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BUDAPEST

**3RD INTERNATIONAL CONFERENCE ON
ENVIRONMENTAL SCIENCE AND TECHNOLOGY**

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On behalf of the organizing committee, we are pleased to announce that the 3th International Conference on Environmental Science and Technology (ICOEST-2017) is held from October 19 to 23, 2017 in Budapest. ICOEST 2017 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 all areas 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 2017 is the oncoming event of the successful conference series focusing on Environmental Science and Technology. The scientific program focuses on current advances in research, 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

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CHEMICAL COMPOSITION, ANTIOXIDANT AND ANTIBACTERIAL ACTIVITIES OF GREEN ALGA ULVA LACTUCA POLYSACCHARIDES

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Abstract:

The objective of this study was to evaluate the chemical composition as well as the antioxidant and antibacterial activities of *Ulva lactuca* polysaccharides.

Ulva lactuca (green algae) was harvested on the rocks of Bousfer beach, northwest of Oran (Algeria). The polysaccharides extraction was carried out according to the method of Hwang et al. (2008) from the seaweed powder. The composition of carbohydrates, lipids, proteins, sulfate groups, and moisture of extracted polysaccharides was determined. The antioxidant power was evaluated by DPPH (2,2-phenyl-1-picrylhydrazyl) scavenging, reducing power test and inhibition of β -carotene bleaching. The antibacterial activity of *Ulva lactuca* polysaccharides was investigated by the diffusion method in agar, against nine bacterial strains (Gram +: *Staphylococcus aureus*, *Micrococcus luteus*, *Bacillus cereus*, *Enterococcus faecalis*, Gram-: *Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella enterica*, *Enterobacter* spp, *Salmonella Typhimurium*).

The average composition of the polysaccharides indicated 54.14% of total sugar content, 7.87% of proteins, 1.25% of lipids, 21.52% of ash and 11.76% of sulfate groups. The antioxidant activity evaluation of *Ulva lactuca* polysaccharides by the DPPH test revealed a dose-dependent antioxidant activity to reach 100% at a concentration of 4 mg / ml. The results also showed that the polysaccharides have the capacity to produce electrons for the reduction of Fe^{3+} ions to Fe^{2+} . In addition, *Ulva lactuca* polysaccharides were effective in inhibiting β -carotene bleaching. Indeed, the activity increased from 36% to 100% at a concentration of 1 mg / ml. Antibacterial activity test revealed that *Ulva lactuca* polysaccharides were effective against some bacterial strains tested (*Escherichia coli*, *Klebsiella pneumoniae*). Based on these results *Ulva lactuca* could be valorized by its polysaccharides content which are an interesting source of antioxidants, as well as effective inhibitors of pathogenic bacteria growth.

Keywords: Polysaccharides, *Ulva Lactuca*, Chemical Composition, Antioxidant Activity, Antibacterial Activity.

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EFFECT OF PRETREATMENT OPTIONS BEFORE REVERSE OSMOSIS FOR ORGANIZED INDUSTRIAL ZONE WASTEWATER REUSE

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Abstract:

Reuse of wastewater is significant because of decreasing water sources with the use of groundwater for domestic and industrial uses. Water reuse options should be evaluated in wastewater treatment plants located in Organized Industrial Zones (OIZs). Membrane technology is the best option for water reuse. In this study, a membrane bioreactor (MBR) and a ultrafiltration (UF) membrane was evaluated in a pilot scale treatment plant before a reverse osmosis (RO) membrane for a reuse option. Firstly, the wastewater from the primary sedimentation tank of the OIZ wastewater treatment plant (WWTP) was filtered using a hollow fiber membrane module in MBR. Secondly, the treated wastewater from the final settling tank of the WWTP is filtered using UF membrane module. The RO permeate water quality was examined for permeates of both the MBR and UF filtration. In both pre-treatment options, the conductivity removal rates, which is important for water reuse, is over 95%. However, the flux was similar for both treatment options.

Acknowledgement: This study was funded by TUBITAK (Project no: 114Y521) and Erciyes University Scientific Research Projects Unit (Project No: FYL-2017-7116).

Keywords: Water Reuse, Membrane Bioreactor, Ultrafiltration, Reverse Osmosis

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VALORIZATION OF FOOD WASTES THROUGH HYDROTHERMAL CARBONIZATION

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Abstract:

Biodegradable wastes such as municipal solid wastes consisting of fruit and vegetable wastes could be converted to various forms of energy using appropriate technologies. The advantages of utilizing food wastes as an energy resource not only lead to revenue gains by recovering the energy and reducing waste disposal costs but also reducing the impact on the environment. Among thermochemical processes for conversion of food wastes to energy, hydrothermal carbonization (HTC) is a promising route without a need for drying process. In this study, HTC of food wastes, consisting of fruits and vegetables, was studied to obtain coal like solid product (hydrochar). The effect of process conditions (temperature and duration) on the yield and fuel properties of hydrochar was investigated. The temperature of 200 °C and the reaction time of 60 min were determined as optimum conditions in terms of yields of mass and energy. According to Van Krevelen Diagram, hydrochar exhibited low H/C–O/C ratios than food waste while it was in the similar range of lignite area. The combustion behavior of hydrochar obtained under optimum conditions and lignite was comparatively determined by using thermogravimetric analysis. It was found that hydrochar had lower ignition and burn out temperature than lignite. The combustion reactivity of hydrochar was much higher than that of lignite. As conclusion, the results obtained in this study showed that wet carbonization of wastes appears to be promising process to provide benefits to energy sector as well as to protect environment.

The authors wish to thank TUBITAK-MAG-2015 M 314 for the financial support of this study.

Keywords: Hydrothermal Carbonization, Hydrochar, Food Wastes

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DETERMINATION OF COMBUSTION PROPERTIES OF THE FIRETEX IMPREGNATED SCOTCH PINE

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Abstract:

In this study, the effects of impregnation material and impregnation methods on combustion properties of Scotch pine (*Pinussylvestris* L.) have been investigated. The firetex was used for impregnation material. The four different methods were used for impregnation process. Combustion test was performed according to the procedure of ASTM-E 69 standards. The mass reduction, release of gasses (CO, NO, O₂), and temperature differences of samples were determined for each 30 seconds during combustion. According to the test results, Firetex as an impregnation material was found to be the most effective after long-term dipping process in Scotch pine material.

Keywords: Scotch Pine, Firetex, Dipping Method, Fire Retardant, Impregnation

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IMPROVEMENT OF FIRE-RESISTANCE OF SCOTS PINE WOOD USED ON HISTORICAL WOODEN CONSTRUCTIONS

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Abstract:

In this study, the effects of fire retardant finishing materials on combustion properties of 120-years in service historical wooden houses have been investigated. Combustion test was performed according to the procedure of ASTM-E 69 standards. The mass reduction, release of gasses (CO, NO, O₂), and temperature differences of samples were determined for each 30 second during combustion. According to the test results, fire retardant finishing material was found effective to preserve historical wooden structures against fire. Since fire retardant finishing material diminishes combustion, it is possible to advise using fire retardant finishing for varnishing to historical wooden structures.

Keywords: Scotch Pine, Combustion, Historical Wooden Structures, Fire Retardant

* ...

EVALUATION OF THE USE OF SLUDGE PRODUCED BY COAGULATION-FLOCCULATION PROCESS AS A NEW COAGULANT

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Abstract:

Coagulation-flocculation is a physicochemical process that commonly used in the treatment of water and wastewater to remove colloidal suspended solids (MLSS) causing to turbidity and color in water. Several coagulants, especially metal salts containing aluminum and ferric ions are used in this process, and these metal ions precipitate in the form of metal hydroxides which help solid materials to collapse together. The main disadvantage of this treatment process is the production of high volume chemical sludge. Disposal of this sludge that contain high amount of heavy metal ions is a major problem must be solved for the water treatment plants' operators.

The aim of the present study is to re-evaluate the sludge formed as a result of the coagulation process. With this aim, complex industrial wastewater samples that had high color and solid materials belonging especially to textile industry were collected from the discharge canals in Kahramanmaras, Turkey. Coagulation process was applied to wastewater in a jar test, and alum was used as coagulant at different concentration to determine optimum experimental conditions. MLSS and color (Pt-Co; DFZ-436; DFZ-525; DFZ-620) removal efficiencies were found as 99.4%, 77.8%, 66.3%, 63.2% and 71.8% in a 150 mL/L alum dose, respectively. Sludge produced with coagulation-flocculation process was used as a new coagulant again. The optimum alum dose of 150 ml/L was chosen as optimal dose of coagulant, and sludge was treated with sulphuric acid to form a new coagulant called as sludge coagulant reagent (SCR). The treatment performance of SCR was evaluated for its efficiency in the removing of color and the colloidal suspensions from wastewater. According to study results, it was found that SCR produced after a coagulation process could be used as a new coagulant effectively to remove color and turbidity from wastewater.

Keywords: Coagulation, Recycle, Sludge, Treatment, Wastewater

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REVIEW ON USABILITY OF EXTENDED ACTIVATED SLUDGE METHODS FOR REMOVING SOME OF PHARMACEUTICAL AND PERSONAL CARE PRODUCTS PPCPS

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Abstract:

Pharmaceuticals and personal care products (PPCPs) are the chemicals that are manufactured and used worldwide on a large scale. PPCPs are continually being introduced to the wastewater treatment plants (WWTPs) as a result of disposals or human wastes. The increased usage of these chemicals can explain their increasing concentrations in wastewater treatment plants, ground water, surface water and sediments. The untreated wastewater discharges from the WWTPs constitutes the main source of pollution for these drug residues to access to the environment. Nowadays, the occurrence and fate of trace level contamination of these chemicals in the aquatic environment has been recognized as one of the emerging issues in environmental chemistry.

Biological wastewater treatment processes have several advantages over physico-chemical options, and Activated sludge process is still broadly utilized for wastewater treatment because of its effluents that meet required quality standards for release and reusing purposes. PPCPs have also the potential to affect the efficiency of the biological wastewater treatment plants. These metabolites may react with other products in the WWTP with producing other end products, which may be more toxic than the parent compound. The aim of this review is to discover and explanation of the latest studies that has been performed to remove these contaminants from wastewater.

Keywords: Activated Sludge, Pharmaceuticals, Personal Care Products, Treatment, Wastewater

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INVESTIGATION OF THE EFFECT OF THE COVER CROPS ON WEEDS, SILAGE PRODUCTIVITY AND QUALITY IN THE SILAGE CORN PRODUCTION

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Abstract:

Corn is one of the most important rough feed in animal feeding, either green or silage. According to 2016 data in Central Anatolia, the area of silage maize is 349.140 (da), production 1.855.918 tons. There are a lot of biotic and abiotic factors affecting yield in the silage corn fields. Weeds are one of the most important yield limiting factors in the silage corn fields. Alternative weed control methods are needed because of the various side effects of herbicides. Using cover crops for weed control in silage corn fields is one of the broadly applied alternative methods. This study was conducted to determine weed suppressiveness of cover crops in silage corn fields in the Kayseri in Turkey. The cultivar of "Prestij" was used for the experiments. *Vicia villosa*, *Secale cereale*, *Vicia pannonica*, *Brassica rapa rapa*, *Lolium perenne*, *Brassica oleraceae* var. *acephala* were used as cover crops in the experiment. Control plots such as weedy control and weedless control were added as reference plots. The experiments were conducted in a split plots experimental design with four replications, and all cover crops were grown on the same plot during the experimental periods. As a result of the studies, the highest cover crop dry biomass was obtained from pilots of 147.79 g / 0.25 m² hairy vetch (*V. villosa*). While the highest weed dry biomass was obtained from weedy control plots the lowest weed dry biomass were obtained hairy vetch (*V. villosa*) plots. The hairy vetch also affected the yield and quality of maize silage. The highest ratio of crude protein, raw fat content, dry matter content and green grass yield were obtained from the hairy vetch plots.

Acknowledgements: The authors thank the Research Fund of the Erciyes University for supporting this project (Number FYL-2015-6063) and participation at the ICOEST

Keywords: Weeds, Cover Crop, Corn Silage, Silage Quality

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STRUCTURAL AND FUNCTIONAL CHARACTERIZATION OF MAD HONEY AND GRAYANOTOXIN INDUCED ALTERATIONS ON MOUSE MYOCARDIUM

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Abstract:

Mad honey (MH) made by bees from rhododendron plants, which is extensively grown in the Black Sea region of Turkey, contains grayanotoxin (GTX) and induces some toxic effects when consumed in large amounts. However, it is still widely used for the treatment of some medical disorders such as high blood pressure or gastrointestinal diseases, etc. Even though it has been known that MH has some negative effects on heart, the structural and functional effects of it on myocardium are unknown yet at molecular level. For this reason, in this study, we aimed to investigate the effects of different concentrations of MH and GTX-III on mouse myocardium. Male mice were divided into five groups, one being the control group and the others being the MH (25, 50 and 75 mg/kg) and GTX-III (0.01 mg/kg) groups. Myocardium tissues were collected 24 h later and investigated using Attenuated Total Reflection-Fourier Transform Infrared (ATR-FTIR) spectroscopy. Significant differences were observed between 50, 75 mg/kg MH and GTX-III treated and control groups. The total lipid content increased and the total protein content decreased significantly in 50 mg/kg MH-treated groups. Oppositely, in 75 mg/kg MH-treated and GTX-III-treated group lipid content decreased and protein content increased. In addition, the treatment of 50, 75 mg/kg MH and GTX-III changed the secondary structure of proteins, decreased lipid order and increased membrane fluidity of myocardium. These results revealed that MH and GTX-III causes significant alterations in the structure and function of myocardium tissue and these alterations depend on the dose consumed.

This work was supported by Duzce University, BAP (2016.05.01.503)

Keywords: Mad Honey, Grayanotoxin, ATR-FTIR Spectroscopy, Myocardium

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MICROBIAL PESTICIDES IN IPM

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Abstract:

Agricultural production is under the pressure of countless pests like bacteria, fungi, weeds and insects. Over the past 50 years the most common method for pest control has been the intensive use of agrochemical pesticides. The increased public concerns about the potential adverse environmental effects associated with the use of agrochemicals encouraged researches for the technologies and products based on microorganisms to control the pests. Microbial pesticides are whole microorganisms, including bacteria, fungi, viruses, and others, that act as pesticides. Global interest and the demand for nature-based microbial pesticides has been increasing steadily worldwide. Microbial pesticides today hold less than 5% of the total crop protection market but this section of the industry is growing rapidly. With the emergence of new technologies in agriculture, it is expected to continue to gain crop protection market share and reach at least 7% of the total crop protection market by 2023. As the prevalence of chemical or synthetic pesticides in crop protection would continue, human, animal and environmental health concerns would play a key role in driving the usage of microbial biopesticides.

Keywords: Microbial Biopesticides, Crop Protection, Biological Pest Management

* ...

RENEWABLE ENERGY RESOURCES IN EUROPEAN UNION AND TURKEY

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Abstract:

Increasing energy demand and rising economies have led to use alternative energy sources. Increasing energy demand, one of the biggest problems of emerging economies, is fueling environmental problems. CO2 emissions from the energy sector are increasing day by day. Even if countries try to take measures on this issue, increasing energy demand is increasing every day. This article includes the comparison of the energy obtained from the renewable energy sources of the European Union and Turkey and the econometric projections for the future. In addition, environmental emissions from the agricultural sector have been examined in this study and estimates of the future of agricultural emissions have been made.

Keywords: Renewable Energy, Forecasts, Emissions

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AGROECOLOGICAL ECONOMY IN THE WORLD

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Abstract:

This article aims to summarize the concept of agricultural ecological economy in the world. The ecological economy is becoming popular all over the world. Economists are working on the ecological economy, which is new to the conventional economy. Increasing CO2 emissions and constantly rising demand have led to the need to think about emissions and the concept of economy together. When the previous studies were examined, it was determined that the problem was noticed but there were problems in practice. Agricultural ecological economy is a subdivision of this concept and works by agricultural economists. The effects of agriculture-related emissions, fertilizers and environmental impacts, used insecticides, insecticides residues, are associated with increased agricultural income. This article providing a solution recommendation can be called a description and a case assessment.

Keywords: Agroecological Economy, Emissions, Agricultural Economics

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MAPPING THE SPATIAL DISTRIBUTION OF POULTRY FARMS TO SUPPORT ENVIRONMENTAL DECISION MAKING: A CASE STUDY OF IZMIR CITY, TURKEY

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Abstract:

Poultry industry has become one of the fastest growing sector in agriculture. Despite of its advantages such as improving meat availability, economic development, trends in confined poultry production towards intensification and concentration have given rise to a number of environmental concerns. Thus there is a growing need for spatially informed decision support system to make decision makers aware of risks and potentials. Geographic information system (GIS) is an important tools for the capture, storage, retrieval, analysis, and display of spatial data and has been used in many fields related with the spatial information management to making intelligent decisions.

The aim of this paper was to map spatial distribution of poultry farms and to analysis their potential threats on public health and environment quality. Spatial distribution of chicken farms is related closely to the environmental factors of habitats and an important for monitoring impacts and the prevention habitats quality. Indicators used for evaluation were selected by searching related national and international legislation and previous researchs.

