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5TH INTERNATIONAL CONFERENCE ON ENVIRONMENTAL SCIENCE AND TECHNOLOGY

BOOK OF ABSTRACTS

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WELCOME TO ICOEST 2019

On behalf of the organizing committee, we are pleased to announce that the 5th International Conference on Environmental Science and Technology (ICOEST-2019) is held from October 09 to 13, 2019 in Sarajevo. ICOEST 2019 provides an ideal academic platform for researchers to present the latest research findings and describe emerging technologies, and directions in Environmental Science and Technology. The conference seeks to contribute to presenting novel research results in all aspects of Environmental Science and Technology. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Environmental Science and Technology. It also provides the premier interdisciplinary forum for scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in al lareas of Environmental Science and Technology. The conference will bring together leading academic scientists, researchers and scholars in the domain of interest from around the world.

ICOEST 2019 is the oncoming event of the successful conference series focusing on Environmental Science and Technology. The scientific program focuses on current advances in th eresearch, production and use of Environmental Engineering and Sciences with particular focus on their role in maintaining academic level in Science and Technology and elevating the science level such as: Water and waste water treatment, sludge handling and management, Solid waste and management, Surface water quality monitoring, Noise pollution and control, Air pollution and control, Ecology and ecosystem management, Environmental data analysis and modeling, Environmental education, Environmental planning, management and policies for cities and regions, Green energy and sustainability, Water resources and river basin management. The conference's goals are to provide a scientific forum for all international prestige scholars around the world and enable the interactive exchange of state-of-the-art knowledge. The conference will focus on evidence-based benefits proven in environmental science and engineering experiments.

Best regards,

Prof. Dr.Özer ÇINAR

Estimation Of Surface Runoff Potential In An Urban-Rural Gradient	Turkey	17.
Management Structure Proposal For Riparian Zone Stakeholders: Example Of Asar Stream	Turkey	18.
The Importance Of Green Infrastructure And Urban Forestry In The Prevention Of Natural Disasters As A Result Of Climate Change: Example Of Akçakoca Land Slide And Flood Disaster	Turkey	19.
The Effects Of Marine Sciences On Maritime Transportation And Marine Environment At Turkish Straits	Turkey	20.
Mineralogical Speciation As A Tool In Polluted Soils Assesment: A Case Study	Spain	21.
Industry 4.0 And Autonomous Ships Effects On Marine Environment	Turkey	22.
Practical Substitution Of Bpa-Based Coatings In Food Industry	Lithuania	23.
Restoration Of Ayşe Sezgin House, One Of The Examples Of Civil Architecture In Tarakli	Turkey	24.
Impact Of Static Compressional Load On Foam Glass Aggregate	Hungary	25.
Botanical Gardens, Arboretums And Herbariums' Networking And Training Opportunities For Stakeholders In Turkey	Turkey	26.
Middle-Class Mass Housing Users' Satisfaction Of Outdoor Use :A Case Study Of Memursen Housing	Turkey	27.
Examination Of Diesel Engine Particle Emissions And Filters	Turkey	28.
Evidence Synthesis Using Meta Analyses To Assess The Effect Of Air Pollution On Human Health	Qatar	29.
Preparation And Characteristics Of Activated Carbon Supported Fe-Based Catalyst From Biomass Mixture	Turkey	30.
The Metastatic Potential Of Silver Nanoparticles On The In Vitro Model Of The Mda-Mb-436 Cells	Poland	31.
Gold And Silver Nanoparticles Affect The Metabolic Functions And Viability Of The Human Du145 Cell Line	Poland	32.
Impact Of Uvb Radiation On Toxicity Of Chlorpyrifos In Keratinocytes	Poland	33.
Chlorpyrifos Impact On Inflammation In 3t3-L1 Adipocytes	Poland	34.

Estimation Of The Corn Production In Turkey By Means Of Artificial Neural Networks	**Turkey**	**35.**
Analysis Of The Photosynthetic Activity Dynamics Of Different Forest Types Based On Sentinel S2a Spectral Biophysical Properties In Protected Area Tajan	**Bosnia Herzegovina**	**36.**
University Campus Air Quality Monitoring Platform	**Turkey**	**37.**
Influence Of Altitude On Some Chemical Properties Of Soil	**Turkey**	**38.**
Efficiency Of Biochar On Soil Phosphorus Availability In Copper Contaminated Soil	**Turkey**	**39.**
Effect Of Sunflower Seed Shells Ash On Properties Of Self-Compacting Concrete	**Croatia**	**40.**
Biosurfactant Production Using Industrial Wastes From Bacteria Which Is Natural And Clinical Isolates	**Turkey**	**41.**
Identification Of The Early Spring Forest Fire In The Hornbeam Coppice Stand Based On Sentinel S2a Spectral Indices	**Bosnia Herzegovina**	**42.**
A Study On Investigation Of Antimicrobial Properties Of Essentials Herbal Oil-Added Hemicellulose Based-Polymeric Gel Films	**Turkey**	**43.**
The Effect Of Biomass Type On Isolation Efficiency Of Major Macromolecules	**Turkey**	**44.**
Determination Of Pgrp Properties Of Rhizospheric Pseudomonas Strains	**Turkey**	**45.**

ICOEST SARAJEVO
5TH INTERNATIONAL CONFERENCE ON ENVIRONMENTAL SCIENCE AND TECHNOLOGY
October 09-13 2019

THE CO OXIDATION OF THE YCU5MN/TI-SEP CATALYSTS AT LOW TEMPERATURE

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Abstract:

Air pollution is one of the most important environmental problems nowdays, and CO is one of the most gaseous pollutants which released into the air. Ti-sepiolite is often used as a catalyst carrier because of its good specific surface area and activity. Moreover, precious metals have very good catalytic performance for CO oxidation. The combination of these substances is beneficial to enhance the catalytic activity of CO oxidation. The Ti-modified sepiolite (Ti-Sep)-supported Mn-Cu mixed oxide (yMn5Cu/Ti-Sep) catalysts with different Mn/Cu molar ratios were synthesized using the co-precipitation method. The materials were characterized by the XRD, SEM, N2 adsorption-desorption, H2-TPR, O2-TPD, and XPS techniques.It was found that the catalytic activity decreased in the order of 30Mn5Cu/Ti-Sep > 40Mn5Cu/Ti-Sep > 20Mn5Cu/Ti-Sep > 30Mn5Cu/Sep > 30Mn/Ti-Sep > 5Cu/Ti-Sep. Obviously, the 30Mn5Cu/Ti-Sep catalyst exhibited the best activity: the reaction rate (at 70 oC) = 0.875 mol·g-1·s-1, T50 = 56 oC, and T100 = 86 oC. According to the characterization results, we conclude that the excellent catalytic performance of 30Mn5Cu/Ti-Sep was associated with the strong interaction between the copper or manganese oxides and the Ti-Sep support, good low-temperature reducibility, and high mobility of chemisorbed oxygen species.

Keywords: CO Oxidation; Catalysts; Low-Temperature

[*]This study is supported by the National Natural Science Foundation of China (Grant No. 21277008 and 20777005)

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CATALYTIC OXIDATION PERFORMANCE OF AG / OMS-2 FOR BENZENE, TOLUENE AND FORMALDEHYDE

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Abstract:

Volatile organic compounds (VOCs) are the main pollutants causing air pollution and harming to human life and health. Therefore, it is necessary to eliminate VOCs. The cryptomelane-type manganese oxide octahedral molecular sieve (OMS-2) is often used as catalyst carrier for its high activity of catalytic oxidation. Moreover, the oxidation performance of OMS-2 can be greatly improved by loading noble metal. The xAg/OMS-2 was prepared by pre-doping method. XRD, FT-IR, BET, XPS, O2-TPD, H2-TPR and NH3-TPD were used to characterize the physicochemical properties. The results showed that the loading of Ag with different contents had significant effects on the physicochemical properties of OMS-2. Among them, 9Ag/OMS-2 showed the best catalytic activity. The T90 of benzene toluene and formaldehyde oxidation were 362 oC, 270 oC and 168 oC, respctively. The excellent catalytic performance of 9Ag/OMS-2 was mainly associated with the high mobility of chemisorbed oxygen species. The result indicates that the mobility of lattice oxygen species over xAg/OMS-2 catalysts contribute to the catalytic activities of VOCs.

Keywords: Catalytic Oxidation Of Vocs; Ag/OMS-2 Catalysts; Low-Temperature

This study is supported by the National Natural Science Foundation of China (Grant No. 21277008 and 20777005)

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EVALUATION OF THE SIDE EFFECTS OF OXAMYL AND HYMEXAZOL ON FIVE SPECIES OF SOIL-DWELLING PREDATORY MITES

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Abstract:

Side effects of oxamyl and hymexazol on five species of soil-dwelling predatory mites, Lasioseius dentatus (Fox) (Acari: Ascidae), Androlaelaps casalis (Berlese) (Acari: Laelapidae), Rhodacarus roseus (Oudemans) (Acari: Rhodacaridae), Macrocheles muscaedomesticae (Scopoli) (Acari: Macrochelidae) and Cunaxa setirostris (Hermann) (Acari: Cunaxidae) were tested under stringent laboratory conditions. Both oxamyl and hymexazol were found to drastically kill all five predatory soil mites listed above at three different concentrations (half of the recommended dose (HRD), recommended dose (RD) and double the recommended dose (DRD). Oxamyl was found to be more toxic than hymexazol to all five predatory soil mites as it could reduce their population by > 40% at the HRD, except R. roseus, as its population was reduced to 27.80%. In addition, the application of oxamyl can decrease the population of five predatory soil mites by > 83% at RD while at DRD a total mortality rate could be seen.

