conducted.

Keywords: Biogas, Biogas plant, Energy

A REVIEW OF GLOBAL CLIMATE CHANGE IN SCIENCE EDUCATION CURRICULUM OF TURKIYE

Elif Omca ÇOBANOĞLU[1], Aslı SARIŞAN TUNGAÇ[2]

*[*1]Ondokuz Mayis University, Faculty of Education, Mathematics and Science Education Department, Samsun, Turkiye- 0000-0002-3691-8273*

[2] Ondokuz Mayis University, Faculty of Education, Mathematics and Science Education Department, Samsun, Turkiye- 0000-0003-3709-5288

*Corresponding author e-mail: eomca@omu.edu.tr

ABSTRACT

Global climate change is a fact that poses a great danger to our world today and its effects are more clearly observed day by day. Turkiye is located between the temperate zone and the subtropical zone. Due to its geographical location, many different climate types such as continental climate, mediterranean climate, black sea climate, transitional climate are seen in Turkiye. Related to this diversity, Turkiye is one of the countries where the effects of climate change can be observed clearly. It is known that climate change has many negative effects and perhaps children will be exposed to these effects the most. Schools are where children spend the most time after home. For this reason, many countries have started studies within the scope of formal education on climate change awareness, starting from the first stages of education.The main purpose of this study is to critically examine how the concept of global climate change is handled in Turkish Science Education curriculum. As it is known, the main purpose of science education is to raise science literate individuals. This means individuals who are interested in research, questioning understanding and interpreting research results and even produce new information. In this study, it will be examined what kind of concepts and subjects are included in the Turkish science education curriculum on a subject such as climate change.

In this research, document analysis, which is one of the qualitative research methods, will be used and the obtained data will be analyzed with descriptive content analysis. As a data source, science teaching acquisitions in preschool and primary education programs (from 1st to 8th grade) prepared by the Turkiye Ministry of National Education will be discussed. Analyzes will be carried out by two researchers simultaneously, and the reliability of the results will be calculated with the rater reliability formula of Miles & Huberman.

At the end of this study, from kindergarten to 8th grade science education, the dimensions of the concept of global climate change are discussed, which concepts are highlighted, how much time is allocated in the curriculum for the teaching of these concepts, and will be interpreted with a critical perspective.

Keywords: Climate change, science curriculum, document review

INTEGRATION OF STORMWATER CAPTURE AT FLOOD MANAGEMENT RESERVOIRS WITH MANAGED AQUIFER RECHARGE

Emre Burcu Özkaraova[1], Robert Kalin[2]

*[*1]Ondokuz Mayis University, Faculty of Engineering, Environmental Eng. Dept., Samsun, Turkey*

[2]University of Strathclyde, Department of Civil and Environmental Engineering, Glasgow, Scotland

*Corresponding author e-mail: ozkaraova@omu.edu.tr

ABSTRACT

Artificial or managed recharge of groundwater (MAR) has become more important in recent years to conserve groundwater resources and ensure sustainable water resources management. Thus, excess surface water such as surface run off and/or river water has been captured or diverted for subsurface storage. Besides sustaining groundwater levels and preventing saltwater intrusion at coastlines, it is also implemented for reducing land subsidence, impacts of floods and droughts. Thus, it can be seen as a tool for climate change adaptation and resilience. Key aspects of MAR are hydraulic properties of the sink area, water quality of surface and underground water and flow rate (quantity) of surface water. Aquifer systems (unconsolidated sediments, 10^{-5} m/s < hydraulic conductivity < 10^{-2} m/s) contain huge reservoir space with minimum evaporation and wide distribution, and therefore is seen as a natural water storage facility (high storage coefficient). Water quality becomes especially important for surface runoff waters in urban areas and reclaimed wastewaters potentially containing various pollutants.

Understanding water retention of geological formations and water storage capacities of aquifer systems in catchment areas are initial issues to be understood. Appropriate groundwater recharge zone determination with respect to potential flood risk zones and surface runoff harvesting locations is critical. Geophysical investigations, such as aeromagnetic survey and vertical electrical sounding, are used to understand hydrogeological properties of subsurface structures. Remote sensing (RS) and Geographic Information Systems (GIS) are accepted as helpful tools in better understanding surface water and groundwater interaction and assessing locations of flash floods and landslides, respectively. Looking into the depths of MAR, it can be foreseen that a great team work and professionalism is required. This paper aims to describe the potential of Flood-MAR to reduce flood risks and replenish aquifer systems.

Keywords: managed groundwater recharge, flood.

IMPROVEMENT OF THE HYDROPHOBIC PROPERTY OF PET POWDER MADE FROM WASTE

Emine Özlem DENGİZ[1,2], Mevlüt GÜRBÜZ[2]

*[*1]Samsun University, Department of Electricity and Energy, Samsun, Turkey-0000-0002-2889-008X*

[2]Ondokuz Mayıs University, Department of Mechanical Engineering, Samsun, Turkey-

*Corresponding author e-mail: eozlem.dengiz@samsun.edu.tr

ABSTRACT

Polyethylene terephthalate (PET), one of the plastics that we encounter the most in our daily lives and that we use the name the most, constitutes 18% of the plastic production in the world. With a relatively high melting point, PET has a hard and rigid chain backbone that is difficult to bend. For this reason, it has high strength, high toughness, and high resistance to fatigue up to 150°C. PET, which has low specific gravity, can be either ground-hard or full-hard depending on the thickness from which it is produced. PET, which is durable plastic, is also resistant to impact. Besides having good mechanical properties, it is a good barrier to gases, solvent chemicals, and alcohols. Therefore, textile, food and beverage packaging, industrial filtration, photography, electrical industry, automotive, etc. It has a wide range of uses such as fields. Having such a wide usage area, PET has an easily recyclable structure.

Hydrophobic surfaces are surfaces with high water repellency. This property of the surface is measured by the magnitude of the contact angle of the water to the surface. If the contact angle is greater than 90°, the surface is hydrophobic, if the contact angle is between 150-180°, the surface is superhydrophobic. The liquid droplet stays on the surface in a spherical structure. Thus, it is possible to prevent wetting and fogging on the surfaces and create self-cleaning surfaces. Studies carried out to impart hydrophobic properties to surfaces aim to increase the contact angle. Such applications have taken their place in many fields today.

This study, it is aimed to reuse PET wastes by increasing their hydrophobic properties. For this, talc powder and silica powder were added to the waste material, which was ground into powder, at different rates. The powder solution homogeneously dispersed in the solvent was coated on the glass substrate surface by the spray method. The samples subjected to heat treatment at 360°C were allowed to adhere to the glass surface. The contact angle measurements were carried out by performing the drop test. As a result of the measurements, it was observed that while the contact angle on the untreated PET material surface was 53°, the droplet contact angle increased to 113° with the contribution of 20% talc and 10% silica of the material that gave the best results.

Keywords: Hydrophobic surfaces, polyethylene terephalate waste, powder, coating

MODERN ASPECTS OF HEMP ANALYSIS

Enes Atmaca[1], Orhan Tokur[2], Abdurrahman Aksoy[3]

*[*1]Ondokuz Mayis University, Faculty of Veterinary Medicine, Department of Pharmacology and Toxicology, Samsun, Türkiye - 0000-0002-8978-3755*

[2]Ondokuz Mayis University, Faculty of Veterinary Medicine, Department of Pharmacology and Toxicology, Samsun, Türkiye - 0000-0002-0912-3467

[3]Ondokuz Mayis University, Faculty of Veterinary Medicine, Department of Pharmacology and Toxicology, Samsun, Türkiye - 0000-0001-9486-312X

*Corresponding author e-mail: eatmaca@omu.edu.tr

ABSTRACT

The legalization of hemp in some countries has led to the development of hemp-based drugs, hemp extracts, creams, oils, nutritional supplements etc. Accordingly, the use of hemp for medical and industrial purposes has rapidly increased in recent years. However, hemp products may contain pesticides, heavy metals, pathogens, mycotoxins, and residual solvents, and testing these contaminants is of primary concern for consumer safety. On the other hand, potency, moisture determination, and terpene profiling tests are needed to assess products' quality. Several guidelines have been established to evaluate the efficacy and safety of hemp products. However, the variety of products and the complexity of matrixes are challenging for most laboratories. Sampling techniques and analytical methods also differ depending on the product type. In order to overcome the difficulties of hemp testing, a methodological step-wise approach is needed. Many analytical tools and methods have been introduced for the detection, identification, quantification, and analysis, such as solid phase microextraction (SPME), microwave-assisted extraction (MAE), ultrasound-assisted extraction (UAE), supercritical fluid extraction (SFE), pressurized liquid extraction (PLE), gas/liquid chromatography-mass spectrometry (GC-MS/MS, LC-MS/MS), inductively coupled plasma spectrometry (ICP-AES, ICP-MS) and nuclear magnetic resonance spectroscopy (NMR). This review aimed to describe modern methods of hemp analysis and discussed the main aspects of sampling and testing techniques.

Keywords: Cannabinoid, CBD, Chromatography, Methods, THC

COMPARISON WITH TURKEY OF ENVIRONMENTAL STATISTICS IN TR83 REGION

Erol TERZİ[1], Mehmet Şirin ATEŞ[2]

*[*1]Ondokuz Mayis University, Faculty of Science, Department of Statistics, Samsun, Turkey- ORCID ID:* 0000-0002-2309-827X

[2] Ondokuz Mayis University, Faculty of Science, Department of Statistics, Samsun, Turkey- ORCID ID:

*Corresponding author e-mail: eroltrz@omu.edu.tr

ABSTRACT

Population growth, which is one of the environmental driving force indicators in Turkey, puts pressure on urban living spaces due to energy use and as a result; water use and wastewater generation affects the air, water and soil quality, which we define as the receiving environment, by making negative effects on the increase of air pollutant sources and density, the increase in waste diversity and waste generation, and the use of natural resources and land.

These indicators are comparable in the international arena, and in Turkey, according to the Statistical Regional Units Classification (SRUC); provinces, regions and Turkey levels are monitored, and the nature of environmental problems is monitored periodically with Official Statistics.With these follow-up studies, it is also a necessity to know the priorities of the problems in terms of providing input to the development of new targets, solutions and action plans for the realization of these targets. In this study; Environmental indicators of the provinces in the TR83 region (Amasya, Çorum, Samsun, Tokat) were compared with the Turkish level and suggestions were presented.

Keywords: Environmental Statistics, Statistical Indicator, TR83 Region

COMPARISON OF VARIOUS BUILDING MATERIALS PRODUCED WITH HEMP FIBER AND HEMP STRAW WITH TRADITIONAL BUILDING MATERIALS

Fahri Birinci[1], Ali Kemal Ayan[2], Selim Aytaç[3], Şule Karacalar[4], Ali Sarıalioğlu[5]

[1]Ondokuz Mayis University, Engineering Faculty, Samsun/Türkiye-0000-0002-9689-8905

[2]Ondokuz Mayis University, Bafra Vocational School, Samsun/Türkiye-0000-0001-7981-6288

[3]Ondokuz Mayis University, Institute of Hemp Research, Samsun/Türkiye-0000-0003-1786-9725

[4]Samsun University, Kavak Vocational School, Samsun/Türkiye-0000-0002-7270-5494

[5]Samsun Regional Directorate of Surveying and Monuments, Samsun/ Türkiye-0000-0002-0374-7615

*Corresponding author e-mail: fbirinci@omu.edu.tr

ABSTRACT

After the understanding the strategical importance of hemp in Turkey and starting to production, hemp started to be a subject of multidisciplinary scientific works. In and around Samsun, where there is a Hemp Research Institute, usage of hemp product as building materials which became abundant in production in Samsun and nearby is among the research topics. Researched hemp products are mainly broken-hemp hurd types of products which mainly produced from waste hemp stems. But, usage of hemp fibers which are accepted as main products is also included to researchs and its contribution to the results are examined. In this work, 4 types of hemp hurds (in all samples) which are obtained from hemp stems, named as fiber (in some experiment groups) or waste, are used as hemp products (from thick to thin respectively T1, T2, T3, T4). In the experimental work, 6 different binders used which are 3 types of gypsum (for plastering, natural hydrolitic and lime putty), cement, plaster and water based glue. In some samples that lime putty gypsum used, small amount of silis sand and brick hurd added. Brick hurd is used to exemplificate the Horasan type mortar. To accelerate the chemical reaction, CO_2 gas applied for 3 days but it was not possible to measure the effect. Clay that is provided from Kavak region, which is not a binder material but good connective element and used in traditional brick production is also used for sample production. Main reason for that is determining the temperature behavior of the mass which contains the hemp products. In the produced samples, various ratios of stated binder/connective materials and various ratios of hemp products and water used. Unit weight variation and thermal conductivity coefficient calculations done for all samples. Also, for the cube samples that contains main binders, compressive strength experiments done and size variations were examined. 15 samples that have different mixtures were examined and it is found that 13 of them have unit weigth smaller than 1 kg/dm3. Some samples can be named as “isolation material” according to their thermal conductivity coefficient (k<0.06). In some mixtures, k coefficient found higher than

the lower limit of the isolation materials (between 0.060-0.085). According to compressive strength experiment, quite flexible, non deformable, having small unit weight (very preferrable for earthquake resistance) materials were produced. According to results of the produced building materials, those can not be used as load bearing structural elements in this condition but they can be used as partition elements and isolation elements in place, easily applied and at the same time it is possible to use them as economical building materials.

Keywords: Hemp, Hemp tow, hemp straw, hemp fiber, structural element

PLANT BIODIVERSITY RESISTANT TO GLOBAL CLIMATE CHANGE (Water and Drought) IN THE BLACK SEA REGION AND THEIR IMPACT MECHANISMS

Fergan KARAER

Ondokuz Mayıs University, Faculty of Education, Department of Mathematics and Science, Samsun
ORCID ID: 0000-0003-3781-2128

Corresponding author e-mail: fkaraer@omu.edu.tr

ABSTRACT

Global climate change (WCC) is seen in two ways as natural (from the structure of the world) and artificial (from human origin). Since the threats posed by artificial WCC are on a global scale, there is no solution with the measures that people will take alone, so what needs to be done in this case is the implementation of sustainable ecological practices (SEP).

The aim of this study is to determine the water and drought resistant (WDR) plant biodiversity in and around the Black Sea region (BSR) to be used in SEP against WCC and to explain their mechanisms of action.

As a result of the researches, 834 vascular plant taxa (558 species and 212 subspecies and 64 varieties) belong to 91 families and 345 genera belonging to S WDR, 171 of which are endemic, were determined in BSR. Among these, endemic and rare taxa are endangered by the IUCN, as they react very quickly to negativities. Accordingly, 19 of the endemics are globally endangered (CR), 22 of them are endangered (EN), 25 of them are vulnerable (VU), 29 of them may be endangered soon (NT), 71 of them are not endangered for now (LC), and five of them are not endangered (LC). In addition, although not endemic, 16 rare taxa have been identified on a national scale, 12 of them (VU), 1 of them (NT) and 3 of them (DD). In addition, there are 2 taxa in the Bern convention in BSR and 17 taxa in the CITES list.

When the plant biodiversity of WDR in BSR is evaluated phenologically, it consists of 96 trees, 198 shrubs, 541 herbaceous taxa, while according to Raunkiær life forms, 96 of them are phanerophytes, 203 of them are Chamephytes, 90 of the herbaceous taxa are geophytes, 11 of them are cryptophytes and 434 of them are hemicryptophytes. Thirteen of the 19 gymnosperm tree and shrub taxa resistant to WCC are resistant to cold, 14 to drought, 3 to salinity and 14 to air pollution. *Ephedra major* subsp. *procera* has all of these features (cold, drought, salinity, air pollution). While four of the 86 angiosperm trees and shrubs are evergreen (shed their leaves sequentially), 16 of the trees that shed their leaves in winter are resistant to cold, 14 of them are resistant to drought, and all of them have air pollution resistant properties.

According to these evaluations, since WCC has features that can cause many positive or negative changes on aquatic and terrestrial ecosystems, humanity is faced with a great confusion, the outcome of which is not yet fully predicted. Thus, since extinction may be the beginning for all living things, especially human beings, what needs to be done is the fact that we are a part of nature, that survival is not based on our own laws, but on the establishment of natural balance by the laws of nature.

In this context, in practical application, it is necessary to cultivate plant species and varieties that are

tolerant to drought in terms of physiological mechanisms and SEP. Since the use of WCC resistant plants in Turkey, which is a country rich in plant biodiversity, will lead to an increase in the number of SEP-conscious individuals, long-lasting SEP should be made in order to contribute to nature by reducing water consumption with xeriscape techniques. Especially in the green building system, when storing rain water, they should be used as irrigation water, and garden irrigation water should be obtained by purifying sink and bath water. In addition, in order to leave a nature with all its richness to the future with the claim of living together with nature, not to get rid of the self and manage nature, educational studies should be carried out on a Project based education (PBE), centred on all students from 7 to 70, in order to read and teach the mind book of nature.

Keywords: Global climate change (WCC), Sustainable ecological practices (SEP), Water and drought resistant (WDR) plant biodiversity, Black Sea Region (BSR).

WATER QUALITY CRITERIA FOR THE EVALUATION OF TREATED WASTEWATER REUSE AS IRRIGATION WATER

Feryal Akbal, Emre Burcu Özkaraova, Ayşe Kuleyin

**Ondokuz Mayıs University, Faculty of Engineering, Environmental Eng. Dept., Samsun, Türkiye*

ORCID ID: 0000-0001-6871-928X

*Corresponding author e-mail: fakbal@omu.edu.tr

ABSTRACT

The inconsistency of precipitation in some regions causes climate change and put pressure on finding alternative water sources. In this context, increasing the availability of water and ensuring the sustainable use of freshwater resources are among the priority targets. Reuse of treated wastewaters and alternative irrigation techniques attract attention, especially in the management of water resources in drought-affected areas. Therefore, wastewater management issues are becoming more important to increase reuse and recycling of water across sectors (e.g. municipal, industrial and agricultural), especially within the circular economy approach. The need for wastewater reuse lead to the development of water quality guidelines for sectoral (e.g. agricultural and industrial) reuse. Especially for the protection of human and environmental health, water quality criteria were published by global institutions such as World Health Organization (WHO) and Food and Agriculture Organization (FAO). WHO prioritizes risks from pathogens in wastewater and some other human health threats, while FAO focuses on irrigation water quality to maintain soil and crop health. International Standards Organization (ISO) has also published guidelines for treated wastewater use for irrigation projects (ISO 16075). To maintain crop yield and soil health, major parameters for irrigation water quality are salinity (electrical conductivity), total dissolved solids (TDS), sodium adsorption ratio (SAR), and specific ions like sodium, chloride, boron and bicarbonate. Some other major wastewater quality parameters are biochemical oxygen demand (BOD), total suspended solids (TSS), pH and heavy metals. Countries relying on agricultural production have developed additional water quality criteria in order to further reduce the risk level for the protection of national resources. Some countries like Spain defined up to 90 water quality parameters, while France defined 6 parameters for reclaimed water and additional parameters in the soil. The aim of this study is to present national and international water quality criteria for different irrigation water uses as the agricultural sector represents the largest share (approximately 70%) of global water consumption.

Keywords: water quality criteria, irrigation water quality, wastewater reuse

APPLICABILITY OF LIGNOCELLULOSIC MATERIALS IN THE STRUCTURE OF FOOD WASTE IN ADSORPTION

Hakan Çelebi[1], İsmail Şimşek[2], Tolga Bahadır[3], Şevket Tulun[4]

*[*1]Aksaray University, Engineering, Environmental Engineering, Aksaray, Turkey- 0000-0002-7726-128X*

[2] Aksaray University, Engineering, Environmental Engineering, Aksaray, Turkey - 0000-0003-1950-5159

[3]Aksaray University, Engineering, Environmental Engineering, Aksaray, Turkey- 0000-0001-9647-0338

[4]Aksaray University, Engineering, Environmental Engineering, Aksaray, Turkey- 0000-0002-0570-7617

*Corresponding author e-mail: hakanaz.celebi@gmail.com

ABSTRACT

During the food life cycle, large amounts of food waste and by-products containing valuable lignocellulosic (cellulose-lignin-hemicellulose etc.) structures are released. Minimizing food waste, avoiding environmental problems, helping the economy and society are the most important goals. Although the first option seems to be the energy sector today, the management of food waste is important. In recent years, successful and promising results have been obtained in the use of these wastes in wastewater treatment. For this reason, recycling of different food wastes resulting from domestic, agricultural and industrial uses instead of throwing them into the garbage cycle is of great importance both for the protection of the environment and the minimization of other environmental pollutants, and is an innovative approach in terms of eliminating waste with waste. A wide variety of treatment techniques are available to remove different types of pollutants from receiving environments such as water, air and soil. Among these treatment techniques, adsorption is accepted as one of the best techniques in treatment due to its simple working principle, high removal efficiency and low cost. However, the most important negative aspect of this method is the cost and efficiency of the adsorbent type. For this purpose, different types of adsorbents are tried in researches, and the most important one is food waste. In recent years, there are many scientific studies focusing on adsorbents of natural origin, which do not cause pollution as a result of their use. The use of waste material in pollutant removal and keeping this concept in the foreground is increasing day by day. Considering the near-zero cost and simplicity, the use of food waste in treatment is both economical and efficient. In this study, the applicability of food wastes containing lignocellulosic materials in the treatment was evaluated.