Acknowledgments

The authors gratefully acknowledge the scientific research grant of the Ege University Scientific Research Project Department Directorate (Project No:16-CSUAM-002).

Keywords: Poultry Farms, Geographical Information System (GIS), Izmir

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THE TREATMENT OF HIGH-SALINE WASTEWATERS FROM BIOWASTE DIGESTION USING CST- REACTORS

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Abstract:

In Western Europe the urban biowaste is be treated using dry fermentation technologies including a percolate recirculation and chamber digesters. This percolate is the major dynamic element of the anaerobic treatment process as well as the reaction space for biogas production. By continuous trickling and recirculating of this process water, salts and fine particles were enriched and causes biological inhibition and procedurally accidents. The uncontrolled precipitation of struvite (NH_4MgPO_4) and chalk (CaCO_3) can declared as one of these potential damages. Main treatment targets and scientific divers of this study are: (1) the continuous reduction of fine solids in percolate using anaerobic hydrolysis, which causes a better viscosity for the pumping and piping system in the recirculation, (2) the miming of unused biogas potential during the anaerobic treatment, which causes a decrease of specific operating costs comparing to the high number of procedurally accidents and (3) the increase of total ionisation, which causes a higher potential for a controlled and external precipitation of struvite and chalk. For the scientific investigation, a demonstration pilot plant with two CSTR's (each with 10000l reactor volume) and three connected precipitation chambers (each with 2000l reactor volume) were constructed and are already under operation. The major results can be summarized as followed; (1) the external, anaerobic treatment of percolate using CST- reactors causes a reduction of solid compounds from average dry matter 3,4% DM to 2,7% DM. (2) Furthermore, it was able to mine the unused biogas potential from this percolate with an average of 8NL Biogas/L percolate feed (CH_4 - content: 58Vol.-%). (3) Additionally, by introducing of an anaerobic hydrolysis of percolate compounds it was able to increase the total ionisation from 36mS/cm up to 41mS/cm in average, which causes directly a higher efficiency in the downstream- connected precipitation reactors.

Keywords: High-Saline Wastewater, Anaerobic Digestion, Biowaste Processing, Cstr

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THE TREATMENT OF DECENTRALIZED BLACKWATER DIGESTATES USING PISTIA STRATIOTES FOR PHYTOREMEDIATION OF NITROGEN AND PHOSPHOROUS

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Abstract:

In the case of decentralized, innovative sanitation systems blackwater, which is defined as wastewater from toilets including faeces, urine and flushing water, is one of the separated wastewater streams. Blackwater includes a major part of load of nitrogen (1740mgTN/l) and phosphorous (85mgTP/l) depending to the daily-excreted load by human (6l blackwater/human*d using under- pressure toilets). The anaerobic digestion of this blackwater is nearby because of the high amount of organic compounds (COD 8000mg/l) and good degradation performances for human pharmaceuticals (Wätzel et al., 2015). During the anaerobic digestion, the organic load can be reduced with a degradation rate of 70% (COD in blackwater digestate 2400mg/l COD). Nitrogen and phosphorus are quite at the same concentration level. Therefore, a specified application of these high concentrated amounts of nitrogen and phosphorus as a fertilizer substitute should investigated and will be the major scientific driver for this experimental study, too. Pistia stratiotes, as a limnic macrophyte, is good noted for a high tolerance for salts, nitrogen and phosphorous as well as for its very fast growing capacities and enormous biomass potential. Over a period of 1 year, a half- technical cultivation unit for P. stratiotes was constructed including 16 cultivation basins, artificial light sources, and temperature controlling as well as daily analysing strategies. Blackwater digestate was used as test- fertilizer in comparing to defined mineral fertilizer as biological reference system. As major results it can be summarized that blackwater digestate is well- performing as fertilizer substitute and causes biomass- production rates up to 138g fresh weight/m²*d. By thinking in closed loops, the biogas potential of P. stratiotes was investigated, too. With 640NLBiogas/g oDM feed, P. stratiotes can be declared as very good degradable under anaerobic conditions. The application potentials of the ingredients of P. stratiotes for chemical applications are already under investigation.

Keywords: Pistia Stratiotes, Blackwater Treatment, Innovative Wastewater Management, Digestate Processing

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EFFECTS OF INCREASING DOSES OF ZN AND CD ON THE GROWTH AND N, P, K, CONTENTS OF TOMATO SEEDLINGS GROWN ON MYCORRHIZAL AND NONMYCORRHIZAL CONDITIONS

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Abstract:

This study aimed to determine the effects of increasing doses of Zn and Cd on the growth and N, P, K contents of tomato seedlings grown on mycorrhizal and nonmycorrhizal conditions. Soil was used as a growing medium in the study. Cd was applied with three doses (0, 10 and 20 mg) as (CH₃COO)₂Cd·2H₂O and Zn was applied with three doses (0, 100 and 200 mg) as ZnSO₄·7H₂O to autoclaved soil.

At the end of the study, amount of soil pollution, shoot fresh and dry weights, root fresh and dry weights, shoot height, stem-root-neck diameter, leaf number and N, P, and K contents of tomato seedlings were determined.

Seedling traits significantly ($P < 0.01$) increased with mycorrhizal application. Similarly, shoot fresh and dry weights significantly ($P < 0.01$) increased with Cd application. Moreover, root fresh weight, leaf number and stem-root-neck diameter significantly ($P < 0.05$) increased with increasing Cd applications. Increasing doses of Zn decreased the seedling growth traits. Zn doses decreased the root fresh weight, root dry weight and shoot dry weight at $P < 0.05$, $P < 0.01$, and $P < 0.01$ levels, respectively. Similarly increasing doses of Zn decreased the other seedling growth traits, though insignificantly. The N content of plant significantly ($P < 0.01$ and $P < 0.05$) decreased with mycorrhizal and Cd applications, respectively. There were insignificant increases in plant N content with increasing Zn doses. The P content of plant significantly ($P < 0.01$) decreased in the seedlings applied with both Cd and mycorrhizal. Cd and Zn applications had no significant effects on P content of the seedlings, Cd applied mycorrhizal applications and Zn applied mycorrhizal application significantly $P < 0.05$ and $P < 0.01$ levels, respectively increased the K contents of seedlings. Increasing Cd doses insignificantly decreased the K contents of the seedlings and increasing Zn doses insignificantly. Increased the K contents of the seedlings. Additionally soil pollution was not observed.

Keywords: Soil Pollution, Mycorrhiza, Seedling Growth, Tomato

**This study is funded by Van Yuzuncu Yil University Scientific Research Project*

INFLUENCE OF THE ROAD TRAFFIC OVER THE METAL CONTAMINATION OF THE URBAN SOIL AND THE DANDELION

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Abstract:

We investigated the contamination with metals of the urban habitat in a major Romanian city caused by the road traffic. For this reason we assessed the elemental composition of the urban soil and of the different anatomic parts of the common dandelion (*Taraxacum officinale* Web.). This plant is considered to be a good indicator because it is widespread and it has high tolerance to the toxic elements. Relying on the official road traffic data we classified the streets into four sampling strata. We also chose a reference area outside the city. In every sampling stratum we applied the random sampling method. Altogether 120 sites were sampled; from each site at least 10 plants and 500 g topsoil was collected in the autumn of 2015. The samples were digested in acid-oxidative solutions. The quantitative analyses were performed with an ICP-MS spectrometer. The data were statistically processed (t-test, one-way ANOVA). Our major findings were the followings: (i) the road traffic had a positive influence over the concentration of Cd, Cu, Mn and Mo in both aerial and underground parts of the dandelion; (ii) the road traffic had also positive effect over the concentrations of Cu, Cd, Mo and the pH value of the urban soil and negative influence over the B and Mn content of the soil; (iii) comparing the urban soils with those coming from the reference area, we found that the concentrations of Cr, Cu, Fe, Mo, Ni and Pb were significantly higher in the urban area. However the elevated concentrations of some toxic elements in the urban soil may not have harming influence over the vegetation because the relatively high pH of the soil causes the immobilization of these elements so that they are not accessible to the plants.

Keywords: Soil, Contamination, Urban Area, Metals, Dandelion, ICP-MS

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ENVIRONMENTALISM: A NEW SECULAR RELIGION?

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Abstract:

Nowadays our world is facing two important problems; one of them is peace, another is environmental problems. The problem of the environment is one of today's most serious problems. In other words, we have faced with the widespread destruction of the environment. This problem threatens not only ourselves, but the whole world, and future generations and other organisms.

Since the 1960s the development of ecological thinking has been raised. In the 1980's environmentalism has become popular, because the most environmental documents, web sites are available. And also environmental sociology has been raised. But this development has indeed gone hand in hand with the growing popularity of Eastern religions. Eastern ideas have been used to challenge Western ideas and values, and to spread throughout world. So environmentalism, as an alternative paradigm, is not much independent on religion.

In this context, this paper will try to study some questions. For examples, "What is nature, human and god?", "What is the relationship between god and nature?", "Is environmentalism a new secular religion?" "Can environmentalism take the place of religion?", "Is religion compatible with environmentalism, and to what extent?". By the way of entry into the debate about modernity and secularity, I will focus on a sociological answer to these questions about the nature.

Keywords: Environmentalism, Religion, Secularization

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ECOLOGICAL IMPACTS OF ALUMINUM DISCHARGE IN THE DRAINAGE CANALS IN AL-MENOUFIYA PROVINCE, EGYPT

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Abstract:

The problem of 16231 km length of drainage canals in Egypt is a matter of concern. The problem includes the presence of higher concentrations of different metals in both water and fish organs. This work comprised both field and laboratory studies to investigate the impacts of Al discharge on water quality and fishes in the drainage canals of the Nile Delta. Samples of water and *Oreochromis niloticus* fish were collected from Shanawan and Sabal drainage canals for a complete year. Al concentrations were measured in water and in the muscles and liver of fish, using flame atomic absorption spectrophotometer. Detection of electrophoretic pattern of RNA and DNA extraction and apoptosis for in vivo and in vitro studies were used to assess the impact of Al on fish liver. The results revealed that, Al concentrations in water were insignificantly higher ($p>0.05$) in Sabal drainage canal compared to Shanawan drainage canal. The muscles and liver of *Oreochromis niloticus* from both drainage canals had significant ($p<0.05$) higher levels of Al which exceeded the international permissible limit. At the concentration of 10 $\mu\text{g}/\text{ml}$ $\text{Al}_2(\text{SO}_4)_3$, the intensity of RNA in liver tissue of fish from both drainage canals was noticeably increased than control, while the concentrations of 50 and 100 $\mu\text{g}/\text{ml}$ induced discernible decrease of the intensity of RNA. On the other hand, the concentration of 10 $\mu\text{g}/\text{ml}$ $\text{Al}_2(\text{SO}_4)_3$ induced DNA fragmentation of the apoptotic pattern in fish liver, while the concentrations of 50 and 100 $\mu\text{g}/\text{ml}$ induced DNA fragmentation which appeared as smear shape (necrotic pattern). The induction of DNA fragmentation was dose dependent.

Keywords: Drainage Canals, Egypt, Aluminum, *Oreochromis Niloticus*, DNA, Rna

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BIODIESEL PRODUCTION FROM MICROALGAE

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Abstract:

Depletion of fossil fuel reserves, increasing energy demand and serious environmental concerns makes renewable energy such as biofuels more importance. In recent years, biodiesel, the methyl or ethyl esters of fatty acids, gained a significant position as an environmentally friendly substitute of conventional diesel fuel. Generally, biodiesel is produced through transesterification method between vegetable oil and alcohol in the presence of catalyst efficiently. However, the major obstacle to large-scale commercialization of the biodiesel production is its high cost related to high feedstock prices especially in the countries that import most of the consumed oil such as Turkey. On the other hand, microalgae have gained attention as an alternative biodiesel feedstock because of their fast growing nature and high adaptability to the existing environment. The aim of this study is to investigate “microalgae” as a source of alternative oil for biodiesel production, and the biodiesel production processes using microalgal biotechnology under transesterification reaction.

Keywords: Biofuels, Biodiesel, Feedstock, Microalgae, Transesterification

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SOYBEAN METHYL ESTER MANUFACTURING UNDER MICROWAVE IRRADIATION

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Abstract:

Biodiesel also called as Fatty Acid Methyl Ester (FAME) is the most used biofuel as a surrogate of petroleum diesel. The commonly used raw materials for biodiesel production are vegetable oils. Depending on environmental and climatic conditions, the preferred raw materials of biodiesel vary from country to country such as soybean oil for North America, canola and sunflower oil for Europe, palm for Southeast Asia etc. In this study, Soybean oil was used for synthesis FAME using KOH (1 wt. %) as base catalyst and methanol (6:1 molar ratio) as alcohol. In contradistinction to conventional production methods, the transesterification reaction was performed under microwave irradiation in our designed biodiesel reactor. By means of microwave, the reaction time was completed at 5 min with obtaining Soybean FAME that has >96.5% (wt./wt.) ester content and <5 mm²/s kinematic viscosity at 40°C.

Keywords: Methyl Ester, Biodiesel, Soybean Oil, Microwave.

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EFFECTS OF BINARY MIXED EMULSIFIERS ON FUEL PROPERTIES AND PHASE BOUNDARIES OF MICROEMULSION-BASED BIOFUELS

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Abstract:

The use of biofuels which are based on renewable resources has several advantages. Biofuels are an ideal alternative to diminish fossil resources. Vegetable oils have been considered alternative fuel sources according to they produced less pollutants and are renewable nature. However, there are a usage limitation due to their high viscosity, vegetable oil-based biofuels need modification prior to use. Microemulsion-based biofuels have been developed to reduce the viscosity of vegetable oils. This work aimed to investigate effects of binary mixed emulsifiers on phase boundaries and fuel properties of microemulsion-based biofuels. Biofuels were prepared by mixing corn oil and ethanol using binary mixed nonionic surfactants (Tween 80 and Span 80) as emulsifiers and varying co-surfactants (surfactant:co-surfactant = 1:5 molar basis) of 1-butanol and 1-octanol at volume ratios regarding ternary phase diagram to study microemulsion phase boundary and blending stability of biofuels at 40 °C. Fuel properties of microemulsion-based biofuels were investigated through kinematic viscosity and higher heating value. The experimental results revealed that individual use of Span 80 was more effective than of Tween 80 in both 1-butanol and 1-octanol as larger regions of microemulsion phase were observed. In an aspect of co-emulsifier ability, 1-octanol revealed better result than 1-butanol due to its less polarity. Binary mixed surfactants resulted synergistic effects on both phase boundaries and fuel properties. As increasing molar ratios of Span 80 to Tween 80 with 1-butanol, the microemulsion region expanded as a function of Span 80 concentration. While the slight effects on microemulsion phase boundaries were observed when 1-octanol was used. This can be explained that 1-octanol itself was excellent to co-emulsify corn oil and ethanol with those surfactants. The biofuels containing high percentage of ethanol resulted in lower kinematic viscosity while higher heating value was dependent on constituents of 1-octanol and Tween 80.

Keywords: Biofuel, Microemulsion, Surfactant

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LABORATORY ASSESSMENT OF UNIQUE PYRIDABEN PESTICIDE ON THE FOURTH INSTAR LARVAE OF CULEX PIPPIENS L. (DIPTERA: CULICIDAE) MOSQUITO

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Abstract:

Culex pipiens L. is considered the impact vector of some diseases such as West Nile Virus (WNV) and Usutu virus all over the world for the public health. However, pesticides are essential tools in controlling *Culex pipiens* to reduce the vector populations and minimize the transmission of the human pathogens. Although there are few pesticides specified in controlling the vector, more new pesticides must be developed for the vector control. Pyridaben is a novel pesticide that has unique mode of action. It is safe to a range of beneficial insects with the respect to other environmental components. Herein, we evaluated the lethal toxicity of pyridaben on the fourth instar larvae of *Culex pipiens* after 24, 48, 72-h exposure under laboratory conditions. Pyridaben was strongly toxic and the LC₅₀ values were 21.59, 20.23, and 19.16 µg/ml after 24, 48, 72-h exposure, respectively. Further field experiment should be done to illustrate the toxicity under field conditions. Plus, biochemical and molecular biological investigation must be conducted to demonstrate possible mechanisms contributed with certain enzymes which give pyridaben pesticide a promising tool in the global control of *Culex pipiens*.