In conclusion, this research study has provided evidence which highlights the reduction of population of five predatory soil mites even after the exposure to half of the recommended dose of oxamyl and hymexazol. Therefore, precautionary measures should be taken to maintain the sustainability and to avoid disturbing the natural balance of the ecosystem.

Keywords: Toxicity, Oxamyl, Hymexazol, Soil Predatory Mites.

The authors gratefully acknowledge Qassim University, represented by the Deanship of Scientific Research.

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CULTIVATING OF AEROBIC GRANULAR SLUDGE IN A SEQUENCING BATCH REACTOR TREATING MUNICIPAL WASTEWATER AT MODERATE-LOW TEMPERATURE

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Abstract:

Aerobic granular sludge (AGS) was successfully cultivated within 27 days in a pilot-scale (75 m3) sequencing batch reactor (SBR) fed with low-strength municipal wastewater (COD < 170 mg L-1) at moderate-low temperature (13-23 ℃). After approximately 370 days' operation, mixed liquor suspended solids (MLSS) concentration reached 7-8 g L-1 and consisted of 92.1% AGS (diameter > 0.212 mm). The AGS formed in this study had regular and clear circular outline, and its outer surface was dominated by spherical bacteria and some Epistylis. The AGS had a diameter ranging from 0.2 to 2.5 mm (with an average diameter of 1.6 mm) and had an excellent settling ability with an average settling velocity of 39 m h-1. The average COD and NH4+-N removal efficiency kept over 80.0% and 94.0 %, respectively. Moreover, the occurrence of simultaneous nitrification and denitrification and phosphorus removal (SNDPR) was might be responsible for the loss of total nitrogen and PO43--P with a final removal efficiency of 88.4% and 95.5%, respectively. Adjustment of organic load, settling time and feast/famine regime had been concluded as key components for the successfully cultivation of AGS. Strategy of adding the additional carbon sources in this study can effectively solve the problem of long start- up time in a pilot-scale (75 m3) SBR fed with low-strength municipal wastewater at medium-low temperature (13-23 ℃, in the period of 2016.09.12-2017.01.18). Additionally, inoculation of crushed AGS was another strategy for rapid granulation in a pilot-scale (75 m3) SBR even fed with single low-strength municipal wastewater. This study demonstrated that rapidly start-up and long-term maintain of AGS can be achieved in a pilot-scale (70 m3) SBR fed with low-strength municipal wastewater at medium-low temperature.

Keywords: Aerobic Granular Sludge, Low-Strength Municipal Wastewater, Rapid Start-Up, Crushed AGS, Moderate-Low Temperature

*Beijing Municipal Science and Technology Commission Project (Z181100005518002), National Natural Science Foundation of China (51

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October 09-13 2019

EFFECTS OF PERSULFATE TREATMENT ON ANTIBIOTIC RESISTANCE GENE ABUNDANCE AND THE BACTERIAL COMMUNITY IN SECONDARY EFFLUENTS

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Abstract:

Antibiotic resistant genes (ARGs) are an emerging environmental 'contaminant'. Secondary effluents as one of the main 'hotspots' of spreading ARGs into the environment have attracted considerable attention. However, conventional disinfection methods may be inadequate for the successful removal of ARGs. Therefore, this study assessed the removal efficiency and the regrowth potential of ten ARGs in secondary effluents using sodium persulfate activated by Ginkgo biloba L. modified nanoscale zero-valent iron. Moreover, the role of bacterial community is not yet clear when ARGs are removed by persulfate treatment (PT). Therefore, quantitative PCR and Illumina MiSeq sequencing were applied for further analyses. The results showed that 98.6% bacterial 16S rRNA gene was removed within 10 min. After 0.5 h PT, the removal efficiency of target ARGs decreased in the following order: Tn916/1545 (>99.99%) = aac (>99.99%) > int I1 (99.99%) > tet E (99.64%) > mex F (99.10%) > tet W (94.57%) > qnr S (90.18%) > van G (82.21%) > bla-TEM (64.15%) > cat A1 (23.13%). Even upon storage the treated wastewater for 48 h, ARGs abundances were stability or reducing. The influence of pH on ARGs removal efficiency was not significant. The result of variation partitioning analysis showed that genera variation was the greatest contributors to removal of ARGs. Furthermore, the result of network analysis showed that ARGs-genera co-occurring event had nothing to do with any mechanism of resistance. This study revealed PT as an effective method could reduce abundance of ARGs, and bacterial community were no longer the carriers of ARGs.

Keywords: Persulfate Treatment; Modified Nanoscale Zero-Valent Iron; Secondary Effluents; Antibiotic Resistance Genes; Regeneration

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October 09-13 2019

INSIGHT INTO THE EFFECTS OF ACETATE ADDITION ON THE COMMUNITY STRUCTURE OF ACCUMULIBACTER AND COMPETIBACTER IN AN ACTUAL WASTEWATER TREATMENT SYSTEM USING THE DNA STABLE-ISOTOPE PROBING

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Abstract:

Effects of acetate addition on the population structure of Accumulibacter and Competibacter in the enhanced biological phosphorus removal (EBPR) system treating actual wastewater were unclear. In this study, a modified University of Cape Town (MUCT) reactor was operated, and 13C-DNA stable-isotope probing (SIP) combined with molecular biological methods were applied to explore these effects. Results showed that acetate addition significantly improved the P removal efficiency of MUCT from 48.7±12.9% to 96±3.7%, and increased the Accumulibacter abundance from 2.9×107 to 14.9×107 copies/g sludge. The 13C-DNA-SIP experiment revealed that IIF and IIC exhibited higher assimilating activity for 13C-acetate although IID had the highest abundance, interpreting the relative abundance increase of clades IIF (0.7% to 24%) and IIC (1.2% to 9.2%) in the EBPR system, which indicated higher importance of IIF and IIC for the P removal performance EBPR process. High-throughput sequencing showed that the relative abundance of Accumulibacter in the heavy (8th) DNA fraction increased faster than that of Competibacter, and Dechloromonas might be an important bacterial genus involved in the EBPR that was worth further study. Moreover, time-course 13C-DNA-SIP revealed that enough 13C was incorporated into the genomes of Accumulibacter and Competibacter after 42 h SIP incubation. This is the first research on metabolic activity of Accumulibacter and Competibacter using the DNA-SIP.

Keywords: Municipal Wastewater; Acetate; Stable-Isotope Probing; Candidatus Accumulibacter; Accumulibacter Clades; Candidatus Competibacte

National Key Research and Development Programme of China (No. 2016YFC0401103)

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DEVELOPMENT OF AN ELISA METHOD FOR ANALYSIS OF VITELLOGENIN OF LAKE VAN FISH

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Abstract:

Lake Van is one of the largest soda lakes in the world and the biggest lake in Turkey. The extreme physicochemical properties of the lake limited the life of animals. A single fish species lives in the lake, Lake Van fish. In this study, an ELISA method has developed with the aim of determining the pollution caused by estrogens and estrogen-like chemicals. The purified vitellogenin was concentrated and injected into rats to obtain specific polyclonal antibodies. The limit of the detection developed ELISA was 4.63 ng/ml, and the working range was 7.8 to 2000 ng/ ml. The value of intra- and inter-assay variations were within 13.0 % and 13.3 %, respectively. The highest level of vitellogenin of male fishes was measured as 23.56 µg/ ml. As a result of this study, a specific polyclonal antibody against vitellogenin was developed, and a Van Fish-specific ELISA method was developed using this antibody.

Keywords: Lake Van Fish, Vitellogenin, ELISA, Polyclonal Antibody

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A CITIZEN SCIENCE ACTION IN CREATING OPEN AND GREEN SPACES: GUERILLA GARDENS

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Abstract:

Citizen Science is a concept that has emerged in order to ensure the participation of scientists or volunteers who are not professionals or non-scientists in any field profession in the scientific research process. Thanks to citizen science applications, both community education and data collection are provided. Open and green spaces are the most important land use of the city as well as the most basic needs of the citizens. Although urbanization is often planned, it is sometimes shaped by spontaneous interventions of various actors. Guerrilla gardening is one of them. Guerrilla gardening can be described as the act of gardening on land that the gardeners do not have the legal rights to cultivate, such as abandoned sites, areas that are not being cared for, or private property. The term of guerilla gardening was used first in 1973 in New York. The land that is guerrilla gardened is usually abandoned or perceived to be neglected by its legal owner. That land is used by guerrilla gardeners to raise plants, frequently focusing on food crops or plants intended for aesthetic purposes, like flowers. Some guerrilla gardeners carry out their actions at night, in relative secrecy, to sow and tend a new vegetable patch or flower garden in an effort to make the area of use and/or more attractive. Some gardens at more visible hours for the purpose of publicity, which can be seen as a form of activism. Today, guerrilla gardening is a type of gardening that can take place in urban agriculture classification. In this paper, the emergence, shaping, development and the relation with citizen science of guerrilla gardening as a social movement are explained with examples.