Keywords: Adsorption, Adsorbent, Food Waste, Non-toxic environment, Waste Management

SUSTAINABILITY ASSESSMENT OF REMEDIATION ALTERNATIVES FOR SOILS CONTAMINATED BY POLYCYCLIC AROMATIC HYDROCARBONS

Hale Demirtepe[1]

*[*1]Izmir Institute of Technology, Faculty of Engineering, Department of Environmental Engineering, Izmir, Turkey- ORCID ID: 0000-0003-4711-2467*

*Corresponding author e-mail: haledemirtepe@iyte.edu.tr

ABSTRACT

Contaminated soils have been recognized as globally important environmental problem since they pose significant risk to the human health and the ecosystem. To reduce this risk, several remediation techniques can be applicable. However, not all the remediation techniques are sustainable, considering the environmental, social, and economical aspects of the application. The aim of this study is to evaluate remediation alternatives for contaminated soils from a sustainability perspective. This study focuses on polycyclic aromatic hydrocarbons (PAHs) contamination of soils nearby an industrial region; hence the scope involves identification of soil PAH concentrations. The surface soil samples were collected from Aliağa region around the industrial district in İzmir. The samples were extracted by using ultrasonic extraction method, purified by neutral silica gel, and analyzed by Thermo Trace gas chromatography coupled with ISQ mass spectrometry to determine the PAH concentrations. Sustainability assessment was then performed using the SiteWise Tool for Green and Sustainable Remediation Version 3.2, developed by US Navy, USACE and Battelle. The indicators used in the tool were greenhouse gas emissions, energy use, air emissions, water and resource consumption, and worker safety. The remediation alternatives compared using this tool were soil washing, bioremediation and in-situ chemical oxidation. The results revealed the footprints of each remediation alternative at every stage of project implementation. Therefore, the results of this study are deemed to provide useful information for policy makers when selecting the remediation technology to apply at soils contaminated by PAHs.

Keywords: contaminated soils, polycyclic aromatic hydrocarbons, remediation, sustainability

INDENTIFICATION OF CLIMATE CHANGE VULNERABILITIES AT LOCAL LEVEL AND STRENGTHENING THE RESILIENCE OF THE CITY TO CLIMATE CHANGE

Hande Barlın[1], Pınar Ergenekon[2], Nihal Bektaş[3]

*[*1]Gebze Technical University, Faculty of Business Administration, Economics Department, Kocaeli, Türkiye*

-0000-0001-7699-2382

[2]Gebze Technical University, Faculty of Engineering, Environmental Engineering Department, Kocaeli, Türkiye -0000-0002-0555-5932

*[*3]Gebze Technical University, Faculty of Engineering, Environmental Engineering Department, Kocaeli,Türkiye -0000-0002-8257-9452*

* nbektas@gtu.edu.tr

ABSTRACT

Climate change, which is caused by anthropogenic activities, is one of the most existential challenges faced by the humankind. It has perpetual effects on ecosystems and living organisms around the world in many ways such as extreme weathers, droughts, rising sea levels and melting glaciers etc. It has potential for serious economic and social adversities in the medium and long term. Therefore, mitigating effects of climate change and adapting to is of outmost importance. Building resilient cities are at the heart of mitigation and adaptation strategies. However, the process is challenging and burdensome for governments and local authorities in developing countries with high urbanization rates, as relevant measures have potential for decelerating economic growth and exasperating social problems such as unemployment if not carefully and inclusively designed. To build resilient cities with high absorption to future shocks against the effects of climate change, the first step is identifying urban-specific vulnerabilities considering principles laid out in climate justice paradigm. As an endeavour towards this end, we critically evaluate current framework for identification of vulnerabilities and put forth an inclusive preliminary road map for local authorities to map the vulnerabilities in their cities.

Keywords: Climate Change, Mitigation and Adaptation Studies, Vulnerability Indicators, Social and Urban Inequalities, Climate Justice

SUSTAINABLE WASTE MANAGEMENT SYSTEM IN IZMIR-KARABURUN PENINSULA

Haniyeh Hajatnia[1], Bora Okan[2], Hatice Eser Ökten[3]

*[1]*İzmir *Institute of Technology, Engineering Faculty, Department of Environmental Engineering, İzmir, Türkiye- 0000-0002-4337-4155*

*[2]*İzmir *Institute of Technology, Engineering Faculty, Department of Environmental Engineering, İzmir, Türkiye- 0000-0001-6482-0778*

*[*3]* İzmir *Institute of Technology, Engineering Faculty, Department of Environmental Engineering, İzmir, Türkiye- 0000-0001-7511-940X*

*Corresponding author e-mail: haticeokten@iyte.edu.tr

ABSTRACT

Global solid waste generation is constantly rising, hence the need for management strategies that implement environmental improvements. The sustainable municipal solid waste management strategy for municipalities must include collection and transportation. The collection and transportation sector have been neglected while it is one of the most significant polluters. As a result, this study aims to model municipal solid waste transportation using Life Cycle Assessment (LCA) software which we used CCalC2 for this study and CML2001 methodology was used. To demonstrate how different approaches to waste management through transportation can reduce environmental impacts, LCA modeling was done for the three districts of Urla, Çeşme, and Karaburun, all of which are located on the Karaburun Peninsula. Each district was assigned three scenarios, with Scenario 0 representing current municipal practices, Scenario 1 representing a 50% reduction in plastic waste, and Scenario 2 representing a 50% reduction in all renewables. Results showed that only plastic separation might not be enough to achieve significant e reductions in environmental impacts. It has been demonstrated that in the transportation sector of Urla and Çeşme, Scenario 1 had a CO_2 reduction of 3.7% and Karaburun had a CO_2 reduction of 3.8% while Scenario 2 represented at least a 20% reduction of carbon footprint in all three districts. Findings of this research will support municipalities in the roadmaps they will choose for the Municipal Solid Waste Management applications.

Keywords: Solid Waste Management, Life Cycle Assessment, Sustainability.

IMPACT OF CLEAN COAL TECHNOLOGIES ON CLIMATE CHANGE

Hüseyin KARACA*[1]

*[1]*Inonu University, Faculty of Engineering, Department of Chemical Engineering, Malatya, Türkiye- ORCID ID* https://orcid.org/0000-0002-0543-8947

*Corresponding author e-mail: huseyin.karaca@inonu.edu.tr

ABSTRACT

In this study, the effect of clean coal technologies on climate change was investigated. Today, fossil energy sources (coal, oil and natural gas) are used intensively both as an energy source and for the production of basic chemical raw materials. Considering the current consumption rate of fossil energy resources, it is estimated that the apparent oil reserves in the world will decrease significantly after approximately 40 years, natural gas reserves after 65 years and coal reserves after 250 years. However, among these fossil energy sources, coal sources are the most influential on environmental pollution and therefore climate change. Although the negative effects of coal on the environment (such as greenhouse gas, acid rain, ozone layer depletion) are known, coal resources are still used intensively in energy production. The use of low quality coals (high in ash, sulfur, moisture and volatile matter content and low calorific value) without improving the fuel quality by burning them directly in energy production causes negative effects on environmental pollution and therefore climate change. Therefore, the quality of such low-quality coals needs to be improved to reduce their impact on the environment before they are directly burned. Various clean coal technologies (such as supercritical gas extraction, pyrolysis, liquefaction, gasification, fluidized bed technology, advanced combustion technologies) have been used to obtain clean solid, liquid and gaseous fuels from coal. In this study, a detailed research was conducted on the conversion of low quality coals, which cause environmental pollution, into a more environmentally friendly fuel with the specified clean coal technologies.

Keywords: Fossil energy sources, Incineration, Clean coal technologies, Environmental pollution, Climate change

AN EXAMINATION OF GLOBAL CLIMATE CHANGE AND ENVIRONMENTAL PROBLEMS IN SECONDARY SCHOOL SCIENCE TEXTBOOKS ACCORDING TO THE DIDACTIC TRANSPOSITION THEORY

İlknur Bozoğlu[1], Mustafa Ergun[2]

[1]Ministry of National Education, Samsun, Turkiye

[2] Ondokuz Mayıs University, Faculty of Education, Science Education Dept., Samsun, Turkiye

https://orcid.org/0000-0003-4471-6601

*Corresponding author e-mail: mergun@omu.edu.tr

ABSTRACT

The theoretical framework that explains all the elements that scientific knowledge is affected by until it becomes learnt knowledge by students is called didactic transposition. The external didactic transposition, which is the first step of this transposition, deals with the transformation of scientific knowledge into knowledge to be taught. The textbook, which is used to convey the students' targeted acquisitions, is an important material that enables students to acquire the objectives, qualifications and content aimed in the curriculum. Textbooks are of great importance for effective science teaching. The aim of this study is to examine and evaluate the subject of global climate change and environmental problems in the secondary school science 5th, 6th, 7th and 8th grade textbooks in terms of external didactic transposition. In line with the purpose of the study, the document analysis method, which is one of the qualitative research designs, was used. Textbooks were examined under three headings: scientific content, visual elements and design principles related to the field of science. As a result of the analysis of the textbooks examined in the research, it was seen that the information related to global climate change and environmental problems was not given information about global warming, which is the main cause of global climate change, in which environmental problems were extensively covered in the 5th grade science book. In the 6th grade science textbook, global warming and greenhouse gases are mentioned in the form of a reading text without using any visuals. In the 7th grade science textbook, it has been seen that superficial information about global warming, which is the main cause of global climate change, is generally treated as recycling. It has been observed that the subject of global climate change and environmental problems is extensively covered in the 8th grade science textbook. On the other hand, it has been concluded that the possible economic, social and psychological effects of global climate change in the near future are not explained superficially in the books. In addition, it has been observed that there is very limited information on the measures to be taken to minimize the possible future effects of global climate change and environmental problems. Considering the results of the research, some suggestions were presented for the science textbooks and the science course curriculum.

Keywords: Science Education, Didactic Transposition Theory, Global Climate Change, Environmental Problem, Textbook

SUITABILITY PREDICTION OF SOME DIPHENYLAMINE DERIVATIVES FOR APPLICATION IN DYE-SENSITIZED SOLAR CELLS (DSSCs) USING DENSITY FUNCTIONAL THEORY (DFT)

***Ismail Muhammad[1,2,3], Hamisu Ibrahim[1], Sule Erten Ela[2], M. S. Sallau[1], Z. N. Garba[1], Adewale O. Adeloye[3], and Yasir Albashir[4]**

[1]Ahmadu Bello University, Faculty of Physical Sciences, Chemistry Department, Zaria, Nigeria

[2]Ege University, Solar Energy Institute, Bornova/Izmir, Turkey

[3]Umaru Musa Yar'adua University, Ibrahim Shehu Shema Center for Renewable Energy Research, Katsina, Nigeria

[4]Bayero University, Faculty of Physical Sciences, Pure and Industrial Chemistry Department, Kano, Nigeria

*Corresponding author email address: ismail.muhammad@umyu.edu.ng

ABSTRACT

The suitability of the photosensitizer dyes has to be taken into consideration prior to the synthetic process for application in dye-sensitized solar cells to avoid waste of resources, therefore, Density functional theory and time-dependent density functional theory DFT-TD-DFT modeling techniques are used to conduct a computational study of the electronic structure of some Diphenylamine organic photosensitizer dyes (IM1-IM5) using the Gaussian 09 program. The calculation was optimized by means of the Becker three parameters hybrid functional with Lee-Yang-correlation functionals (B3LYP) with 6-31G (d,p) atomic basis set. The solvation effect was taken into account in the TD-DFT calculations in dichloromethane with the nonequilibrium version of the C-PCM model. This study provides a basic understanding of the impact of molecular design on the performance of some diphenylamine derivatives in dye-sensitized solar cells (DSSC).

Keywords: Diphenylamine, Organic dyes, TD-DFT, Molecular design, Optimization.

DESIGN AND SIZING OF SOLAR PHOTOVOLTAIC STAND-ALONE SYSTEM OF A TYPICAL HOUSEHOLD IN NIGERIA

***Ismail Muhammad[1,2,3], Sule Erten Ela[3] and Hamisu Ibrahim[1], Adewale O. Adeloye[2], and Z. N. Garba[1]**

[1]Ahmadu Bello University, Faculty of Physical Sciences, Chemistry Department, Zaria, Nigeria

[2]Umaru Musa Yar'adua University, Ibrahim Shehu Shema Center for Renewable Energy Research, Katsina, Nigeria

[3]Ege Unversity, Solar Energy Institute, Bornova/Izmir, Turkey

*Corresponding authors email address: ismail.muhammad@umyu.edu.ng

ABSTRACT

The rapid population increase in Nigeria and the over-reliance on fossil fuels have created significant environmental, health, and economic consequences. solar photovoltaic devices' economic and environmental merits have made it the most suitable clean energy alternative to help developing countries such as Nigeria achieve SDG-7. Nigerian Electricity Regulatory Commission (NERC) has created an off-grid electrification strategy as part of the Power Sector Recovery Program (PSRP) by approving an off-grid solar rooftop generation capacity of 5,000MW. Also, a feed-in tariff system was signed into law by NERC in 2016 to promote self-generation and reduce the overloading of the national grid. This study proposed a design of a stand-alone solar PV system for a sustainable home that matches the Nigerian sunlight and weather conditions to meet the required energy need of the household by Sizing each component used in the stand-alone system that will power all electric appliances at a medium-energy-consumption household in Nigeria based on Watt-hour.

Keywords: Solar PV, Stand-alone, System sizing, Peak sunshine hours (PSH), Inverter.

THE CURRENT STATUS OF WIND ENERGY IN THE WORLD AND TURKEY

Kadir KAYA[1]

*[*1]Ondokuz MayisUniversity, Samsun, Turkey- 0000-0003-4273-6684*

*Correspondingauthor e-mail: kadir.kaya@stu.omu.edu.tr

ABSTRACT

Renewable energy sources are known as environmentally friendly and clean energy sources that can remain in exhaustible for a long time, such as hydraulic, wind, solar, geothermal and biomass energy. Wind energy is one of the most important renewable energy sources. In recent years, the developments in wind turbine technology have reduced the cost of electricity generation from wind energy, bringing it to a competitive level with fosil fuel reserves. For this reason, countries want to benefit more from wind energy by making it a state policy. This study aims to provide a general assessment of the state of wind energy in Turkey and the world. In this context, the current condition of renewable energy resources has been evaluated by analysing the primary energy demand in the world, the amount of electricity generation and the installed power of renewable energy power plants. Then, the present status of wind energy has been examined in terms of the installed capacity of wind power plants and the amount of energy produced through wind energy plants. Lastly, wind energy policies and strategies for majorcountries have been presented.

Keywords: Energy, Renewable Energy, Wind Energy, Wind Energy Policies

TREATABILITY OF LEACHATES; THE CASE OF SAMSUN

Kasım ATMACA[1], Nevzat BEYAZIT[2]

*[*1]Sinop Üniversitesi, Mühendislik-Mimarlık Fakültesi, Çevre Mühendisliği Bölümü, Sinop, Türkiye-0000-0002-6570-4127*

[2]Ondokuz Mayıs Üniversitesi, Mühendislik Fakültesi, Çevre Mühendisliği Bölümü, Samsun, Türkiye- ORCID: 0000-0002-8396-5996

*Correspondingauthor e-mail: katmaca@sinop.edu.tr

Abstract

Leachate is a dangerous liquid mixture for the environment and human health, consisting of a high percentage of organic and inorganic pollutants formed from rainwater leaking from solid wastes, natural moisture and biochemical reactions occurring in wastes. This study discussed leachate treatment methods, and experimental studies with leachate samples obtained from Samsun Solid Waste Sanitary Landfill were evaluated within the Water Pollution and Control Regulation framework. The literature research and the results obtained in this study revealed that a single method is insufficient to treat leachate, and several methods should be used together to provide the recommended discharge standards.

Keywords: Hazardous waste, landfill, leachate, treatment

THE ROLE OF GENOME EDITING IN THE RESPONSE TO CLIMATE CHANGE

Karam Mostafa[1], Bayram Ali Yerlikaya[2],Mohamed Farah Abdulla3, Seher Yerlikaya[4], Musa Kavas[5]*
[1]Ondokuz Mayis University, Faculty of Agriculture, Department of Agricultural Biotechnology, Samsun, Turkey-0000-0003-2286-0434
[2]Ondokuz Mayis University, Faculty of Agriculture, Department of Agricultural Biotechnology, Samsun, Turkey-0000-0002-2864-7709
[3]Ondokuz Mayis University, Faculty of Agriculture, Department of Agricultural Biotechnology, Samsun, Turkey-0000-0001-6454-1410
[4]Ondokuz Mayis University, Faculty of Agriculture, Department of Agricultural Biotechnology, Samsun, Turkey-0000-0001-7767-2188
[5]Ondokuz Mayis University, Faculty of Agriculture, Department of Agricultural Biotechnology, Samsun, Turkey-0000-0001-5903-2873
* Corresponding author e-mail: musa.kavas@omu.edu.tr

ABSTRACT
Climate change is a global threat to crop growth and productivity and almost every aspect of our life in the present times. Changes in global temperature, population growth and water scarcity are increasing at an alarming rate and are likely to get worse. Crop respiration and evapotranspiration are temperature-reliant, and insect infestation and disease have become more common; the overall impact of climate change on agriculture outcomes will be negative. As reported by the Intergovernmental Panel on Climate Change (IPCC), major commodity crops' productivity was negatively affected due to their susceptibility to weather variables, resulting in significant economic losses. Climate change will also harm livestock. Therefore, improving agricultural productivity and sustainability is critical for the entire planet. Recently, the urgency of harnessing crop and livestock genome editing technology to tackle some of our biggest global challenges has grown exponentially. Genome-editing systems are set to enable precise modifications to the DNA in a cell or organism, which creates opportunities for rapid develoment of elite cultivars with desired traits. Therefore genome editing provides a suitable approach for either boosting organisms in adapting to climate change or limiting the consequences of climate change on agriculture. Transcription activator-like effector nucleases (TALENs), Zinc Finger Nucleases (ZFNs), and CRISPR/Cas systems have paved the way to enhance performance across a variety of traits. The use of CRISPR/Cas systems has dramatically increased the precision and efficiency of generating appreciable promise for producing crops and animals that can better deal with the effects of climate change. Here it is highlighted the current efforts and applications of genome-editing techniques in plants and livestock. which could help secure the global food supply. Furthermore, we recap a comprehensive overview of the CRISPR-Cas9 tool and talk through their abilities to resist the daunting threat of climate change.
Keywords: Climate change, Genome editing, CRISPR, Agriculture

EFFECTS OF CLIMATE CHANGE ON BIRDS

Kiraz Erciyas-Yavuz[1]
*[1]*Ondokuz Mayıs University, Ornithological Research Center, Samsun, Turkey- ORCID ID: 0000-0002-7085-2378*

*Corresponding author e-mail: erciyaskiraz@yahoo.com

ABSTRACT
The effect of climate on bird biology has been an important study area for scientist over the last half century. Changes in communities and ecosystems as a result of global climate change affect birds as well as other organisms in various ways. In order to reveal the effects of climate change on birds, observational, experimental and modelling studies were compiled and presented in this study. Changes observed in ecosystems respond to the basic vital needs of birds in different ways such as habitat and foraging. It is observed that some behavioural and structural features affecting the lives of birds such as migration and breeding time, distribution, demographic structure and morphology are changing rapidly. Within this scope of this study, the responses of birds to climate change were evaluated and an evaluation was made on possible future scenarios.
Keywords: birds, ecological niche modelling, bird migration, distribution

EFFECT OF CLIMATE CHANGE ON WAVE OVERTOPPING SAFETY OF COASTAL STRUCTURES

M. Adil Akgül[1*]

*[*1] Yeditepe University, Facultyof Engineering, Civil Engineering Department, Istanbul, Turkey*

*Corresponding author e-mail: adil.akgul@yeditepe.edu.tr

ABSTRACT

Significant consequences of climate change are observed in particular on coastal structures. Two problems due to climate change are considered, which are defined as the increase in water level and the increase in the magnitude of environmental effects, namely the wave height and wave period. Besides leading to risks in terms of structural integrity and safety, these changes also reduce the efficiency of breakwaters and seawalls due to increased water volumes passing over the structure crest, i.e. overtopping. Functional safety of coastal structures against wave overtopping has been defined in various guidelines mainly as a function of overtopping rates, defined as the volume of water passing a unit-width of the structure crest per unit time. The effect of sea level rise has also been introduced into international design manuals such as EurOtop (2018). However, in some cases, improvement of existing coastal structures may not be practical, economical or even possible due to the design limits, type of existing structures and foundation capacity. This study aims to give practical diagrams in order to estimate the increase in the overtopping rates caused by water level rise, which may be useful in the planning of required countermeasures to retain structural safety. Work has been carried out for rock, cube and tetrapod-armed sloped breakwaters and vertical breakwaters are considered in the study considering the two-dimensional case and simplified sea bottom profiles. Empirical equations for the prediction of overtopping rates have been used by considering both the sea level rise and the related growth in the design waves. Results are presented as diagrams showing the relationship between sea level rise and the increase in overtopping rates. It is believed that the evaluated diagrams may be useful in the decision making for the safety assessment of coastal structures and their hinterland against sea level rise.