Keywords: *Culex Pipiens*; Pyridaben; Public Health; Mosquito Control

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SPIDER (ARACHNIDA: ARANEAE) DIVERSITY IN THE VLĂȘINESCU PEAT BOG (MARAMUREȘ, ROMANIA), WITH SOME NEW DATA FOR THE CARPATHIAN ARACHNOFAUNA

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Abstract:

Peat bogs are highly endangered ecosystems in Europe, with unique, specialized flora and fauna, therefore are listed in Annex I of the European Habitats Directive as a priority habitat type, and protected under the Natura 2000 Network. The Vlășinescu peat bog, part of the Igniș ROSCI0092, lies in the Gutâi-Igniș Mts., at an altitude of 900 m, at 30 km from Baia Mare. Epigeic spider communities of this peat bog were studied in the April-November period of 2016. Samples were collected monthly, using a 'D-vac' suction sampler, from a 10x1 square meter area. Spiders caught were placed in 70% alcohol-water solution and adult specimens were identified to species level in the laboratory. During the sampling period, the total number of 2546 spiders (154 male, 402 female and 1990 juvenile) were collected, and 68 species were identified, belonging to 16 families. Some spider species were new for the Romanian and Carpathian arachnofauna. This investigation revealed a rich and variable spider fauna, with a considerable number of bog specialist spider species, to whom these bogs are ultimate refuge habitat islands. This study was supported by the Institute of Research Programmes of the Sapientia Hungarian University of Transylvania (grant reg. nr. 12/24/28.04.2015).

Keywords: Araneae, Peat Bog, Diversity, Species Richness, Conservation

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WASTEWATER TREATMENT BY FLOATING MACROPHYTE (SALVINIA NATANS) UNDER ALGERIAN SEMI ARID CLIMATE

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Abstract:

Macrophyte pond has developed strongly in the field of wastewater treatment for irrigation in rural areas and small communities. Their association allows, in some cases, to increase the hydraulic capacity while maintaining the highest level of quality.

The present work is devoted to the treatment of domestic wastewater under climatic conditions of Algeria (semi-arid) through a system using two tanks planted with *Salvinia natans*.

The performance study and treatment efficiency of the system overall shows that the latter provides a significant removal of nitrogen pollution: total Kjeldahl nitrogen NTK (85.2%), Ammonium NH_4^+-N (79%), Nitrite NO_2--N (40%) also, a major meaningful reduction of biochemical oxygen demand BOD5 was observed at the output of the system (96.9 %). As BOD5, the chemical oxygen demand (COD) removal was higher than 95 % at the exit of the two tanks. A moderately low yield of phosphate-phosphorus ($\text{PO}_4\text{-P}$) was achieved with values not exceeding 37 %. In general, the quality of treated effluent meets the Algerian standard of discharge and which allows us to select a suitable species in constructed wetland treatment systems under semi-arid climate.

Keywords: Nutrient Removal, *Salvinia Natans*, Semi-Arid Climate, Wastewater Treatment

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COMPARISON OF ECOLOGICAL RISK PERCEPTION AND ENVIRONMENTAL AWARENESS

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Abstract:

The aim of this study is to investigate the Households residing in Adana sensitivities of environmental awareness (EA) and environmental risk perceptions (ERP). A survey on ecological risk perception and Environmental Awareness was implemented. Total 502 households on a randomly selected, the survey evaluated the factors affecting on ERP and EA. In this study was used the "Environmental Risk Scale" developed by Slimak and Dietz in 2006. This scale was chosen because it covers the environmental problems that are effective in our country and in the world. In the scale, 4 groups are divided into environmental risks, Ecological Risk, Biological Risk, Global Risk and Chemical Risk. In the survey, 16 questions were asked to measure EA. The answers were assessed with a 5-linkert significance scale. The study analyzed the correlation between the demographic factor, EA and ERP. Results show an increased waste generation associated with the socioeconomic level. Data from the survey were compared using single factor analysis of variance (ANOVA). The p critical values were calculated using an alpha value equal to 0.05 and time steps as the replicate. This analyze and descriptive statistics such as means and ranges was computed by the use of the Statistical Package for Social Science (SPSS) computer program.

Results show the average score of the questions about EA is 31.3 ± 4.8 (min. 8-max. 40). According to the results, the relationship between EA and the demographic factor is significant ($p < 0.05$). But, Total ERP is shown significant difference only by education and income. There is a significant difference between education and ERP. This is an expected situation. Because the education of the person increases in the sense of residual risk.

Keywords: Survey, Ecological Risk Perception (Erp), Environmental Awareness (Ea), Adana, Households

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ESTIMATING WILLINGNESS TO PAY FOR IMPROVED DOMESTIC WATER SERVICES IN TERENGGANU, MALAYSIA: A COMPARISON BETWEEN CONTINGENT VALUATION AND CHOICE MODELLING APPROACHES

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Abstract:

Many environmental resources are characterized as public goods, such as water quality, biodiversity, and a stable climate. It is reasonable to question whether environmental resources are public goods in a fully pure sense. With low water quality, for example, those enjoying it may cause some degree of rivalry, when good water quality are not accessible to everyone. Unsustainable and excessive water consumption harms the environment by changing the water table and depleting ground water supplies. The objective of this study is to assess the willingness to pay of consumers in Terengganu for improvements in domestic water services. Excessive water consumption, frequent interruptions, urbanization, climate change, rapid social and economic growths are putting higher demands for quality of services and the water provider is unable to cope with the growing number of populations. Water price was last reviewed about 20 years ago and demonstrated among the lowest in Malaysia. This study has employed Contingent Valuation (CVM) and Choice Modelling (CM) methods to investigate water demand among the consumers, focusing on improvement in water services. This study found that consumers are ready and willing to pay for new proposed water prices as long as they are guaranteed with high standards in services. They are willing to pay about RM0.58 applied on the first 30m³ which is 11.53 percent higher than the current water price. Moreover, the findings have several implications for the water companies, by reducing the frequency of water interruption becomes the main concern of the consumers for a positive change in their water services. The estimated water prices can be suggested for implementation in the water industry which will support numerous upgrading projects for sustainable water supply for future generation. Sustainable water service is also helping the environmental, economic, and social sustainability of the communities with these utilities served.

Keywords: Economic Valuation, Sustainable Water Management, Willingness To Pay, Water Services

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IMPACT OF IKHUENIRO DUMPSITE LEACHATE ON THE KIDNEY OF WISTAR RATS

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Abstract:

In other to access the impact of Ikhueniro dumpsite leachate on wistar rats, a total of A total of 10 rats were acclimatized for two weeks and randomly distributed into two groups consisting of the control and leachate administered group. The rats were maintained in laboratory conditions; and had access to drinking water and standard rodent chow ad libitum. Each animal in the leachate group was gavaged 2 ml of the leachate for 30 consecutive days (once every 48 hour). At the end of exposure period, survivors were fasted overnight and sacrificed under light Anesthesia; then blood samples and kidney tissue were collected. The experiment continued with the remaining rats in the leachate group of rats where leachate administration was discontinued. After another 30 consecutive days, survivors were again fasted overnight and sacrificed under light Anesthesia; after which blood and kidney tissue samples were collected. Biochemical analysis showed that leachate administration in wistar rats caused an increase in calcium 0.13%, magnesium 34.89%, with a decrease in sodium 0.82%, chloride 1.90% and uric acid 1.88%. Histopathological investigations indicated that the leachate provoked alterations and deleterious changes in the tissues; which include mild to severe ulceration of the vascular tissue, interstitial hemorrhage and necrosis. When leachate administration was stopped, rats recovered from tissue damages to some extent. In conclusion, the findings of the present study have shown the potentials of Ikhueniro dumpsite leachate to induce blood and tissue dysfunction probably via direct and/or indirect chemical disruption of the blood.

Keywords: Dumpsite, Leachate, Toxicology, Kidney

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THE IMPACT OF THE "BAIKAL FACTOR" ON THE SOCIO-ECONOMIC DEVELOPMENT OF THE REGION

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Abstract:

A significant part of the Republic of Buryatia is attributed to the Baikal natural territory (BNT), which is about 53% of its area. The term "BNT" refers to a territory that includes the territory of Lake Baikal, as well as specially protected natural areas adjacent to Lake Baikal. In 1996, the World Natural Heritage site "Lake Baikal" became a special protected area of international status, it is the only object in Russia nominated for all four criteria: geological uniqueness, uniqueness and duration of ecological processes, natural beauty and aesthetic value, as well as value from Biodiversity perspectives. Of the eight GPA of Russia - "Lake Baikal" - the largest, an area of 8.8 million hectares, and in the world it occupies the 4th place. The complexity of the unified management of the WNHS "Lake Baikal" is associated not only with a multilevel administrative division and a large area of the territory, but also with the presence of various purposes in the composition of the object. These are lands of settlements, agricultural and recreational purposes, state land reserves, as well as several categories of PAs under the jurisdiction of several categories. In addition, these lands differ in their status - federal, regional and municipal. A special regime of economic and other activities is established throughout the Baikal natural area, which provides for the liquidation and re-profiling of environmentally hazardous economic objects, as well as increased requirements for economic entities in respect of compliance with the maximum permissible harmful effects on the unique ecological system of Lake Baikal. The competitiveness of the Republic of Buryatia is affected by the so-called "Baikal factor", which is a legislatively established special regime for nature management in the Lake Baikal basin, which strictly regulates all types and objects of life activity.

Keywords: Ecology, Baikal Factor, Strategic Planning

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EVALUATION OF AIR QUALITY IN THE CITY OF ISTANBUL DURING THE YEARS 2013 AND 2015

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Abstract:

Air pollution has been the most important health issue in recent years. Nowadays, it is well-known fact that air pollutants increase the incidence of asthma, chronic obstructive pulmonary disease and cardiovascular diseases. In this study, our aim was to evaluate the results of regular measurements of air pollutants PM10 and SO₂ concentrations in the city of Istanbul by taking the years 2013 and 2015 each as a sample. The data were obtained through the website, <http://www.havaizleme.gov.tr>, which was published by the Administration of Marmara Clean Air Center. The acceptable upper limits by WHO (World Health Organization) for SO₂ and PM10 respectively are 20 µg/m³ and 50µg/m³. For evaluation, the months of January, April, June and September were chosen. For the years 2013 and 2015, during January, the average SO₂ concentration was 7,32±5,71; 16,94±9,84 µg/m³ and the average PM10 concentration was 61,90±35,69; 53,38 ±23,95 µg/m³. For the years 2013 and 2015, during April, the average SO₂ concentration was 15,10±5,01; 7,43,00±2,76 µg/m³ and the average PM10 concentration was 73,26±24,19; 55,70±12,45 µg/m³. For the years 2013 and 2015, during June, the average SO₂ concentration was 7,70±4,00; 12,17±3,71 µg/m³ and the average PM10 concentration was 86,63±37,41; 38,86±15,93 µg/m³. For the years 2013 and 2015, during September, the average SO₂ concentration was 3,30±0,84; 5,11±1,34 µg/m³ and the average PM10 concentration was 70,84±14,67; 58,22±15,68 µg/m³. As the air pollution is within high concentrations during these two years and throughout all the seasons, it has shown that air pollution emerges as a problem awaiting solutions in Istanbul, where is industrially intense, highly populated and also with high traffic density.

Keywords: Istanbul, Air Pollution.

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QUALITATIVE ASSESSMENT AND IDENTIFICATION OF POLLUTION SOURCES IN THE TADLA PLAIN, MOROCCO

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Abstract:

In Morocco, irrigated perimeters are threatened by diffuse nitric pollution of groundwater, which reduces the potential of water resources which are of good quality, thus creating a health risk for the population and socioeconomic developments in the country. Control of this pollution requires sufficient knowledge of the causes and mechanisms responsible for this problem.

The Beni Mellal-Khenifra region suffers from the misuse of agrochemical inputs coupled with agricultural intensification and heavy pumping of groundwater, which is make water in the region of poor quality. Despite decades of efforts to reduce the release of pollutants into the environment, nutrient enrichment of aquatic environments remains an important issue, especially phosphates released into the environment, which come from agricultural sources (Fertilizers) and industrial wastes, human excreta and detergents or phosphate washed, and nitrates that turn into nitrites causing diseases that are in some cases fatal in newborns.

In this context, this study has achieve to determined the effects of the use of fertilizers on the water quality of the Tadla aquifer, by carrying out various analyzes such as nitrates, nitrites and phosphates, whose results have allowed extracting polluted areas and unpolluted areas.

Keywords: Irrigated Perimeters, Nitric Pollution, Groundwater, Quality, Water.

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GEOCHEMISTRY OF HAZARDOUS TRACE ELEMENTS IN MIOCENE COAL BEARING UNITS OF CENTRAL ANATOLIA (GEMEREK-SIVAS), TURKEY

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Abstract:

Fossil fuels, especially coal is one of the main energy sources throughout the world and it is likely to maintain its significance in the near future. Although it is known that coal mining and consumption cause important environmental pollution problems, coal will continue to be a very substantial energy source all over the the world and also in Turkey. This study focuses on the geochemistry of hazardous trace elements and the coal quality parameters of Miocene coal bearing units from Gemerek coal mining area. The mineralogy, elemental composition, and distribution of elements in these samples were studied by optical microscopy, X-ray diffraction (XRD), inductively coupled-plasma mass spectrometry (ICP-MS), proximate and ultimate analyses. Common minerals in the this coals are clay minerals, pyrite, quartz, calcite and siderite. These coals are characterized by broad variation of ash, high total sulphur contents and high gross calorific values. The coals are "Bituminous coal" rank, with vitrinite reflectance ranging from 0.52 to 0.64%. This coal consist mainly of SiO₂ and Al₂O₃, with secondary CaO, and minor proportions of TiO₂, and other oxides. Several trace elements of environmental concern namely As, Ni, U, V, Co, Zn, Se, and U in Gemerek coal are above the world averages, while Th, Mo, Pb, Cu, Sb, Hg and Pb concentrations are less than the world average. On the basis of analytical data, there is no possibility that the Gemerek coals could be used for local heating or industrial needs; when used, they cause significant of environmental pollution and health problems.

Keywords: Environmental Pollution, Coal, Hazardous Trace Elements, Gemerek, Sivas Basin, Turkey.

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TRAFFIC RELATED PARTICULATE MATTER DISTRIBUTION IN URBAN AND RURAL AMBIENT AIR, ADANA, TURKEY

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Abstract:

Unplanned urbanization and the rapidly increased number of vehicles substantial contribution to particle matter beside other sources such as heating, industrial activities. Especially for urban areas, traffic is an important source for particles ambient air. Particles have received much attention because their ability to be transported over long distances, have a long lifetime in atmosphere. The size of particles is directly related to their potential to causing adverse effect health. The coarse particles (d_p : 2.5 to 10 μm) tract effectively filter in the respiratory system, the smaller particles ($d_p < 2.5 \mu\text{m}$) are, the more deeply it will penetrate to the respiratory system, more dangerous. Fine and ultrafine particles represent most of the particles in terms of number concentration in the atmosphere, the coarse particles have the less numerous but dominate the mass concentration measurements. For this reason, assessing together with concentration of particulate matter (PC) and the particle size fractions distributions (PFD). The objective of the present study is to evaluate emitted PC and PFD urban and rural area in Adana. A portable particulate matter counter was used to the concentration and size distribution of particulate matter measurement on a real-time basis. Urban station selected at the center of traffic where the traffic volume and intensity is the highest. However urban station is significantly little or no traffic emissions. The results indicated that particles which have 0.3,0.5,1,2.5,5,10 μm size fraction contain a significantly higher fraction of the concentration particulate matters in urban ambient air. The concentration of all the fractions showed a traffic related pattern in urban station and all of PF have a higher level. When comparing the urban area with the rural area, in rural areas air quality is typically abatement. Traffic is daily PM10 concentration exceeds EU limit values sampling day in the urban area.

Keywords: Air Quality, Air Pollution, Particle Concentration; Size Distribution

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LEAD CORROSION IN BRASS FIXTURES EXPOSED TO HIGH TURBIDITY DRINKING WATER (CHLORINATED AND CHLORAMINATED) TREATED WITH PHOSPHATE BASED CORROSION INHIBITORS.

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Abstract:

With greater attention paid to lead contamination in drinking water, any potential lead source comes under much greater scrutiny. One source gaining attention is leaded brass fixtures. Many homes have brass hardware containing lead. The Birmingham Water Works Board; Birmingham, Alabama USA (BWVB) conducted a pilot study to compare distribution system water quality for chlorinated and chloraminated drinking water. The BWVB wanted to determine if a switch to chloramines (from chlorine) would have an adverse effect on water quality. A pilot flow-through system (flow-through) was constructed. One section of the flow-through showed extremely high turbidity (175% or greater ntu compared to other sections). Samples collected from the high turbidity section were compared for this study.

Polyphosphates were introduced to the rack as corrosion inhibitors. Lead residuals spiked above regulated levels after the introduction of the polyphosphates to chlorinated water (relative to untreated chlorinated water). When polyphosphates were discontinued and replaced with orthophosphate, lead residuals dropped below regulated levels. This suggested that polyphosphates were likely responsible for the increased lead residuals in the brass assemblies. This of great concern because certain brands of polyphosphates are marketed for their professed ability to “prevent lead corrosion”.

Statistical comparisons were made between chlorinated and chloraminated drinking water samples collected from the high turbidity section of the flow-through system. The Kolomogorov Smirnov two-sample test was employed for the analyses. The collected data showed higher lead residuals in high turbidity water, relative to low turbidity water ($\alpha = 0.05$). Lead residuals continued to drop during a switch from chlorine to chloramines in water treated with orthophosphate. Lead residuals continued to decrease when chloramines were replaced with chlorine (“burn out”). The lead residuals measured during the “burn out” phase were significantly lower than lead residuals in chlorinated and chloraminated water samples measured earlier in the study.