Keywords: Urban, Guerilla Gardening, Plant, Society

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DETERMINATION OF CANCER RISK FOR MAXIMUM PM10 VALUES IN IZMIR VICINITY

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Abstract:

The effect of environmental carcinogens on human health is a challenging issue in present type. Environmental carcinogens from various production and consumption activities affect living life on earth. The World Health Organization (WHO) and the International Agency for Research on Cancer (IARC) stated that outdoor air pollution increases the risk of developing lung and bladder cancer. Therefore, air pollution was included in the list of cancer-causing factors. In addition, Particulate Matter (PM), which is one of the parameters that constitute air pollution, has been declared as carcinogenic. In this study, three air quality stations belonging to Izmir Metropolitan Municipality was used. From 01.12.2017-28.02.2018 including the winter months, maximum hourly PM10 values daily data obtained from the vicinity of Izmir was collected. Normal distribution, Log-Normal distribution and Gumbel distribution were applied to estimate the best fitted distribution. The best fitted distribution was determined according to the measured data. By using the Monte Carlo Simulation, randomly generated data were used to estimate new PM10 values. New generated PM10 values were used to calculate risk prediction. As a result of this study, the maximum risk were determined around the vicinity of Izmir namely in Buca, Karsiyaka and Alsancak.

Keywords: Cancer, Air Quality, Monte Carlo Simulation, Particulate Matter, Risk Analysis

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INTEGRATING LIFE CYCLE ASSESSMENT AND OPTIMIZATION MODEL TO EVALUATE THE ENVIRONMENTAL IMPACT OF TAIWAN'S POWER STRUCTURE

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Abstract:

Due to the sustained demand for electricity generated by Taiwan's economic development, coupled with the expectations of multiple targets such as energy costs, environmental protection, energy autonomy and non-nuclear parks, public opinion and economic energy allocation have become a major issue in the current energy policy. Among them, the impact caused by electronic structure on the environment is the most commonly concerned item, in which the image of air quality and emission of greenhouse gases are the most commonly set evaluation object. In this study, the concept of Life Cycle Assessment (LCA) with the damage oriented methodologies of Eco-indicator 99 and impact 2002+ were used to determine the environmental impact of Taiwan's Power Structure on the category from cradle to gate, and it was expected that a more comprehensive exploration to deal with the possible conflict between different aspects in the whole environment. In the research, an optimization model of electric power structure was built to explore the best allocation of various types of energy under the target of minimizing the impact of human health, ecological quality, resource depletion and greenhouse gases emission, respectively, with the consideration of the limitations of power demand, power baseload requirement, energy supply potential and energy self-independent target at the same time. The result shows that natural gas is superior to other fossil energy sources in the human health impact, but it is significantly higher than that of coal-fired power in resource depletion. The degree of the human health impact of solar power generation is not only the highest in emerging energy but also higher than the impact strength of natural gas power generation. The results of power structure planning with the goal of minimizing the total impact of the environment are quite consistent with the situation of minimizing the impact of resource exhaustion, but the situation with human health impact or ecological quality impact is extremely different. Therefore, How to set the planning goals of the energy structure is another problem we must face.

Keywords: Power Structure, Environmental Impact Evaluation, Life Cycle Assessment, Optimization Analysis

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October 09-13 2019

EVALUATION OF AN INDUSTRIAL PARK WASTE WATER TREATMENT PLANT ENVIRONMENTAL PERFORMANCE BY USING LIFE CYCLE ANALYSIS

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Abstract:

Because of the increased population the environmental effect of water production industry is getting higher. Due to this reason developed countries are dealing with the sustainability and perform environmental protection strategy for increasing energy and environmental preservation. The irregular usage of natural resources leads to environmental problems and a decrease in natural resources. In order to prevent this situation, various studies have been carried out. One of the techniques developed for this purpose is Life Cycle Analysis (LCA) method. LCA is a method that allows us to evaluate all environmental impacts from the procurement of raw materials to the disposal of a product. In this study, the environmental performance of the joint waste water treatment plant (JWWTP), in an Industrial Park, including many industries effluent wastewater treated to comply the inlet quality standard of JWWTP was determined by using LCA method. In the life cycle analysis and inventory analysis, the data in the facility's internal report were analysed by using GaBi 8.7 Education Software.

Keywords: Wastewater, Life Cycle Analysis, Gabi 8.7 Education Software

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ESTABLISHING EARTHQUAKE EMERGENCY EVACUATION SYSTEM USING MULTI-AGENT BASED APPROACH

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Abstract:

Emergency evacuation planning has always been a concern, especially in recent years due to the global warming issues caused by climate anomalies. As many uncertainties exist in the occurrence of complex disasters that that it is a sudden event when any disaster happens. It is extremely important to have an emergency evacuation plan in place beforehand. In order to improve the effectiveness of evacuated planning and also reduce the loss of life and property, predict potential problem in emergency evacuation and make evacuation strategies is the method in this study. Agent based model, defined system-bounding include pedestrians, buildings, alarm as agents, other disaster such as earthquakes, fires, explosions and collapses as an event. To establish a pedestrian evacuation model should consider compound disaster events, which contain reacted behavior, herding behavior and evasive behavior of people. In addition, uncertainty compound disasters are taken into account to understand the evacuation situation with compound disasters. Finally, using scenario simulations to discuss the different impacts of disasters, human behavior and evacuation time.

In this study, taking dormitory area for case study and simulating the evacuation of students during an earthquake. The results explain when people over 2000 in context simulation, the evacuation time may also be affected by the spatial environment. When crowding occurs at that place, students may choose different routes for escape or some other will avoid colliding to move to other exit at first. In addition, it can be seen in the second simulations that the number of people with herding behavior will affect the total evacuation time.

Keywords: Compound Disaster, Disaster Emergency Evacuation System, Agent Based Model, Behavioral Modeling

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EFFECT OF DELTAMETHRIN ON DORSAL ROOT GANGLION NEURONS

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Abstract:

Deltamethrin is a widely used pyrethroit group worldwide. Although pesticides are used to struggle insects, they also have effects on other non-target organisms. One of these are mammals. The nervous system controls the functioning of organs and organ systems that enable the organism to respond to changes in its environment. The cells of the nervous system are called “neurons”. Neurons detect and respond to chemical and physical changes. They are responsible for transmitting nerve impulses to other neurons and the target organs. It is known that deltamethrin, which is widely used in agricultural fields, farming and even in households, has neurotoxic effects on neurons, in this study, the effect of deltamethrin on Dorsal Root Ganglion (DRG) neurons was demonstrated by cell culture method at cellular level and completely in vitro conditions. The aim of the cell culture studies is to provide as many cells as possible and experimental variety in vitro conditions similar to the function of each tissue and to make them available for use in the studies. In this way, various studies can be done to understand cellular functioning, analyze possible pathological processes and eliminate them if it is possible. With this aim, DRG neuron culture were obtained as pure neurons based on the appropriate temperature and humidity levels in the medium prepared to prevent any contamination. Deltamethrin was administered to the neuron culture at doses ranging from 50-8000 nM. After cell seeding, death of neurons were visualised with cell observer microscopy system by adding Propidium Iodide to culture medium, before, 24 hours and 48 hours after deltamethrin application. As a result, even low doses of deltamethrin have a lethal effect on dorsal root ganglion neurons.

Keywords: Deltamethrin, Dorsal Root Ganglions, Toxicity

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SPATIAL VARIATIONS OF ORGANIC MAJOR COMPONENTS BY EEFM+PARAFAC IN DONGGANG RIVER BASIN

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Abstract:

In this study, fluorescent excitation-emission matrix (FEEM) combined with parallel factor analysis (PARAFAC) was applied to compare the differences of major organic components and their spatial variations during abundant and dry seasons in Donggang River Basin in southern Taiwan. Four components, individually included in abundant and dry seasons, were evaluate by an integrated validation methods including variance explained, core consistency diagnostic, half split analysis, residual and visual inspection. The pairs of excitation/emission wavelengths (EX/EM), C1,A(244,328/433 nm), C2,A(230,274/388 nm), C3,A(262,354/454 nm) and C4,A(308,378/490 nm) were respectively found in abundant seasons; however, C1,D (248,314/430 nm), C2,D(258,288/358,469 nm), C3,D(268,350/469 nm) and C4,D (230,272/350 nm) existed in dry seasons. Major components were belonging to humic-like substance and fulvic-like substance in abundant seasons. Beside previous major components, protein-like substance was also included in dry seasons. From upstream to downstream, total fluorescent intensity (TFI) revealed an ascending trend. AFI values at most of sampling station in dry seasons were larger than those in abundant seasons.

Keywords: Fluorescent Excitation-Emission Matrix (FEEM), Parallel Factor Analysis (PARAFAC), Humic-Like, Fulvic-Like, Protein-Like

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INDOOR AIR QUALITY IN ANATOLIA SCHOOLS: INDOOR AIR QUALITY LEVELS AND SOURCES OF POLLUTANTS

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Abstract:

Background: Air pollution harms child health. Indoor air quality affects health and academic performance. The main objectives of the study are to (a) demonstrate the levels of indoor air quality (PM, CO2, CO, CH2O, total bacteria and fungi) in schools; (b) to compare the concentrations with the standards; (c) to analyze the seasonal variation of indoor pollutant concentrations. Methods: The indoor air samples of 34 primary schools in the center of a province in Anatolia were collected. Of the schools, 29.41% were located in industrial, 55.88% in urban and 14.71% in rural areas. The study was conducted in winter and spring. Particule matters(PM), CO2, CO, CH2O, relative humidity, temperature, total bacterial and fungal levels were measured. The sample group consisted of 360 primary school students. Parents were asked to complete a questionnaire about symptoms of respiratory problems. Results: PM1 average of the urban region was higher than in other regions(p=0.029). PM10 increase was related to chalk use(MN-U=23.500, p=0.014). According to CO2 measurements, only one met the criteria recommended by WHO. Positive correlation was found between CO2 and student population as well as total bacteria and student population(r=0.512, p=0.003;r=0.401, p=0.028). Rate of students with allergic symptoms was higher in the industrial areas(X2=7.283,p=0.026). 44% of the classrooms exceeded the microorganisms' concentration which was recommended by WHO guidelines. None of the school had a ventilation systems.