Keywords: Sea level rise, wave overtopping, breakwaters, overtopping rate, coastal flooding.

DANCE THEATRE PERFORMANCE, LIVE ART IN PUBLIC SPACE AGAINST HUMAN ABUSIVE BEHAVIOR TOWARDS THE ENVIRONMENT THE CASE OF H_2O ZERO – WATER IS A CHEMICAL AND ONE OF THE ELEMENTS OF NATURE

Maria Maro Galani[1*], Hrissi K. Karapanagioti[2]

*[*1] Choreographer, Performer, Researcher of Performance Writing, Special Teaching Staff at the Department of Educational Sciences and Social Work, University of Patras, Greece*

[2] Associate Professor at the Department of Chemistry, University of Patras, Greece

*Corresponding author e-mail: galani@upatras.gr

ABSTRACT

Climate change makes it clear that humanity is operating beyond planetary limits resulting in an ecological deficit. This paper explores the role of dancetheatre performance in raising public awareness, changing attitudes, the prevalence of a conscious behavior and environmental awareness. Dancetheater performance is presented based on its structural elements, its origin, and its relation to environmental behavior. It is a research-action with a participatory and collaborative character and aims to investigate the effectiveness of dancetheatre performance in raising public awareness about the problem of water pollution and water scarcity. The pilot research process was activated within the framework of a program of the University of Patras. A group of trainees under supervision explored environmental, social, and cultural phenomena through Performance. Focused on water, they created short video performances related to the aqueous element. In the main action of the performance "H_2O zero - Water is a chemical and one of the elements of nature" the performance maker, using the collective memory as a source and incorporating in the performance elements of ritual, purification through water, creates an access to the personal stories of the public. It emotionally activates the viewers to be led into a deeper relationship with water, to become aware, to awaken, and possibly, lead to a redefinition of water utilization and management. The performance was presented in urban and natural environments. The content analysis methodology was used for the data collected at the end of the performance [written texts, images, maps, audio documents, short questionnaires, with open-ended answers about alternative environmentally friendly behaviors, dealing with water scarcity problem, water resources, plastic pollution of the aquatic environment]. It is necessary to make changes in the attitude of the people on a collective and individual level, because our habits are cumulatively creating burdens for the environment..

Keywords: Education, awareness, attitude change, environmental protection, water

UNDERSTANDING BIOFILM STRUCTURE ON ANTI-BIOFOULING COATING FOR *CHLORELLA VULGARIS*

Mehmet Ali Küçüker[1]*, Kaniye Güneş[1], Uğur Cengiz[2], Fatma Gulcin Durmaz[2]

[1] Izmir Institute of Technology University, Faculty of Engineering, Department of Environmental Engineering, 35430, İzmir, Türkiye

[2] Canakkale Onsekiz Mart University, Faculty of Engineering, Department of Chemical Engineering, Surface Science Research Laboratory, 17020 Canakkale, Turkey

*Corresponding author e-mail: mehmetalikucuker@iyte.edu.tr

ABSTRACT

Biofouling is a nuisance as surface problems for photobioreactor (PBR) system. Biofilm layer on PBR surface causes damage reducing light penetration, decreasing photosynthetic activity, and cutting backing lifetime of the reactor material. In this study, we investigated the Ormosil coating glasses having anti-biofouling properties to overcome this problem. For investigation of biofilm attachment, glass with $HETAV_{60}$ and $TAV_{2,5}$ coating was studied for the *Chlorella vulgaris* (freshwater green algae) strain. $HETAV_{60}$ Ormosil coating included HEMA, TEOS, AA, and VTS, while $TAV_{2,5}$ included TEOS, AA, and VTS. The water contact angle values of flat $HETAV_{60}$ and $TAV_{2,5}$ Ormosil coating were found as 60 and 42°. The rough surface was produced using hydrophilic silica nanoparticles (10.4 and 12.2 % wt) to produce the superhydrophilic surfaces. For investigation of biofilm attachment, glass with $HETAV_{60}$-10.4; $HETAV_{60}$-12.2; $TAV_{2,5}$-10.4; $TAV_{2,5}$-12.2 coating was studied for the *Chlorella vulgaris* (freshwater green algae) strain. First, coating glasses have been pulled out of the reactor at the end of harvesting time (14 days). Then, the light penetrations of coating glasses and the biofilm layers on the coating surface were examined using a light meter and a florescent microscope, respectively. These results suggest that superhydrophilic $HETAV_{60}$-10.4 and $HETAV_{60}$-12.2 Ormosil coating glasses would be a more useful candidate than $TAV_{2,5}$-10.4 and $TAV_{2,5}$-12.2 coating glasses for light penetration *Chlorella vulgaris* strain aspect.

Keywords: Biofouling, Algae, Biofilm, Photobioreactor, *Chlorella vulgaris*

STATISTICAL OVERVIEW ON CLIMATE CHANGE AND THE GREEN ENVIRONMENT IN TURKEY

Mehmet Şirin ATEŞ[1], Erol TERZİ[2], Şahin DEĞİRMENCİ[3]

*[*1] Ondokuz Mayis University, Faculty of Science, Department of Statistics, Samsun, Turkey, ORCID ID:*

[2] Ondokuz Mayis University, Faculty of Science, Department of Statistics, Samsun, Turkey, ORCID ID: 0000-0002-2309-827X

[3] Ondokuz Mayis University, Terme Vocational School,Department of Foreing Trade, Samsun, Turkey, ORCID ID: 0000-0003-3655-8404

*Corresponding author e-mail: eroltrz@omu.edu.tr

ABSTRACT

Although all the joint effort of countries, climate change is rapidly advancing towards an irreversible point. The loss of biodiverstiy on Earth, combined with other environmental problems such as water pollution and soil degradation , is pushing our planet to the brink of global warming. The time for urgent action is long since, in fact, we are running out of time to avoid from serious harm. In this context, the variation of climate change and green agreement in Turkey according to regions and the situation with statistical indicators are presented. Natural disasters that have occured in Turkey over the years, the measures taken, awareness studies have been put forward with statistics and suggestions have been presented.

Keywords: Climate Change, Biodiversity, Statistical Indicators

APPROACH TO INFECTIOUS DISEASES FROM THE WINDOW OF CLIMATE CHANGE

Mehtap ÜNLÜ SÖĞÜT[1], Merve EROĞLU[2]

*[*1] Ondokuz Mayıs University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Samsun, Turkey, 0000-0001-9461-6428*

[2] Ondokuz Mayıs University, Graduate School of Education, Department of Forensic Sciences, Samsun, Turkey, 0000-0002-3880-7585

*Corresponding author e-mail: mehtap.sogut@omu.edu.tr

ABSTRACT

In this study, it was aimed to evaluate the effects of climate change in terms of infectious diseases. The destruction and alteration of natural ecosystems, the reduction in biodiversity, the unhygienic combination of wild and domesticated species increase the possibility of transmission of viruses and other pathogens to humans and the risk of infection. Air pollutants are mainly; It plays a role in deterioration in respiratory functions, increase in respiratory system diseases, and increase in disease exacerbations in people with chronic respiratory system and heart diseases. Asthma symptoms may worsen due to the increase in the density of fungal spores and pollen in the air. Some diseases such as upper respiratory tract infections, flu, sinusitis, asthma, bronchitis, chronic bronchitis and even pneumonia are more common in areas where polluted air density is evident. Those most affected by air pollution are children under the age of five, chronic patients (such as asthma, bronchitis, COPD, cardiovascular disease, diabetes) and the elderly. It has been reported that there may be changes in the diversity of hosts and vectors transported to new geographical areas by human activities. This situation has also been shown to be the reason for the increase in the frequency of some arthropod-borne zoonotic diseases. In addition, some extinctions due to climate changes, it has been reported that it can increase the risk of zoonotic infections in both wildlife and humans. It has also been stated that habitat-specific outbreaks may occur, as the synchronization of life cycles between the agent and the vector may be disrupted in relation to the temperature changes that occur. The climate variables that directly affect the ecosystems of vector-borne diseases are mainly temperature and precipitation.

Keywords: Climate change, infectious diseases, zoonotic infections.

PREDICTION OF NUTRIENT LOADS IN AN INDUSTRIALIZED WATERSHED UNDER FUTURE CLIMATE DYNAMICS

Meltem ÇELEN[1], Mehmet Salim ÖNCEL[1,2], Halil Nurullah ORUÇ*[1], İsmail KALAFAT[1], Sinem VURAL[1], Meltem YAĞCIOĞLU[1]

*[*1] Gebze Technical University Earth and Marine Sciences Institute, 41400, Kocaeli, Turkey*

[2] Gebze Technical University Environmental Engineering Department, 41400,Kocaeli, Turkey

*Corresponding author e-mail: horuc@gtu.edu.tr

ABSTRACT

Projection of streamflow and nutrient loads is critical for water resources and the quality of basins that discharge into inland seas like the Marmara Sea, which responds quickly to environmental anomalies. Although most climate change projections of streamflow and nutrient loads are for agricultural basins, few studies have measured future responses in industrialized basins. In this context, this research aims to model changes in streamflow and nutrient loads (TN, TP – kg/ha/month) in an industrialized basin under future climatic conditions. Saz Stream (NW of Turkey) consists of two main drainage networks, Saz and Çayırova, within a small-scale basin that is highly urbanized and industrialized (approximately 72%). Saz stream are under pressure from point sources originating from Çayırova tributaries with wastewater characteristics and two Organized Industrial Zones. Because of these characteristics, the Saz Stream can be regarded as a prototype for point pollution sources found throughout the Izmit Bay drainage area. Projections were performed in three main stages, (i) Soil and Water Assessment Tool (SWAT) was set to calibrate streamflow and nutrient loads for 6 sub-basins generated along Saz Stream under the current conditions, (ii) The MPI-ESM-MR projection model's RCP4.5 and RCP8.5 outputs were incorporated into the SWAT between 2018 and 2040, (iii) three reference periods (2025-2029, 2030-2034, 2035-2039) were used to analyze model outcomes and were compared the current conditions. The findings indicate that the streamflow are exhibited only modest increases (3%–6%) across all reference periods. The TN and TP loads, which are already recorded at hazardous levels under the current conditions, are predicted to increase by 2%–40% and 10–60%, respectively for the throughout the basin. The increase in nutrient loads can be constrained in the future to tolerable levels if the study team's suggested nutrient reduction scenarios (particularly for Çayırova drainage network) are put into practice.

Keywords: Nutrient Pollution, Climate Changes, Climate Projections, Water Quality Modelling

IMPACT OF CLIMATE CHANGE TO WATER PROVISION: TREATMENT AND REUSE OF GREY WATER

Meltem Sarıoglu Cebeci*, Berk Koker[1], S. Furkan Selçuk Surname[1]

*[*1S]Sivas Cumhuriyet University, Faculty of Engineering, Departmen of Environmental Eng , Sivas, Turkey- ORCID ID orcid.org/0000-0002-3700-4377, orcid.org/0000-0002-3700-4377*

*Corresponding author e-mail: sarioglu@cumhuriyet.edu.tr

ABSTRACT

Due to population growth and pollution of water sources, water demand is increasing in all over the word. Technological developments with climate change and industrial and agricultural activities are causing significant water demand problems. Therefore wastewater treatment and reuse of them in different goals such as irrigation, cleaning of surfaces, car, are very important for sustainable water management strategy.

Several physical, chemical and biological treatment processes can be used based on raw greywater characteristics and water quality standards. Conventional physical, chemical and biological processes individually are not sufficient to required water quality standards. technologies. Greywater including organics, solids and surfactants treatment considering parameters of turbidity, TSS, TDS, total coliforms and COD removal can be achieved using advanced treatment systems. In this study greywater removal processes and use of treated greywater in Turkey and Europe will be discussed.

Keywords: Greywater, climate change, reuse, advanced treatment, sustainability

WASTE VEGETABLE OILS TO BIODIESEL: USING OF IN EU AND TURKEY

Meltem Sarioglu Cebeci[1]

*[*1S]Sivas Cumhuriyet University, Faculty of Engineering, Departmen of Environmental Eng , Sivas, Turkey- ORCID ID orcid.org/0000-0002-3700-4377*

*Corresponding author e-mail: sarioglu@cumhuriyet.edu.tr

ABSTRACT

The gradual decrease of fossil fuel energy sources in the world will put these non-renewable energy sources in a more important strategic position in the future. In recent years, in order to find solutions to the extreme fluctuations in oil prices in the world and the economic crises caused by this, alternative new sources to oil are sought. Therefore, vegetable oils are considered as alternative sources to motor fuel and oil obtained as petroleum derivatives.

Biodiesel is mainly produced from renewable materials such as vegetable oils, animal fats, waste oils, microalgae, etc. It has gained great deals with biodegradability, biocompatibility,non-toxicity, easy synthesis, safe operation. the biodiesel has been recognized as a green fuel, because it emits very low amounts of gases such as SOx, COx, NOx, and suspended solid particles by combustion.

In this study biodiesel was obtained from waste frying oil oil using the transesterification method. The kinematic viscosity of the obtained biodiesels was determined as 5.54 mm^2/s The specific gravity values were found to be 0.889g/cm^3. Performance tests can be made by burning the produced biodiesel in engines as fuel. In addition, waste vegetable oils were used biodisel production in Turkey and Europe will be discussed.

Keywords: Biodisel, renewable enery, waste, vegetable oil

CLIMATE CHANGE IMPACTS ON EXTREME WEATHER EVENTS: 2021 FLASH FLOODING EVENTS OVER THE BLACK SEA REGION

Meral Demirtaş[1]

*[1]*University of Samsun, Faculty of Aeronautics and Astronautics, Department of Meteorological Engineering, Samsun, Turkey - 0000-0002-3026-9276*

*Corresponding author e-mail: meral.demirtas@samsun.edu.tr

ABSTRACT

Climate describes the statistics of weather for typically over a 30-year period; it can describe long-term averages or variability of weather over specified temporal and spatial scales. Climate change may be described in terms of spatial scales (regionally and globally), in the temporal mean of a given atmospheric parameter (e.g., temperature, precipitation) or in its variability in various time-scales. Since the warmer atmosphere can hold more moisture - 7% per 1°C according to the *Clausius-Clapeyron* relationship – it can pave the way for the extreme precipitation events. Sea surface temperature (SST) is one of the major climate variables due to its key role for climate variability and change. Some studies indicate that the spatial pattern of the Black Sea SST has a general warming tendency. The Black Sea region is also prone to intense precipitation events due to its highly complex topography which makes predictability of intense precipitation difficult. In the summer of 2021, both the eastern and the mid-western parts of Black Sea region experienced high impact flash flooding events, which resulted in severe casualties and damages. In Kastamonu, for example, measured rainfall amounts were close to 500 mm in 48 h, causing several fatalities, damages and estimated economical losses of being above EUR 425 million. This study addresses the intensity of precipitation events using measured precipitation amounts and their predictability. Sensitivity of intense precipitation events to SST modifications (-/+ 1°C) were examined by numerical studies. SST-1°C resulted in less precipitation and smaller areal coverage, while SST+1°C yielded larger coverage and higher precipitation amounts. These results have two major implications; firstly, it indicates sensitivity of numerical weather prediction on SST distribution, and secondly it hints what may happen to precipitation amounts when SST of the Black Sea region increases in a warming climate.

Keywords: climate variability and change, high impact weather, flash-floods, Black Sea region

CLIMATE VARIABILITY AND CHANGE: THE 2019 SUMMER HEATWAVE EVENTS OVER THE EURO-MEDITERRANEAN REGION

Meral Demirtaş[1]

*[1]*University of Samsun, Faculty of Aeronautics and Astronautics, Department of Meteorological Engineering, Samsun, Turkey - 0000-0002-3026-9276*

*Corresponding author e-mail: meral.demirtas@samsun.edu.tr

ABSTRACT

Changes in climate mean and in variability may lead to the high impact weather events, which can be unusual and extreme than normal or average weather conditions, such as intense heat spells, severe droughts, heavy precipitation and flash floods. The Mediterranean basin has been referred as a '*climate change hot spot*', and the region experiencing intense and frequent heatwaves, prolonged severe droughts, and wild forest fires. It was reported that the global mean surface air temperature for 2015–2019 was approximately 1.7 °C above pre-industrial period and 0.3 °C warmer than the previous 5-year period. The global mean temperature of 2019 was noted to be approximately 1.1 ± 0.1 °C above the 1850–1900 baseline, which is used as an approximation of preindustrial levels. It was reported that the year 2019 was the second warmest on record. The heat-wave indicator -which uses a non-parametric approach to diagnose a spatiotemporally varying maximum temperature threshold- gave an objective account of hot spells of summer of 2019 over the Euro-Mediterranean region. The total number of heatwave days varied from 3 to 48 days for the June-July-August 2019 over the Euro-Mediterranean region, which were resulted from 1-6 major heatwaves. Examining each summer month separately revealed that in June, some parts of south-eastern Europe and the eastern Turkey had approximately 3-18 heatwave days with accompanying 1-2 heatwaves; in July, duration of hot spells varied from 3 to 12 days with 1-2 major heatwaves which were located over the north-eastern Spain, the western Italy and south-east of Turkey; in August, heatwaves lasted 12-24 days over east of Spain, south-eastern France, Italy, the Balkans and Turkey, and the region experienced 3 major heatwaves.

Keywords: climate variability and change, heatwaves, the-Euro-Mediterranean region

ZERO WASTE MANAGEMENT IN UNIVERSITIES

Mesut TEKBAŞ[1], Nihal BEKTAŞ[2]

*[*1]Gebze Technical University, Faculty of Engineering, Environmental Engineering Department, Kocaeli, Türkiye- 0000-0001-5053-7381*

[2] [1]Gebze Technical University, Faculty of Engineering, Environmental Engineering Department, Kocaeli, Türkiye -0000-0002-8257-9452

*Corresponding author e-mail: mtekbas@gtu.edu.tr

ABSTRACT

Rapidly developing technology and new consumption habits can cause the differentiation and increase in the amount of waste produced. Many studies on waste management in our country in recent years adopt the management of recyclable wastes in a way that will contribute to the national economy. At the same time, ensuring the proper disposal of non-recoverable wastes is another issue that needs attention. Considering the diversity of wastes and the density of recyclable wastes, it is very important to manage and control the wastes generated in universities.

The subject of waste management and zero waste is carried out in our country within the framework of the legislation enacted by the Ministry of Environment, Urbanization and Climate Change. Our university works with the goal of zero waste philosophy, which adopts the idea of explaining waste management to people not only with legal regulations, but also with a waste management philosophy. Zero waste is a target defined as a waste management philosophy that includes preventing waste, using resources more efficiently, preventing or minimizing waste generation by reviewing the causes of waste generation, and collecting and recycling waste separately at the source in case it occurs. In our university; waste management and control of waste management is done by the waste management unit of Gebze Technical University. In this study, studies carried out within the scope of waste management and zero waste at Gebze Technical University will be presented.