Keywords: Polyphosphate, Orthophosphate, Chloramines, Lead Corrosion, Drinking Water

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ATRIPLEX HALIMUS CALLUS HISTOLOGY

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Abstract:

In vitro plant tissue culture is an interesting tool for their micropropagation and transformation. They develop unorganized cell masses like callus in response to various stimuli. Since the historical discovery that the combination of two growth-promoting hormones, auxin and cytokinin, induces callus from plant explants, cultivated in vitro. Atriplex is a xerohalophyte which can help to solve degraded soils rehabilitation. Its callus histology is an important step to better understand the histological and cellular features of callus initiation, which will ultimately help to develop more efficient methods to induce embryogenic callus formation. This experimental system has been used extensively in both basic research and horticultural applications. Callus are obtained from cut stem cultivated on MS medium added with 2,4-D/KIN. They were fixed and dehydrated and embedded in paraffin. Serial sections are cut with rotary microtome. They were stained with PAS/ Naphtol blue black. We studied histological structure as crucial aspects that need to be improved during Atriplex transformation. This research provided detailed descriptions. In this research, we investigate callus histology. Histological examination showed that callus tissues originated from out-growths of the cambium rings through de-novo meristematic activity.

Keywords: Atriplex Halimus, Callogenesis, Histology, In Vitro Culture, Plant Growth Regulators

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TOXIC METALS ACCUMULATION AND ECOLOGICAL RISK IN INTERTIDAL MANGROVE ECOSYSTEM IN UPSTREAM OF HOOGHLY ESTUARY, INDIA

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Abstract:

Mangroves act as a natural purifier of industrial and municipal wastewater along tropic and sub-tropics and helps in maintaining a healthy estuarine ecosystem. At present, these intertidal communities are under severe risk from toxic metal contamination instigated by anthropogenic activity along with rapid urban and industrial growth. This study represents the degree of metal contamination in Hooghly estuary, West Bengal, India samplings were done in six locations namely Babughat (S1), Shibpur (S2), Bata (S3), Birlapur (S4), Falta (S5) and Nayachar (S6). Collected samples of surface sediment were dried and ground to powder for analysis of physico-chemical properties and metal accumulation. Sediment samples were digested using aquaregia (HNO₃ : HCl; 1:1) and trace metal analysis was carried out using Inductively Coupled Plasma Optical Emission Spectrophotometer (ICP-OES). The results obtained for pH (7.57-7.81), conductivity (112.1-879.0 μ S/cm), organic carbon (0.51-0.92%) and different metals in the sediments shows following sequential order Al>Fe>Mn>Cr>Zn>Ni>Cu>Pb>Co>Cd. This variation in metal distribution is may be due to different type and magnitude of industrial effluent and domestic sewage and different types of source substrata undergone natural weathering process. Different sediment quality indices such as Enrichment Factor (EF), Geo-accumulation index (I_{geo}), Pollution Load Index (PLI) values were used to assess the degree of sediment contamination. Sediment of the Hooghly estuarine region shows moderate to high ecological risks, when compared with effect-range-low (ERL)/ effect-range-median (ERM) and threshold-effect-level (TEL)/ probable-effect-level (PEL) values as per sediment quality guidelines (SQG). Potential ecological risk index (PERI) in two sampling location e.g. Babughat (S1) and Shibpur (S2) showing very strong level of ecological risks. The work has potentially illuminates the status of metals distribution and corresponding ecological risks in the intertidal sediments of mangrove dominated habitats in Hooghly estuary. Domestic sewage, semi treated industrial effluents, surface and agricultural run-off are all potential sources of trace metal contamination.

Keywords: Sediment ; Metal ; Hooghly Estuary ; Sediment Quality Indices ; Ecological Risk

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ASSESSMENT OF ANTIMICROBIAL AND ANTIOXIDATIVE PROPERTIES OF MANGROVES FROM INDIAN SUNDARBAN

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Abstract:

Mangroves are one of the most significant and vulnerable estuarine resources having various ethno-medicinal applications since ages due to presence of several bioactive compounds. They possess very effective free radical scavenging system comprising of several phytochemicals and phenolic compounds which provide opportunities for their pharmaceutical exploitations. Investigation and identification of the antimicrobial and antioxidant potential of common mangrove plants is of serious concern for the researchers working on coastal resources. In this study, 18 mangrove plants from Indian Sundarban have been screened on the basis of their antimicrobial property against four bacteria (*Agrobacterium tumefaciens*, *Escherichia coli*, *Streptococcus mutans*, *Staphylococcus aureus*); and four fungi (*Aspergillus flavus*, *Fusarium oxysporum*, *Tricophyton rubrum*, *Alternaria tenuissima*). Among all plants, *Avicennia marina*, *Avicennia alba*, *Acanthus ilicifolius*, *Ceriops decandra* and *Excoecaria agallocha* showed best antimicrobial potentiality in terms of their zone of inhibition and minimum inhibitory concentration. The active leaf extracts of screened mangrove plants have been used for further separation and characterization using thin layer and column chromatography. The phytochemical groups were identified by standard chemical methods. Antioxidative properties of mangroves has also been determined by measuring total phenolics, reducing efficiency and free radical scavenging ability using a stable radical, Diphenyl Picryl Hydrazyl (DPPH) and Butylated Hydroxyl Toluene (BHT) as positive control. Among all plants *Avicennia marina* showed the highest antioxidative activity. The final separated fractions of *A. marina* have been characterized using Fourier Transformed Infrared Spectroscopy and Liquid Chromatography with Mass Spectrometry. 50 compounds have been identified from the 8 active fractions which mostly belong to Alkaloid, Flavonoid, Glucosinolate, Phenylpropanoid, Stilbenoid, Tannin and Terpenoid groups. Glycyrrhizic acid ammonium salt (Terpenoid), Canthaxanthin (Terpenoid), Syringaldehyde (Phenylpropanoid), Hinokitiol (Terpenoid), Peonidin-3,5-O-di-beta-glucopyranoside (Flavonoid), Diosmin (Favonoid), 3-Methylxanthine (Alkaloid), Neohesperidin dihydrochalcone (Flavonoid) are most abundant among them. The identified active compounds can be further exploited for large scale synthesis and therapeutic applications.

Keywords: Mangroves, Antimicrobial Property, Antioxidative Property, Bioactive Phytochemicals, Sundarban.

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EVALUATION OF THE EFFECT OF SOME PROTECTIVE AGENTS, STORAGE TEMPERATURE AND DRYING TECHNIQUES ON VIABILITY AND BIODEGRADATION ACTIVITY OF PTA DEGRADING BACTERIA

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Abstract:

Owing to plastic industries, PTA (Pure Terephthalic Acid) chemicals such as terephthalic acid, p-toluic acid, 4- carboxybenzaldehyde have led to increasing amounts of environmental pollution. In the case of releasing PTA in the environment and it effects human health. The use of biodegradation which preferable method removes PTA from the environment. This study was comparative effect of different protective agents and lyophilization techniques on PTA degrading bacteria which taken from PETKIM Petrochemical Holding Inc., viability and biodegradation activity after lyophilization. Inoculum culture was cultivated in a fermentor. The bacterial cells harvested by centrifugation and were added in lyophilization vials with sterile protective agents: skim milk, sucrose, trehalose, sodium glutamate, maltodextrin, polyvinyl alcohol (PVA) and yeast individually and in combination. Vials were kept 24 hours at -80 °C for freeze drying method, +4°C for liquid drying methods. After overnight storage in the freezer, samples were desiccated in an Labconco FreeZone 6 freeze dryer at a condenser temperature -40 °C, and at a chamber pressure <0.1 mbar for 48 h. Vials was stored at 4°C and 27 °C. After lyophilization the samples (1. week and 1.month) of biodegradation activity of microorganisms was measured in HPLC by creating standart curve graphs for PTA. The initial concentration used was $4,1 \times 10^8$ cfu/ ml. Bacterial survival rates showed that inoculum bacteria with skim milk+ trehalose, skim milk + sodium glutamate, skim milk + sucrose and skim milk + yeast as protective medium could still reach 10^8 at 4°C after 1 month . Bacterial survival rates showed that Freeze-drying method gave better results than Liquid-drying method. In addition, +4°C gave better results than 27°C storage conditions. Biodegradation activity of some vials (containing PVA) decreased after lyophilization. Results aim to determining good combination system for the studied biodegradation bacteria which is desirable for the industrial development of product.

Acknowledgements: The authors wish to thank Republic of Turkey, Ministry of Science, Industry of Technology under the grant SANTEZ-00719 STZ 2014 for the financial support of this study. The bacteria used in this article was produced within the project above

Keywords: Lyophilization, Protective Agents, Biodegradation, Pta (Puried Terephthalic Acid), Hplc

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DETERMINATION OF MICROBIAL COMPOSITION OF HYDROGEN PRODUCTION FROM FOOD WASTES

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Abstract:

In recent years; energy resources have begun to decline and environmental pollution has increased, which has led to the need for renewable energy sources. Hydrogen is an important industrial renewable energy, which has a wide range of potential applications for our near future. Biohydrogen production from fruit and vegetable wastes was investigated in this study. The anaerobic inoculum was taken from an anaerobic bioreactor of a beer production factory and subjected to heat pre-treatment at 105°C for 5 min in an autoclave. The average H₂% values of the dry fermentation system were 25% and no methane production was observed. For the first 5 days, the dominant metabolite was acetic acid (up to 12 g/L), with butyric acid becoming the dominant metabolite at later time periods, with a corresponding lower H₂ production. The hydrogen-producing bacterial strains were determined Denaturing Gradient Gel Electrophoresis (DGGE). DGGE analysis was applied by using 16S rDNA primers for specific groups. Clear DGGE bands were sequenced and analyzed in detail in terms of sequence similarity. From the phylogenetic analysis, seven DGGE bands results showed that dominated by Clostridium species. In this study, microorganisms that play a role in the production of biological hydrogen in the biological dry fermentation reactor have been determined.

Acknowledgments: The authors wish to thank TUBITAK-MAG-2015 M 314 for financial support of this study. We also thank to IZSU for their kind supports. HNA thanks the Xunta de Galicia (Spain) for his postdoctoral fellowship (ED 481B-2016/195-0).

Keywords: Biohydrogen Production, Dry Fermentation, DGGE, Microbial Community Structure

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DETERMINATION OF THE EFFECT OF MIXED ORGANISM CULTURE OBTAINED FROM THE PETROCHEMICAL INDUSTRY WASTEWATER ON THE BIODEGRADATION OF PTA IN DOMESTIC AND INDUSTRIAL WASTEWATERS

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Abstract:

Purified terephthalic acid (PTA), a very important substance in the textile and plastic industry, is a raw material used in the production of polyethylene terephthalate (PET) or polyester. PTA wastewater contains high concentrations of p-toluic acid (p-Tol), 4-carboxybenzaldehyde (4-CBA) and terephthalic acid (TA). Untreated discharge of PTA wastewater can cause considerable damage to the environment due to its toxic components. In active sludge systems used for aerobic treatment of PTA wastewater is of great importance the presence of microorganisms that resistant to toxic components and capable of biodegradation of PTA. Enrichment by adding microorganisms to the wastewater system, known as bioaugmentation, is often used in wastewater treatment systems. In this study, changes in PTA biodegradation yields of domestic (R1) and industrial (R2) activated sludge samples were investigated by adding mixed microorganism culture obtained from the petrochemical industry wastewater. A total of 150 ppm PTA content (50 ppm TA, 50 ppm p-Tol and 50 ppm 4-CBA) was added to the flasks and incubated at 30 ° C, 150rpm. Control flasks (C1,C2, C3) were inoculated with only domestic and industrial sludge (without mixed organism culture) and synthetic wastewater with PTA contents (without sludge), respectively. Biodegradation efficiencies of the samples were determined by High Pressure Liquid Chromatography (HPLC) analysis. According to the results, the best biodegradation efficiency was obtained in R2 flask. All chemicals were totally degraded at the end of the 12th hour in R2 , whereas this time is up to 18 hours in R1. In C1 and C2 flasks, TA and p-TOL chemicals were remained at the end of the study. These results indicated that inoculated mixed microbial culture has great effects on biodegradation of PTA. In addition, this study also demonstrates the biodegradation efficiencies of PTA with industrial and domestic wastewater microbial flora.

Acknowledgements

The authors wish to thank Republic of Turkey, Ministry of Science, Industry of Technology under the grant SANTEZ-00719 STZ 2014 (112D044-TUBİTAK). The bacteria used in this article was produced within the project above. The support program of the Scientific and Technological Research Council of Turkey. (TÜBİTAK-BİDEB) supported this study.

Keywords: Pta, Wastewater ,Biodegradation, Hplc, Mixed Microbial Culture

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EFFECT OF REHYDRATION MEDIUM ON VIABILITY AND BIODEGRADATION ACTIVITY OF FREEZE-DRIED PRODUCT CONTAINING PTA REDUCING BACTERIA IN SKIMMED MILK AS PRESERVATIVE AGENT

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Abstract:

The freeze drying method is the most preferred method for storing bacteria as a commercial product. The success of the freeze drying method depends on such factors which are initial cell concentration, protective agents and rehydration medium. In this study, it was aimed to determine the best rehydration medium during the reactivation of the lyophilised bacterial product, which is composed of different bacteria with known Purified Terephthalic Acid (PTA) biodegradation activity. Rehydration medium is a critical step that is necessary to provide the bacterial product in a usable and suitable form. Freeze drying microorganisms were rehydrated with some medium. In this study, Vials containing samples using skim milk as a preservative agents were rehydrated with the following rehydration media: water, skim milk, PBS (Phosphate Buffer Solution), sucrose. In this study, samples were brought to original volume with each rehydration medium, mixed gently and incubated at room temperature for 15 minute. Plate count method was used for determination of bacteria and High Performance Liquid Chromatography (HPLC) used for measurement of biodegradation activity. This study results showed that there were differences in viability of the bacteria depending on rehydration media used. The highest percentage viability was obtained with PBS. In addition, when skim milk was used rehydration medium, it gave better result in biodegradation activity but there haven't been major differences. For this reason, PBS has been chosen as the best rehydration medium due to its cost-effectiveness and higher bacterial survival.

Acknowledgements: The authors wish to thank Republic of Turkey, Ministry of Science, Industry of Technology under the grant SANTEZ-00719 STZ 2014 (112D044-TUBİTAK) and Ege University, Scientific Research Projects Fund, Project no: (BAP 2016 FEN 008) for the financial support of this study. The bacteria used in this article was produced within the project above..The support program of the Scientific and Technological Research Council of Turkey.(TÜBİTAK-BİDEB) supported this study.

Keywords: Rehydration Medium, Freeze Drying, Skim Milk, Biodegradation, PTA (Puried Terephthalic Acid)

IRON SPECIATION IN SURFACE WATERS BY NEW ION-IMPRINTED SORBENTS

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Abstract:

Iron exists in surface waters in different physical and chemical forms. In order to provide a better understanding of the interactions of individual processes and the response of ecosystems to varying iron speciation the development of procedure for the determination of the most reactive, kinetically labile Fe(II) and Fe(III) is actual task in environmental analytical chemistry.

The aim of the present study was synthesis and characterization of new Fe(II) ion-imprinted sorbents (Fe(II)-IIPs) and their application for Fe(II)/Fe(III) speciation in surface waters. Fe(II)-IIPs were synthesized by precipitation copolymerization of methacrylic acid (functional monomer), trimethylolpropane trimethacrylate (crosslinking agent) and 2,2'-azobisisobutyronitrile (initiator) in the presence of different template species – Fe(II) complexes with 4-(2-pyridylazo)resorcinol, salicylic acid or 2,2'-bipyridine. The composition, structure and morphology of the polymer particles obtained were characterized using FTIR, SEM and BET analyses. The optimization experiments showed quantitative sorption of both Fe(II) and Fe(III) on the surface of Fe(II)-IIPs at pH 7–8, however selective sorption of only Fe(II) could be achieved in the presence of fluoride ions as a masking agent for Fe(III). Analytical procedure for the determination of Fe(II) and Fe(III) in surface waters was developed and characterized.

Acknowledgments: The current study was financially supported by Sofia University Scientific Foundation (Grant № 80.10-111/2017).