Conclusions: CH2O and CO concentrations were low and at acceptable levels. But indoor PM1, PM2.5, PM10, CO2, total bacteria and fungus levels were above limits. Mobility of students and chalk use were the most important indoor factors for PM increase. Efforts to improve the health of children and their performance should focus on the implementation of adequate ventilation. Schools should improve airing systems. Also, arrangements of the school environment will improve indoor air quality.

Keywords: Indoor Air Quality, Particul Matter, School, Student,

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A RELEVANCE STUDY OF ENVIRONMENTAL EFFICIENCY AND SUSTAINABILITY

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Abstract:

The purpose of this study is to evaluate sustainability of an environment incorporating environmental efficiency and Taiwan Biotope Area Factor (TBAF) with respect to CO2 emission. Main contributions in mathematical modeling include that we utilized bad output data envelopment analysis to estimate environmental efficiency and established TBAF to calculate ecological value of an area. In the empirical studies of Taichung city, we found that traditional technical efficiency evaluation without considering CO2 emission appeared to be over rated. One must consider collateral damage of economic developments in order to reflect the modern definition of sustainability. Therefore, we incorporated the most concerned output CO2 emission in measuring environmental efficiency. Results suggested that labor in most areas of Taichung was fully utilized. However, land usage, especially areas for industry, business, residence, infrastructure and transportation, was not as efficient as labor utilization. As far as output levels are concerned, most districts in Taichung have generated satisfying revenues, but require improvements in social assistances in order to be fully efficient. Our results also showed that environmental efficiency was positively associated with TBAF scores. To improve environment efficiency and TBAF score of the city, CO2 emission reduction is a necessary step to take. Another observation to be noted was that agriculture and forest areas helped to improve sustainability of a city in terms of TBAF; however, these areas did not contribute to environmental efficiency.

Keywords: Bad Output Data Envelopment Analysis, Environmental Efficiency, Sustainable Development, Taiwan Biotype Area Factor

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ESTIMATION OF SURFACE RUNOFF POTENTIAL IN AN URBAN-RURAL GRADIENT

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Abstract:

Understanding the water function of the landscape has an important role at establishing the continuity of nature-human interaction. In this context, especially soil structure, land use/land cover and climate characteristics are determinative. In urban areas, increasing impermeable surfaces and surface runoff as a result of faulty land use, as well as irregularities in the precipitation regime due to climate change, adversely affect the structure and function of landscape components; and the risk of flood increases in these areas and leads to reduction and contamination of groundwater. The aim of this study is to determine the surface runoff potential, which is the most important process affecting the natural cycle of water at the central districts of Ankara. For this purpose, the SCS Curve Number method developed by the United States Department of Agriculture was used. Land cover, soil and rainfall data were evaluated in ArcGIS 10.5. The results show that the surface runoff potential is high in the existing settlement areas and the natural areas in the urban development zone are under threat. Therefore, it is possible to say that the water holding capacity decreases and the flood risk increases in these areas with urban development. Such studies enables, the foreseeing of the possible consequences of the interventions on surface permeability through the city planning studies, and the elimination of the negative effects. On the other hand, it is important that landscape plans, where the ecological processes expressed as landscape function, including surface runoff potential, are considered as the priority action area of the multi-layered spatial planning process.

Keywords: Ankara, Rainfall, Runoff, SCS-CN, Surface Permeability

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MANAGEMENT STRUCTURE PROPOSAL FOR RIPARIAN ZONE STAKEHOLDERS: EXAMPLE OF ASAR STREAM

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Abstract:

Changes in nature and differences in human use are recorded by rivers. Each river system has unique combinations of channel morphology, streamside vegetation, hydrology, geology and soils. So that river systems and riperian areas should be evaluated and managed taking into account their unique characteristics. Riperian areas are faced with a variety of negative interference in Turkey so these areas can not fulfill their functions adequately. Management of these areas and the creation of a healthy riperian zones have a great importance nowadays. The study area was choosen as Asar Stream which is one of the major water resource of Duzce City. In this study, riperian zone stakeholder analysis was conducted, benefits, priorities, behaviors and values of each stakeholder were determined and mutual goals and purposes were established for Asar Stream. Then riperian zone stakeholders for Asar Stream were divided into two groups. In the first stage of the stakeholders, the target group was defined as decision makers of riparian areas. As the second stage of the stakeholders local people were defined. The study method was implemented by using questionnaires for two groups of the stakeholders. Three different type of questionnaires were developed for the each stakeholder group. The results obtained were evaluated using SPSS 22.0 program. One way ANOVA, cross- tab analysis, factor analysis, regression analysis and means were consulted as statistical methods.

As a result of the study, data obtained from surveys serves as important input for riperian zone usage decisions of Turkey. Opinions of the stakeholders who participated in the survey can be summarized as below: Local community and decision makers think optimistically towards to the protection of Asar Stream. They have concern about water quality, water level and riparian changes. In the light of all assessments, riperian zone management model which includes different stages participants and national strategies for riparian areas was improved for Asar Stream.

Keywords: Stakeholder Analysis, Riparian Zone, Asar Stream, Turkey

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THE IMPORTANCE OF GREEN INFRASTRUCTURE AND URBAN FORESTRY IN THE PREVENTION OF NATURAL DISASTERS AS A RESULT OF CLIMATE CHANGE: EXAMPLE OF AKCAKOCA LAND SLIDE AND FLOOD DISASTER

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Abstract:

The Importance of Green Infrastructure and Urban Forestry in the Prevention of Natural Disasters as A Result of Climate Change: Example of Akcakoca Land Slide and Flood Disaster In July 2019, Akcakoca District of Düzce City suffered loss of life due to flood and landslide. Significant material damages have occurred in private agricultural lands, settlements, industrial and commercial areas. Although the study area Akcakoca is a highly preferred area for sea tourism in summer, tourist demand has decreased considerably after the flood disaster.

Within the scope of the study, the effects of landslide and flood disaster in Akcakoca were evaluated in terms of agriculture, forestry, tourism and settlement sectors by using Arc Map 10.3 program and Google Earth images. Land use and planning suggestions have been developed within the framework of “urban forestry” and “green infrastructure” concepts with the aim of establishing the relationship between water resources and hydrological networks and all urban and rural settlements correctly, protecting water resources and increasing resistance to climate change.

Keywords: Victim, Crime, Citizen Science, Landscape Design, Urban Planning

*Green Infrastructure, Natural Disaster, Urban Forestry, Climate Change, Akcakoca

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THE EFFECTS OF MARINE SCIENCES ON MARITIME TRANSPORTATION AND MARINE ENVIRONMENT AT TURKISH STRAITS

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Abstract:

The Turkey is a great bridge and correct example of the connecting the Asian and Europe continents. From the history, this sea area has importance of strategical and commercial at maritime trade. The area name is the Turkish Straits Sea Area which is consist of Istanbul Strait (Bosphorus), Canakkale Strait (Dardanelle) and also The Marmara Sea. The Istanbul and Canakkale straits are connecting the Black Sea with the Aegean Sea through by the Marmara Sea. With geographic position, The Turkish Straits has great importance not only strategic but also geopolitics. Recently increasing of energy transportation, The Turkish Straits has become importance and risky waterway at the world maritime transportation. The Turkish Strait Sea Area also Straits have been governed by the Montreux convention, since the 1936. Beside all legalty,The Turkish Republic Maritime Authorities have important responsibilities like on local maritime traffic, innocent passage, safety navigation and marine environmetal management during the maritime transportation. Marine Sciences responsible of the measures all details of marine and environment sciences. Deeply survey of these are could have chance both to making environmental planning for decreasing marine pollution and protect all the straits shoreline by the national and international regulations and making another planning about maritime safety trough the Turkish Straits. This working, try to explain the marine effects and their surveys importance for maritime transportation and environmental management, planning at the Turkish Straits selected area.

Keywords: Turkish Straits, Environment, Pollution, Coastal

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MINERALOGICAL SPECIATION AS A TOOL IN POLLUTED SOILS ASSESMENT: A CASE STUDY

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Abstract:

During the last decades, soil contamination derived from mining and industrial activities has been a matter of special environmental concern. Risk assessment studies are usually carried out following USEPA procedures, in which the contaminant (typically a metal(loid)) concentration in the soil and its toxicity are considered as key factors. The toxicity of a given element depends on its chemical form, so chemical speciation (sequential extraction procedures) is a method widely applied in most of the environmental studies that include soil pollution characterization. Although some useful information can be obtained from sequential extraction procedures, some recent studies have pointed out that the interpretation of their results is sometimes subjected to many limitations (discussion beyond the scope of the paper).

The goal of this investigation is to analyze, through a case study, the suitability of mineralogical speciation as a tool for soil pollution studies. Some advantages can be expected for mineralogical speciation in comparison to chemical speciation: i) it provides indirectly the chemical speciation; ii) X-ray based mineralogical techniques are objective; iii) some other aspects, such as grain size, shape and particle weathering can also be determined, which would help to a better understanding of the sample geochemistry.

The case study is an ancient unactive As mine located near Ponferrada (NW Spain), where hundreds of tonnes of low-grade ore are disposed on a spoil heap directly over the soil. Soil samples were taken, properly prepared and analyzed by XRF, SEM-EDX and TEM. In the spoil heap, As has only been found in the form of arsenopyrite, whereas in the soil it appears as (by order of abundance): scorodite (≤60 µm), weathered arsenopyrite (≤100 µm), and associated to iron oxides and silicates (usually ≤20 µm), showing that As in the soil suffers predominantly mechanical and, to a lesser extent, chemical dispersion.