Keywords: Zero Waste, Waste management

MULTIDISCIPLINARY ENGINEERING EDUCATION: A COMPREHENSIVE STUDY ON INTELLIGENT TRANSPORTATION SYSTEMS (ITS)

Metin Mutlu Aydın[1], Dimitris Potoglou[2], Liana Cipcigan[3], Yasin Çelik[3]

*[*1]Ondokuz Mayıs University, Engineering Faculty, Civil Engineering Department, Samsun, Türkiye- 0000-0001-9470-716X*

[2]Cardiff University, School of Geography and Planning, Cardiff, United Kingdom - 0000-0003-3060-7674

[3]Cardiff University, School of Engineering, Cardiff, United Kingdom - 0000-0002-5015-3334

[3]Cardiff University, School of Engineering, Cardiff, United Kingdom - 0000-0002-5545-0717

*Corresponding author e-mail: metinmutluaydin@gmail.com

ABSTRACT

The Intelligent Transportation Systems (ITS) applications such as intelligent intersections, park violation detection, red light violation detection and average speed corridor systems in the world are becoming more important day by day with the development of technology. The encountered problem during the development and utilization of these systems is the lack of competent engineers and technical staff in this area and correct utilization of new technologies in transportation planning and management. The current number of ITS applications in urban roads and the opportunity to learn these systems' all application processes from the development to their implementation and operation is very limited. Thus, project-based education (PbE) for undergraduate and postgraduate engineering students on intelligent transportation system applications gains big importance. In this study, project-based education expectations (PbEE) of students were tried to examined and modeled by collecting questionnaire survey data under various effective parameters. Model results show that there is a distinct desire among students to receive a PbE on ITS. Then, the developed project titled "i-gCar4ITS: Innovative and Green Carrier Development for Intelligent Transportation System Applications" for PbEE of students in Turkey and UK were introduced in detail. Developed "i-gCar4ITS" project still ongoing and have a partnership with "Smart City Traffic Safety" project carried out Samsun Metropolitan Municipality in Turkey. Every stage of the project, which is implemented to make Samsun city urban roads more fluent and safer with intelligent solutions, is Turkey's biggest ITS project on ITS. At the end of i-gCar4ITS education project, engineering students in both countries with knowledge and experience in intelligent transportation will be trained. Thus, target stakeholders who had experience in this field will be able to create new R&D projects on ITS, have employment opportunities in this field, and have the desire, knowledge, and experience to take part in international projects for their future carriers.

Keywords: Intelligent transportation systems; traffic planning; road safety; smart cities; intelligent intersections.

BENEFITS OF BIOGAS USAGE AS A SUPPLEMENTARY FUEL IN SOLID WASTE COMBUSTION

Mohammad Safayat Hossain*, Bahtiyar Ozturk

Department of Environmental Engineering, Ondokuz Mayis University, Samsun, Turkey

E-mail address: safayathossain076@gmail.com*, bozturk@omu.edu.tr

ABSTRACT

Rapid urbanization and unmanaged human activities generate a considerable amount of Municipal Solid Waste (MSW), which is extremely difficult to manage in emerging and impoverished nations. Solid waste is gathered at the source and disposed of in many impoverished countries by open dumping. In open dumping, there is little treatment and human monitoring. Open dumping is also harmful to the environment and takes up a lot of space as a garbage disposal site. As a result, a more efficient solution to this problem is required. Various alternatives, including bioreactor sites, have proven effective in many impoverished countries, but they need a large amount of land and a significant degree of running and maintenance expenditures. Furthermore, because these technologies are concentrated, they face substantial transit costs. Incineration is used efficiently in several nations throughout the world. The high heat values of waste materials are utilized to generate thermal energy, which may then be converted into electricity. Recent trends in MSW composition have revealed a drop in the amount of organic material and an increase in the material that may be utilized to investigate combustion possibilities in various nations across the world. The goal of this study is to use biogas as an extra fuel in a combustion system to increase the heat value of municipal solid waste. The experiment is divided into three sections: the fundamental features of MSW are specified, and the heating value of MSW in various proportions after the combination of biogas and air is calculated. To ensure improved efficiency in the combustion system, biogas has been blended with the waste to be consumed in various percentages, as well as a prediction for the needed area and years after utilizing biogas and air as supplementary fuel in the solid waste combustion system.

Keywords: Solid waste, Biogas, Supplementary fuel, Calorific value, landfilling

DETERMINATION OF IDEAL PERIODS FOR BEACH TOURISM IN TERMS OF THERMAL COMFORT CONDITIONS IN SAMSUN AND PREDICTIONS FOR THE FUTURE

Muhammet BAHADIR[1], Savaş ÇAĞLAK[2]

[1]Ondokuz Mayıs University, Faculty of Science and Letters, Department of Geography, Samsun-TURKEY. Orcid ID: 0000-0001-5068-4250

*[*2] Ministry of Education, Amasya, TURKEY. Orcid ID: 0000-0002-9051-7710*

* Corresponding author e-mail: *savas_caglak@hotmail.com*

ABSTRACT

The happy, peaceful and healthy time of individuals participating in tourism depends primarily on climatic conditions. Therefore, people who will participate in tourism and recreational activities today also consider climatic conditions in their destination selection. Because of its coast to the Black Sea, Samsun has important beaches in terms of sea-sand-sun (3S) tourism. There are a total of 7 beaches in Samsun, 6 of which are in Atakum district and one in Ilkadım district. Thermal comfort can be defined as the state of people feeling comfortable or happy in their thermal environment. In this study, suitable periods in terms of beach tourism in Samsun in terms of thermal comfort conditions have been examined from the past to the present and predictions for the future have been made. In the study, the measurement data of the Samsun regional meteorology station numbered 17030 between 1991 and 2020 and the future climate prediction (projection) data based on the climate scenarios of the Representational Concentration Paths (RCPs) scenario set, which can be described as moderate (RCP4.5) and pessimistic (RCP8.5) were used. As a method, the Physiological Equivalent Temperature obtained from the RayMan model (Physiological equivalent Temperature - PET) index was used. As a result of the study, in terms of thermal comfort conditions, 190 days today (1991 - 2020) for beach tourism in Samsun, 210 days in the near future (2021 - 2050) and 230 days in the far future (2069 - 2098) are ideal has been determined. It should be taken into account that the duration and seasons of tourism activities, types and types will change with the change of thermal comfort conditions. In this case, it is recommended that tourism investors, planners and tour organizers make decisions considering the changing conditions for tourism activities.

Keywords: Thermal Comfort, Beach Tourism, PET (Physiological equivalent temperature), Climate Change, Samsun.

LEGAL DEAL WITH MEAL

[1]Mustafa Kenan Ustahaliloğlu

*[*1]Mustafa Kenan Ustahaliloğlu, Osmaniye Korkut Ata University, Faculty of Economics and Administrative Sciences, Department of Business Administration, Division of Commercial Law, Osmaniye, Türkiye- ORCID ID 0000-0003-1554-5997*

*Corresponding author e-mail: mkustahaliloglu@osmaniye.edu.tr

ABSTRACT

Understanding the importance of the natural environment as the only source for the sustainability of all beings' life, and realizing the non-endlessness of natural resources; human beings get to the conclusion that they must protect it, i.e., they must stop damaging it, for their own sake. The legal instrument used for this protection is penalty-based: the legislator forbids the foresought actions through legislation and determines penalties for those persons who violate these legislations. There are, among many, two major points that this method lacks: sanctioning the un-foresought actions and ensuring that the foresought sanctions serve the restitution of damaged natural beings. There is an alternative method, that is in use in some countries, fulfilling the above-mentioned shortcomings: attributing legal personality to natural beings. In this way; first, it is possible to sue for the damages given to a natural being regardless of its being foresought or not; second, the court takes the actual damages given to the natural being instead of a pre-determined penalty; third, the compensation ordered by the court serves for the reparation of the damages of the natural being. Such a simple change of view towards them makes an enormous difference in the simplification and effectuation of their protection procedure. In this paper, we will examine this new method of attributing legal personality to natural beings.

Keywords: Environment, protection, legal personality.

INVESTIGATION OF THE IMPORTANCE OF RECYCLING AND ENERGY SAVING ACCORDING TO THE INTERNAL DIDACTIC TRANSPOSITION THEORY

Murat FAKİR[1], Mustafa ERGUN[2]

*[*1]Ministry of National Education, Samsun, Turkiye*

[2] Ondokuz Mayıs University, Faculty of Education, Science Education Dept., Samsun, Turkiye

https://orcid.org/0000-0003-4471-6601

*Corresponding author e-mail: mergun@omu.edu.tr

ABSTRACT

Many approaches can be used to shape the scientific information desired to be taught to students by the teacher, and for students to assimilate this information and turn it into a form that they can use in their lives. Didactic transposition theoryis a theory that examines the educational process from the scientific knowledge produced by scientists to the assimilation by the student, and the transitions and transformations accompanying this process. The importance of recycling and energy saving is increasing day by day in many areas where the results of global climate change will shape the future. The first level where recycling and energy saving issues are addressed is the science course in primary school. The aim of this study is to examine primary school students in the teaching of recycling and the economical use of resources and its importance in the context of knowledge assimilated within the scope of internal didactic transposition theory. In this study, a case study pattern was chosen from qualitative research methods. Within the scope of the information to be taught, the subject of human and environment, which is the 6th unit of the 4th grade science textbook, was created and processed by using different methods and teaching techniques in two different classes. In the control group, traditional teaching methods with the teacher at the center were used. In the experimental group, a learning environment based on learning by doing was created. In this class, the student was taken to the center, activities were organized at all stages of the lesson and active participation of the student in the process was ensured. The participants of the study consisted of two different 4th grade students and a total of 52 students from a primary school in the central district of a province in the Black Sea Region. In addition, within the scope of the study, the parents of these students were included in the process and the parent monitoring test was applied in order to determine the behavioral changes in the students. In the study, the control and experimental group students were first administered a pre-test to measure their prior knowledge, and an achievement test at the end of the process. It was observed that the students in the experimental group, who had a learning environment based on learning by doing, participated in learning activities more willingly, had more confidence in themselves, collaborated more, and were more problem solvers compared to the students in the control group.

Keywords: Recycling, Energy saving, Primary school students, Didactic transposition theory

EFFECTS OF CLIMATE CHANGE ON MATERNAL AND NEWBORN HEALTH

Neşe KARAKAYA[1]

*[*1]Ondokuz Mayıs Üniversitesi, Sağlık Bilimleri Fakültesi, Ebelik Bölümü, Samsun, Türkiye- ORCID ID: 0000-0002-6125-6291*

ABSTRACT

Climate change directly or indirectly affects human health in the short and long term. Changing weather conditions and environmental disasters are making living conditions more and more difficult. Climate-sensitive health risks particularly affect vulnerable and socioeconomically disadvantaged groups such as women and children. There is increasing epidemiological evidence between maternal exposure to air pollution before pregnancy, during pregnancy, and in the early postpartum period and adverse birth outcomes such as preterm birth. In recent studies, it has been reported that the risk of pregnancy complications such as preeclampsia and gestational diabetes mellitus may increase in mothers exposed to air pollution. Decreased lung function, increased respiratory symptoms, and development of childhood asthma in infants born to mothers exposed to air pollution are also associated factors. Infants affected by preterm birth and low birth weight are more likely to encounter neurodevelopmental disorders, immunological complications, obesity, and cardiovascular diseases later in life.

The majority of healthcare providers see climate change as a major threat to human health. However, lack of guidance, education, and resources are seen as major obstacles in tackling climate change. Therefore, the provision of education, patient education materials, and clear policy guidance will contribute to the efforts of healthcare providers to reduce health risks.

Keywords: climate change, air pollution, maternal health, newborn health

HOW CARBON FOOTPRINT MATTER IN TURKSTAT: A CASE STUDY OF SAMSUN REGIONAL OFFICE

Nevra Alhas-Eroglu[1], Nuri Er[2]

*[*1] Turkish Statistical Institute, Regional Office, Samsun, Turkey- 0000-0002-1188-8274*

[2] Turkish Statistical Institute, Regional Office, Samsun, Turkey- 0000-0001-7576-2657

*Corresponding author e-mail: nevra.alhas@tuik.gov.tr

ABSTRACT

Greenhouse gas emissions has been further examined in the last two decades due to the fact that it has been one of the main results of climate change. In this sense, carbon emissions have been estimated by different organizations and institutions in order to introduce carbon footprint. The aim of this study was to estimate carbon footprint for Samsun Regional Office of Turkish Statistical Institute via carbon emissions of man-made facilities in the period of 2017-2021. The material of this study was included different source of emissions such as natural gas consumption, fugitive emissions, electricity, transport-related activities and fuels classified under three scopes. The results of the study revealed that carbon emission was calculated 134 tons CO_2e in 2017 but it has decreased in years and measured as 89 tons CO_2e in 2020. Nevertheless, carbon emission has started to increase by 2021 and reached 115 tons CO_2e considerably as a result of rise in fuel consumption. The results also highlighted that carbon emission substantially shifted from electricity to natural gas consumption in five-years period whereas it has sharply decreased in pandemic period.

Keywords: Carbon footprint, carbon emission, TURKSTAT

ONE HEALTH APPROACH AND CLIMATE CHANGE

Nurcan COŞKUN US[1], Zuhal KAYAR[2]

*[*1]Ondokuz Mayıs University, Health Sciences Faculty, Health Care Department, Samsun, Türkiye- ORCID ID: 0000-0001-9010-0192*

[2] Süleyman Demirel University, Social Sciences Institute, City, Uzm./MSc., Isparta, Türkiye- ORCID ID: 0000-0002-3453-9608

*Corresponding author e-mail: nurcan.coskun@omu.edu.tr

ABSTRACT

One Health is a concept that emphasizes a multidisciplinary approach to reveal better policies, practices and research for the protection and development of public health. The concept of One Health has a key role in keeping the public health consequences of global climate change under control. In this study, it is aimed to investigate collaborations made in the conflict against global climate change within the scope of One Health approach. The study was designed as a literature review. It is recommended to increase awareness activities for the provision of better health services to the public and the cooperation of different disciplines for the protection of health.

Keywords: One Health, Environmental Protective Health Services, Health Policies, Climate Change.

INVESTIGATION OF RECYCLED POLYMERS FOR ELECTROCHROMIC WINDOWS FABRICATION

Özge AKPINAR SARIHAN[1], İbrahim İNANÇ[2]

*[*1]Ondokuz Mayıs University, Graduate School of Sciences, Nanoscience and Nanotechnology Program, SAMSUN, TURKEY*

[2]Ondokuz Mayıs University, Graduate School of Sciences, Metallurgy and Materials Engineering, SAMSUN, TURKEY

*Corresponding author e-mail: ozgeakpinar86@hotmail.com

ABSTRACT

The constant increase of polymer waste released into the environment is a global problem which is raising concern to the general population. Polymer waste causes harm to humans, animals and plants through toxic pollutants. It can take hundreds or even thousands of years for polymer to break down so the environmental damage is long-lasting. Recycling is currently seen as one of the most promising technologies in that it allows polymer waste to fit into a sustainable, circular economy. Windows cause the energy loss in buildings allowing heat transfer from the inside to the outside or vice versa. By using electrochromic windows energy saving can be achieved in buildings The new polymers obtained by recycled method have shown promising values of ionic conductivity that make them attractive candidates to be implemented as sustainable polymer electrolytes for electrochromic devices. This procedure opens the way for recycling methods to produce electrochromic windows using polymer waste as an alternative sustainable feedstock. Herein we investigate the recycling of different polymer waste for electrochromic windows. Polymer waste was solved with different solvents. Some of polymers were solved homogeneously. For fabrication of electrochromic windows these homogeneous solutions were used.

Keywords: Recycled polymer, polymer electrolyte, electrochromic windows

RECOVERY OF ENDUSTRIAL WASTES FROM THE PRODUCTION OF PORCELAIN TABLEWARE

Ozlem Ozcan DURDAG[1]*, Dilek Yasar[1], Baris CELTIKCI[1]

[1]Bonna Porcelain , Bilecik, Turkey

*Corresponding author e-mail: ozlem.ozcan@bonna.com.tr

ABSTRACT

Fine Porcelain belongs to the vitreous porcelain group called “Vitreous China”. In general, the production of these porcelains uses clay, kaolen, quartz and feldspat raw materials. While it is aimed that the amount of waste generated from these raw materials during the production processes does not exceed 3% of the total production, many studies were started on the ability to recycle all waste created for a sustainable world. In this study, industrial treatment wastes were recycled and turned into a product. In addition to providing the physical and mechanical properties expected from vitreous china products, the shapeability of the product is also provided. The biggest limitation of this study is that industrial wastes do not have a continuous standard chemical analysis due to coming from different production points and the chemicals used in settling pools create shaping constraints. For this reason, in this study, it has been studied on the complete use of industrial waste cakes with additives that will provide the process conditions and minimum TSE10850:2021 properties of vitreous china in the final product and stoneaware product output has been obtained.

Keywords: Sustainability, vitreous china, recycling.

HEMP AS A SUSTAINABLE PHARMACEUTICAL RAW MATERIAL SOURCE

Özge Balpınar[1*], Şahane Funda Arslanoğlu[2]

*[*1]Ondokuz Mayıs University, Hemp Research Institute, Samsun, Turkey*

[2]Ondokuz Mayıs University, Faculty of Agriculture, Department of Field Crops, Samsun, Turkey

*Corresponding author e-mail: ozge.balpinar@omu.edu.tr

ABSTRACT

The meaning of sustainability is constantly evolving in this rapidly changing world. One of the first official definitions of sustainable development was expressed in the Burtland Report published by the United Nations in 1987 as “development that meets the needs of the present without compromising the ability of future generations to meet their personal needs”. One of the biggest problems in health is the sustainability of the acquisition and management of qualified and eco-friendly pharmaceutical raw material resources. A sustainable source of pharmaceutical raw materials should both serve the people of today’s world and respond to the health needs of future generations with a qualified approach. Hemp products are gaining in importance as the need for products with a lower environmental footprint increases. As a low-input, fast-growing and high-yielding crop, hemp has great potential for future sustainable crops. Hemp has been used in medical applications for thousands of years as a sustainable drug raw material source with its rich secondary metabolite content and phytocannabinoids. It is a plant that has been used in traditional Chinese medicine for thousands of years as an alternative medicine product in the treatment of diseases. When the cannabis plant is grown, its leaves and flowers are valued for their medicinal wealth. The remaining parts of the plant are also the subject of many researches; It is used in domestic and industrial applications such as paper packaging, cigarette paper, waxed paper, electrical insulation paper, textile, pulp, composite material, construction material, fuel, food, cosmetics, synthetic plastic. Cannabis offers an excellent opportunity for sustainable raw material and climate change control due to its fast growing crop cycle of around four-five months, and its wide range of applications and capture two-three times more carbon dioxide per hectare per year than forests.

Keywords: Hemp, medicine, sustainability

THE IMPORTANCE OF NUTRIENT RECOVERY FROM WASTE IN CLIMATE CHANGE ADAPTATION AND THE CIRCULAR ECONOMY MODEL

[1*]Özgecan MADENLİ, [1]Ece Ümmü DEVECİ

[1]Niğde Ömer Halisdemir University, Faculty of Engineering, Department of Environmental Engineering

*Corresponding author e-mail: ozgemadenli@gmail.com

ABSTRACT

The biosphere supports a complex but recoverable system in nature for the sustainability of all living things in their basic habitat. Access to clean air, clean water, food, and environmentally safe living spaces is the most fundamental right of every living thing. However, the population growth of human beings makes natural ecosystems vulnerable due to various ecological dynamics such as migration and competition and creates inefficient by-products in the form of waste behind it. Besides these; the Consumption of carbon-based natural resources, climate change and inefficient use of resources, and unsustainable agriculture and food productivity is the main challenges humanity is currently facing. In the face of these challenges, the natural ecosystems of the Biosphere become vulnerable, and there is a need for ecological designs that can cope with the problems of urbanization and industrialization sustainably and effectively. At this point, waste-fed refinement systems should be developed, and maximum efficiency and zero waste philosophy should be created by ensuring cyclicity within the system. Food recycling is a promising strategy for reducing the environmental impact of depletion of non-renewable resources and the production of these resources. Such systems would have the potential to mitigate climate change. At the same time, with the strong aspects that can strengthen the global economy, adaptation to the circular economy model will be achieved. In this study, the cyclicity, climate change, and environmental impact of nutrient recovery from nutrient-rich wastes will be examined by establishing the Environment-Agriculture-Food connection as a nature-based solution.