Keywords: Iron Speciation, Ion Imprinted Sorbent, Surface Waters

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SYNTHESIS OF DIETHYL CARBONATE (A FUEL ADDITIVE) FROM ETHANOL AND PROPYLENE CARBONATE, USING HYDROXYLAPETITE BASED CATALYSTS

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Abstract:

Diethyl carbonate (DEC) is a valuable organic carbonate which contains more oxygen as compared to well-known oxygenate methyl tert-butyl ether (MTBE). When added to diesel, it reduces CO₂ and particulates emission. Various non-phosgene methods have been developed for its synthesis which includes ethanolysis of urea, carbonylation of ethanol using CO₂, oxy carbonylation of ethanol, etc. Ethanolysis of urea suffers from its poor efficacy of giving yield and selectivity of DEC. Due to high stability of CO₂, carbonylation of ethanol using CO₂ possesses poor thermodynamics and oxy carbonylation of ethanol suffers from catalytic deactivation problem. However, transesterification of propylene carbonate (PC) and ethanol to give DEC is a potent route due to its efficacy of giving high yields, having favorable thermodynamics and also due to the usage of cheap catalysts involved in it. Also propylene carbonate is synthesized from propylene oxide and CO₂, this route for DEC synthesis can be termed as sink of CO₂. Hydroxylapatite (HAP) (Ca₁₀(PO₄)₆(OH)₂), are well known naturally occurring minerals for their unique crystal structure. Due to their basic properties, they are widely used as catalysts now days. In the present study, hydroxylapatite based catalysts were synthesized using precipitation method, and were modified using Zn and Mg (Zn/HAP and Mg/HAP). The catalysts were characterized using X-ray diffraction spectroscopy, Fourier transform infrared spectroscopy and CO₂ temperature programmed desorption methods. These catalysts were used for synthesis of DEC using propylene carbonate and ethanol. The effect of surface basicity was observed to be profound in the synthesis of DEC. Mg/HAP performed best among all the three catalysts owing to its high basicity. DEC yield of 74.9% was obtained in 5 hours at 160 °C. Effect of reaction conditions like temperature and time on DEC yields was also studied and optimized.

Keywords: Diethyl Carbonate (DEC); Propylene Carbonate (PC); Ethanol; Hydroxylapatite (HAP)

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REMOVAL OF HEXAVALENT CHROMIUM FROM AQUEOUS SOLUTION BY CAPACITIVE DEIONIZATION WITH RICE HUSK ACTIVATED CARBON ELECTRODE

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Abstract:

Capacitive deionization (CDI) is promising low cost and high energy efficiency desalination process. The aim of present work is preparation of porous electrode from rice husk activated carbon and applied for removal of hexavalent chromium from aqueous feed solution of hexavalent chromium by CDI process. The prepared electrode characterizations were carried out with scanning electron microscopy, energy-dispersive spectroscopy. The result shows that good electrosorption of hexavalent chromium and effective regeneration of electrode was found. The maximum removal of hexavalent chromium was found 85.10% for 10 mg/L feed solution at optimized flow rate 16 mL/min and 1.2 V. Three single component isotherm models were applied for electrosorption of hexavalent chromium experiment and parameter estimation were carried out. The Kinetic model study also carried out for electrosorption of hexavalent chromium. Thus CDI with rice husk activated carbon electrode was found efficient for electrosorption of hexavalent chromium from low concentration aqueous feed solution.

Keywords: Capacitive Deionization, Hexavalent Chromium, Rice Husk, Electrode

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A NEW GRAPHENE OXIDE COMPOSITE HYDROGEL AS ADSORBENT FOR REMOVAL OF HARMFUL DYE POLLUTANTS FROM WASTEWATER

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Abstract:

The enlargement of industrialization creates a great amount of environmental pollution, especially, the industries that discharge large quantities of untreated wastewater cause serious water pollution due to their non-biodegradable and toxic dye contents. To remove dyes from disposed water that can be harmful to both human and environmental health, various physical and chemical methods can be used and among them adsorption is an effective treatment method. Although there are many adsorbents being effectively used for removal of dyes from aqueous solutions, nowadays there has been an increasing amount of literature on utilization of graphene oxide (GO) nanosheets based composites to improve adsorption capacity and time. Graphene Oxide has an extremely high surface area and its basal plane decorated by oxygen-containing groups which may form strong electrostatic interactions with dye molecules; because of this, GO and its composites provide superior adsorption capacity for efficient water purification. In this work, graphene oxide was incorporated into the polyethylenimine and itaconic acid/PEG diacrylate (PEI/IA-PEGDA) semi-IPN (semi-interpenetrating polymer network) hydrogels to enhance the adsorption of dye molecules. The semi-IPN composite hydrogel was prepared via in situ free-radical polymerization in the presence of PEI with IA and PEGDA as the monomers and GO nanosheets as the reinforcer. The retention of anionic and cationic dye molecules on the GO-based adsorbents was carried out in batch adsorption experiments and adsorption ratios were monitored spectrophotometrically. The effects of various parameters such as presence of GO, amount of adsorbent, medium pH and contact time were tested. Desorption tests were also performed to test the reusability of the material. Overall, this study displays that the proposed GO containing semi-IPN hydrogel composite could be potentially used as adsorbents for dye removal in wastewater treatment.

Keywords: Graphene Oxide, Semi-IPN Hydrogel, Adsorption, Anionic And Cationic Dyes.

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MEASURING AMBIENT AIR POLLUTION USING DATA ENVELOPE ANALYSIS WITH PRINCIPAL COMPONENTS: AN EXPOSURE - RESPONSE ASSESSMENT

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Abstract:

Worldwide scientists are actively engaged in revisiting exposure-response assessment since Ambient Air Pollution (AAP) has assumed gigantic proportions. Literature reports describe adverse health effects linked to AAP and there is a need to develop standardized methods for AAP sensing. Projecting the nature and magnitude of AAP is one of the basic criteria for development of mitigation strategies. In order to create research priorities that allow assessment of exposure that can more accurately define exposure–response relationships of AAP on human health, generation of real-time environmental data and modeling thereof is a primary requirement. Principal Component Analysis (PCA) is one such preferred mathematical tool that is used world over to investigate correlative patterns between air pollutants and existing meteorological factors in a city to identify major pollutants.

In the current study, concentrations of different environmental pollutants (PM_{2.5}, PM₁₀, CO, SO₂, NO₂, O₃, NH₃, CH₄) were measured at three different times of the day (7 a.m., 1 p.m. and 8 p.m.) at five different places (Peenya, BTM, BWSB, CRS and SGHLI) in Bengaluru, the IT hub of India. Results indicate NO₂ to be majorly contributing to AAP due to its high average concentration compared to others and is easily explained on the basis of increased number of vehicles and traffic jams resulting from it. Similarly high concentrations of SO₂ recorded at PEENYA could be attributed to presence of heavy industries. A typical analysis involving Pearson correlation matrix for four pollutants at BTM station indicated a strong positive correlation between NO₂ and other oxides of nitrogen whereas SO₂ is seen to exhibit weak but negative correlation with NO₂. Spatial and temporal studies carried out in the present investigation assumes importance especially in growing city like Bengaluru with inherent demographic movement, so that mitigation measures can be proactively adopted well in time.

Keywords: Principal Component Analysis, Ambient Air Pollution, Exposure-Response

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PRELIMINARY ASSESSMENT OF SIMULTANEOUS EMISSION OF PM_{0.5}, PM_{2.5} AND CO FROM INCENSE AND MOSQUITO REPELLENTS CONTRIBUTING TO NON-DISCERNIBLE POLLUTION WITHIN ASIAN HOUSEHOLDS

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Abstract:

Scientists have been engaged in identifying non-discernible (hidden) sources of ambient air pollution (AAP) and working out mitigation strategies for reduction of the same. However, their efforts have concentrated primarily around outdoor AAP, while indoor AAP which is known to vary with location, lifestyles and cultures has somehow not been studied in great depth. Indoor AAP has led to gradual augmentation in cardiovascular diseases and pulmonary infections particularly amongst susceptible group of elderly, infirm and children who spend most of their time indoors. In the current study, simultaneous generation of carbon monoxide (CO) and particulate matter (PM) arising from burning of incense (two types) and mosquito repellents (three types) have been investigated. Measurements indicate that while PM_{0.5} pollutant levels are high in case of the two incense types, high PM_{2.5} levels are noted in the mosquito repellent coils with the only exception being the low-smoke coil. However, in the first minute, low-smoke coil emits comparable concentrations of PM_{0.5} and PM_{2.5} pollutants (448 and 465 µg / m³ respectively). It is interesting to note that first minute CO concentration level of agarbatti (~ 57 ppm) is more than eight times that of dhoopbatti (~ 7 ppm) but after 15 minutes the levels of CO emission from both dhoopbatti (~ 125 ppm) and agarbatti (~ 124 ppm) become comparable. In real-life scenario mosquito repellents are known to smoulder for about 8 hours and incense sticks are used in bunches hence CO levels can be envisaged to cross WHO prescribed safe limits quite easily. High values PM_{0.5} and PM_{2.5} concentration levels from within the same source (incense or mosquito repellent) can be ascribed to existence of different physical states of particles resulting from use of various types of ingredients (fragrance chemicals, binders etc.) for smoke generation used in different incense and mosquito repellents

Keywords: Ambient Air Pollution (AAP), Carbon Monoxide (CO), Particulate Matter (PM), Mosquito Repellents, Incense

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OPTIMIZATION OF PARAMETERS ON PHOTOCATALYTIC DEGRADATION OF 2,4-DICHLOROPHENOXYACETIC ACID (2,4-D) HERBICIDE USING TiO₂/H₂O₂ BY RESPONSE SURFACE METHODOLOGY

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Abstract:

2,4-Dichlorophenoxyacetic acid (2,4-D), a chlorinated phenoxy-alkanoic herbicide which is used extensively in agricultural fields of various developing countries, is found to be potential carcinogen, an endocrine disrupter and a mutagen. Present work addresses on TiO₂/UV and TiO₂/H₂O₂ mediated UV photocatalytic degradation of 2,4-D were investigated in a laboratory-scale photo-reactor. The three levels Box-Behnken factorial design (BBD) technique combined with response surface methodology (RSM) was used to design experiments. Four experimental parameters (including TiO₂ concentration, pH, 2,4-D concentration and H₂O₂ concentration) were adopted to obtain the preliminary information. Two kinds of multivariate experimental design (pH, TiO₂ concentration, 2,4-D concentration) and (pH, TiO₂ concentration, H₂O₂ concentration) were employed to establish two quadratic model as a functional relationship between degradation rate of 2,4-D and three independent experimental parameters. The regression analysis and optimization processes were made by using Minitab 17.0 Statistical Software. For first model, the optimum values of the operation parameters were found as pH 5.70, TiO₂ concentration of 1.20 gL⁻¹ and 2,4-D initial concentration of 32 mgL⁻¹ whereas, the optimal values of the second model were pH 4.94, TiO₂ concentration of 1.34 gL⁻¹ and H₂O₂ initial concentration of 161 mgL⁻¹. The degradation rate of 2,4-D approached 78.10 % for model 1 and 83.63 % for the second model. For both models, similar results were obtained between optimizing variables by RSM and single factorial batch reactor operation. For the model 1 and 2, the regression analysis with R² value of 0.9958 and 0.9976, respectively that had a good agreement between the experimental results and the predictive values. Moreover, TiO₂ concentration had a significant effect on the degradation rate of 2,4-D for all models.

Keywords: 2,4-D, Advanced Oxidation, Box-Behnken Design (BBD), Response Surface Methodology (RSM), TiO₂ Photocatalysis

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STARCH-COATED SILVER NANOPARTICLES AS A SELECTIVE LSPR-BASED SENSOR FOR IRON(III) DETECTION IN WATERS

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Abstract:

It is well known that iron in its II/III ionic states plays an important role in biological and environmental systems. Therefore, there is a great need for reliable, selective, and sensitive probes for detecting and monitoring iron levels and Fe(III)/Fe(II) speciation in different kinds of samples. Keeping this in mind, a simple, rapid and low cost method for easy, selective and sensitive quantification of Fe(III) trace amounts has been developed on the basis of a redox reaction between Fe(III) and starch-coated silver nanoparticles (Ag NPs) in 0.001 mol/L HCl. Silver nanoparticles were prepared under sonication using soluble starch and D-glucose as a green stabilizing and reducing agents, respectively. It was found that the Ag NPs have a LSPR band at 408 nm, high colloidal stability and oxidation ability for the reduction of Fe(III) at pH 3 archived by hydrochloric acid. Furthermore, a degradation of highly clustered Ag NPs by their oxidation to Ag(I) was observed. Hence, a remarkable change in the LSPR absorbance strength, which depends on the Fe(III) concentration, was established. This LSPR-based optical sensor has a very good sensitivity and a linear response over the range of 0.7 – 7 mg/L Fe(III) with a detection limit of 0.1 mg/L. It was demonstrated that Fe(II) and other metal ions do not interfere under the same conditions, which guarantees the high selectivity of the proposed optical sensor towards Fe(III). Added/found method was used to confirm the validity of proposed AgNPs sensor for selective determination of Fe(III). The developed LSPR-based optical sensor for Fe(III) detection has a potential to be applied for iron speciation in real environmental samples, such as ground and tap waters.

Acknowledgement

The authors are grateful for financial support of Project 80-10-54/2017 of Scientific Research Fund of Sofia University “St. Kliment Ohridski”.

Keywords: Silver Nanoparticles, Starch Coating, Fe(III), Sensor, Localized Surface Plasmon Resonance (LSPR)

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MODELING OF MULTICOMPONENT ADSORPTION SYSTEM CASE STUDY: WASTEWATER TREATMENT

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Abstract:

Heavy metals elimination from aqueous solutions has been a focus area of research in recent years. Many technologies have been developed for removing this kind of pollution but adsorption is generally chosen since it is considered as one of the most useful and economical techniques used to remove heavy metals from water.

In this study, nine multicomponent isotherm models as well as one new proposed model were used to model the removal of Cd²⁺, Cu²⁺, Ni²⁺ and Pb²⁺ from multi-metal ion aqueous solutions using natural Ca-bentonite was studied. Experimental adsorption data were obtained for literature as ternary mixtures. The coefficients of these models were obtained by coupling two optimization methods: genetic algorithm with optimization algorithm by adjustment of the least squares curves (Matlab code: GA-Lsqcurvefit).

To validate the proposed model, the adsorption values predicted by this equation for the quaternary system charged with heavy metals were compared to values determined experimentally.

Results show that the proposed model is the most suitable for describing kinetics of the selected multi-component system adsorption after Langmuir and Freundlich isotherm, which was explained by the absolute average relative deviation (AARD) 17.56% and a coefficient of regression 0.8009 for proposed model.

Keywords: Multicomponent, Adsorption, Model, Isotherm

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ARTIFICIAL NEURAL NETWORK MODELING OF MULTICOMPONENT ADSORPTION SYSTEM, CASE STUDY: WASTEWATER TREATMENT

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Abstract:

The object of this work is to model the phenomenon of multi-component adsorption, it means developing an optimized neural model capable of predicting the adsorbed quantities for a ternary mixture (blue acid 92, direct green 6, and direct red 31) on the Gemini polymeric nanoarchitecture (GPN). Experimental adsorption data were obtained for literature as ternary mixtures. This modeling is based on the development of a Matlab[®] program. Results show that the Optimized Static Neural Network (OSNN) has an architecture of (9-11-4-3): {9 neurons in the input layer ; 11 neurons in the first hidden layer ; 4 neurons in the second hidden layer and 3 neurons in the output}. The OSNN reproduces the experimental data from the literature with high accuracy: Mean Square Error (MSE) = 0.3682 and a coefficient of determination $R^2 = 0.9998$, these results confirm the robustness of the established neural model.

Keywords: Multi-Component Adsorption, Artificial Neural Networks, Modeling, Dyes.

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PREPARATION OF IONIC LIQUID MEDIATED SOL-GEL SILICA FOR THE REMOVAL OF CR(VI) IONS FROM AQUEOUS SOLUTIONS

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Abstract:

Chromium has a wide range of industrial application areas such as; metal plating, tanning pigment and coating industries. Chromium in aqueous solutions exists in a range of oxidation state from -2 to +6. Cr(VI) exhibits toxic effects for living organisms, therefore the allowable limit is kept at low concentrations. World Health Organization (WHO) has set this limit as 0.05 mg/L for the drinking waters. For that reason it is very important to develop a process for selective removal Cr(VI) ions from aqueous solutions.

In this study ionic liquid mediated sol-gel silica adsorbents are prepared and used for the removal of Cr (VI) ions from aqueous solutions. For this purpose silica based adsorbents containing ionic liquids (ILs) are synthesized by sol-gel method. Thus the high chelating ability of ILs are combined with the surface properties of silica substances. Commercial (Aliquat 336[®]) and synthesized ([A336][NO₃]) ionic liquids are incorporated directly with sol-gel operation. Silica based adsorbents are being initiated with silica precursor (TEOS), water, alcohol and ionic liquid hydrolysis in the presence of an acid catalysts then completed with a condensation reaction. Physicochemical and morphological characterization of prepared adsorbents have been investigated by FTIR, SEM and BET analysis. The sorption behaviour of adsorbents have been investigated by using a series of batch sorption experiments. The effect of ionic liquid contents on the thermodynamic and kinetic properties of adsorbents were also investigated. Sorption percentages of the adsorbents have been enhanced by containing ILs up to 99%. Equilibrium behaviour of adsorbents fitted well with Langmuir Sorption Isotherm having the maximum adsorption capacity value of 22.53 mg/g. It can be concluded that sorption of Cr(VI) ions from aqueous solution by sol-gel silica based adsorbents containing ILs takes place favourably and these type of adsorbents are promising agents in the adsorption processes

Keywords: Ionic Liquid, Sol-Gel, Silica Adsorbents

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FAST AND RELIABLE MERCURY SPECIATION ASSISTED BY NOBLE METAL NANOPARTICLES AS HIGHLY EFFECTIVE EXTRACTANTS FOR Hg SPECIES IN SURFACE WATERS

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Abstract:

Mercury is one of the most hazardous and harmful trace elements that naturally occurs in the environment and has serious impact on ecosystems and human health. Generally, organomercury species (especially methylmercury) are much more toxic than inorganic Hg forms. In environmental samples total Hg content is usually extremely low, for surface waters, typical concentrations of total mercury are at low-ppt range. Due to the significant differences between toxicity of Hg(II) and methylHg as well as their extremely low concentrations in unpolluted waters, a reliable procedure for speciation analysis is often required.