Keywords: Polluted Soils, Mineralogical Speciation, Environmental Tool.

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INDUSTRY 4.0 AND AUTONOMOUS SHIPS EFFECTS ON MARINE ENVIRONMENT

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Abstract:

The Economic flows and Financial resource flows are of great importance in the world trade economy. Developments that develop as the common denominator of these trends and which affect the world economies are known as “Industrial Revolutions”. These Indsutrial Processes which have been increasingly influential since the early 18 centuries and reshaped the economies of the whole countries, have reached a new stage today and are defined as Industry 4.0. As a result of the effects of industry 4.0, autonomous ships which are developing technology products, are also preparing to serve in maritime transportation and maritime trade sector. It is clear that all these developments will continue to be implemented within the framework of unchanging maritime and environmental rules. In this study trying to explain all comments and observations on how the Industry 4.0 and autonomous ships could be integrated into the marine environment during the maritime transportation on maritime trade sector.

Keywords: Industry 4.0, Autonomous Ship, Marine Environment

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PRACTICAL SUBSTITUTION OF BPA-BASED COATINGS IN FOOD INDUSTRY

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Abstract:

Food contact materials containing bisphenol A derived epoxy resins have been used in the canned food industry since 1960s. Although BPA is chemically reacted to form the resin, its' residue is often found and may migrate into foodstuffs. BPA and potentially other bisphenols are now known to have oestrogen-mimicking properties and additionally there are regulatory risks for manufacturers. Work with a canned milk producer to phase-out BPA and other hazardous chemicals in manufacture began in 2016 in the framework of project LIFE Fit for REACH. Initially coating products used were evaluated from regulatory and occupational health perspective. 3 different articles (cans) were tested for BPA, BPF, BADGE and other compounds. For migration testing 50% EtOH simulant was used (1h@100C followed by 240h@40C/60C) followed by extraction and GC-MS analysis. Specific BPA migration 0.098 mg/kg was found from can no.1, while other samples exhibited lower migration. BPA residue analysis in canned milk samples revealed results below quantification limit. Alternative can part and coating search was conducted scanning available BPA-free options meeting technical, safety, regulatory requirements as new BPA migration limit in FCM was lowered to 0,05 mg/kg according to Regulation (EU) 2018/213. Investigation revealed numerous alternatives, but sensitive information like product composition or residue migration is not easily obtainable but also technical challenges are likely. Chemical analysis of the ordered alternative yielded BPA migration below quantification limit. But the composition of the lacquer was not acceptable for this particular industry (contained melamine). Thus a decision to switch to different process and polyester-based powdered coating was made allowing to avoid lacquers containing BPA and other undesired substances. Thus the case example illustrates that chemical substitution to phase-out BPA from FCM is a complex multi-step process requiring substantial expert input to overcome supply chain communication, technical, health and safety and economical challenges.

Keywords: Bisphenol, BPA, Emerging Pollutants, FCM, Food Contact Materials, Food Industry, Milk Industry, Canned Food.

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RESTORATION OF AYSE SEZGIN HOUSE, ONE OF THE EXAMPLES OF CIVIL ARCHITECTURE IN TARAKLI

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Abstract:

The buildings that make up the urban environment and which are made with traditional construction techniques that give character to the region constitute the original texture of Anatolian architecture in terms of landscape and urban appearance. The historical, aesthetic and technical evaluation of these buildings is the greatest effort that is intended to be passed on to future generations.The architectural and structural features of Ayse Sezgin House, one of the examples of civil architecture of Tarakli architecture were examined. The architectural layout, interior layout, construction system, roof characteristics, number of floors, the properties of the materials used in the construction of the building and its location in the environment are indicated. The damage status of the building was examined by considering these characteristics of the building. Information was also collected on the history of the building by interviewing the landlords. The roleve, restitution and restoration projects of Ayse Sezgin House were drawn, the facade and the plan features were supported with pictures and their reports were prepared. The cultural identity of the Ottoman architecture has been documented with the approval of the Kocaeli Regional Cultural Heritage Conservation Board and the guiding principle has been determined.

Keywords: Restoration, Architecture, Tarakli

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IMPACT OF STATIC COMPRESSIONAL LOAD ON FOAM GLASS AGGREGATE

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Abstract:

By depending on waste glass as a main basic material, foam glass aggregate is produced as a man made light weight material which lead to get more sustainable environment. Foam glass aggregate can be used in various geotechnical applications such as such as bridge abutments, retaining wall back fill, road embankments and bedding layers of isolated floors. Therefore good understanding of the material behaviour is very important. In this study, foam glass aggregate has been subjected to compressional static loading pressure by using big size oedometer apparatus. A series of static continuous loads (50, 100, 150 and 200) kPa are applied on foam glass aggregate samples which were compacted in three different compaction percentages (10%, 20%, and 30%). An increasing in amount of deformation has been revealed with time by increasing the amount of static continuous loads, while reverse of that was appeared by increasing compaction ratios. The oedometric compression module (Eoed) of the foam glass aggregate under all loading steps and for all compactions ratios has been calculated.

Keywords: Foam Glass Aggregate, Static Load, Deformation, Oedometric Compression Module

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BOTANICAL GARDENS, ARBORETUMS AND HERBARIUMS' NETWORKING AND TRAINING OPPORTUNITIES FOR STAKEHOLDERS IN TURKEY

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Abstract:

Botanical Gardens Conservation International (BGCI) refers botanical gardens; research, conservation, exhibition and education. Botanical gardens are the institutions that cultivate natural and cultural plants in accordance with their aims, conduct scientific researches on plant species that contribute to education by introducing them to the public and students. Working under the Botanical Gardens located in different provinces of Turkey, educational activities of the Arboretum and herbaria, organized scientific meetings, publications produced, the courses etc. qualifications were evaluated in terms of education and networking opportunities. Suggestions have been made to improve the opportunities provided to the stakeholders of the Botanical Gardens, Arboretums and Herbariums, which contribute to environmental awareness and have a high scientific and social contribution. Botanical Gardens Conservation International (BGCI) refers botanical gardens; research, conservation, exhibition and education. Botanical gardens are the institutions that cultivate natural and cultural plants in accordance with their aims, conduct scientific researches on plant species that contribute to education by introducing them to the public and students. Working under the Botanical Gardens located in different provinces of Turkey, educational activities of the Arboretum and herbaria, organized scientific meetings, publications produced, the courses etc. qualifications were evaluated in terms of education and networking opportunities. Suggestions have been made to improve the opportunities provided to the stakeholders of the Botanical Gardens, Arboretums and Herbariums, which contribute to environmental awareness and have a high scientific and social contribution.

Keywords: Conservation Planning, Botanical Gardens, Networking, Stakeholder

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MIDDLE-CLASS MASS HOUSING USERS' SATISFACTION OF OUTDOOR USE :A CASE STUDY OF MEMURSEN HOUSING

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Abstract:

In this study, it is aimed to evaluate the satisfaction of the people living in the mass housing units in the middle income group in Düzce towards the outdoor landscape of the housing environment and whether the outdoor landscape features have an impact on the choice of housing. In this context, 384 users were surveyed and the results were measured using SPSS 22.0 program with frequency and percentage, mean value, one-way analysis of variance and factor analysis. As a result of the study, it was concluded that the economic factors were more important than the possibilities of outdoor use, the open and green areas around the housing area were sufficient and the user satisfaction was high.

Bu calismada Düzce'de orta gelir grubuna yönelik toplu konutlarda yasayan halkin konut cevresi dis mekan peyzajina yönelik memnuniyetleri ve konut tercihinde dis mekan peyzaj özelliklerinin etkisi olup olmadigi degerlendirilmeye calisilmistir.Bu kapsamda 384 kullaniciya anket uygulanmis, sonuclar SPSS 22.0 progaminda siklik ve yüzde, ortalama deger, tek yönlü varyans analizi ve faktör analizi kullanilarak ölcülmüstür. Calismanin sonucunda konutlarin tercihinde ekonomik etkenlerin, dis mekan kullanim olanaklarindan daha önemli bir etken oldugu, calisma alaninda konut cevresi acik ve yesil alanlarin yeterli, kullanici memnuniyetinin yüksek oldugu sonucuna ulasilmistir.

Keywords: Middle-Class Mass Housing, User Satisfaction, Landscape, Düzce

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EXAMINATION OF DIESEL ENGINE PARTICLE EMISSIONS AND FILTERS

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Abstract:

Diesel engines have been preferred power sources for a wide range of motor vehicles due to their superior performances and thermal efficiencies. However, their nanometer level particle emissions, which are extremely hazardous for health and environment, are becoming a growing concern especially in developed countries. The only reliable technology of today to control these nanometer level emissions is diesel particle filters. On the other hand, unless remedied, exhaust back pressure which increases with filter loading has a significant adverse impact on engine performance. In this work, particle emissions from a diesel engine were examined in terms of particle number and size distribution. It was pointed out that the particle emissions from the diesel engine are especially high during rapid engine loadings. During such a period, particle emissions rise up immediately to the level of 1013 #/cm3 with a size range approximately from 10 to 200 nm. The size distribution has a bell-shaped curve with 45 nm of mode.

The alternative filter technologies and microstructures of particle filters were examined to be a remedy for the exhaust backpressure. It was observed that particle filters can minimize the particle emission with an efficiency of over 90% if the porosity content is ~%50 and 10-12 micron porosity size. Besides with the development of needle-like crystals DPF substrate increases the surface area and, hence, increases the filtration efficiency while minimizing the backpressure. This kind of microstructure may provide minimization of thermal stresses during regeneration and the life time of DPF will increase.