Key words: Environmental effect, Nitrogen, Phosphorus, Circular economy, Climate change

IN THE CITY OF AMASYA INVESTIGATION OF THE RELATIONSHIP BETWEEN THERMAL COMFORT CONDITIONS AND RESPIRATORY DISEASES

Savaş ÇAĞLAK [1]

*[*1] Ministry of National Education, Amasya, Turkey - 0000-0002-9051-7710*

* Corresponding author e-mail: savas_caglak@hotmail.com

ABSTRACT

Studies on the effects of thermal comfort conditions on human health have been very limited in Turkey, which is located in the transition zone of air masses in the middle belt. In this study, PET (Physiologically equivalent temperature) it is aimed to examine the relationship between thermal comfort conditions and respiratory diseases by using the index. In order to determine the thermal comfort conditions in the study, hourly between 2017 and 2019; the PET index obtained from the RayMan model was used by using the air temperature (ºC), relative humidity (%), wind (m/s) and cloud cover (octa) data . The relationship between PET values and respiratory diseases hospital admissions Pearson Correlation analysis and linear regression analysis were used. As a result of the study, a very high level of statistically negative correlation was found between thermal comfort conditions and respiratory diseases. It has been stated that when PET values increase by 1 ˚ C , there will be a decrease of -39.556 to -87,436 units in respiratory diseases. Cold thermal conditions have been found to increase hospital admissions for respiratory diseases. These findings can be informative and guiding for decision makers to protect public health, preventive and preventive medicine studies, and for studies on the effects of climate change on human health.

Keywords: Thermal Comfort, Respiratory Diseases, Public Health, PET (Physiological equivalent temperature), Amasya

EVALUATION OF PLATEAU TOURISM ACCORDING TO THE THERMAL COMFORT CONDITIONS; ÇAMICI PLATEAU, NIKSAR/TOKAT

Savaş ÇAĞLAK [1]

*[*1] Ministry of National Education, Amasya, Turkey - 0000-0002-9051-7710*

* Corresponding author e-mail: savas_caglak@hotmail.com

ABSTRACT

The tourism potential of a region is influenced by various factors such as landscape, flora, fauna, geographical location, topography, culture, leisure opportunities, weather and climate. The happy, peaceful and healthy time of individuals participating in tourism depends primarily on climatic conditions. Therefore, people who will participate in tourism and recreational activities today also consider climatic conditions in their destination selection. Thermal comfort can be defined as the state of people feeling comfortable or happy in their thermal environment (mainly temperature, humidity, wind climatology). In the absence of such comfort, many social, economic and physical problems are observed, such as a decrease in welfare and happiness, health problems and an increase in energy use, and a decrease in work efficiency. In this study , it is aimed to determine the suitable tourism periods according to the thermal comfort conditions of Çamiçi plateau of Niksar district of Tokat province . In the study, the number 19045 located in **Çamiçi** plateau meteorology of the station between 2017 and 2021 (5 years) hourly; air temperature (˚C), relative humidity (%), wind speed (m/s) and cloudiness (octa) data were used. As a method, the Physiological Equivalent Temperature obtained from the RayMan model (Physiological equivalent Temperature - PET) index was used. As a result of the study, it has been determined as the most ideal period for tourism and recreational activities, during which comfortable conditions are experienced during 5 months of the year (150 days) from May to the end of September. It is recommended that tourism planners and people who will participate in tourism take into account the specified periods in order to ensure that the tourism and recreational activities to be done are healthy and of high quality.

Keywords: Thermal Comfort, Plateau Tourism, Çamiçi /Niksar, PET (Physiological equivalent temperature)

CLIMATE CHANGE AND HEMP

Selim AYTAÇ[1*] Ali Kemal AYAN[2], Nazlıcan SÖNMEZIŞIK[3], Hossein HAJIABAEE[4], Merve BEZMEN[5]

[1]Ondokuz Mayis University, Institute of Hemp Research, Samsun/Türkiye-0000-0003-1786-9725

[2]Ondokuz Mayis University, Faculty of Agriculture, Samsun/Türkiye-0000-0002-9689-8905

[3]Ondokuz Mayis University, Institute of Postgraduate Education, Samsun/ Türkiye-0000-0002-1487-3115

[4]Ondokuz Mayis University, Institute of Postgraduate Education, Samsun/Türkiye-0000-0002-7293-297X

[5]Ondokuz Mayis University, Institute of Postgraduate Education, Samsun/ Türkiye-0000-0003-4961-5930

*Corresponding author e-mail: selim@omu.edu.tr

ABSTRACT

It has important targets for 2030 and 2050 within the scope of the implementations of the “European Green Deal - EU Green Deal” accepted by the European Union Commission. These targets are; It is structured under 7 policy areas: a) clean energy, b) sustainable industry, c) construction and renovation, d) farm to fork, e) elimination of pollution, f) sustainable mobility and g) biodiversity. From these established policies; In terms of our country, it is expected that the sectors that use coal as energy in production, such as Automotive, Textile, Plastic, White Goods, Construction Materials, Chemistry, will be affected more. On the other hand, in accordance with the Paris Climate Agreement signed by Turkey in 2021, it is necessary to present and implement the details showing the 30% reduction targets of emissions in the energy, waste, transportation, buildings and agriculture sectors for 2030. Hemp agriculture and industry presents a great opportunity in order to fulfill the provisions of both the EU Green Deal and the Paris Climate Agreement. Turkey’s first venture in the industrial sector of hemp was with textiles. The construction of a facility that can process hemp and similar products for textile purposes, which is expected to come into service in May 2023, continues in the Havza district of Samsun. It is necessary to discuss the scope of the subject as textile first. It is expected that the “Border Carbon Tax” applications will be started as soon as possible during the entry of textile products with a high “Carbon Footprint” into the European Union Member States. Carbon Tax at the border is planned to be implemented not only in the textile sector, but also in many sectors. Since we export a significant part of our exports to European Union countries, these practices will have a significant impact on our country. Precautions must be taken as soon as possible in order to reduce the “Carbon Footprint” of the products we manufacture, starting with our exported products. In the case of textiles obtained from natural products; In conventional production of cotton

plant, carbon and water footprint is very high compared to flax and hemp plants. For this reason, it is certain that increasing the use of alternative fiber plants in our cotton-based textile industry will make significant contributions to reducing the carbon and water footprint of textile products. Hemp is one of the leading non-cotton fiber plants that can reduce the carbon footprint in textile products. Registration of hemp varieties suitable for fiber production is one of the most important steps to ensure standard and quality fiber production in fiber-purpose hemp cultivation areas in our country. Considering the material value and market share that will be lost in the carbon tax application at the border to be applied by the EU; The investment costs required to increase the use of alternative fiber plants such as hemp in the textile industry will be a significant gain and gain rather than a loss.

Keywords: Hemp, Green Deal, Paris Climate Agreement,

CLIMATE CHANGE AND ARTIFICIAL INTELLIGENCE

Sema Gül[1], Murat Terzi[2], Kübra Aslan[3]

*[1]*Ondokuz Mayis University, Graduate Education Institute, Neuroscience, Samsun, Turkiye- 0000-0002-8285-5541*

[2] *Ondokuz Mayis University, Medicine, Neurology, Samsun, Turkiye- 0000-0002-3586-9115*

[3] *Adapha Yapay Zeka ArGe ve Yazılım AŞ, Samsun, Turkiye- 0000-0002-2828-3239*

*Corresponding author e-mail: sema.gul@omu.edu.tr

ABSTRACT

According to reports reported by the World Meteorological Organization, the temperatures experienced in the last decade have been reported as the hottest decade in the history of the world. The widespread threats of climate change to health are being considered by health professionals and governments to protect the health of current and future generations. Without additional action, significant increases in morbidity and mortality are expected in the coming decades, linked to a range of health issues, including heat exchange, poor air quality, poor food quality and safety, and selected vector-borne diseases in some places. At the same time, worker productivity is expected to decline, especially at latitudes where the effect of heat increase is increasing. A database should be created in which all these parameters will be included and will create data for the artificial intelligence process. Thanks to this database, artificial intelligence can be trained, the risk relationship of regional and seasonal changes with diseases can be analyzed, and financial resources can be allocated more effectively to the infrastructure and treatment expenditures required for preventive health and the treatment process of diseases. With our artificial intelligence supported database work, we aim to develop a forecasting, support and warning system. All these parameters are being used for this data base. This system predicts the results of climate change by years datas.

Keywords: Climate Change, Artificial Intelligence, Data.

ANALYSIS OF THE DESIGN'S ROLE FOR ZERO WASTE IN THE CASE OF PRODUCT DESIGN EXAMPLES

Sevcan Ekmekçioğlu[1], Deniz Ekmekçioğlu[2]

*[*1]Samsun University, Faculty of Architecture and Design, Industrial Design Department, Samsun, Turkey- 0000-0003-1707-2919*

[2] Ondokuz Mayıs University, Faculty of Fine Arts, Industrial Design Department, Samsun,Turkey- 0000-0003-2772-5784

*Corresponding author e-mail: sevcan.ekmekcioglu@samsun.edu.tr

ABSTRACT

The world has faced with the waste problem in the last decades. Especially environmental problems and the risk on the life of species are main problems occuring due to these waste. People mostly ingore these issues and they prefer the products that are easy for them. Besides these people, there is an increasing group that are interested in waste reduction and zero waste which is the term used recently much more. Even zero waste has 'zero' , the term has five levels to achieve that. There are products that can not be refused in daily life, it is possible to reduce them or to find alternatives. While consumpting, environmental friendly products have begun to increase in markets and preferred by people concerning the world. On the other hand, there are other roles to create these 'zero waste' products. In the last decades, designers are seen as responsible for consumption and they have a new role for a sustainable world. Many designers and producers have focused on creating products called green, sustainable etc to reduce plastic consumption and provide reachable alternatives for them. The aim of this study is to discuss the roles of product designers for zero waste and to show that there are possibilities for the consumption via mentioning the existing products designed. For this study, literature review is used to see the connection between designers and zero waste, also the sustainable world and the products designed for this reason. The data collected from literature will be analyzed and discussed.

Keywords: zero waste, industrial design, sustainability

CALCULATION OF INDIVIDUAL ECOLOGICAL FOOTPRINT

Sevde Üstün Odabaşı[1]

*[*1]Ondokuz Mayis University, Engineering Faculty, Environmental Engineering Department, Samsun, Turkey- 0000-0003-3533-4089*

*Corresponding author e-mail: sevde.ustun@omu.edu.tr

ABSTRACT

Individuals meet their basic needs such as food, heating, and shelter from nature to maintain their lives. As a result of these actions, they cause serious damage to nature. While our natural resources are consumed unsustainably, many wastes are generated, and the ecosystem balance is disturbed. To calculate how much the ecological carrying capacity of the world has been exceeded, the concept of ecological footprint has been created. The ecological footprint is the measure of the self-renewal capacity of our world, and the ecological footprint determines the pressure exerted by the living thing on the world. For this purpose, in this study, an individual's ecological footprint was calculated with a web calculator. As a result of the study, the ecological carbon footprint of an individual was calculated as 9.4 gha. It has been determined that an individual living in this way need 5.8 Earths. In terms of equivalent CO_2, an ecological footprint of 9.7 tons was calculated.

Keywords: Ecological Footprint, World Overshoot Day, Biological Capacity, Carbon Footprint, Offsetting

CONVERSION FROM SO_X AND NO_X IN FLUE GAS INTO FERTILIZER

Sevtap TIRINK[1*], Bahtiyar ÖZTÜRK[2]

*[*1]Iğdır University, Vocational School of Health Services, Environmental Health Program, Iğdır, Türkiye - ORCID ID: Orcid ID: 0000-0003-0123-0054*

[2] Ondokuz Mayıs University, Faculty of Engineering, Department of Environmental Engineering, Samsun, Türkiye - ORCID ID: 0000-0002-3385-0701

*Corresponding author e-mail: sevtaptirink@gmail.com

ABSTRACT

Pollutant emissions from developing countries continue to increase. Many of these countries also suffer from social problems such as poverty, food shortages and unemployment. It is also an important key to agricultural development, better crop production, solving the problem of food shortages, as well as job creation and income generation, another problem facing developing countries. Emissions from industrial activities, heating and traffic need to be brought under control in order to protect human and environmental health. It is aimed to transform the harmful gases released into the atmosphere into useful products due to the use of fossil fuels in different areas, by using more efficient and economical environmentally friendly technologies than the flue gas treatment systems used today, and to use the waste product in agricultural areas by taking into account the sustainability of resources and environmental and soil pollution. This study focuses on both the removal of NOx and SOx from the industrial flue gas flow using fossil fuels (coal/petroleum) and their conversion into high value-added products. In this way, it is of great importance in terms of contributing to the environment, public health and economic development (especially agriculture) of pollutants originating from flue gas.

Keywords: NO_x and SO_x removal, waste flue gas, fertilizer, fossil fuels, friendly technologies

QUALIFIED PRACTICES FROM TEACHERS' OWN EDUCATIONAL APPROACHES (KEY) IN IMPROVEMENT OF EDUCATIONAL QUALITY: ENVIRONMENTAL AWARENESS

Süleyman YAMAN[1], Belgin BAL İNCEBACAK[2], Aslı SARIŞAN TUNGAÇ[3]

[1]Ondokuz Mayis University,Science Education slymnymn@gmail.com, https://orcid.org/0000-0001-5152-4945

[2]Ondokuz Mayis University, Primary Education belginbal33@gmail.com, https://orcid.org/0000-0003-4643-8051

[3]Ondokuz Mayis University,Science Education, aslisarisan@gmail.com, https://orcid.org/0000-0003-3709-5288

*Corresponding author e-mail: *aslisarisan@gmail.com*

ABSTRACT

This study is an output of the project of "Sharing and Disseminating Best Practices of Teachers in Increasing the Quality of Education" carried out within the scope of TÜBİTAK 1003-Priority Areas R&D Projects Support Programme. With this project, it is aimed to reveal and disseminate the Own Educational Approaches (KEY) used by effective teachers who conduct science courses in their lessons. Within the scope of the project, classroom and secondary school science teachers who take part in the science courses in the schools affiliated to the Ministry of National Education in Samsun were interviewed. In total, 630 teachers from 17 districts were interviewed. Teachers were asked to send their lesson presentations to the project team by determining their own Educational Approaches (KEY) that they expressed effectively. The presentations sent by 198 teachers were examined by field experts who are project consultants. Field experts evaluated KEYs according to purpose/target, content, educational status, measurement and evaluation, in-class education-teaching processes and their effects on students' learning outcomes, and 148 of them were qualified as KEY. Lesson plans containing 43 achievements for grades 3-8 were prepared by teachers. When the achievements of the KEY for Environmental Awareness are examined, "F.3.6.1.2. Presents the results of the observation of the life cycle of a plant., F.3.5.2.1. Classifies the light sources around him as natural and artificial light sources., F.7.1.1.2. Expresses the causes of space pollution and estimates the possible consequences of this pollution., F.8.6.4.1. Pays attention to be economical in the use of resources. F.8.6.4.2. Designs projects for the efficient use of resources, F.8.6.3.3. It discusses the causes and possible consequences of global climate changes." It has been seen that appropriate plans for the gains have been developed. In addition to the importance of the environment issue in our century, it is seen that less number of activities are carried out among the effective lessons. For this purpose, it is thought that it is important to disseminate these KEYs, which were developed by teachers and determined to be effective by experts. In this research, the studies carried out to create and improve effective examples designed by teachers and developed by academicians will be conveyed, and sample KEYs will be shared.

Keywords: Teacher qualifications, TUBITAK, Own Educational Approaches, Environmental awareness

CLIMATE CHANGE AND WOMEN'S HEALTH

Sümeyye BAL[1]

*[*1]Ondokuz Mayis University, Health Sciences Faculty, Midwifery Department,-0000-0002-7568-0974*

*Corresponding author e-mail: sumeyyebal@gmail.com

ABSTRACT

Purpose: Climate change is an important global health problem that has become a priority. Its harmful effects on the world directly and indirectly affect human health. Natural disasters, vector-borne diseases, poor air quality and extreme variations in climate temperatures can cause changes in human health. Climate change may increase the health needs of women, who are more in number than men in developing countries, especially in adulthood and old age when pregnancy occurs. The aim of this review is to reveal the effects of climate change on women's health.

This review was searched on PubMed, Cochrane, Science Direct and Google Scholar pages using the keywords "climate change", "women" and "women's health" and their combination, and the results of the research were given in an interpretative way. Database research was carried out between 27 September and 05 October 2022. The health of women who experience social, cultural and economic inequality can be greatly affected by climate change. For this reason, the women's population should be addressed against climate change and the necessary interventions should be planned and implemented by the countries.

Keywords: Climate change, environmental pollution, women, women's health

INVESTIGATION OF THE IMPACT OF GREEN CHEMICAL ACTIVITIES ON PRIMARY SCHOOL STUDENTS' AWARENESS OF THE ENVIRONMENT

Şadiye KARAŞAH ÇAKICI[1], **Belgin BAL İNCEBACAK** [2]

[1] Ondokuz Mayıs University Science Education, Samsun, Turkey- 0000-0002-6673-6366

*[*2] Ondokuz Mayıs University, Primary Education Samsun, Türkeyy-* 0000-0003-4643-8051

*Corresponding author e-mail: karasah08sados@gmail.com

ABSTRACT

With the development of technology and the rapid increase in the world population, the problems of the importance of the 21st century, such as water shortage and environmental questions, have emerged. In this context, it has become essential to teach the concept of environmental awareness to young age groups for environmental askers. This research aims to increase the awareness levels of primary school students with green chemistry activities and to raise individuals with high environmental awareness as individuals of the future. The research was carried out in a primary school in the city of Artvin Turkiye between 2021-2022. The study group is 26 students studying at the 4th-grade level. In order to increase the awareness of the students about environmental problems, five weeks of green chemistry activities developed by the researchers were applied to the students. The research was conducted by a mixed method. In the quantitative dimension of the research, the 44-item 'Awareness for Environmental Problems' scale developed by Güven and Aydoğdu (2012) was used to determine the awareness levels of the students as a measurement tool. The qualitative dimension of the research was carried out with a semi-structured interview form developed by the researchers with the students. The collected data were examined with a statistical program. As a result of the analysis, it was determined that the data showed a significant difference. According to the research results, it was determined that the student's awareness of the environment increased significantly. The student's awareness of their responsibilities towards the environment increased and when the interviewees were examined, they stated that they were more sensitive to the environment and that green chemistry activity was different and enjoyable, increasing their interest in the course

Keywords: Green Chemistry, Environmental Awareness, Environmental Problems

OPTIMIZING WASTE MANAGEMENT WITH GEOGRAPHICAL INFORMATION SYSTEM (GIS) WITHIN THE SCOPE OF ZERO WASTE: THE CASE IN ATATURK UNIVERSITY

Şahin Korkmaz[1*], Elif Tuna Pulaş[2], Cemal Sevindi[3], Zeynep Ceylan[4]

[1] Ataturk University, Faculty of Engineering, Department of Environmental Engineering, Erzurum, Turkey- ORCID ID: 0000-0002-2241-359X*

[2] Ataturk University, Faculty of Engineering, Department of Environmental Engineering, Erzurum, Turkey- ORCID ID: 0000-0003-1716-0505

[3] Ataturk University, Biodiversity Science Museum of Atatürk University, Erzurum, Turkey- ORCID ID: 0000-0002-4252-887X

[4]Ataturk University, Faculty of Engineering, Department of Environmental Engineering, Erzurum, Turkey- ORCID ID: 0000-0003-1231-6929

*Corresponding author e-mail: sahinkorkmaz25@gmail.com

ABSTRACT

Population growth, irregular migration and change in living standards in the world; causes an increase in production and consumption. This situation destroys the ecological balance of the world by rapidly depleting the biological capacity. Non-renewable natural resources are insufficient to meet the increasing needs. In order to meet human needs, many wastes are generated during production, logistics, storage and consumption. It is important that these wastes are properly separated at the source, collected separately, recycled and disposed.

The recycling of waste which is planned and managed correctly, is a significant added value both in terms of raw materials and energy, in terms of environmental and economic aspects. For local governments, the cost of collecting, transporting and storing solid waste is quite high. Reducing both the production amount and the economic cost of waste is possible with recycling, reuse and circular economy. With this awareness; important initiatives have started in the world. Observing the ecosystem has become a general goal, as it contributes to the economy by recycling all the recyclable wastes that have become idle in the form of raw materials and energy. The "Zero Waste" policy, which covers the prevention of waste, the more efficient use of resources, the prevention or minimization of waste generation by reviewing the causes of waste generation, and the collection of waste separately at the source and ensuring its recycling, is becoming widespread locally and nationally.