In this study we report the preparation of two core-shell nanocomposite materials containing cores from submicron-sized silica spheres covered with shells of silver and gold nanoparticles and their further application as highly effective sorbents for non-chromatographic Hg speciation based on solid phase extraction. Silica spheres were grown using Stober method and functionalized with amine terminal groups by treatment with (3-aminopropyl)-trimethoxysilane. Noble metal nanoparticles were synthesized according to a completely green procedure based on reduction of Ag(I) and Au(III) using D-(+)-glucose as an environmentally benign reducing agent and stabilization with soluble starch as a non-toxic capping agent. The colloid mixing method was applied for deposition of starch-coated silver and gold nanoparticles onto the amine-functionalized silica spheres. Characterization of morphology, surface properties and colloidal stability of nanocomposites SiO₂/AuNPs and SiO₂/AgNPs was realized by SEM, TEM, UV-Vis spectroscopy. The extraction efficiency and selectivity of the sorbents toward Hg species were studied by batch method and the optimal chemical conditions for selective separation and enrichment of both Hg(II) and methylHg were defined (pH 2, time for sorption 20 min, etc). A simple analytical procedure for speciation of Hg in surface waters based on two sequential extraction steps was developed.

Acknowledgments: The authors acknowledge the support by Sofia University Scientific Foundation (Grant No. 80.10-113/2017).

Keywords: Mercury Speciation Analysis, Solid Phase Extraction, Surface Waters, Noble Metal Nanoparticles

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ARTIFICIAL NEURAL NETWORKS FOR AIR QUALITY MANAGEMENT

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Abstract:

The improvement of air quality and protection of human health implies defining efficient air quality strategies. Regional authorities and decision-makers need suitable tools to evaluate both the impact of emission reduction strategies on pollution indexes and the costs of such emission reductions. In order to quickly compute the impact of different emission scenarios on air quality, non-linear models based on Artificial Neural Networks (ANN) can be applied. This paper describes and assesses the capability of non-linear models to capture the relationships between emissions and air concentrations using as case study the Northern Region of Portugal. Aiming to identify the ANN, a set of 10 simulations was performed using a Chemical Transport Model (CTM) fed with different emission reduction scenarios for NO₂ and PM₁₀, and a technique for aggregating the emissions in four triangular slices (to reflect the influence of the surrounding cell emissions and the influence of the prevalent wind directions on the study domain) was used. The results show that the selected source–receptor models are able to accurately reproduce the simulated results by the CTM, with much lesser computational costs. Furthermore, the RIAT+ tool (Regional Integrated Assessment Tool +) was used to cost-efficiently define air quality improvement policies. The RIAT+ optimal solutions indicate that external costs (or benefits) are always higher than the internal costs (implementation costs). This fact points out that acting on emission control to reduce both PM₁₀ and NO₂ concentrations is greatly beneficial from a socio-economic point of view. The tested ANN have proven to be a viable substitute for highly time demanding deterministic models, and can be used in scenario analysis and optimization techniques.

Keywords: Air Quality Policies, Artificial Neural Networks, Integrated Assessment Tool

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ECOLOGICAL RISK ASSESSMENT OF OCP RESIDUES IN SEDIMENT OF AN URBAN COASTAL LAGOON, TURKEY

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Abstract:

With their high lipophilicity and long half-lives, organochlorine pesticides (OCPs) are semi-volatile organic compounds. They are bioaccumulative and persistent toxicants causing adverse impacts on the environment and health. These prevalent contaminants were used to control insect pests since the 1940s over the globe. In this study, pollution history of OCPs residues along a sediment piston core recovered from the Kucukcekmece Lagoon, which became urbanized rapidly since the 1950s, was determined for the first time. This is a 20m deep lagoon at the northern coast of the Marmara Sea, and fed by three streams.

The HCH isomers (α -, β -, γ -, δ -) and o,p'-DDT, p,p'-DDT and their degradation products (o,p'-DDD, p,p'-DDD, o,p'-DDE, p,p'-DDE) were measured with the gas chromatograph equipped with electron capture detector (Agilent GC 7890A, 63Ni-ECD) (recoveries 83- 106%; method detection limits <0.06 ng/g dw). The highest total HCH and DDT residues were 469.4 and 72.0 ng/g dw, respectively. α -HCH, p,p'-DDT and Aldrin were accounted for 64, 10 and 12% of total OCPs. For calculating fluxes, sediment accumulation rates and depositional dates were determined using ²¹⁰Pb and ¹³⁷Cs analysis methods. The DDTs and HCHs originating from technical types were dominant and they were highest in 1945 and 1963-1972, respectively. The distribution of residues along the core presented depositional variabilities implying combined effects of riverine inputs, surface runoff, domestic usage and agricultural activities in the region, as controlled by the regulations on the restricted use and banning the use of pesticides.

The total DDTs and p,p'-DDD levels were between ERL and ERM; that may cause biological effects occasionally. The residues of p,p'-DDT and γ -HCH for 1930-1980 exceeded the ERM and PEL levels; that may cause adverse biological effects frequently. The outcomes of this study were expected to contribute governmental and local institutions in their struggles against toxic pollution in the environment.

Keywords: Hydrophobic Organic Compounds, Core Sediment, Ecological Risk Evaluation, Sedimentary Record, Kucukcekmece Lagoon

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BIOREMEDIATION & RENEWABLE RESOURCES FROM ORGANOTIN CONTAMINATED MARINE SEDIMENTS

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Abstract:

Tributyltin (TBT, C₁₂H₂₇Sn⁺), is an anthropogenic organotin compound which has been classed as a persistent organic pollutant and is recognised as the most toxic chemical ever knowingly introduced into the marine environment. Organotins have a wide range of applications including, marine antifouling paints, agricultural pesticides and fungicides with an estimated global production of 50,000 tons per year. Due to the effects of TBT in the marine environment at concentrations below <1 ng L⁻¹ a necessity exists for the treatment of contaminated sediment using nature-based solutions, which are both non-invasive and sustainable.

Several studies have suggested that microorganisms are the primary pathway for TBT removal by biological degradation. In addition, phytoremediation is a proven method employed for the clean-up of sites contaminated with various pollutants. Combining these methods could represent an environmentally friendly, cost-effective and carbon neutral method to clean up organotin pollutants. Moreover, nature-based solutions can improve resource efficiency by providing a range of alternative sources of energy from resulting by-products such as biofuels and biomaterials.

The objectives of this study were to (1) investigate the potential of *Hordeum vulgare* to degrade/bio-accumulate TBT in sediment after 30 days and (2) to inoculate seedling roots with known TBT degrading bacteria to enhance the phytoremediation capacity. Statistical analysis on seedlings biomass was carried out followed by analytical analyses by atomic absorption spectroscopy. Further sediment was analysed by gas chromatography mass spectrometry for TBT degradation. Results showed a maximum decrease of ≥ 82% and ≥ 80% of TBT in sediment samples respectively with bacteria inoculum C7 (KX881905) and C22 (KX881904).

Keywords: Tributyltin, Microorganisms, Contaminated Soils, Marine Sediments, Bioremediation, Characterisation, Gas Chromatography.

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DETECTION OF PTA BIODEGRADATION IN CSTR STIRRED TANK BY ADAPTATED LIQUID INOCULATE IN ACTIVE SLUDGE SYSTEM

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Abstract:

One of the major environmental problems today is hydrocarbon contamination resulting from the activities related to the petrochemical industry. Accidental releases of petroleum products are of particular concern in the environment. Hydrocarbon components have been known to belong to the family of carcinogens and neurotoxic organic pollutants. Generally mechanical and chemical methods used to remove hydrocarbons from contaminated sites have limited effectiveness and can be expensive. Bioremediation is the promising technology for the treatment of these contaminated sites since it is cost-effective and will lead to complete mineralization. Bioremediation functions basically on biodegradation, which may refer to complete mineralization of organic contaminants into carbon dioxide, water, inorganic compounds, and cell protein or transformation of complex organic contaminants to other simpler organic compounds by biological agents like microorganisms. In this study, the liquid culture, which was stored at 27°C for 3 months was added to the activated sludge system. After that each of the chemicals (Terephthalic acid, P-toluic acid, 4- CBA) was added to the activated sludge system at 50 ppm, 100 ppm, 200ppm, 400 ppm respectively. Also control system was carried out.

Results obtained during 24h with HPLC (High Performance Liquid Chromatography). It was showed that the biodegradation rate in the microorganism-added reactor was better than in the control reactor. In the future the use of such adaptated liquid inoculate products may serve as an example for successful bioaugmentation studies.

Acknowledgements:

This work was funded by the research project SANTEZ -00719 STZ 2014 (112D044-TUBİTAK). – of Republic of Turkey, Ministry of Science, Industry of Technology. The bacteria used in this article was produced within the project above.

Keywords: PTA, Biodegradation, Wastewater Treatment, Sludge, Bioaugmentation, Hydrocarbons

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A MODELLING METHODOLOGY FOR ASSESSING THE USE OF DATA CENTER WASTE HEAT IN GREENHOUSES

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Abstract:

In Sweden the number of data centers establishments are steadily increasing thanks to green, stable and affordable electricity, free cooling, advantageous taxes and well developed internet fiber infrastructures. Data centers consume a lot of energy but the waste heat created are too seldom reused. One explanation is that the waste heat often is low grade and airborne and is therefore hard to directly connect to a district heating system without upgrade, which consumes additional energy. Without upgrade one option is to heat up greenhouses. Building physical prototypes to assess heat reuse scenarios can be costly, therefore using computer models to simulate real world conditions is an opportunity. However there is a lack of computer modelling methodology to assess the possibility of using waste heat from data centers in greenhouses in cold climates. The objective of this paper is therefore to propose such a methodology and discuss its benefits and drawbacks in comparison with other research studies. A case is presented where a data center in northern Sweden was studied. The temperature and the relative humidity was measured and fan speed data was collected for the air discharged from the data center to assess the waste heat. Computer models based on computational fluid dynamics, process modelling and control engineering principles were developed to create a decision support system to study different waste heat and greenhouse and mushroom house scenarios. The resulting methodology of conducting measurements and computer models calculations can be used for other data center operators or greenhouse developers to judge whether it is suitable to build greenhouses using data center waste heat.

Keywords: Data Center, Waste Heat Reuse, Greenhouse, Computer Modelling

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PLANT HYPERACCUMULATION OF LITHIUM

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Abstract:

The earliest evidence of humans mining for metals dates back 40'000 years ago to the late Pleistocene period. Since then the extraction of metals from the earth has been an imperative for the advancement and prosperity of human civilisation. We are not the only ones who have been extracting metals from the earth, plants have been doing this for the last 450 million years since the late Ordovician period.

The first of these plants evolved on soils that were rich with metals and practically barren, they had to survive in hostile environments so they developed a large tolerance for metals in the soil. Some plants have evolved the ability to accumulate enormous amounts of metals in their tissues, these plants are called hyperaccumulators. The *Sebertia acuminata* tree endemic to the ultramafic soils of New Caledonia grows up to ten meters high and can contain at least 25% nickel, that's around 37kg per plant.

Lithium is a metal which is becoming more valuable. It is our goal to investigate whether several plant species can hyperaccumulate lithium. Some plants are natural hyperaccumulators, and in others the property can be induced by adding chelating agents such as Ethylenediaminetetraacetic acid (EDTA) to the soil. Our trials include the use of chelating agents. In this poster, we present our research to date. Our results show that there is potential for the technology regarding lithium.

Keywords: Lithium, Hyperaccumulator.

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THE EFFECTS OF CADMIUM DOSES ON PLANT CHARACTERISTICS OF CAB-6P (PRUNUS CERASUS L.)

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Abstract:

Cadmium (Cd) is among the rare elements found in nature that are not necessary for plants. Cd is considered to be an important contaminant because its half-life is long and it is toxic at very low doses. Cadmium is found in all agricultural soils, with varying amounts (mostly in low quantities). However, uptake of Cd is easier by plants in low pH soils.

The study was carried out in the growing room and greenhouse in 2016 and CAB-6P (*Prunus cerasus* L.) cherry rootstock was used as plant material. Plants produced with mikro propagation were kept in a growth chamber until 50 cm length was reached. As a growing medium, a mixture of peat/perlite (2/1 v/v) was used. Plants reaching 50 cm were transferred to the greenhouse in 5 liter pots. As from June 25, 150, 300, 450 and 600 μM cadmium have been applied to each plant once a month. The study design was planned as 3 replications and each repetition had one plant. As of November the plants have been dismantled. The data obtained were assessed at the $P \leq 0.05$ level in the IBM SPSS (20.0) package statistical program with one-way variance analysis (ANOVA) and subjected to the Duncan Multiple Comparison Test.

The treatments that have the greatest negative effect on plant characteristics. According to the results obtained from recent study, Cd treatments reduced plant growth. Even the lowest cadmium dose has significant negative effects on plant characteristics.

Keywords: Cadmium, Cherry Rootstock, Heavy Metal, Plant Characteristics.

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PERFORMANCE OF LAB-SCALE ANAEROBIC MEMBRANE BIOREACTOR FOR THE TREATMENT OF REAL TEXTILE WASTEWATER

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Abstract:

This study aims at investigating the filtration and removal performances of the anaerobic membrane bioreactor (AnMBR) for the treatment of real textile wastewater. For this aim, a laboratory-scale anaerobic MBR equipped with hydrophilic flat sheet polyethersulfone (PES) membranes (0.45. μm) was used to evaluate the filtration and removal performances. The real textile wastewater was contained 600 ± 50 mg/L COD and 400-800 Pt-Co colour. High COD removal efficiencies (up to 94%) were observed in the AnMBR. On the other hand, colour removal efficiency remained between 70% and 84%. In addition to process performance, membrane filterability and the foulants characterization using GPC and FT-IR analysis were investigated in detail. The GPC analyses were conducted on the supernatant, permeate and cake layer samples. In the GPC measurements, quite high molecular weight compounds (~ 10000 kDa) were observed in cake layer. FT-IR analyses illustrated presence of both carbohydrate and protein-like compounds in the cake layer. AnMBR was successfully operated at 4.10 ± 0.7 LMH with weekly maintenance cleaning. Increasing the NaOCl concentration in the chemical cleaning resulted in better cleaning efficiency and removal of pore-blocking foulants. Chemical cleaning was carried out with 500 mg/L NaOCl and 1000 mg/L NaOCl solution, the average fouling rate obtained 0.063 ± 0.007 mbar/min and 0.060 ± 0.008 mbar/min, respectively. At the same operational conditions, chemically cleaned membrane resistances decreased from 2.58×10^{12} m⁻¹ to 1.89×10^{12} m⁻¹ with increasing the NaOCl concentration from 500 mg/L to 1000 mg/L.

Keywords: Anaerobic Membrane Bioreactor, Chemical Cleaning, Filtration Performance, Real Textile Wastewater, Wastewater Treatment

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TECHNOLOGICAL PROPERTIES OF FIBREBOARD PRODUCED WITH THERMOSETTING RESINS MODIFIED WITH CONDENSATE GENERATED DURING KILN-DRYING STEP OF WOOD

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Abstract:

A steam generated in a drying step of a lumber, sawdust or wood powder is usually discarded. The objective of the present study was to investigate potential use of condensate generated by cooling the steam obtained during high-frequency/vacuum drying step of a lumber. Unfortunately, the liquid condensate produced in this process is discarded to ground water. When the condensate fluid is discharged to the ground water, it can be harmful for aquatic organisms. The impact of the increased consciousness about environment has also created a demand for environmentally-friendly solution of the discarded condensate.

In this study, liquid condensate (5 wt% of total resin composition) obtained from various lumbers of trees (oak lumber (*Quercus petraea*), beech (*Fagus orientalis* Lipsky), and walnut (*Juglans Regia* L.) during the drying in a vacuum dryer with high frequency were added into commercial urea-formaldehyde (UF) resin and melamine/urea formaldehyde (MUF) resin. The MDF panels were produced with the control and modified resins. The condensate was supplied from a commercial lumber mill in Adapazari, Turkey. It was obtained from lumbers during high-frequency/vacuum drying. The UF and MUF resins were produced at the laboratory scale reactor of Polisan Chemical company. The condensates were replaced with deionized water used in the production of UF and MUF resins. The viscosity, gel time, density, and solids content of the resins was determined. Bending strength, bending modulus, internal bond strength, and thickness swelling of MDF panels were determined according to the European standards. The technological properties of MDF panels produced with the modified resins were slightly lower than the properties of the control MDF panels. The results of this study revealed that the condensate generated in a drying step of a wood could be efficiently used in the production of commercial UF and MUF resins.