Keywords: Diesel Engines, Particle Matter, Dpf, Microstructure, Porosity

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October 09-13 2019

EVIDENCE SYNTHESIS USING META ANALYSES TO ASSESS THE EFFECT OF AIR POLLUTION ON HUMAN HEALTH

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Abstract:

Meta-analyses offer a systematic framework for synthesizing data that can be used for a wide range of research areas, study designs, and data types. Most frequently used in assessing the effectiveness of clinical interventions, the utility of meta analyses has wide spread appeal these days. Given the health effect of an air pollutant are assessed in various geographic regions repeatedly, cumulating the data from all these studies that assess the link between a particular pollutant and health outcome can provide much more conclusive evidence than individual study. The National Ambient Air Quality Standards advocates many potential applications of meta-analysis. More importantly, while an individual meta-analysis can only synthesize studies addressing the same research question, the results of separate meta-analyses can be combined to address a question encompassing multiple data types. This observation applies to any scientific or policy area where information from a variety of disciplines must be considered to address a broader research question. In this talk I will attempt to provide how meta analysis is done and showing examples of outcome from meta analyses assessing the health effect of particulate matters. The author has developed a new method of meta analysis that take into account the quality of studies pooled. The utility of such models in pooling air pollution data will be demonstrated.

Keywords: Meta Analysis, Air Pollution, Health Effect

[*]*None*

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PREPARATION AND CHARACTERISTICS OF ACTIVATED CARBON SUPPORTED FE-BASED CATALYST FROM BIOMASS MIXTURE

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Abstract:

Activated carbons (ACs) are the most widely used as supporting material for commercially available precious metal catalysts due to controllability of their surface properties, resistance to acidic and basic media, and ease of regeneration. ACs are relatively expensive due to high cost of precursors and production methods. Recently, intensive researches have been carried out on the synthesis of AC from biomasses by physical and chemical activation methods in order to produce cheaper ACs. In these studies, it has been shown that high quality ACs can be obtained from biomasses. In their use as catalyst support, the AC surfaces are coated by chemical precipitation or impregnation of the catalyst material. However, it is directly possible to prepare by impregnation of biomass with direct catalyst material and then pyrolysis. This method will not only reduce production costs, but will also provide catalysts with desired properties. From this point of view, in this study, AC supported Fe-based catalysts which are used in advanced oxidation reactions were prepared by impregnation method from the waste biomasses mixture by FeSO4 activation and then pyrolysis. The effects of FeSO4:biomass mixture ratio and pyrolysis temperature on the catalyst properties were investigated. The synthesized catalysts were characterized by surface area, total pore volume, pore diameter, pHpzc, FTIR, Boehm titration, SEM, EDS, XRD and VSM analysis. Desired catalyst was synthesized by pyrolysis of the chemically activated biomass at impregnation ratio of 20:40 at 700°C for 60 minutes in CO2 atmosphere. The surface area, total pore volume and pore diameter were found to be 375.28 m2/g, 0.2391 cm3/g and 2.5486 nm, respectively. It has been found that iron having catalytic effect is transformed into magnetite crystal structure having chemical formula of Fe2.9O4. The results showed that cheaper catalysts with desired surface properties can be obtained by the proposed method.

Keywords: Activated Carbon, Biomass, Catalyst, Ferrous, Support Material

[*]The authors thank Scientific and Technological Research Council of Turkey (TUBITAK) for their financial support [Project number: 11Y300

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THE METASTATIC POTENTIAL OF SILVER NANOPARTICLES ON THE IN VITRO MODEL OF THE MDA-MB-436 CELLS

Magdalena Matysiak-Kucharek[a*], Magdalena Czajka[a], Berta Fal[a], Krzysztof Sawicki[a], Marcin Kruszewski[a], Lucyna Kapka-Skrzypczak[a]

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Abstract:

Due to the increasing use of nanomaterials in consumer products, the general population is exposed to the nanoparticles (NPs) released into the environment. Among other nanomaterials, silver NPs (AgNPs) play an important role, due to their wide application in areas such as cosmetics, personal hygiene and household cleaning products, packaging and food production. In recent years, AgNPs have been shown to have cytotoxic and genotoxic effects on mammalian cells, including disrupting oxidative balance and inducing inflammation. Single reports have shown that some NPs may support the metastasis of malignant tumors by inducing an epithelial-mesenchymal transition (EMT) process that occurs e.g. with apoptosis resistance. Such studies have not been conducted for AgNPs while due to their wide use, it seems important. Therefore, the aim of this study was to evaluate impact of 20 nm and 200 nm AgNPs on human triple negative breast cancer MDA-MB-436 cells EMT and apoptosis markers. EMT markers mRNA expression was measured by quantitative reverse transcriptase real-time polymerase chain reaction. The effect of AgNPs on the concentration of proteins that are markers of apoptosis was determined using a commercially available Proteome Profiler Human Apoptosis Array Kit. The conducted research showed that both AgNPs have a statistically significant impact on the mRNA expression of epithelial and mesenchymal markers of EMT – E-kadherin, N-kadherin, vimentin, matrix metalloproteinase 2 and matrix metalloproteinase 9. Incubation of cells with AgNPs influenced also several apoptosis markers levels. The results of the conducted experiments indicate that AgNPs may exert a potential effect on cancer cells and potentially participate in the metastasis process. This study was financed by the National Science Centre based on decision No DEC-2015/19/N/NZ7/03071 and from Ministry of Science and Higher Education resources for young scientists in 2019 (Projects manager – Magdalena Matysiak-Kucharek, MSc).

Keywords: Silver Nanoparticles, Breast Cancer, Metastasis, Epithelial-Mesenchymal Transition, Apoptosis

[*]National Science Centre (No. DEC-2015/19/N/NZ7/03071); Ministry of Science and Education (resourses for young scientict in 2019)

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GOLD AND SILVER NANOPARTICLES AFFECT THE METABOLIC FUNCTIONS AND VIABILITY OF THE HUMAN DU145 CELL LINE

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Abstract:

The ever-increasing use of nanoparticles (NPs), and thus the steady increase in their emissions into the environment, raises important questions about the impact of these new materials on living organisms. It is therefore necessary to carefully assess their possible negative effects to prevent risks to health and the environment. Gold nanoparticles (AuNPs) and silver nanoparticles (AgNPs) belong to the group of the most commonly used NPs, which means their presence in the environment is inevitable. What's more, their increasing accumulation in the natural environment is accompanied by effective overcoming of the body's protective barriers. Despite the numerous benefits that the various implications of these metallic NPs provide, the number of reports of their negative impact on biological structures is increasing.

In this study, we evaluated the toxicity of AuNPs and AgNPs on the human DU145 cell line. To assess cytotoxicity, an MTT assay was used to measure the reduction of the water-soluble yellow tetrazolium salt to the insoluble violet formazan compound carried out by mitochondrial dehydrogenases. Cells were treated with dispersed AuNPs and AgNPs at concentrations of 5, 10, 25, 50, 100 µg/ml for 24h and 48h. AuNPs and AgNPs induced cell toxicity in DU145 cells was observed as a mitochondrial function. MTT results showed cytotoxicity in a dose and time dependent manner. An increase in the cytotoxic effect was observed with increasing concentration and increasing exposure time for both types of NPs. In addition, AgNPs showed stronger cellular toxicity compared to AuNPs. The results obtained suggest that the constantly increasing exposure to particles of nanometric size may have a negative impact on the functioning and viability of human cells.

Keywords: Nanoparticles, Environment, Cytotoxicity

[*]This study was financed by the National Center for Research and Development funds, decision No. POWR.03.02.00-00-I002/17-00

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IMPACT OF UVB RADIATION ON TOXICITY OF CHLORPYRIFOS IN KERATINOCYTES

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Abstract:

Chlorpyrifos (CPS) is a widely used organophosphorus (OPs) insecticide. Due to its lipophilic nature, this substance is easily absorbed through the skin. Therefore prolonged exposure is associated with harmful effects on human body. UVB radiation carries a significant amount of energy, and therefore its impact on cells is high. Numerous studies have shown toxicity, both UVB and chlorpyrifos, to a various types of cells in vitro. Unfortunately, little is known about the simultaneous action of these harmful environmental factors.

The aim of the study was to investigate the effect of UVB radiation on toxicity of chlorpyrifos an organophosphorus insecticide in skin cells. In addition, the purpose of study was to explain the mechanism of such action.

Studies were performed on HaCaT (keratinocytes) cell lines. Cells were exposed (alone and simultaneous) to various intensity of UVB radiation (5, 10, 15, and 20 mJ/cm2) and two concentrations of CPS (50, 250 µM). Samples were measured by LDH assay, Comet assay, Apo One® Homogenous Caspase -3/7 assay, ROS-Glo™ H2O2 assay and TNFα/ Il-6 ELISA kit.

Our research showed that exposure to UVB radiation contributes to cytotoxic effect of chlorpyrifos in skin cells. Increased cytotoxicity may be due to induction of free radical formation, inflammatory state and DNA damage in skin cells.