In this study; In the main campus of Atatürk University (central campus, west campus, lodgings) located in Erzurum, 4 campuses in the city center (botanical park, hobby gardens, guesthouse 3, yoncalık education faculty campus) in a total of 7 campuses; the waste collection system has optimized with the help of GIS in order to manage solid wastes (recyclable, non-recyclable and organic, bio-degradable wastes) in accordance with the zero waste triple separation system, taking into account the optimal conditions and current conditions. Blue containers for recyclable wastes, black containers for non-recyclable wastes, and brown containers for organic and biodegradable wastes have placed at the points determined by considering the number of buildings in the campuses, human circulation in the buildings, waste type and quantity density. Optimization studies have carried out for the wastes accumulated in the containers placed at the determined points. Data sets have created by calculating road standards (road width, number of lanes, etc.), type and amount of waste according to seasonal conditions, waste collection hours, road networks belonging to the collection system, demographic structure of the study area, waste amounts. With the help of the data sets created, temporary storage areas where different types of collected waste are optimally created. By evaluating the data, minimum cost systems have studied for the collection and transportation of waste in an efficient and regular manner.

Keywords: Zero Waste, Waste Management, Collection and Transport System, Container, GIS.

THE PHILOSOPHY ROOTS OF THE CONCEPT OF THE HUMAN-CENTERED ENVIRONMENT

Şengül Özdemir[1]

*[*1]Sinop University, Faculty of Theology, Department of Philosophy of Religion, Sinop, Turkey- https://orcid.org/0000-0001-9921-0873*

*Corresponding author e-mail: sozdemir5561@hotmail.com

ABSTRACT

Environmental ethics, which is classified in applied ethics today, is a philosophical discipline that questions from where to make sense of the moral relationship in the human-environment relationship. This discipline discussed the human-centered (anthropocentric) approach of classical Western philosophy with alternative approaches such as deep ecology, social ecology, and feminist ecology etc.. These alternative approaches are based on the common problem of human domination of their environment through the industrial revolution, scientific progress and technological innovations. This problem is discussed with reference to the fact that the value and meaning of the environment is reduced to an instrumental value to the extent that it benefits people.

In this study, the philosophical background of the human-centered understanding of value is questioned. We evaluate this reductionist approach in terms of two dimensions: environment (physis) and human (techne). Accepting one of these two dimensions as the center and reducing it to the other in the environment-human relationship is discussed in this study with the concept of monologic language. This monological language, which we trace in the history of philosophy, is analyzed within the framework of the concepts of "event" expressing religious and mythical consciousness and "fact" expressing scientific consciousness. The purpose of this analysis is to reveal that the environment-human relationship resists any centeredness, otherwise moral problems turn into a crisis. As a result, in this study, it is claimed that making visible the dialogic language of the environment-human relationship, which resists reduction to any center, is an important step to discuss the human-independent (intrinsic) value of the environment demanded by environmental ethics.

Keywords: Environmental ethics, instrumental value, anthropocentrism

COMPOSITE PRODUCTION WITH HEMP AND BANANA FIBERS MODIFIED WITH BORIC ACID

Tugba Mutuk[1*], Sıla Oral[1], Kerem Arpacıoğlu[1], Sevim Alışır[1], Gökhan Demir[2]

[1]Department of Metallurgy and Materials Engineering, Ondokuz Mayıs University, Samsun, Turkey
[2]Department of Civil Engineering, Ondokuz Mayıs University, Samsun, Turkey

*Corresponding author e-mail: tugba.isitan@omu.edu.tr

ABSTRACT

Many problems such as the increase in the world population and therefore the increase in global drought and greenhouse gases have caused the materials used in industries to be reconsidered. Thus, the concept of green composite emerged. Environmental friendly materials play an important role in the building materials market. To obtain such materials, various additives such as natural fibers are used to strengthen composite material typologies. In this project, gypsum was determined as the main material. The main reason for its use is that it is cheap and suitable for use in many applications such as non-flammability and decoration for the internal structure system. Organic fibers are preferred as additive material. It is aimed to use natural organic fiber additives. It is aimed to produce green biocomposite by adding such natural fibers to gypsum composite. It is aimed to perform thermal conductivity and microstructure analyzes of the composites to be obtained in this study. Since organic fibers of natural origin are used, it has both sustainable and recyclable features at its advantages. The positive results and comments that can be obtained in line with the study results will be a guide for natural fibers to replace synthetic fibers.

Keywords: hemp fiber, thermal properties, microstructure, gypsum plaster

SURVEY ON THE CHALLENGES OF REDUCING CARBON EMISSION USING RENEWABLE ENERGY TECHNOLOGIES IN NIGERIA

Umar H. Y[1], Abdullahi I. D[1], Sa'adu Ibrahim.[2], Aliyu Usman[2], Sule Erten Ela[3]

*[*1,2]Federal college of education (Technical), School of science Education, Chemistry Department Gombe, Nigeria.*

[1]Bayero University Kano, Faculty of pharmaceutical Sciences, Pharmacology Department, Kano, Nigeria.

[3]Ege University, Solar Energy Institute, Izmir Turkey.

suleerten@yahoo.com

*Corresponding author e-mail: yahayaumarhauwa@gmail.com

ABSTRACT

Energy is needed to support human social and economic development. Major part of the world population especially those in developing countries like Nigeria, rely on fossil fuel to meet their energy needs. Renewable energy is a great strategy for addressing climate change, but it must be sustainable to meet future generations' energy demands and slow the process of global warming. Therefore, one of the key strategies for achieving the goals established by energy policy in this area is to reduce carbon dioxide emissions. This study examined the challenges encountered in reducing carbon dioxide emission using renewable energy technologies in Hadejia and Gashua towns of Jigawa and Yobe state, Nigeria respectively. Descriptive survey design was used with a structured questionnaire as data collection instrument. The population of the study comprised 271 households who were randomly selected. Simple percentages were used to analyze the demographic information of the respondents, while the hypotheses were tested using chi-square. Findings revealed higher percentage in the use of fossils (firewood, charcoal and kerosene) as against a very low percent for renewable energy (solar plate/ batteries and battery cells) use in the study areas. The finding also revealed that availability and low cost are the factors influencing the utilization of fossils in the production of energy. Negative factors such as cost, lack of awareness and lack of trust in the new form of energy production affects the use of renewable energy. The result of the test of hypothesis revealed that the use of renewable energy has an impact on carbon dioxide emission reduction in the study areas. Therefore, it is essential for regulators to adopt motivation in their approach for boasting investments in renewable energy resources, considering the higher percentage of challenges discovered, in order to enhance CO_2 reduction.

Keywords Carbon dioxide emission, Fossil fuel, Renewable energy

BLOCKCHAIN TECHNOLOGY IN FOOD SAFETY AND TRACEABILITY

Volkan Arif YILMAZ

[*]Ondokuz Mayis University, Engineering Faculty, Food Engineering Department, Samsun, Türkiye

ORCID ID: 0000-0001-5039-4026

*Corresponding author e-mail: volkan.yilmaz@omu.edu.tr

ABSTRACT

There is an unprecedented demand for a smarter, safer food supply for people and also feed supply for pets and livestocks all around the world. Adulterations, safety crisis, diseases and epidemics have increased more than ever in recent times, and people are demanding food they can track, know what's in, and trust. As a result, it is more necessary than yesterday to seek a system that can increase food safety and freshness, protect human health, reveal efficiencies in the supply chain, minimize waste, improve the reputation of brands and directly contribute to their earnings. Nevertheless, globalization of the food sector results in difficulties and chaos in the supply chain. Blockchain technology is considered to have the potential to solve or minimize many of the food safety and traceability issues. Blockchain is a digital record of transactions maintained by multiple unconnected computer networks, and this technology allows data to be processed, transmitted, stored and represented in a readable proprietary software format. Data is shared in encrypted form in data blocks, and each block forms a link in this chain. Thus, without the need for an official validator, information and documents are shared over the network in a trust relationship and time-stamped. Today, various examples can be given to global companies that have taken steps towards implementation in food supply and traceability by making the agreements with the organizations that provide blockchain technology. It is clearly seen that the applications of blockchain technology in the food sector are very promising in increasing food safety and that this traceability has the potential to become widespread in the future with digitalization.

Keywords: Blockchain; food; safety; traceability; supply

EVALUATION OF DROUGHT IN THE KIZILIRMAK DELTA WITH THE HELP OF DIFFERENT INDICES

Yasemin BALKA[1], Murat TÜRKEŞ[2], Tamer ÖZLÜ[3]

[*] 1Amasya University , Education Faculty , Turkish and Social Studies Education, Amasya, Turkey -
[2] Boğaziçi Universit , Climate Change and Policies Application and Research Center, Istanbul, Turkey -
[3] Ondokuz Mayıs University , Faculty of Arts and Sciences, Department of Geography, Samsun, Turkey -

* Corresponding author e-mail: balkayasemin@gmail.com

ABSTRACT

Drought, which is one of the negative effects of climate change, poses a risk in the Mediterranean basin and in our country as well as all over the world. Drought is expressed as the deviation or decrease of precipitation in a place or area from the long annual average. Drought has a transforming and destructive effect on human activities and the natural environment. Hydrological systems, ecology, agricultural areas and agricultural production, energy production, wetlands are some of them. . For this reason, many indices have been developed around the world to detect and monitor drought. Wetlands are rare areas in the world that contain terrestrial and aquatic ecosystems. For this reason, it is important for wetlands to examine, observe and research the effects of climate change and drought. The Kızılırmak Delta, which is the largest delta in Turkey whose natural features have not been preserved, is one of the most important deltas and wetlands of Turkey. There are many lakes and flooded forests in it. At the same time, being a habitat for more than 350 bird species, it is important to determine the climate change and drought impact level of the Kızılırmak Delta, the level of drought severity and how it will be in the future. In order to determine the drought in the Kızılırmak Delta, the total precipitation, maximum temperature and minimum temperature data of Bafra Meteorology station between 1964 and 2020 were used. These data were analyzed using the SPI (Standardized Precipitation Index) and SPEI Standardized Precipitation and Evopotranspiration indices. As a result of the analysis, drought was classified as 1, 3, 6, 9, 12, 18, 24 month time series. According to SPEI 1, 355 months of drought of varying intensities, from exceptionally dry to mildly arid, were observed in the Kızılırmak Delta. While -0.0065 is the least arid drought value, the most severe drought value is -3.65 extraordinarily arid. According to SPEI 24, from 1964 to the end of 2020, 14 years and 2 years of continuous drought (SPEI24) passed. According to the results of the analysis, even in the Kızılırmak Delta on the Black Sea coast, drought has been effective from past to present. Increasing heat waves and decreasing precipitation with the effect of climate change pose a danger of drought in the Kızılırmak Delta as well as all over the world. For this reason, it is important to detect and monitor drought in the Kızılırmak Delta, which hosts an important wetland ecosystem.

Keywords : Drought, SPEI Index, SPI Index, Delta, Wetland, Kızılırmak Delta Samsun.

CLIMATE CHANGE AND NURSING

Züleyha Ural Yıldız [1], Aynur Ataman Kufacı[2], İlknur Aydın Avci[3]

*[*1] Provincial Health Directorate, Home Health Services Unit Coordination Center, Samsun, Turkey – 0000-0002-8987-9888*
[2]Sinop University , Vocational School of Health Services, Medical Services Techniques Department, Sinop, Turkey- 0000- 0002-3708 -0556
[3]Ondokuz Mayıs University, Faculty of Health Sciences Department of Nursing, Samsun Turkey- 0000-0002-5379-3038
*Corresponding author e-mail: zuleyha__89@hotmail.com

ABSTRACT

Climate change refers to long-term changes in temperatures and weather patterns. Climate change, one of the most important global threats of the 21st century, is a serious public health problem. When the health problems that occur as a result of climate change are examined; diseases associated with heat and cold, side effects of ultraviolet radiation, health problems caused by air pollution, diseases related to food and water, changing infectious disease factors, and mental problems. The role of the nurse, who is in one-to-one communication with the society, is quite large in preventing these problems. The role of nurses in preventing climate change and the problems that may occur as a result, and in addressing health sequelae by using their professional roles is very important and nursing is a key role for health policy and advocacy in the 21st century.

Keywords: climate change; climate action; global warming; climate and nursing; sustainable development goals

POSTER PRESENTATION

INVESTIGATION OF LUBRICATION PERFORMANCE OF NANO-PARTICLE ADDED WASTE OILS

Aleyna Taşkın[1], Fevzi Şahin[2], Cengiz Görkem Dengiz[3]

[1]Ondokuz Mayıs University, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye-
0000-0002-8308-9957

[2]Ondokuz Mayıs University, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye-
0000-0002-4808-4915

*[*3]Ondokuz Mayıs University, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye-*
0000-0003-1308-3223

*Correspondingauthor e-mail: gorkem.dengiz@omu.edu.tr

ABSTRACT

Friction at the interface of the die and the wor piece is an importan tparameter. For this reason, it is important to investigate and control the friction at the interface. Thisstudy investigated the effect of different lubricants on the friction coefficient with the ring compression test. The aim is to find the oi lwith a better friction coefficient than the others. It is planned to compress the aluminium rings in a hydraulic pres machine under dry conditions with vegetable oil, motor oil, and nanoparticle-reinforced waste oil (nano-oil), respectively. For the preparation of nano-oil, silconoxide was added to waste vegetable oil at additive ratios of 1%, 3% and 5% byweight. The mixture was mixed first mechanically and then in an ultrasonic mixer. Then, the compression process was applied to the ringsunder 320 bar pressure. The lubrication performance of the lubricants was determined in the Male and Cockroft friction calibration curves according to the size changes of the compressed rings. The highes tfriction coefficient was detected in the dry ring, and the lowest friction coefficient was detected in the 5% nanooily ring. The friction coefficient of the ring lubricated with 5% nanooil is 93.7% lower than in dry conditions. As a result, the friction coefficient values are as dry conditions, vegetableoil, 1% nanooil, motor oil, 3% nanooiland 5% nanooil, from largest to smallest.

Keywords: friction, lubricant, ring compression test, waste oil

DETERMINING THE RELATIONSHIP BETWEEN ZERO WASTE INDEX AND GREENHOUSE GAS EMISSIONS REDUCTION WITH A ZERO WASTE MANAGEMENT APPROACH AT ONDOKUZ MAYIS UNIVERSITY

Arife Şimşek[1], Yüksel Ardalı[2]

[1] Ondokuz Mayıs University, Blacksea Advanced Technology Research and Application Center, Ondokuz Mayis University, 55200, Samsun-Türkiye,*

ORCID ID:0000-0002-7177-1764

[2]Ondokuz Mayıs University, Environment Engineering Department, Atakum, 55139, Samsun-Türkiye,

ORCID ID:0000-0003-1648-951X

*Corresponding author e-mail: arife.simsek@omu.edu.tr

ABSTRACT

A zero-waste concept is needed to measure how balanced the zero-waste system and raw material substitution are. The purpose of this research is to calculate the zero-waste index (ZWI), to know the effect of the zero-waste index, to relate the carbon emission caused by the waste with the amount of waste and to use the Zero waste program. In this study, Ondokuz Mayıs University (OMU) campus is the chosen area. In this research, the effect of evaluating the amount of waste within the scope of zero waste management on the reduction of greenhouse gas emissions by calculating the zero-waste index at the university was made. 78% of the internal stakeholders of the university participate in waste separation and 62% know that waste is managed, but the majority support the project. According to the waste characterization of the university, the distribution rates are 51% for packaging waste, 10% for park and garden waste, 12% for organic waste, 5% for non-recyclable waste and 32% for other waste. After one year of monitoring at OMU, work has been initiated to manage the waste generated and the recycling potential and minimization of existing waste. According to the amount of waste sent to the recycling, composting and landfill area with the zero-waste approach, the waste managed in the campus was determined as 45.6%, while the zero-waste index was determined as 0.28. The greenhouse gas reduction from waste managed at the university was found to be 623.4 kg/CO_2e and was evaluated by relating it to the waste index.

Keywords: greenhouse gas, waste management, zero waste

RECOVERY OF AMMONIUM FROM LEACHATE IN THE FORM OF FERTILIZER

Ömer Yeni[1], Ayşe Kuleyin[2*]

[1]Vezirköprü Belediyesi, Samsun, Türkiye

*[*2] Ondokuz Mayıs University, Engineering Faculty, Environmental Engineering Department, Samsun, Türkiye*

*Corresponding author e-mail: akuleyin@omu.edu.tr

ABSTRACT

Landfill leachates at high concentrations are complex wastewaters containing organic and inorganic pollutants. Nitrogen and its derivatives, which are an important component of wastewater in high concentrations, cause eutrophication in receiving environments, deteriorating the quality of water resources and preventing their use. For this reason, studies on the recovery of ammonia from wastewater have gained importance. It is aimed to ensure the recovery of ammonium from landfill leachate with high ammonia value by using ammonium sulfate and magnesium ammonium phosphate (MAP) precipitation method.

The primary aim of the study is to obtain ammonia recovery in high yields (80-90%) by providing optimum conditions according to the characteristics of the landfill leachate. For this purpose, it is expected that the effluent obtained as a result of the ammonium sulfate and MAP precipitation process will not be affected by the chemicals used during the precipitation. One of the objectives of the study is to increase the success of other treatment stages by removing ammonia, which may have an inhibiting effect in further treatment stages, by ammonium sulfate and MAP precipitation. Achieving the best efficiency in the natural pH of the leachate with the use of minimum chemicals in a short time and having the fertilizer value of the obtained sediments are considered as important advantages.

Keywords: Nitrogen recovery, leachate removal, fertilizer

INVESTIGATION OF SILICA PRODUCTION FROM NEEDLE LEAVES OF PINE TREE

Başak Mesci Oktay*[1], Feza Geyikçi[2] , Kürşat Furkan Ağırca[2]

*[1]*Ondokuz Mayis University, Faculty, Metallurgical and Materials Engineering Department, Samsun, TURKEY- 0000- 0002-1204-0195*

[2] *University, Faculty, Department, City, Country- 0000-003-4789-1026*

*Corresponding author e-mail: basakm@omu.edu.tr

ABSTRACT

Pine trees, whose scientific name is Pinus, are one of the most common tree species in the world. These trees, with needle-shaped leaves, evergreen and woody seed-bearing cones, are among the most commercially important tree species. These trees are generally used for ornamental and industrial resin material. Silica, whose chemical symbol is SiO2, is a basic raw material widely used in the cement industry, glass industry, paper and cosmetics industry, as well as in the electronics, ceramics and polymer material industries. The synthesis of silicates is very important because of their use in many industrial areas. SiO_2 is generally obtained from silicate solutions. Silicate solutions, on the other hand, are obtained from processes that require high energy such as melting quartz at high temperatures such as 1400-1500 °C or ore enrichment. Pure silica is also obtained by using initiators such as tetraethylorthosilicate (TEOS) as a SiO_2 source under laboratory conditions. Since this method is not economical, agricultural resources are used to obtain silica. In line with this information, a study was carried out to obtain a porous and amorphous silicate used in the production of various silicates such as magnesium, calcium, barium, zinc and aluminum from pine needles. İIn this study the pine needles were collected, washed and then dried for one day to prepare the analyzes. The dried pine cones were treated with 3M 100 mL H_2SO_4 for 3 hours. After the reaction with the acid, the sample is subjected to filtration. It was calcined in an ash furnace at 800°C for 3 hours. After calcination, characterization was performed by SEM, X-Ray and FT-IR analyzes. Materials were assigned and images were taken. With this study, it is desired to show that agricultural resources can be used to obtain silica.