Keywords: Condensate, Adhesive, Wood, Recycling

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EFFECT OF RESIN CONTENT IN THE CORE LAYER ON PROPERTIES OF THREE LAYERED MEDIUM DENSITY FIBERBOARD (MDF)

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Abstract:

MDF panels are commonly used in the furniture industry. The main objective of this project was to increase production capacity without decreasing its performance. The surface layers of the MDF consisted of fine fibers while the core layers consisted of the coarse fibers. It is aimed to decrease the amount of resin content used in production of three-layered MDF panel by using coarse fibers in the core layer. The amount of the resin in the core layer was gradually decreased from 10.5 to 6.5% by weight. As for tree species, the softwood fibers (pine wood fibers) were used in the face layers while the hardwood fibers (beech wood fibers) were used in the core layer. The physical and mechanical properties of the MDF panels were determined according to EN standards. The results showed that the physical and mechanical properties of the MDF panels were negatively affected by the decreased resin content while there was no statistical significant difference as the resin content decreased from 10.5 to 9.5 wt%.

Acknowledgement:

This work was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under grant 114O263.

Keywords: Three-Layered Fiberboard, MDF, Resin, Wood

**This work was supported by the Scientific and Technological Research Council of Turkey (TUBITAK) under grant 114O263.*

A PRELIMINARY STUDY ON POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) ACCUMULATION IN URBAN SOILS OF ISTANBUL

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Abstract:

Polycyclic aromatic hydrocarbons (PAHs) are one group of the most notorious pollutants in the urban environment. They are mainly generated from combustion of carbon containing fuels, and many of them are mutagenic and some are carcinogenic. Concentration of PAHs in urban soils was frequently 10 times higher than that in natural soils. This undoubtedly means a potential risk of PAHs in urban soils and raises people's great concern about PAH contamination in the urban environment. The aim of this study is to give preliminary data on contaminations and the origins of PAHs in soil samples obtained from various towns of Istanbul.

A total of 23 top- soil samples collected in main urban areas in seven towns of Istanbul, Turkey in 2015 summer season. Samples were analyzed for 8 PAHs [naphthalene (Nap), acenaphthylene (Any), acenaphthene (Ane), phenanthrene (Phe), anthracene (Ant), fluoranthene (Fla), pyrene (Pyr), benz[a]anthracene (BaA)]. The total concentrations ranged from 0,12 to 26,3 ng g⁻¹ for Σ 8PAHs. The highest Σ PAHs concentrations were found at roadsides and industrial sites.

To determine the sources of PAHs, the ratios of phenanthrene to anthracene and fluoranthene to pyrene were used to identify pyrolytic and petrogenic sources. Usually Phe/Ant ratio <10 and Flu/Pyr ratio >1 indicate that PAHs come from pyrolytic source and Phe/Ant >15 and Flu/Pyr <1 indicate petrogenic origins of PAHs. In most cases, PAHs in soils in urban areas of Istanbul were pyrolytic and petrogenic together. Only two towns in Istanbul show pyrolytic source. These sources included motor vehicle exhausts, industrial activities and coal burning. These data is a database for further monitoring studies and can be used to assess the health risk associated with soils polluted with PAHs.

Keywords: Polycyclic Aromatic Hydrocarbons (Pahs), Soil Pollution, Istanbul

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COMPARISON OF ANIONIC DETERGENT CONCENTRATIONS (LAS) IN THE ENTRANCE AND THE EXIT OF THE TURKISH STRAITS SYSTEM (TSS)

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Abstract:

The Turkish Straits System (TSS) consisting of Istanbul Strait, Canakkale Strait and Marmara Sea, is continuously under anthropogenic stress such as domestic and industrial discharges. One of these significant chemical pollutants is anionic detergents in marine environments. Anionic detergents are compounds derived from synthetic organic chemicals (mainly surfactant) having cleaning power and play an important role toward increasing pollution originated from wastewater.

This study aimed to understand the changes in concentrations of anionic detergent due to the stations in TSS. Names of the stations are listed as 1- Igneada, 2- Kiyikoy, 3- Karaburun, 4- Rumeli Feneri, 5- Riva, 6- Sile, 7- Kinaliada, 8-Seddulbahir, 9- Kumkale, 10- Bozcaada 1, 11- Bozcaada 2, 12- Bozcaada 3, 13- Aydincik, 14- Yuzen Taslar. Samplings were performed in autumn of 2016 and in spring of 2017.

Seawater samples were alkalinized with 0.1 N NaOH, acidified with 0,1N H₂SO₄. After extraction with chloroform they were shaken by wash solution and filtered. The filtrate volume was adjusted to 100 ml with chloroform, analyzed by UV spectrophotometer at 652 nm. Generally the results of the first sampling were higher than the findings of the second sampling. This case is related to the increase in discharges after the summer season having recreational activities and bathing. The highest value was found as 0,098 mg/l at Seddulbahir which is located at the exit of TSS. Value of the surface-active substances should be kept below the permitted value (≤ 0.3 mg/l) according to regulations on quality of swimming water published in Turkish Official Journal in 2006. The results were lower than the limit value according to use of the Marine and Coastal waters published in Turkish Official Journal in 2006. Similarly, these findings were not higher than the value (0.3 mg/l) recommended by Engineering and Environmental Consultant (EEC) Bathing Water Quality Directive.

Keywords: Anionic Detergent, Turkish Straits System (TSS), Pollution

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TECHNICAL-ECONOMIC APPRAISAL OF WATER REUSE IN METAL-MECHANICS INDUSTRY

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Abstract:

The use of water and disposal of effluents is a concern by the industrial sector. There is a great responsibility by the industries about the efficient treatment and its reutilization, considering the current water crisis and the climate changes. The metal-mechanics sector is responsible for an expressive quantity of generated effluents that carry polluting potential to the environment due to the presence of toxic metals. The reuse of wastewater in metalworking is fundamental to the preservation of environmental resources, lowering the water footprint of the obtained products. However, scarce knowledge of this practice is observed in small companies, especially in developing countries. On top of that, we note corporate resistance based on the economic cost, despite the existence of advanced methods and equipments for effluent treatment. Therefore, the improvement of the existing treatment processes in industrial units is imperative. Accordingly, this work aimed the technical feasibility and evaluated the economical aspects of the liquid effluents reuse after treatment in a metal-mechanics sector industry. The process of effluent treatment used by industry was precisely studied. Samples of the effluent before and after conventional treatment were collected in order to determine quality standards (alkalinity, chlorides, hardness, total and dissolved solids, oils and greases, pH, turbidity, DBO/DQO). The economical study was based on operational and reagents costs needed for effluent treatment up to reuse conditions. Preliminary results indicated that adjust in reagent quantity has made the process faster and more efficient, reducing the worked hours needed in 50%. Besides that, 66% reduction in aluminum polychloride and 52% in polymer consumption was observed, as well as the substitution of hydrated lime by sodium hydroxide, resulting in 42% reduction in annual input cost.

Keywords: Wastewater Reuse, Technical-Economic Viability, Metal-Mechanic Industry, Environment

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FUEL CHARACTERISTICS OF RICE PLANTS

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Abstract:

Rice (*Oryza sativa*), a member of grass family (Poaceae) is a tropical plant associated with the wet and humid climate. India is one of the world's largest producers of rice \approx 100 M ton/Yr. There are \approx 20000 varieties of rice in India of which \approx 4000 are cultivated. Rice straw is the vegetative part of the rice plant, which is burned and left on the field before the next ploughing or used as a feed for livestock. Rice straw is a major forage in rice-producing areas. The burning of rice residues causes severe air pollution in some regions. The outermost layer of the paddy grain is the rice husk, also called rice hull. At least 80, 20 and 30 M Ton/Yr rice grain, husk and straw are produced in the country. In this work, their fuel properties in the terms of gross calorific value(GCV) are described. The GCV of rice grain, husk and straw derived from 20 different rice plants was ranged from 4900 – 7150, 4520 – 6800 and 4810 – 6910 kcal kg⁻¹ with mean value ($p = 0.05$) of 5748 ± 253 , 5299 ± 245 and 5646 ± 195 kcal kg⁻¹, respectively. The weight loss of 9 and 5% due to volatile matter (including moisture) in the straw and husk material over temperature range of 50 – 150 oC was observed. The weight loss of 52 and 49 % in the straw and husk material due to decomposition of hemicellulose, cellulose and lignin over temperature range of 150 – 500 oC was marked. The effect of physical parameters i.e. cultivation period, biomass production, bulk density, moisture and ash content in the GCV of the rice are discussed. The energy fluxes derived from the rice grain, straw and husk is highlighted.

Keywords: Gross Calorific Value(GCV); Energy Fluxes; Cultivation Period; Vegetative Part

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CALORIFIC PROPERTIES OF FLOWERING PLANTS

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Abstract:

Flowering plants (angiosperms) are largest genera including > 25000 species, comprise ~ 90% of the Kingdom Plantae. They are thrown in large scale as waste after harvesting. The aim of this work is to study their heat properties and proximate variables. The fuel characteristic of 40 plants was grouped into two groups using proximate parameters i.e. BD, MC and AR as discriminating factors. In the I-group, 28 plants having GCV < 7030 kcal kg⁻¹ was included. In II-group, 12 energetic plants having GCV value >7470 kcal kg⁻¹ was categorized. The pyrolytic decomposition of the plant was occurred in six stages over temperature range of 50 – 1000 oC. In the first stage, a 7.5% weight loss was seen over temperature range of 50 – 100oC, may be due to evaporation of light volatile compounds including water. In the second stage, a large weight loss of 42.7% along with endothermic reaction was marked over temperature range of 150 – 400oC, may be due to decomposition of hemicellulose materials. Similarly, 16.2, 10.4, 6.7 and 3.3% weight loss in the third, fourth, fifth and sixth stages was observed over temperature range of 400 – 600, 600 – 750, 750 – 850 and 850 – 950oC, respectively, may be due to decomposition of cellulose and lignin materials of the plant. The value of bulk density, moisture content, calorific value and ash residue of the flowering plants (n = 40) was ranged from 560 – 1300 kg m⁻³, 1.6 – 4.8%, 4450 – 9500 kcal kg⁻¹ and 3.7 – 17.6% with mean value (p = 0.05) of 953±56 kg m⁻³, 3.3±0.3%, 6657±352 kcal kg⁻¹ and 11.4±1.3%, respectively. The correlations of calorific value with the proximate parameters of the biomass are discussed.

Keywords: Flowering Plant, Proximate Parameter, Gross Calorific Value (GCV)

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THE GREEN CHEMISTRY ANALYSIS OF BAKER'S YEAST PROCESS WASTEWATER TREATMENT WITH MICROALGAE

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Abstract:

Baker's yeast production constitutes an important portion of production industry in Turkey. In many parts of the yeast production process (cleaning and sterilising molasses, fermentation, filtration, mixing, extrusion, the cleanness of production area and equipment), high quality water is used and discharged as effluent. According to water pollution control regulations, the wastewater of yeast production in food industry is characterized with respect to the given limits of chemical oxygen demand (COD), suspended solids (SS), oil, grease, pH, and colour. Yeast industry effluents, especially inert COD caused by molasses, are hard to refine; therefore, advanced treatment technologies like anaerobic, aerobic, sludge settling and stabilization ponds, are mostly used to achieve the regulation limits. In this study, wastewater obtained from production facilities was centrifuged under 4000 rpm for 20 minutes to get rid of SS. After SS was removed, the wastewater was diluted to different concentrations. 6 ml microalgae cultures incubated in 250 ml erlenmeyer flasks under 27°C and 200 rpm with natural ventilation; where, organic substances of effluent had become nutritional source for microalgae. After 40 days of incubation, the grown microalgae were centrifuged under 5000 rpm for 5 minutes to get separated from the media. The COD of baker's yeast process wastewater treated with microalgae had been found to be quite lower than regulation limits. The efficiency of COD refinement had been almost 94%. This promising biological treatment had been assessed with respect to 12 principles of green chemistry to evaluate its greenness. This method satisfies 8 principles: waste prevention by no sludge formation, atom economy, safer solvents and auxiliaries, energy efficiency, renewable feedstock, reducing derivatives, bio-catalysis, and design for degradation. Since there exist no chemical synthesis, the following 4 green chemistry terms are not applicable: less hazardous chemical synthesis, designing safer chemicals, real-time analysis, and inherently safer chemistry.

Keywords: Baker's Yeast Wastewater Treatment, Microalgae, Green Chemistry

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EVALUATION OF LACTIC ACID PRODUCTION FROM GLYCEROL ACCORDING TO GREEN CHEMISTRY PRINCIPLES

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Abstract:

Hydrocarbons, such as coal, natural gas, and petroleum, have been the primary energy source of the world for ages and it is known that they are polluting the environment while depleting. The most common alternatives are biofuels, but some side products are formed during the production of biofuels. It is foreseen by the authorities that increasing need of biofuels will cause an increase in wastes. Biodiesel is a biofuel derived from vegetable and animal oil by esterification reaction. During its production, 10% of input is produced as glycerol. Therefore, glycerol is about to become a hard-to-manage waste as biodiesel is expected to be used and produced more in fuel market. Lactic acid production from glycerol can be a promising alternative for valuation of excess glycerol.

Main usage areas of lactic acid are food, cosmetics, drugs, and detergent industry. But, the most important one is the production of polylactic acid (PLA). Polylactic acid is an important bioplastic and it is the most preferred polymer as its prices are close to current plastic raw materials. Lactic acid production from glycerol, not only will remove glycerol from being a waste, but also it will positively contribute to bioplastic industry and environment by sustaining raw material to bioplastic production.

Green chemistry is the design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances. The twelve principles of Green Chemistry can be summarized as waste prevention, atom economy, safer synthesis, safer products, safer auxiliaries, energy efficiency, renewable feedstocks, derivative reduction, catalysis, degradability, pollution prevention and accident prevention. This study aims to investigate the lactic acid production from glycerol by investigating the each principles of Green Chemistry.

Keywords: Glycerol, Lactic Acid, Green Chemistry

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DETERMINATION OF SOME REPRESENTATIVE PETROLEUM PRODUCTS IN THE SEDIMENT OF LAKE IZNIK, TURKEY

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Abstract:

Being a recreational area and important water supply for irrigation and industrial use, the Lake Iznik is one of the crucial environments for sustainable development of Turkey's economy. Its water and sediment quality, however, tends to degrade with riverine discharges and intensive use of land. In order to provide a baseline data on both the environmental state of Lake Iznik, the concentrations and spatial distribution of TPH and aromatic gasoline compounds (PAHs and BTEX-benzene, toluene, ethylbenzene and three-xylene isomers) in its sediment, a potential sink for several organic contaminants, were detected using by gas chromatography and mass spectrophotometry. Aromatic hydrocarbons are the priority pollutants issued by the US-EPA and may have serious adverse effects on aquatic organisms at high concentrations. The levels of TPH and $\Sigma 12$ PAH in the lake sediment were low to moderate. Meanwhile, the total BTEX concentrations ranged between 11 and 272, with a mean of 88 $\mu\text{g}/\text{kg dw}$. The m-,p-Xylene was the most abundant congener (50.0% in average), and followed by toluene (31.2%), o-xylene (12.2%), ethylbenzene (5.3%) and benzene (1.3%). Taking into account additional parameters, such as sediment texture, organic carbon contents, TPH and $\Sigma 12$ PAH concentrations, multivariate statistical analyses indicated that individual gasoline congeners and their distributions in the sediment were controlled mainly by the morphological and textural features of the lake, the anthropogenic inputs via the surrounding main rivers, as they are influenced by agricultural facilities, the absorbance of BTEX compounds in sediment, and biodegradation processes. Having no any national sediment quality guidelines for petroleum hydrocarbon compounds, the obtained results will demonstrate a significant baseline that will shed light on the administrative authorities for formulating their rational environmental strategies.

Keywords: Petroleum Hydrocarbon Compounds, Aromatic Light Hydrocarbons, Pollution, Lake, Sediment

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A CROSS-SECTIONAL STUDY ABOUT THE RESPIRATORY HEALTH OF WORKERS WHO ENVIRONMENTALLY EXPOSED CEMENT DUST

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Abstract:

Objectives: The cement industry leads to significant occupational and environmental health problems in developing countries. Respiratory system diseases are one of the most important public health problems seen in the cement industry. In this study, we aimed to investigate functional capacity changes in the respiratory system according to the working environment conditions of a cement sector employees.