Keywords: UVB Radiation, Chlorpyrifos, Keratinocytes, Toxicity

**This study is supported by Institute of Rural Health statutory funds for financing of young researchers in 2017 and in 2019.*

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CHLORPYRIFOS IMPACT ON INFLAMMATION IN 3T3-L1 ADIPOCYTES

Magdalena Czajka[a*], Magdalena Matysiak-Kucharek[a], Krzysztof Sawicki[c], Berta Fal[a], Lucyna Kapka-Skrzypczak[a]

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Abstract:

Organophosphorus pesticides (OPs) are among the most commonly used pesticides. Regardless the acute poisonings, understanding the association of chronic and sub-lethal OPs exposure with some chronic diseases is important from the environmental toxicology and public health point of view. A growing body of evidence points to the association between the pesticide exposure and increase in the incidence of metabolic diseases. Adipose tissue is a key endocrine organ that secretes adipokines, that have pro-inflammatory or anti-inflammatory activities. Dysregulated production or secretion of these adipokines can contribute to the pathogenesis of various disease processes including obesity-linked complications. The aim of this study was to determine the impact of chlorpyrifos, being a representative of OPs, on the level of cytokines and adipokines. Analysis were performed on 3T3-L1 cells, which are widely used to investigate cytokines synthesis in white adipose tissue. 3T3-L1 preadipocytes treatment with differentiation medium led to differentiation them into mature adipocytes. Presented research evaluated the effect of chlorpyrifos on IL-6, TNF-α and MCP-1 levels as markers of inflammation and level of adipokines which affect inflammation (adiponectin, resistin and leptin). Determination of IL-6, TNF-α, MCP-1, adiponectin, resistin and leptin within cell supernatants was done by enzyme-linked immunosorbent assay (ELISA) using commercially available kits. The analysis showed that chlorpyrifos influenced on cytokines and adipokines level.

This study was financed by the National Science Centre founds, based on the decision No. DEC-2014/15/N/NZ7/03065 and from Ministry of Science and Higher Education as the statutory project for young scientists for 2019 (Principal Investigator: Magdalena Czajka, MSc).

Keywords: Chlorpyrifos, Adipocytes, Inflammation, Adipokines

National Science Centre (DEC-2014/15/N/NZ7/03065), Ministry of Science and Higher Education, project for young scientists 2019

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ESTIMATION OF THE CORN PRODUCTION IN TURKEY BY MEANS OF ARTIFICIAL NEURAL NETWORKS

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Abstract:

The aim of the study is to model and estimate the corn production in Turkey by means of Artificial Neural Networks. Data of the period 1960-2018 which were used in the development of the model were collected from Turkish Statistical Institute. In the development of the Artificial Neural Network model, 'years' were used as input parameters and 'production amount' was used as output parameters. The efficiency of the model has been determined by using statistical parameters such as Mean Squared Error (MSE) and Coefficient of Determination (R2). It was found that the Artificial Neural Network having the best predictability for the production amongst the models developed was the one with eight inputs (1-8-1), single hidden layer and had a network architecture using Levenberg-Marquardt back-propagation learning algorithm (trainlm). Performance criteria of the model was calculated as MSE=0.001 and R2=0.952. According to the estimated results obtained between the years 2019-2030, Turkey's corn production amount will be between 5.979.076 and 10.555.760 tons. The results have revealed that there will be an increase of 85.19 % in 2025 compared to 2018, and an increase of 85.19% in 2030 compared to 2018. As a result of the study, successful estimations regarding Artificial Neural Networks and corn production values were obtained.

Keywords: Artificial Neural Networks, Forecasting, Corn, Production.

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ANALYSIS OF THE PHOTOSYNTHETIC ACTIVITY DYNAMICS OF DIFFERENT FOREST TYPES BASED ON SENTINEL S2A SPECTRAL BIOPHYSICAL PROPERTIES IN PROTECTED AREA TAJAN

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Abstract:

The importance of analysis of biophysical indices from remote sensing data for vegetation dynamics analysis and typisation is rapidly increasing. This study aim is evaluation of derived Sentinel 2A products: fraction of absorbed photo-synthetically active radiation (fAPAR) and leaf area index (LAI) on 17 randomly distributed plots in different forest types (beech, oak, pine and fir dominated stands) in area Tajan, in central Bosnia. The analysis is performed using 12 satellite images provided at four comparable dates during growing season for three years: 2016, 2017 and 2018. Here is performed repeated measurements' ANOVA for fAPAR with LAI as covariate using General Linear Models (GLM) in Statgraphics Plus 5.0. For the whole period, the obtained LAI mean values range from 1.2 to 1.7 while the fAPAR range from 0.58 to 0.90. Correlation between LAI and fAPAR was significant for each forest type with coefficients above 0.91. Significant differences between regression intercepts and slopes were obtained for each forest type ($p<0.01$). Repeated measurements' ANOVA resulted in fAPAR mean significant differences for forest types and growing seasons compounded in year ($p<0.05$). GLM model explained more than 95% in fAPAR variation. The lowest statistically significant different mean photosynthetic activity was found for fir while other forest types expressed higher and similar mean values. The mean fAPAR values were higher at the begging of growing season, decreased in the second and then increased in third and fourth quarters sharply. Obtained results could be used to extend characterization of general forest types performances and their dynamics. We found that performed study could become a base for further research of forest types characteristics expanded with additional spectrally based biophysical parameters (leaf chlorophyll content, canopy water content and fraction of vegetation cover) and in relation with other factors as orography, soil types, species compositions, management measures and climate changes.

Keywords: Forest Types, Photosynthetic Activity, Growing Season, Sentinel S2A Biophysical Properties

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UNIVERSITY CAMPUS AIR QUALITY MONITORING PLATFORM

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Abstract:

This paper describes an ongoing work for creating a mobile platform for air quality monitoring in Ege University, Izmir-Turkey. The goal is to measure general temperature and humidity levels as well as some basic air pollution components using mobile devices and interfaces. Data, collected through mobile platforms mounted on users' phones, bicycles or cars around the campus, is analyzed to allow observing the quality of the surrounding air on user mobile devices. This paper describes the system architecture and interfaces as well as the sensor's selection and operation.

Two separate system architectures were determined. In the first architecture, collected sensor data is sent to a smartphone application via a Bluetooth module. Arduino Nano MCU is used for data transfers from the gas sensors. Wireless communication uses HM-11 BLE module. The user is able to observe the current sensor values on the smartphone screen. An Android interface app is designed using MIT APP Inventor 2. In the second proposed system architecture, the goal is to transmit the collected data from the sensors to a control center using a GSM module (Adafruit FONA 808). Data exchange is done using the publish-subscribe application layer protocol - MQTT, which is simple and low power, specifically used in IoT applications. The data from the sensors is read and then transmitted to the MQTT broker using a predetermined topic. For the Subscriber, a website in Java Script was designed, allowing users to connect to the MQTT broker, subscribe to the data published on the selected topic and receive messages (sensor data) published in a certain period. The first prototype utilizes DHT-11 sensors for environment measurements such as temperature and humidity, and the MQ-135 sensor which measures air quality and the amount of components such as NH3, smoke, CO2 etc.

Keywords: Mobile Air Quality Monitoring Platform, Environment, GSM/GPRS Network

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INFLUENCE OF ALTITUDE ON SOME CHEMICAL PROPERTIES OF SOIL

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Abstract:

Climatic changes and different vegetation can affect soil properties along different altitude. In this study, some chemical properties of soils of oak growing areas around Gülbahar Dam near Bingöl along different altitude were investigated. For this, the soils were collected from 5 different altitude (1225-1275-1325-1375-1425m). In order to achieve this goal, we analyzed soil pH, electrical conductivity (EC) and organic matter (OM). Moreover, regarding the orthogonal statistical result, the greatest effects of altitude values were quadratic (2nd degree) on pH and EC, and quartic (4th degree) on organic matter. According to the analysis of variance obtained from orthogonal polynomials R2 values for pH, EC and organic matter were 0.994, 0.998 and 0.629, respectively. Our result depicted that pH values were observed significantly different along altitudes ($p<0.001$). While the highest pH (6.64 ± 0.03) was observed with 1275m, the lowest pH was observed (5.83± 0.03) with 1325m altitude. In addition, EC values were observed significantly effects along altitudes ($p<0.05$). While the highest EC (98.63 ± 0.7 µS/cm) was observed with 1275m, the lowest EC was observed (50.40 ± 0.4 µS/cm) with 1225m altitude. Likewise, OM values were observed significantly effects along altitudes ($p<0.05$).

Keywords: Ph, EC, Organic Matter, Altitude

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EFFICIENCY OF BIOCHAR ON SOIL PHOSPHORUS AVAILABILITY IN COPPER CONTAMINATED SOIL

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Abstract:

This present study demonstrates the reduction of copper (Cu) toxicity and improvement soil phosphorus availability with different doses of olive pulp biochar (BR). In order to achieved this aim, an incubation trial was set up to test the influence of different doses of BR (0 (Control), 0.5 %, and 1 %) with Cu (0 mg kg-1, 100 mg kg-1, and 200 mg kg-1) contaminated soil on a special focus on soil available P (AP) and total phosphorus (TP), one of the main important nutrients in agroecosystem. Regarding the effects of increasing the dose of BR from to 0 (Control), to 0.5 %, and 1 % (treatments) on the content of available P, significantly effects were observed. Moreover, a significant interaction between the application BR and Cu was also found ($P<0.05$). Interestingly, neither the application of BR doses nor the Cu treatments affected TP. In conclusion, AP can be increased with increased BR doses AP in Cu contaminated soil.