Keywords: Silica, pine needle, calcination

THE USE OF BIODEGRADABLE PLASTIC MULCHES IN VEGETABLE PRODUCTION

Burak TUZEN[1*], Aysun PEKŞEN[2], Yüksel ARDALI[3], Yusuf YANAR[4], Serkan İÇ[5], Mustafa SAĞLAM[6]

[1]Ondokuz Mayıs University, Faculty of Agriculture, Department of Horticulture, Samsun-Turkey, 0000-0001-6562-1332

[2]Ondokuz Mayıs University, Faculty of Agriculture, Department of Horticulture, Samsun-Turkey, 0000-0002-9601-5041

[3]Ondokuz Mayıs University, Engineering Faculty, Department of Environmental Engineering, Samsun-Turkey, 0000-0003-1648-951X

[4]Tokat Gaziosmanpaşa University, Faculty of Agriculture, Department of Plant Protection, Tokat-Turkey, 0000-0002-5795-6340

[5]Ministry of Agriculture and Forestry, Black Sea Agricultural Research Institute, Samsun-Turkey, 0000-0001-8072-863X

[6]Ondokuz Mayıs University, Faculty of Agriculture, Department of Soil Science and Plant Nutrition, Samsun-Turkey, 0000-0002-7564-5079

*Corresponding author: buraktuzen55@outlook.com

ABSTRACT

Different types of mulches are used in the production of special crops to modify soil temperatures, maintain soil moisture, and reduce weed pressure, ultimately increasing crop yield and quality. One of the most commonly used mulches is polyethylene plastic (PE) mulches. It is relatively cheap, easily processed, highly durable, and flexible. However, the extensive use of PE mulches is a source of serious environmental pollution in agricultural production. Removal of polyethylene plastic mulches from the field after harvest is an important agricultural, economic, and environmental concern. In recent years, interest in the development of biodegradable mulch obtained from renewable biological resources and their use in agricultural production has increased globally to eliminate the disadvantages of using PE mulch. The main advantages of biodegradable plastic mulches for agricultural applications and the environment are that they can be incorporated into the soil after harvest without being removed from the field and then degraded by microorganisms in the soil. Bioplastics produced using raw materials of biological origin (vegetable starch, cellulose, etc.) are expected to be an environmentally sustainable alternative to commonly used plastics produced from fossil fuels. Although biodegradable plastic mulches are very new in Turkey, they have been used in European agriculture for many years and have also been adopted by farmers. This review gives general information on the benefits and importance of biodegradable plastic mulches used in vegetable cultivation.

Keywords: Mulching, polyethylene plastic mulch, biodegradable plastic mulch, vegetable, production

THE ACTIVATED CARBON THAT WAS DERIVED DOMESTIC HEMP BIOMASS: A PRELIMINARY INVESTIGATION ON THERMOCHEMICAL CONVERSION AND CHARACTERIZATION FOR SUPERCAPACITOR APPLICATIONS

Buse Ecevit[1], Mehmet A. Ilgaz[2], Görkem D. Karaaslan[3], Tugba B. Maden[4], Yıldıray Topcu[5], Selim Ceylan[6], Sevim Alışır[7], Berker Fıçıcılar[8], Burak Tekin[9]*

[1]Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey- 0000-0002-6820-6000

[2] Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey- 0000-0001-8909-0046

[3] Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey- 0000-0002-3574-8225

[4] Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey- 0000-0002-5109-3142

[5]Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey- 0000-0002-2095-6603

[6]Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey

[7]Ondokuz Mayis University, Faculty of Engineering, Department of Metallurgy and Materials Engineering, Samsun, Turkey-0000-0001-7296-8318

[8]Ondokuz Mayis University, Faculty of Engineering, Department of Chemical Engineering, Samsun, Turkey- 0000-0003-3882-1691

*[*9] Ondokuz Mayıs University, Engineering Faculty, Chemical Engineering Department, Samsun, Turkey-0000-0002-7533-3008*

*Corresponding author e-mail: burak.tekin@omu.edu.tr

ABSTRACT

In recent years, some issues such as energy, materials with high added value and the evaluation of national resources have become extremely important due to the limited resources of raw materials, the increase in costs and the importance of keeping the increasingly polluted environment clean. In this context, domestic biomass, which are easy to access and inexpensive are need as raw materials for the production of energy and various chemicals, whereby will provide significant energy savings. In this study, as Turkey's first registered local and national cannabis plant, hemp shells was investigated with thermochemical methods such as pyrolysis and gasification in an environmentally friendly way. Various methods that can be used in the evaluation of cannabis stems were explained, and It was drawn attention to the potential of the products that can be produced with these methods. The process steps from the biomass to the activated carbon are hydrothermal, pyrolize, and activation with KOH. We investigate how the activation procedure influences the texture (by BET), the morphology (by SEM), the structure (by XRD, TGA) and the surface properties (by FTIR) of the carbon

Keywords: Thermochemical Conversion, Activated Carbon, Hemp

α-Fe_2O_3/CdS/g-C_3N_4 COMPOSITE MATERIAL for DEGRADATION of MB DYE and H_2 EVOLUTION

Çağdaş Yavuz[1], Şule Erten Ela[1]

*[*1] Institute of Solar Energy, Ege University, Izmir, Turkey - 0000-0002-6174-4383*

[1] Institute of Solar Energy, Ege University, Izmir, Turkey

*yavuz.cgds@gmail.com

ABSTRACT

Environmental remediation and renewable energy production were studied employing photocatalytic degradation of waste materials in aqueous medium, as well as photocatalytic hydrogen generation [1]. α-Fe_2O_3 and CdS are common visible-light-driven semiconductor photocatalysts due to their low cost, easy fabrication, and stability. However, its applications are reduced by the photo corrosion, narrow optical band gap for solar-light operations and weak separation of photogenerated electron-hole pair [2,3]. To boost the implementation of α-Fe_2O_3, CdS, α-Fe_2O_3/CdS, and g-C_3N_4 [4]; a ternary nanocomposite (α-Fe_2O_3/CdS/g-C_3N_4) was created. CdS nanoparticles were expanded on α-Fe_2O_3 nanorods-cubes utilizing simple wet-chemical procedure to acquire binary structure, and as-prepared g-C_3N_4 was decorated with binary material. Material characterizations were employed to investigate the crystal structures, surface morphology, optical properties and functional groups. Photocatalytic investigations for hydrogen production and MB dye degradation under solar light irradiation were carried out by regarding optical absorption characteristics. The ternary semiconductor had the highest photocatalytic H_2 evolution, 165 $\mu molg^{-1}2h^{-1}$ from water, among the produced samples. The photocatalytic performance yielded in 99.4% percent degradation of the MB after 120 minutes. The higher performances were ascribed to Z-scheme mechanism, optical band levels and stringent heterojunctions of the photocatalysts that brings significant electron-hole separation, afterward quick diffusion of photogenerated charge between structures and the optical bandgap value of the ternary structure that more suitable for solar lights implementations. This research lays the way for photocatalysts to improve in actual pollution and energy situations.

Keywords: Photocatalysis, Hydrogen evolution, Photodegradation, α-Fe_2O_3/CdS/g-C_3N_4

References:

[1] Sahoo DP, Rath D, Nanda B, Parida KM. Transition metal/metal oxide modified MCM-41 for pollutant degradation and hydrogen energy production: A review. *RSC Adv*; 5:83707–24, 2015.

[2] Mahadik M, Shinde S, Mohite V, Kumbhar S, Rajpure K, Moholkar A, et al. Photoelectrocatalytic oxidation of Rhodamine B with sprayed α-Fe_2O_3 photocatalyst. *Mater Express*;3:247–55, 2013.

[3] Peng T, Zeng P, Ke D, Liu X, Zhang X. Hydrothermal preparation of multiwalled carbon nanotubes (MWCNTs)/CdS nanocomposite and its efficient photocatalytic hydrogen production under visible light irradiation. *Energy and Fuels*, 25:2203–10. 2011.

[4] Ong WJ, Tan LL, Ng YH, Yong ST, Chai SP. Graphitic Carbon Nitride (g-C_3N_4)-Based Photocatalysts for Artificial Photosynthesis and Environmental Remediation: Are We a Step Closer to Achieving Sustainability? *Chem Rev;*116:7159–329, 2016.

EFFECT of g-C_3N_4 REINFORCEMENT in BINARY ZnO/CdS for PHOTOANODE of DSSC

Çağdaş Yavuz[1], Şule Erten Ela[1]

*[*1] Institute of Solar Energy, Ege University, Izmir, Turkey - 0000-0002-6174-4383*

[1] Institute of Solar Energy, Ege University, Izmir, Turkey

*yavuz.cgds@gmail.com

ABSTRACT

Due to the direct wide band gap (□3.3 eV) of ZnO, the photoconversion efficiency is significantly reduced due to limited light absorption and charge transfer properties caused by defects in the structure. For heterostructured photocatalysts, besides charge carrier transfer mechanisms, an increase is observed in photocatalytic processes and efficiency values of solar cell applications, especially for long-term applications [1]. It is known that conventionally prepared CdS and ZnO are generally exposed to severe photocorrosion in long-term photocatalytic reactions. Therefore, hybridization of conjugated g-C_3N_4 with binary (ZnO/CdS) can effectively improve their visible light response and photovoltaic power conversion efficiency activities [2]. In this study, it is thought that by growing CdS nanospheres on ZnO, the absorbance limit shifted towards the visible region and type II mechanism harmonization was achieved, which would make the electron-hole transfer effective at conduction - valence band levels. The current density and efficiency values of DSSC produced with a triple structure (ZnO/CdS-g-C_3N_4) were calculated as 9.34 mA/cm^2 and 2.23%, respectively, and showed the highest performance.

Keywords: Photoanode, DSSC, ZnO, CdS, g-C_3N_4

References:

[1] Xuewen W, Gang L, Gao Q, Hui-Ming C, Stable photocatalytic hydrogen evolution from water over ZnO–CdS core–shell nanorods, International Journal of Hydrogen Energy, 35 (2010) 8199–8205.

[2] Liua C, Qiua Y, Zhanga J, Liangb Q, Mitsuzakic N, Chen Z., Construction of CdS quantum dots modified g-C_3N_4/ZnO heterostructured photoanode for efficient photoelectrochemical water splitting, Journal of Photochemistry & Photobiology A: Chemistry 371 (2019) 109–117.

PLC CONTROLLED SENSOR-LESS SOLAR TRACKING SYSTEM DESIGN AND IMPLEMENTATION

Cenk Gezegin[1], Hasan Dirik[2], Mehmet Can Özer[3]

*[*1]Ondukuz Mayıs University, Engineering Faculty, Department of Electric and Electronic Engineering,*
Samsun, Turkey-ORCID ID:0000-0002-4442-904X
[2]Sinop University, Vocational School Engineering Faculty, Department of Electric and Energy,
Sinop, Turkey-ORCID ID:0000-0003-0625-7213
[3]Ondukuz Mayıs University, Institute of Science, Department of Electric and Electronic,
Samsun, Turkey-ORCID ID:0000-0003-2161-0644
*Correspondingauthor e-mail: cenk.gezegin@omu.edu.tr

ABSTRACT

The demand for electrical energy is increasing day by day due to the increasing population, developing technology and industrial investments. Fossil fuels are used to a large extent in the production of electrical energy. Access to fossil fuels becomes more difficult due to problems such as political, financial and pandemic, and it turns into a global energy crisis as it has been recently. Increasing climate change and security problems in energy increase the interest in renewable energy sources. In recent years, a great deal of investment has been done in electricity generation from solar energy, which is one of the renewable energy sources, with photovoltaic (PV) systems. The amount of energy obtained from PV systems is directly proportional to solar radiation. If the PV panels are positioned exactly perpendicular to the sun, the electricity generation efficiency can be increased. For this purpose, the PV panel must accurately track the position of the sun. In this study, a prototype design and application of a solar tracking system were carried out using PLC (Programmable Logical Controller). The system has dual-axis movement and is controlled as open loop. The position of the sun is calculated with the help of astronomical time equations using the PV panel position (latitude, longitude), date and time information entered via HMI (Human Machine Interface). PLC enables the panel to follow the sun by controlling two stepper motors according to the calculated location information. The system can also be controlled on a single axis, if desired. The experimental study results of the solar tracking system working as a fixed, single and dual axis panel were compared. The results clearly showed that the dual-axis solar tracking system is more efficient.

Keywords: Photovoltaic systems, PLC, Astronomical coordinates, Sun tracker, Dual-axis

ENHANCING THE PERFORMANCE OF THE ANODE ELECTRODE BY SURFACE MODIFICATION IN LITHIUM-ION BATTERIES

Eyup Akbulut[1], Engin Burgaz[2]

*[*1] Ondokuz Mayis University, Faculty of Engineering, Department of Metallurgy and Materials Engineering, Samsun, Turkey - 0000-0002-6819-6877*

[2] Ondokuz Mayis University, Faculty of Engineering, Department of Metallurgy and Materials Engineering, Samsun, Turkey - 0000-0002-3953-6131

*Corresponding author e-mail: eyup.akbulut@omu.edu.tr

ABSTRACT

Electric energy storage technologies play an important role in the demand for green and sustainable energy. Fossil fuels such as coal, crude oil and natural gas are used as primary energy sources to power all high-tech human activities. However, pollution from the combustion of fossil fuels has had devastating effects on human health and the natural environment. In addition, the natural reserves of fossil fuels are limited and unsustainable. Therefore, the focus of research has shifted to sustainable energy that is harmless to the environment. Rechargeable lithium-ion batteries are classified as secondary batteries. Many studies have been carried out to improve the properties of components such as anode electrode, separator, electrolyte and cathode electrode, since the performance of lithium-ion batteries depends on the components that make up their structure. The anode electrode performance may increase according to the properties of the material used. However, these materials used exhibit some negative properties during the operation of the system. One of the most important methods applied to eliminate or mitigate these negative properties is the surface modification of the anode electrodes. Surface modification methods applied to anode electrodes in lithium-ion batteries generally have purposes such as reducing the lithium-ion diffusion pathway, eliminate or alleviate negative properties of the electrode such as pulverization caused by volume change during the lithium storage, and prevent or reduce the formation of a solid electrolyte interface (SEI) layer on the surface of the electrodes due to the degradation of the organic electrolyte. Most of the methods applied for the stated purposes include nano-scale approaches. Thanks to the surface treatment we make on the anode electrode in the lithium-ion battery, the performance of the lithium-ion battery can be increased.

Keywords: Green energy, sustainable energy, Lithium-ion battery, anode electrode, surface modification.

THE SLOPE STABILITY ANALYSIS OF THE WIND POWER PLANT AREA TURBINE IN KAHRAMANMARAS-ANDIRIN

Gökhan Demir[1]

*[*1]Ondokuz Mayıs University, Engineering Faculty, Civil Engineerimg Department, Samsun, Turkiye- 0000-0002-3734-1496*

e-mail: gokhan.demir@omu.edu.tr

ABSTRACT

In this study, it was aimed to perform slope stability analysis after detailed field observations and measurements for the area in which the turbine 7 will be built between the Çuhadarlı and Alanlı Villages of Kahramanmaraş-Andırın Province. In this context, detailed geological, geophysical and geotechnical features of the study area have been revealed. The slope section was obtained on the 1: 1000 scale topographic map for the slope where the turbine 7 is. Slope stability analysis was performed with the limit equilibrium analysis method by using the data obtained from the seismic and electrical resistivity measurement results on the study area. It was concluded that the slope located in the area where the turbine 7 will be constructed is not stable under dynamic conditions and therefore it is necessary to take some engineering measures.

Keywords: Kahramanmaraş, Limit equilibrium methods, Slope stablity, Wind power plant

FABRICATION AND CHARACTERIZATION OF HEMP FIBERS AS SURGICAL SUTURES

Gülsüm TARIM*[,1] , Pınar Ezgi BAT[1], Onur Ahad ÇOKLUK[1], Engin BURGAZ[1,2]

[1]*Ondokuz Mayis University, Department of Metallurgical and Materials Engineering, Samsun, Turkey*

[2]*Ondokuz Mayis University, Department of Nanoscience and Nanotechnology, Samsun, Turkey*

*Corresponding author e-mail: glsmkls@outlook.com

ABSTRACT

As of 2014, the annual consumption of surgical sutures, which is estimated to be around 155 million TL (65 million dollars) in our country, still does not have 100% domestic production. The main use of surgical sutures is to aid the closure and healing of trauma wounds as well as surgical wounds. It is necessary to keep the scar tissues together to facilitate this healing process. The aim of this project is to produce antibacterial absorbable sutures that provide excellent tissue support, suitable for mass production, with hemp and antibacterial agent chlorhexidine diacetate (CHA) added as surgical sutures. Since the cannabis to be used in the project is a plant that can be grown in 4 months, it provides an advantage in rapid production. For this material, a chemical method for preferred cannabis plant will be used to make filament. In the preparation of sutures, cleaned fibers would be knitted in five spinning machines. This method will add mechanical strength to the suture. Hemp is a natural fiber that provides high strength, durability and absorbency. Annual fiber yield is quite high. It has features such as providing UV protection and anti-allergic. It has been proven that when hemp fibers are mixed with cotton and similar raw materials, it allows to produce more durable yarns and the yield per unit area is high. At the same time, hemp, which has a similar structure and cross-section with synthetic fibers, is comparable to synthetics in terms of durability and stability. As a result, we believe that the surgical suture production potential is high due to the superior ecological properties of hemp fiber. Our project is currently applicable. Suture production will be ready for commercialization if required tests (cytotoxicity, hemolysis, antibacterial activity, straight tensile, knot tensile strength, SEM-EDS, FTIR, TGA) are performed.

Acknowledgments This study was supported by Ondokuz Mayıs University Project No. PYO. MUH.1908.21.015.

Keywords: hemp, hemp fiber, suture, surgical suture

EFFECTS OF USAGE OF CANNABIS SATIVA L. AS FIBER REINFORCEMENT IN EPOXY COMPOSITES TO TENSILE AND IMPACT STRENGTHS

Gürkan KARA[1], Fevzi ŞAHİN[2], Cengiz Görkem DENGİZ[3], Mevlüt GÜRBÜZ[4]

[1]*Ondokuz MayısUniversity, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye- 0000-0003-0365-3827*

[2]*Ondokuz MayısUniversity, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye- 0000-0002-4808-4915*

[3]*Ondokuz Mayı sUniversity, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye- 0000-0003-1308-3223*

[4]*Ondokuz Mayıs University, Engineering Faculty, Mechanical Engineering Department, Samsun, Türkiye- 0000-0003-2365-5918*

*Corresponding author e-mail: gurkan.kara@omu.edu.tr

ABSTRACT

Composite materials, which meet many of the features expected in almost all engineering fields such as high strength, corrosion resistance, low weight, ease of production and supply, fracture toughness and low cost, are widely used in almost all sectors especially in aviation and automotive. Although a wide variety of materials are used as matrix material in composites, carbon and glass fibers are generally used as reinforcement material. The accuracy of the usage of these reinforcement materials in terms of both their high costs and the negative effects of the production processes to the environment has been intensively discussed recently and this increased the interest in studies on gren composite materials produced using organic fibers. In this study, epoxy resin was used as matrix material and long fibers produced from Cannabis Sativa L. Fibers were used as reinforcement material. After the fibers were impregnated with resin, they were placed in test sample molds by hand lay-up method, and test samples were prepared in 25% and 35% fiber-matrix ratio by volume. As a result of the charpy and tensile tests performed on the prepared samples; tensile strength increased by 95.6% at 25% fiber aspect ratio, 52.1% at 35% ratio, compared to the unreinforced condition. On the other hand, there was an increase of 193.5% in the 25% ratio and 345.2% in the 35% ratio compared to the unreinforced state in the impact strength.

Keywords: Composite, Organic fiber, Hemp, Tensile strength, Impact strength

REMOVAL OF HEAVY METALS FROM SOİL RESOURCES BY USİNG NATURAL REACTANTS

Mamadou Fadilou BAH[1], Gediz UĞUZ[2*]

[1] Ondokuz MayısUniversity, Engineering Faculty, Department of Chemical Engineering, Samsun, Turkey
*[*2] Ondokuz MayısUniversity, Engineering Faculty, Department of Chemical Engineering, Samsun, Turkey*
*Corresponding author e-mail: gediz.uguz@omu.edu.tr

ABSTRACT

Heavy metals have many negative effects on living organisms. For example, zinc (Zn) causes symptoms such as inflammation of the digestive and respiratory tracts, fever, shortness of breath, narrowing of the airways, pneumonia and respiratory failure in children and some adults. In addition to muscle and joint pain, Zn causes stomach irritation, ulcers and various effects on the liver. The adsorption method and a number of other methods are widely used to remove heavy metals such as chemical precipitation, ion exchange, extraction and reverse osmosis. However, these processes have significant disadvantages such as high energy requirement and chemical consumption, thus providing irreversible contributions to environmental pollution. These disadvantages are particularly evident at low metal concentrations. Therefore, alternative methods should be considered for the removal of heavy metals from substances. All heavy metals that threaten the environment are considered as pollutants that need to be treated because they accumulate in the food chain and have toxic effects even at very low concentrations. These elements lead (Pb), Cadmium (Cd), Chromium (Cr), Iron (Fe), Cobalt (Co), Copper (Cu), Nickel (Ni), Mercury (Hg) and Zinc (Zn) are generally found on Earth. stable compounds exist in the form of carbonates, oxides, silicates and sulphides or trapped in silicates. In this study, an electrokinetic cell is designed to investigate the removal efficiency of heavy metals from natural soil sources polluted as a result of industrial processes by an electrolytic method and experiments are carried out in this designed cell. The original aspect of the study is that the heavy metal removal process does not pollute our environment, such as vinegar, salt water, etc. It is made with natural reagents. In addition, the effects of various parameters such as voltage (voltage), time, solution concentration and type on the removal efficiency were examined and heavy metal removal efficiencies in a dynamic system were calculated. It is thought that the study will directly reduce environmental pollution and indirectly have a positive effect on climate change in terms of using natural reagents by using green manufacturing technique.