Keywords: Available P, Total P, Copper, Contaminated Soil, Biochar

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EFFECT OF SUNFLOWER SEED SHELLS ASH ON PROPERTIES OF SELF-COMPACTING CONCRETE

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Abstract:

There are numerous researches in the field of civil engineering that attempt to find a possible application of biomass ash. The purpose of this study is to investigate the possible use of the sunflower seed shells ash as powder material in self-compacting concrete. Four mixtures of self-compacting concrete have been made and tested. In all the mixtures there were equal amounts of cement, the total amount of fines, additives and aggregates. The water to binder ratio is maintained 0.55 for all mixtures. The reference mixture is made with cement, silicate fume and stone powder. In two mixtures, a part of the stone powder was replaced with the sunflower seed shells ash and in the last mixtures, silica fume was replaced with fly ash. Mixtures were tested for air content and workability of the fresh concrete is determined by using V funnel method, slum flow, T 500, L - box, and visual check of stability. The dynamic modulus of elasticity and compressive strength were tested after 7 and 28 days. According to the obtained results, the higher ash content of the sunflower seed shells reduces the mechanical properties of the concrete and in the fresh state affectes on the setting time. The workability depends on the ratios and types of powders. Specimens of lime mortar with the addition of sunflower seed shells ash were also made. The obtained results do not indicate that sunflower seed shells ash has pozzolanic activity.

Keywords: Sunflower Seed Shells Ash, Self-Compacted Concrete, Workability, Mechanical Properties, Pozzolanic Activity

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BIOSURFACTANT PRODUCTION USING INDUSTRIAL WASTES FROM BACTERIA WHICH IS NATURAL AND CLINICAL ISOLATES

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Abstract:

Biosurfactants are chemicals which have both hydrophilic and hydrophobic groups that are synthesized by microorganisms in the cell membrane and released outside the cell and act on the interfaces. It is used in many industrial fields such as food, cosmetics, pharmaceutical, petroleum industry and environmental technologies due to their properties that increase the solubility and biodegradability of hydrophobic pollutants and emulsion properties

In this study, production of biosurfactant was be carried out using waste frying oil and corn steep liquor by bacillus sp. isolated from soil, clinical isolates Pseudomonas aeruginosa and Escherichia coli. These bacteria were incubated for 72 hours at 37 oC in the corn steep liquor and LB broth containing 5% waste oil. Then, these produced biosurfactants were detected by oil spreading technique All samples with a zone diameter exceeding 1.5 cm were considered positive. Biosurfactant from bacillus sp. incubated in the oil waste has showed 8.6 cm zone diameter which is even higher than tween 80 used as a control. Surface tension of biosurfactants were determined using pendant drop method

It has been determined that the biosurfactants obtained can reduce the surface tension range %23.6 to %44.8 for vegetable oil waste and range to %3 to 18% for corn steep liquor.

As a result, it is shown that industrial wastes are appropriate growth mediums for biosurfactant production from microorganisms.

Keywords: Biosurfactant, Industrial Waste, Ecology

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IDENTIFICATION OF THE EARLY SPRING FOREST FIRE IN THE HORNBEAM COPPICE STAND BASED ON SENTINEL S2A SPECTRAL INDICES

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Abstract:

The early-spring forest fires near settlements caused by human impacts appear in low productive coppice forests more frequently. Burnt areas are usually small, but burning have negative ecological effects, cause economical loos, slow natural regrowth and need reforestation measures.

The objective of this study was to identify and analyse the area of early-spring brush forest fire in hornbeam coppice forest compartment (37 ha size, 2.5 ha burnt) using terrestrial observations and Sentinel S2A satellite images. The study area was located near Pliva lake in central Bosnia. Terrestrial area observations were conducted and different types of land covers (burnt, regrowth coppice, closed coppice) were digitized as polygons. To analyse burnt areas, we used two Sentinel S2A images from early spring in year 2019 (before and after the fire). We calculated normalized vegetation difference (NDVI) and normalized burnt (NBR) indices, and the separability index (SI). Statistical differences were obtained for both indices. Differences of NDVI values were highly significant ($p<0.01$).The NDVI increase was obtained on regrowth and coppice while NDVI decrease on burnt area. The dNBR value was positive for burnt area (0.03) while those values were negative on regrowth (-0.21) and coppice part (-0.52) corresponding with burnt severity categories scale (Key&Benson, 1999). Separability of burnt area was low (SI=0.3) affected by low carbon content in coppice stand at the beginning of vegetation period. To conclude, we identified and characterised burnt areas in hornbeam coppice stand despite of their small sizes, low carbon contents, the begging of vegetation season using Sentinal S2A images. This insight provides additional spatial information about burnt areas relevant for forest management planning process. Further research is recommended using satellite images with higher spatial resolution and other 3D technologies considering negative forest fire effects related as to additional silvicultural treatments and protection measures so to overall ecological impacts.

Keywords: Coppice Stand, Forest Fire, Small Area, Early Spring, Sentinel S2A, Indices

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A STUDY ON INVESTIGATION OF ANTIMICROBIAL PROPERTIES OF ESSENTIALS HERBAL OIL-ADDED HEMICELLULOSE BASED-POLYMERIC GEL FILMS

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Abstract:

In this study, hemicellulose-based gel film production was performed using nine different vegetable essential oils (mint, rosemary, thyme, clove, nettle, lavender, pine turpentine, garlic, juniper) known to have natural antimicrobial effect. The antimicrobial activity of essential oils in gel films was determined using agar diffusion method. E. coli stock culture was used for antimicrobial analysis. In the analyzes carried out by the propagation method, 0.1 mL was taken from the adjusted cultures and cultured on the Nutrient Agar medium with the help of sterile swab of the culture. Mint, rosemary, thyme, lavender etc. Circular films containing essential oils were placed on top of the agar plate. It was allowed to incubate at 37 ° C for 24 hours. At the end of the incubation, photographs of the petri dishes were taken to determine the clear zone diameter around the films. Image analysis was performed with MATLAB R2017 version. Antimicrobial activity of gel films was determined. Experimental observations have shown that the antimicrobial effect of the gel films is based on the diffusion of the essential oil to the agar of the cultivated E. coli. Essential herbal oils added into the polymeric matrix have been found to be unable to act as the herbal oils. It was determined that herbal oils in polymeric gel film structure could not be diffused effectively on agar. It is thought that this may be due to the crosslinking density of the gel films and the hydrophobic properties of the herbal oils. As a result of the agar diffusion test, E. coli growth was determined on the control sample which was not contined essential oil. Polymeric films containing rosemary, oregano, clove and nettle essential oil were observed to have antimicrobial effect. ie it was determined that a zone where no reproduction occurs around the gel film disc. The most effective antimicrobial effect was demonstrated by gel films prepared using rosemary essential oil. It was determined that other essential herbal oils decreased reproduction activity even if they did not stop reproduction.

Keywords: Polymeric Film, Antimicrobial Properties, Essentials Herbal Oil, Agar Diffusion Method

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THE EFFECT OF BIOMASS TYPE ON ISOLATION EFFICIENCY OF MAJOR MACROMOLECULES

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Abstract:

In this study, the conversion potential of different types of waste biomass to products with high added value was investigated through a sustainable bio-refinery approach. And the effect of chemical structure of biomass on the isolation yields of major macromolecules (hemicellulose, cellulose and lignin) were tried to determine. For this purpose, the pine wood, the walnut shell, the sugar beet pulp, the tea pulp and apricot kernel had been evaluated as waste biomass resourch. In order to interpret the isolation experimental results more accurately firstly, the waste biomass samples were characterized with suitable instrumental and analytic analysis methods (proximate analysis, elementel analysis, chemical anlysis, FTIR analysis, TGA/DTA analysis etc.). The isolation of major components was carried out using alkali extraction method, which is a chemical pretreatment process. This study was carried out by treating waste biomass sources at 55 ℃ and 20 g/L NaOH solution for 6 hours.

As a result of the experiments carried out under these conditions, hemicellulose isolation yields (based on raw materials) for waste tea pulp, apricot kernel bark, sawdust, sugar beet pulp and walnut husk were obtained as 24.58%, 19.20%, 5.08%, 18.2% and 16.42%, respectively. Lignin isolation yields were (in the same order) 16.33%, 17.67%, 16.80%, 13.11% and 19.56% on the basis of raw materials. It was concluded that the chemical composition of the biomass was closely related to the isolation yield of the basic components. In particular, it has been found that lignin content significantly affects the extraction efficiency. Besides, it was experimentally observed that hemicellulose which was obtained from the apricot kernel was lighter in color than the others.

Keywords: Waste Biomass Resources, Alkali Pretreatment Process, Hemicellulose, Cellulose, Lignin, Isolation Yield.

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DETERMINATION OF PGRP PROPERTIES OF RHIZOSPHERIC PSEUDOMONAS STRAINS

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Abstract:

Plant growth-promoting rhizobacteria (PGPR) are belong to wide range of bacteria species that can enhance plant growth by several mechanisms like phosphate solubilization, siderophore production, pytohormone production etc. In this study, a total of 48 Pseudomonas strains were obtained from rhizosphere layer of agricultural soils. These strains were evaluated for their plant growth promoting traits, including siderophore production and phosphate solubilization. 8 Pseudomonas strains were selected by their performance on the performance of PVK (Pikovskaya) and CAS (Chrome Azurol S) Agar plate. Then, to evaluate the IAA activity, the selected Pseudomonas strains inoculated to LB broth which contains L- Tryptophane (0,5 g L-1) and incubated at 28 oC for 3 days. The quantitation of IAA production was determined by using Salkowski reagent. The optical density was taken at 530 nm with a spectrofotometer. The results of quantitative analysis were range from 8,48 to 36,88 µg/mL. Pseudomonas sp. 18 was found to be the highest efficient IAA producer.

Keywords: PGPR (Plant Growth Promoting Rhizobacteria), Pseuodomonas sp., IAA (Indole Asetic Acid), Siderophore, Phosphate Solubilization

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