Keywords: *elektrolitic cell, green manufacturing, heavy metals, climate change*

FABRICATION OF MXENE, A NEW GENERATION MATERIAL, AND INVESTIGATION OF ITS USE AS AN AIR POLLUTION SENSOR

Mehmet KURU[1,*], Muhammet Samet ASLANTÜRK

*[*1,2]Ondokuz Mayıs University, Engineering Faculty, Department of Metallurgy and Materials Engineering, Samsun, Turkey- 0000-0001-6030-0791*

*Corresponding author e-mail: mehmet.kuru@omu.edu.tr

ABSTRACT

In recent years, with the increase in urbanization and industrialization, harmful gases (CO, NO_2, etc.) released into the atmosphere threaten the development and health of humanity. It is very important that these gases, which harm human health and cause air pollution, can be detected with high sensitivity, high selectivity, fast return and response time, stable and repeatable sensors. Transition metal carbide, nitride or carbonitrides, which are the new members of the 2D material family and named as MXene, are among the innovative materials that have attracted attention in recent years. MXenes are ideal for high-performance gas sensors, thanks to their high surface/volume ratio, high number of active zones, easy functionalization of surfaces and integration with devices.

$Ti_3C_2T_x$ is the most preferred type among MXenes due to its excellent hydrophilicity, low cost, superior electrical conductivity, fast electron transfer ability, functional groups that facilitate the absorption of gas molecules, and its stable and durable layered structure. Thanks to its outstanding features, $Ti_3C_2T_x$ based MXenes have high potential in gas sensors applications.

In this study, firstly, the MAX phase Ti_3AlC_2 powders will be selectively etched, and the appropriate wet chemical methods will be determined to obtain and delaminate $Ti_3C_2T_x$ nanomaterial, and their crystal structure, morphological properties and chemical compositions will be examined with the help of XRD, SEM and XPS, respectively. Using the obtained MXene nanomaterial, nanofibers with high surface area/volume ratio will be produced with the help of electrospinning device. With the sensors to be produced with the help of MXene nanofibers obtained, CO gas detection tests that cause air pollution in the environment will be carried out.

Keywords: MXene, nanofiber, gas sensor

HEXAGONAL BORON NITRIDE: A NOVEL LOW-COST ADSORBENT FOR ORGANIC DYE REMOVAL

Merve Çoban[1], Abdülsamet Kavak[1], Rukan Can Seyfeli[*,1], Selim Ceylan[1]

[1]Ondokuz Mayıs University, Faculty of Engineering, Chemical Engineering Department, Samsun, TURKEY

*rukancan.seyfeli@omu.edu.tr

ABSTRACT

Due to the rapid development of industrialization, waste quantities and types are increasing day by day. Thus, it is necessary for a sustainable production to eliminate waste flows in the processes such as painting or washing in the production processes of industrial zones and factories. The inorganic or organic content of such currents has negative effects of environment and organisms. For this reason, different processes have been developed for the elimination of pollutants in these currents. Adsorption is one of the most common and low -cost methods of these methods. Active carbon is one of the most widely used adsorbents. However, there are restrictions on recovery and reusability of these type of materials. Also, considering the increasing waste and quantities, new generation adsorbents are needed. In recent years, hexagonal boron nitrite has found use areas in many different fields. Especially studies on capacity and reusability in adsorption processes have made it an important adsorbent candidate. In this study, the production of hexagonal boron nitrite was synthesized with mixing urea and boric acid and pyrolyzed in a 1000°C oven with nitrogen flow. Then, the adsorption performance of the produced boron nitrite was examined by using the methylene blue as a model compound. It has been observed that Boron nitrite has a significant potential when examining the dye removal performance and reusability.

Keywords: adsorption, boron nitride, methylene blue, water treatment

ATMOSPHERIC CARBONDIOXIDE SEQUESTRATION BY ALGAE

Özgür Baytut[1], Ali Ekber Özdemir[2], Hakan Bülbül[3]

*[*1]University of Ondokuz Mayıs, Faculty of Science, Department of Biology, Samsun, Türkiye- ORCID 0000-0002-8424-4672*

[2] University of Ordu, Fatsa Faculty of Marine Sciences, Ordu, Türkiye- ORCID ID

[3]University of Ondokuz Mayıs, Faculty of Science, Department of Physics, Samsun, Türkiye- ORCID 0000-0002-8586-5075

*Corresponding author e-mail: obaytut@gmail.com

ABSTRACT

The atmospheric CO_2 is the most responsible fossile gas of the global climate changes. So far, the decline of CO_2 emissions is not enough for reducing the effects of the global climate changes. We therefore need the systems sequestrating the CO_2 from the atmosphere. There are many methods including burning and chemical sequestration processes. Those are mostly inadequate in storing and reusing the atmospheric CO_2. It is however not convenient that a system taking only CO_2 gas. But this system should also convert the CO_2 to an another form which does not feature a greenhouse gas. We therefore designed a system that enriches the air by filtrating the CO_2 and routes this enriched air to the algal culture. After photosynthesis processes, extra CO_2 be taken into the algal biomass. This algal biomass may have economic value in many industries such as bioenergy, agriculture and food technology. This research is supported by on-call scientifisc research project (PYO.FEN.1908.22.001). A patent application process is also being proceeded for this project.

Keywords: Climate Change, Algae, Photosyntehsis

GRAPHENE DOPED LI-ION BATTERIES

Samet BALKAŞ[1], Engin BURGAZ[2]

*[*1]Ondokuz Mayıs Universty, Metallurgy and Materials Engineering, Samsun, Türkiye-0000-0002-1492-8120*

*[*2]Ondokuz Mayıs Universty, Metallurgy and Materials Engineering, Samsun, Türkiye -0000-0002-3953-6131*

*Corresponding e-mail: balkasamet@gmail.com

ABSTRACT

As a result of theincrease in carbon emissions in the world, clean energy has gained more importance. For this reason, it has started to turn to different energy sources. One of the biggest steps started with the transformation of transportation vehicles int electricmotors. At this point, there chargeable high-cycle li-ion battery technology has developed rapidly. Many automobile giants are making large R&D investments in this sector. One of the most important criteria is low weight, high-capacity battery cell, high cycle number, fast charging times (15 min, 80% filling speeds) they do research on many subjects.

In this study, we will do a study to obtain higher capacity than the unit cell in li-ion batteries. In order to achieve this, we will use graphene, a monolayer nanomaterial with a very high surface area. First of all, mixing will be done with th ehelp of a solvent agent by using an ultrasonication device to dispersed the graphene layers very well. Afterwards, the prepared mixture will be separated from each other with the help of centrifuge (in the experimental working period) and made ready to be used at the anode. In this way, a new area will be created with an increased unit surface area where lithium ions will accumulate at the anode. Thus, it will be possible to synthesize a new battery with a higher capacity from the same unit cell compared to conventional li-ion batteries.

In addition to this study, reducing the internal resistance of the battery, increasing the wettability of the electrolyte and the separator. It will have a positive effect on the features of Li-ion batteries such as the number of cycles, shortening of the battery charging time and a wider operating temperature range.

Keywords: Li-ion battery, graphene, anode material, nanomaterial

PRODUCTION AND INVESTIGATION OF THE ANTIBACTERIAL PROPERTIES OF HEMP ADDED PLA-BASED BIOCOMPOSITE WOUND DRESSES

Sevim Alışır[1], Abdurrahman Aksoy[2] , Ayyüce Baş[1]

*[*1] Ondokuz Mayis University, Faculty of Engineering, Department of Metallurgy and Materials Engineering, Samsun, Turkey-0000-0001-7296-8318*

[2] Ondokuz Mayıs University, Faculty of Veterinary Medicine, Department of Veterinary Pharmacology and Toxicology, Samsun,Turkey - 0000-0001-9486-312X

*Corresponding author e-mail:sevimh@omu.edu.tr

ABSTRACT

In our daily life, we may encounter serious injuries in which the integrity of the tissues in certain parts of our body is impaired as a result of many different events. The dressing used plays an important role in the healing process of these wounds. From a dressing; It is expected to protect the irritated area against infection, microorganisms and possible external factors, absorb blood and exudate and accelerate the wound healing process. In this study, it is aimed to investigate the antibacterial properties and production of polylactic acid (PLA) based biocomposite wound dressings with hemp seed oil for use in the treatment of open wounds that occur in the body in any way. Composites were prepared by using two different cannabis oils, 15% and 30% by weight, as queen and pomegranate. 3% and 5% $AgNO_3$ was added to the mixture to give the biofilms antibacterial properties. Morphological properties and antibacterial properties of composites prepared in different compositions were investigated. It has been determined by SEM images that the biofilms exhibit a porous structure and have a texture consisting of fibers with a diameter of 50-350 nanometers. The biological activities of the produced biofilms against gram positive, gram negative and yeasts were investigated. Simultaneously, the same tests were applied to the commercially available wound dressing called bactigrass. As a result of the tests, it was observed that the biological activities of the produced composites were quite close to the value of commercial dressings.

Keywords: PLA, biocomposite, hemp seed oil, antibacterial property, wound dressing

DEGRADATION OF AZO DYES

[*1]Seyhan OZTURK, [2]Gaukhar SHERİMBETOVA and [3]Necati MENEK

*[*1] Ondokuz Mayıs University, Sciences Faculty, Department of Chemistry, 55139 Atakum-Samsun, TURKEY-0000-0003-4638-5578*

[2] Ondokuz Mayıs University, Sciences Faculty, Department of Chemistry, 55139 Atakum-Samsun, TURKEY-

[3] Ondokuz Mayıs University, Sciences Faculty, Department of Chemistry, 55139 Atakum-Samsun, TURKEY-0000-0001-7620-5676

*Corresponding author e-mail: sturna@omu.edu.tr

ABSTRACT

The environmental problems originating from the textile industry have been receiving increasing attentions for several decades, since the textile industry is one of the major sources of contaminated effluents. According to the statistical data reported previously, azo dyes account for over 80% of the total dyes produced globally each year, and they have been widely used in the textile and dyeing, papermaking, printing, leather, cosmetics and pharmaceutical industries. These colored compounds contain one or more azo bonds (-N=N-) as chromophore group linked to aromatic structures with functional groups such as OH and SO3H, among others. The dyeing process of textile industries produces large volumes of wastewater effluents with high dye contents, which are discharged into water bodies such as lakes and rivers. Azo dyes are very stable in the aquatic environment and usually persist under ambient conditions because they are difficultly removed in conventional wastewater treatment plants due to their high stability under sunlight and high resistance to biodegradation in aerobic conditions. Therefore, attention has to be focused on techniques that lead to the complete destruction of the dye molecules. Combining UV radiation and hydrogen peroxide oxidation has been applied successfully in previous work to treat different pollutants in water.

In our present work we reported the effect of operational parameters on degradation of some azo dyes by H2O2/UV/US, H2O2/US, H2O2 and US process, so the aim of the present work is to study the advanced photocatalytic degradation of an azo dye. The effect of H2O2 , UV light irradiation, pH and the amount of azo dyes concentratins and sonicator effects were examined. Kinetic recation mechanism of some azo dyes have been explained from experimental data.

Keywords: Azo Dyes; Degradation, H_2O_2; UV-irradiation; Reaction mechanism.

PREPARATIONAND CHARACTERIZATION OF MAGNESIUM BORATE ADDED PVDF COMPOSITE MEMBRANE AS A SEPARATOR FOR LITHIUM-ION BATTERIES BY ELECTRO-SPINNING METHOD

Simge KARA[1]*, Engin BURGAZ[2],

[1],Department of MetallurgicalandMaterialsEngineeringOndokuzMayisUniversity, Atakum, 55139 Samsun, Turkey-0000-0002-7665-2414

[2]Department of MetallurgicalandMaterialsEngineering, OndokuzMayisUniversity, Atakum, 55139 Samsun, Turkey- 0000-0002-3953-6131

*Correspondingauthor e-mail: simgeekara@gmail.com

ABSTRACT

The development of portable, wearable devices has led to the development of lighter and thinner lithium-ion batteries.The developing battery system reveals more functional requirements for the separator, such as flame retardancy, good adaptability to volume changes of the electrodes and the ability to adsorb harmful impurity ions.Separetor multifunction and high performance, battery cycle life and safety is vital, and in the meantime, improvements in the safety and cycle life of the separator multifunction a deep understanding of the role of high-performance lithium batteries, it is of great importance to obtain.In this study, it was aimed to improve the thermal and mechanical properties by using Magnesium borate reinforced PVDF composite in separator construction. in particular, the composite material that will be formed by the addition of PVDF as a result of the synthesis of boron element, which is widely available in our country, with magnesium, provides a widespread improvement in the developing LIBS as a separator and determines the thermal properties.The addition of magnesium borate will increase the lithium ion transfer number (t Li+) from 0.24 to 0.57 in the LiPF6-based electrolyte due to the interaction of Lewis acid regions with Lewis base acting magnesium borate, the increase in t Li+ will reduce the concentration polarization and support the transition of lithium ions.In addition, the prepared Magnesium Borate reinforced PVDF separator will have better wettability, electrolyte uptake and thermal stability with liquid electrolyte.It will not only have better cycle stability, but also have higher capacity retention rate at high current. Within the scope of this project, innovative materials will be produced, certain tests will be applied on the produced materials and their important properties will be determined.

Keywords: Separator, Solid electrolytes, Lithium-ion battery applications, Membrane

THE ROLE OF CELL DEATH IN PYRETHROID TOXICITY

Sinem İnal[1], Dilek Güvenç[2*]

[1]Ondokuz Mayis University, Faculty of Veterinary Medicine, Department of Pathology, Samsun, Turkey

0000-0002-2552-5159

[2] Ondokuz Mayis University, Faculty of Veterinary Medicine, Department of Pharmacology and Toxicology, Samsun, Turkey*

0000-0003-0036-0914

*Corresponding author e-mail: dguvenc@omu.edu.tr

ABSTRACT

Pyrethroids pesticides are widely used in plant, public and animal health. When applied, these chemicals become a threat to human health by entering the food chain by accumulating in plant parts, water, soil, air and biota. They also enter groundwater, streams, rivers, and lakes, causing damage to non-target species and ecosystems. Residue studies in biological samples such as blood, urine and adipose tissue show that living beings are exposed to pyrethroids in various ways. The toxic effects of pyrethroid insecticides have been demonstrated primarily in organs such as the liver and kidney, which are responsible for detoxification and elimination, and also on the cardiovascular, urinary, reproductive, immune and nervous systems. In vitro and in vivo studies highlight the importance of cell death among the mechanisms mediating the toxicity of pyrethroids. Cell death can occur in three different ways: necrosis, apoptosis and autophagy. Necrosis is defined as the local death of tissues and cells. Molecules called caspases are involved in apoptotic cell death. There are two different pathways, extrinsic and intrinsic, in the formation of apoptosis, which is also known as programmed cell death. Autophagy is a process that occurs when various components are transported to lysosomes in the cell cytoplasm and degraded. The degradation products are reused through recycling and play an important role in cell survival and protection. Mechanistic studies on the effects of long-term low-dose exposure to pyrethroids on non-target organisms play an important role in risk assessment. Therefore, investigation of cell death mechanisms at the molecular level and evaluation of results in toxication caused by pyrethroid exposure are important for public and animal health.

Keywords: pyrethroid, cell death, apoptosis, autophagy

ENVIRONMENTAL BENEFITS OF USING TOMATO HARVEST WASTES AS ANIMAL FEED

Unal KILIC[1], Mahmoud O.A. ELFAKİ[2]

*[*1]Ondokuz Mayis University, Agricultural Faculty, Department of Animal Science, Samsun, Turkiye- ORCID ID: 0000-0003-3909-799X*

[2] Ondokuz Mayis University, Agricultural Faculty, Department of Animal Science, Samsun, Turkiye- ORCID ID:0000-0002-5951-2962

*Corresponding author e-mail:unalk@omu.edu.tr

ABSTRACT

Inappropriate use of harvest waste and its use as garbage can cause economic and environmental problems. Tomato harvest wastes - THW (leaves, stems, and other green parts) are used as a biomass energy source or mixed with manure in biogas production. These wastes are mixed back into the soil as fertilizer after breaking down or used in compost production. In addition, the wastes are burned in the field, causing environmental pollution and wasting economically. The amount of pesticides and chemical fertilizers left in the wastes pollute the groundwater together with the rainwater. Additionally, these wastes are tried to be disposed of by throwing them into rivers, stream beds, and landfills. The use of THW as fertilizer and their random disposal into the environment cause the contamination of pathogens and pests. If THW are used as animal feed both economic and environmental contributions can be achieved. It is stated that 88.52% of the wastes left after the harvest in the farms and greenhouses are evaluated in a way that will harm nature and the atmosphere.

There are applications for using these wastes as animal feed in fresh form, hay, silage or pellets. It is predicted that THW will make a significant contribution to meeting the roughage deficiency seen especially in the winter months. Since hay, silage, and pellets are made, it is seen that animals prefer to consume THW, their digestibility has increased and they have an important share in closing the roughage deficit. Greenhouse gas emissions from ruminants have a share of approximately 16% worldwide. As the quality of roughage increases, methane release in animals decreases. It is important to ensilage or pellet THW by treating them with some additives that increase their nutritional value and decrease methane emissions. The evaluation of THW as animal feed is of environmental importance in terms of preventing the damages that may occur when these wastes are left in the environment. Considering global warming and climate change, it is of environmental importance in terms of preventing the damages that may occur when THW are left to the environment.

Keywords: Environmental pollution, greenhouse gas, harvest wastes, ruminant, silage.

DEOXYGENATION OF OLEIC ACID USING ACTIVATED CARBON SUPPORTED BIMETALLIC CoMo/AC WITH A HYDROGEN DONOR SOLVENT

Vuslat İrem Şimşek[1], İrem Özgenç[1], Rabia Halezeroğlu[1], Selim Ceylan*,[1]

[1]Ondokuz Mayıs University, Faculty of Engineering, Chemical Engineering Department, Samsun, TURKEY

*Corresponding author e-mail: selim.ceylan@omu.edu.tr

ABSTRACT

Due to the increasing population and industrialization, a great increase has been observed in national and international transportation. Especially with the developments in the aviation sector, the use of airlines has become quite widespread. However, the environmental impact of polluting gases emitted due to the increasing use of fossil fuels used in air transport is reached critical levels. Biomass-based alternative fuels have the potential to reduce this effect created by fossil fuels. Waste oils are a good candidate for biomass due to their widespread availability. Impurity problems arising from the composition of waste oils cause problems in biodiesel production. In recent years, the deoxygenation of waste oils and the production of diesel-like fuel have emerged as an important alternative in terms of both waste management and the environment. However, high cost due to the hydrogen used in these processes requires the use of low-cost hydrogen sources. In this study, biodiesel production by-product glycerol was used as hydrogen source in the deoxygenation of waste oil and its effect on the process was investigated by choosing oleic acid as the model compound. The experiments were carried out at under atmospheric conditions and obtained liquid products were characterized by analytical tools such as FTIR, GC, and oxygen bomb calorimeter. Results of the study give information about application of biofuels as additive recent fossil fuels which have potential to lower environmental effects and can support economic sustainability.

*This study supported by TUBİTAK with a project number of **2209-A**.

Keywords: oleic acid, catalytic deoxygenation, glycerol, bimetallic catalyst

Cooperation for Climate and Green Deal Symposium

ONDOKUZ MAYIS UNIVERSITY
ATATÜRK CONGRESS & CULTURE CENTER
SAMSUN / TURKEY

Contact

Address
Ondokuz Mayıs University Kurupelit Campus, 55139
Atakum / SAMSUN / TÜRKİYE

Phone
Dr. Arife ŞİMŞEK +90 542 398 7178
Dr. Melih RÜZGAR +90 536 586 58 48
Dr. İsmail ÇETİN +90 544 665 81 06

E-Mail
coccgds22@gmail.com

https://coforclimate.omu.edu.tr/