Research Methods: This cross-sectional study was conducted among 178 male workers between November 21st, 2016, and March, 30th, 2017, from a cement plant with a total of 334 employees. Data on socio-demographic characteristics, occupational history, chronic diseases, smoking habits, alcohol consumption, and respiratory symptoms were collected using a questionnaire during an interview with employees who worked in the production department. At the same time, respiratory function capacities of workers were evaluated by performing respiratory function tests and examining exposures. The obtained data was statistically analyzed using SPSS 21.0.

Results: The average age of the exposed group was 36.73 ± 6.7 and 73.59% of the employees had been working in the same cement factory for 5 years. Of the subjects, 46.1% were smokers, 42.7% consumed alcohol, and the mean body mass index (BMI) was 26.92 ± 3.93 kg/m². There was no relationship between forced vital capacity (FVC), forced expiratory volume (FEV₁), FEV₁/FVC values, BMI, alcohol use, smoking, and chronic diseases, but a statistically significant relationship with the duration of working time was revealed ($p < 0.05$).

Conclusion: Chronic respiratory diseases seen in the cement production industry represent a public health problem in developing countries. Measuring environmental exposures in the cement sector to check for possible dust particle exposure, providing employees and managers with RFT tests for occupational respiratory diseases, and providing awareness training on early diagnosis will be beneficial in terms of protecting employees and environmental health.

Keywords: Cement, Occupational And Environmental Health, Respiratory System, Workers

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OCCURRENCE OF BARLEY YELLOW DWARF VIRUS (BYDV) IN WHEAT REGIONS IN THE LAKES REGION OF TURKEY

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Abstract:

Cereals are the most common agricultural crops in Turkey. Numerous viral diseases cause economic losses in cereals. Among these BYDV is the most widespread and damaging virus of cereals both in Turkey and in the world. Yellow dwarf disease symptoms in cereal crops is caused by the strains of Barley yellow dwarf virus (BYDV). There are two strains of barley yellow dwarf virus- BYDV-MAV and BYDV-PAV. BYDV-MAV is transmitted by the English grain aphid (*Sitobion avenae*), while BYDV-PAV is transferred by the bird cherry-oat aphid (*Rhopalosiphum padi*) and the English grain aphid (*Sitobion avenae*).

This study was conducted to determine the epidemic virus diseases of winter wheat in the region in the last two years. During the surveys severe yellowing and dwarfing observed on wheat plants. Leaf samples showing virus symptoms were collected from various fields.

With this work, BYDV-MAV and BYDV-PAV is detected in the Lakes region for the first time. BYDV 2015-2016 epidemic is investigated in detail using 94 samples of wheat. The presence of virus was determined using enzyme-linked immunosorbent assays. The results revealed a high frequency of the serotype BYDV-PAV as a single infection present in 72.3%(68 samples) of the samples, whereas BYDV-MAV was detected in 2.1%(2 samples) and BYDV-PAV+BYDV-MAV mixed infection in 4.2% (4 samples) of the samples. As shown, BYDV-PAV infections have been found to be clearly ahead of PYDV- MAV. The high detection rate of BYDV-PAV in this study indicates the high populations of *Rhopalosiphum padi* and *Sitobion avenae* in the region, which are effective in the transmission of this virus. *Sitobion avenae* and *Rhopalosiphum padi* were already detected intensively in wheat production areas in the Lakes region, in a previous study (Demirozer ve Bilginturan, 2014).

Keywords: Barley Yellow Dwarf Virus, Wheat, DAS-Elisa

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ENERGY EFFICIENT BUILDING DESIGN AND SAMPLES

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Abstract:

Nowadays, "energy efficient environmental design" has become a current issue as a result of growing importance conscious consumption of energy resources, environmentally responsive design and the concepts of sustainability. It is aimed to minimize the duration of load and usage time of buildings energy-consuming systems without compromising comfort conditions that needs of the users. The architect's and engineer's decisions in the process of building design for this purpose It should be given the appropriate values various scales of design variables. The aim of this study, the questioning of the concept of energy efficient building design, this concept to what extent has changed the architecture discipline and analyzing energy efficient structure design applied in the context of examples. The topic of the study will be elucidated by using written sources, internet database and the analyses. Furthermore, visual elements such as photos and graphics will be used. After examining "CH2 Local Administration Building" and "Manitoba Hydro Office Building", the values are emerged. These final values show us that renewable energy sources transportation affect construction elements. Facades and roofs, has precedence in terms more efficient utilization of structure and ease of access to renewable energy sources because of the wind and solar power contact directly. A high rate of use of the facade depends on the product development of clean energy technologies in this field. By taking into consideration that both structures are taken the highest points build certificate, it is remarkable that taken the minus points on the subject of "natural lighting" and "thermal insulation".

Keywords: Energy, Energy Efficient Building Design, Energy Sources And Energy Technologies

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LEVELS AND ECOLOGICAL RISK OF ORGANOCHLORINE PESTICIDES AND PCBS IN SURFACE SEDIMENTS AND FISH ALONG THE EASTERN AEGEAN COAST

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Abstract:

Generally, organochlorines (OCs) are highly concentrated by living organisms and concentrations can biomagnify along the food chain. Therefore, an investigation of the distribution of some OCs in biota and sediments can give valuable information about organic contamination in a marine environment. Organochlorines were measured in fish and sediment collected from different bays (Izmir and Candarli) of eastern Aegean coast.

Surface sediments with three replicates were collected and sediment samples were extracted in microwave extraction system. After pre-concentration for the extracts sulfur was removed, then sediment samples were transferred into florosil column for fractionation (UNEP/IOC/IAEA/FAO, 1990).

Three subsamples of 5gr of dried fish sample were extracted with a microwave digestion system. To avoid the lipid interfere during GC analysis sulfuric acid was used for saponification. Florisil column was used for fractionation (UNEP/IOC/IAEA/FAO, 1990). Quantitative analysis was performed with Agilent5975C GC/MS.

The results showed that in all samples, p,p'-DDE was the predominant DDT congener. Σ Cyclodienes were generally predominant contaminants. Aroclors were found in noticeably higher levels than OCPs in sediments and fish. The highest levels of Aroclors, OCPs were found in sediments of Nemrut which can be attributed to industrial activities. According to Sediment Quality Guidelines, DDTs were lower than the values that may cause adverse biological risk in sediment samples. Aroclor 1254 in sediments only exceeded the TEL value at Nemrut region. The maximum levels of Σ OCPs were found in fish collected from Gulbahce, while Aroclors were measured in Aliaga. According to selected ratios indicated no recent influxes of DDT in the sampling areas. The estimated daily intake of DDTs, Aroclor1254 were below the acceptable daily intake level recommended by FAO/WHO.

Keywords: Organochlorine Compounds, Fish, Sediment, Ecological Risk, Izmir Bay, Candarli Bay

TOXIC EQUIVALENCY APPROACH FOR RISK ASSESSMENT OF POLYAROMATIC HYDROCARBONS, ANTALYA, TURKEY CASE STUDY

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Abstract:

In recent years, the presence of micropollutants has become a major threat to the health of human and receiving environment. Micropollutants, also termed as persistent organic pollutants, consist of a vast and expanding array of anthropogenic and natural substances. Due to their physicochemical properties, behavior in the environment and their interaction with biota and humans are governed by the number and the position of aromatic rings in the compound. Polyaromatic Hydrocarbons (PAHs) are produced in a variety of processes, such as by incomplete combustion of carbon-containing materials and also as combustion by-products. They are mostly used as intermediaries in pharmaceuticals, agricultural products, photographic products, thermosetting plastics, lubricating materials, and other chemical industries. PAHs, those containing two or more than two fused benzene rings are of great concern. Those chemicals enter the human body through different ways and cause various mutations on DNA. Therefore, toxicity of PAHs needs to be well documented.

This study aims to determine the levels and to estimate the toxicity of sixteen PAH compounds in wastewater samples. Samples were collected from industrial and urban wastewater treatment plants located in Antalya, Turkey. Samples were concentrated and separated by Horizon SPE-DEX 4790 automatic extraction system. Extracted analytes were analyzed with Shimadzu Gas Chromatography-Mass Spectrometry. In order to estimate toxicity of PAHs, Toxic Equivalency (TEQ) was calculated. TEQ concentrations were estimated to assess the risks associated with exposure to PAHs in wastewater.

The authors would like to express appreciation for the financial support of TUBITAK (Project No: 115Y309).

Keywords: Pahs, Wastewater, Toxicity Assesment

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DISTRIBUTION OF MARINE LITTERS IN THE SEA OF MARMARA

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Abstract:

The Sea of Marmara which located in Turkish territorial waters is a small inland sea where the Black Sea connects to the Aegean Sea. Its length and width are 250 km and 70 km, respectively. It covers a surface area of 11.500 m² and is 1390 m deep at its deepest point. It is an important area with regard to biodiversity, it has faced with ecosystem degradation under human press due to overpopulation of cities located around and industrial zones. A more than 25 million people live in basin of the Sea of Marmara. Beside this, the Turkish Straits and the Sea of Marmara located between the Black Sea and Aegean Sea have been used in marine transportation. Moreover, an intensive fishing pressure is the other issue related to environment in this area. These changes based on anthropogenic origin negatively effect on living resources in the Sea of Marmara. One of the most apparent change is abundance of marine litter exist in marine environment as well.

In this study, the composition and density of marine litter for 50 trawl hauls conducted seasonally between 2015 and 2017 in depths of 40-150 m in the Sea of Marmara were examined. Marine litters were categorized according to MEDITS protocol. The amount of litter per unit area was calculated by swept area method. 7442 items were collected from 1.2 km² of swept area (mean of 148±25 items per km²). The most abundant type of litter was plastic (64.6%), followed by metal (16.9%), rubber (7.9%), cloth (3.4%), glass/ceramic (2.8%), wood processed (2.8%) and other (1.6%) with the majority of plastic items being plastic bags, plastic bottles and beverage containers. When quantitative amount of marine litter per unit area compare with respect to depths and seasons, differences between seasons are found important ($p < 0.05$).

Keywords: Marine Litter, Composition, Density, Sea Of Marmara

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ASSESSMENT OF CAFFEINE EFFECTS ON MARINE PHYTOPLANKTON GROWTH

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Abstract:

Some pharmaceuticals are not totally eliminated by the conventional technology used in wastewater treatment plants. Caffeine is one of the most consumed chemical in food and pharmaceutical industry all over the world. It is used as anthropogenic indicator in densely populated city centers, sewage discharges, wastewaters, lakes, rivers, groundwater and marine water. The aim of the present study was to evaluate varying concentrations of caffeine and its most effective metabolite's (i.e., paraxanthine) effect on phytoplankton growth.

Isochrysis galbana and *Thalassiosira pseudonana* cultures were used to evaluate the effects of caffeine and paraxanthine in laboratory conditions. The phytoplankton cultures were exposed varying concentrations of both chemicals in 15°C and 14:10-h day/night period. Each group was monitored during 96 hours for different concentrations of caffeine and paraxanthine. Cell amount of the cultures were determined in every 24 hours by using Thoma counting chamber under a light microscope. Results were compared with the control groups for both phytoplankton.

Regarding to the growth inhibition, the highest effect of caffeine was observed with concentrations of 500 mg/L on *I. galbana* and 550 mg/L on *T. pseudonana* at the end of 96 hours. On the other hand, 150 mg/L of paraxanthine had the highest growth inhibition on *I. galbana* in the same period.

As an anthropogenic indicator, effects of caffeine and its the most effective metabolite, paraxanthine, on *I. galbana* and *T. pseudonana* growth was studied for the first time. Obtained data may be used for future consideration regarding to prevent of marine pollution and improvement of advanced wastewater treatment plants which discharges the effluents into the marine systems.

Keywords: Caffeine, Paraxanthine, Growth Inhibition, *Isochrysis Galbana*, *Thalassiosira Pseudonana*

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AN ANATOLIAN CITY ON HISTORY-FUTURE PENDULUM; KUTAHYA-ESKIGEDIZ (TURKEY) HISTORICAL CITY

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Abstract:

Historical cities are placement including livability, identity and original values that have occurred as a result of cultural factors in harmony with nature from past to present. Historical cities expressed in time for visual and semantic features that including meaning in terms of living traditional cultural history and place. Because of these characteristics of such areas must be protected. Using protection is a valid approach in terms of sustainability. Uncovering of the importance of historical cities and ensuring the efficient use of these cities should be created to forefront of the tourism value of these cities, to include in the tour itinerary and/or to attract urban visitors and visitors to the city by highlighting the special factors of these places. In this study Kutahya-Eskigediz historical urban structure were investigated in terms of the quality of the natural and cultural landscapes. Concepts were developed within the protected areas for urban use strategies in the study. These strategies include proposed urban land use decisions, new functions, the maintenance, repair and urban design guidelines within the concept. The suggestions were presented in the form of the landscaping projects in the study. Autocad 2016, Photoshop CS5, Sketchup and Lumion software were used as well as hand drawings and sketches for creation of the landscape project. Recommendations and three-dimensional images have been presented in the form of plans. The projects produced results of the study can be an example for other historical cities of a similar nature.

Keywords: Historical City, Historical City Protection, Landscape Planning, Landscape Design, Kutahya-Eskigediz City.

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THE RECOVERY OF NaOH FROM THE CONCENTRATED WATER USING THE BIPOLAR MEMBRANE ELECTRODIALYSIS

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Abstract:

Today, mankind faces a variety of environmental problems. A global consensus on the urgent solution for the global warming due to the increase of greenhouse gas, especially CO₂, from industrial activities and for the water shortage has been formed.

The purpose of this study is to propose the eco-friendly treatment methods for the concentrated water from the desalination of seawater which is a solution of the water shortages and for the CO₂ gas which is the major cause of the global warming.

In the concentrated water, the amount of salt such as NaCl as well as various bivalent cations such as Ca or Mg is about twice higher than that of the conventional sea water. We have performed the project whose objectives are to introduce the concept of CO₂ immobilization and then be to remove Ca or Mg in concentrated water. This presentation is for the recovery of essential NaOH for carbonation process using the bipolar membrane electrodialysis. For these experiments we used real concentrated solutions before and after carbonation along with simulated solutions.

In the results of electrodialysis using simulated solutions containing 5-20% NaCl, the desalination time and NaOH concentration were proportional to the concentration of the simulated solutions. In the case of the pre-carbonated real concentrated water, complete desalting reaction was impossible and the final concentration of NaOH was only 0.5N. Also, the complete desalination was achieved in the electrodialysis on post-carbonated concentrated water, but the desalting time was significantly longer than that in the simulated water. These results can be explained as the addition of NaOH solution for carbonation and the disturbance of Ca or Mg still remaining in the concentrated water. In conclusion, for the successful recovery of NaOH, it is essential to establish the removal conditions of divalent ions in the concentrated water after carbonation.

Keywords: Greenhouse Gas, Desalination, Concentrated Water, Electrodialysis, Carbonation

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MICROBIAL TRANSFORMATIONS OF SELENITE BY METHANE- OXIDIZING BACTERIA

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Abstract:

Methane oxidizing bacteria are well known for their role in the global methane cycle and their potential for microbial transformation of wide range of hydrocarbon and chlorinated hydrocarbon pollution. Recently, it has also emerged that methane-oxidizing bacteria interact with inorganic pollutants in the environment. Here we report what we believe to be the first study of the interaction of pure strains of methane-oxidizing bacteria with selenite. Results indicate that the commonly used laboratory model strains of methane oxidizing bacteria, *Methylococcus capsulatus* (Bath) and *Methylosinus trichosporium* OB3b are both able to reduce the toxic selenite (SeO₃²⁻) but not selenate (SeO₄²⁻) to red spherical nanoparticulate elemental selenium (Se⁰), which was characterised via energy-dispersive X-ray spectroscopy (EDX), X-ray absorption near-edge structure (XANES) and X-ray absorption fine structure (EXAFS). The cultures also produced volatile selenium-containing species, which suggests that both strains may have an additional activity that can either transform Se⁰ or selenite into volatile methylated forms of selenium. Transmission electron microscopy (TEM) measurements and experiments with the cell fractions: cytoplasm, cell wall and cell membrane show that the nanoparticles are formed mainly on the cell wall. Collectively these results are promising for the use of methane-oxidizing bacteria for bioremediation or suggest possible uses in the production of selenium nanoparticles for biotechnology.

Keywords: Methane Oxidizing Bacteria, Microbial Transformation, Selenite, Elemental Selenium, Bioremediation

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GHOST FISHING NETS IN THE WESTERN BLACK SEA (TURKEY)

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Abstract:

Ghost fishing is an invisible and unwanted fishing situation caused by lost, discarded or abandoned fishing gears largely confined to passive gears such as gillnets. In this study, the amount of turbot and bonito net lost in the fishing season of 2008 was determined by surveying the questionnaire with artisanal fishermen in the western Black Sea.

Black Sea is a major fishing ground in Turkey where artisanal/small scale fishing is economically important. The artisanal fleet in the Black Sea is commonly composed of boats 8–10 m in length operating in shallow waters using a variety of gear types and targeting a large range of species. However, Black Sea marine ecosystem faced with environmental stressors such as eutrophication, pollution, over and illegal fishing etc.

It was revealed that unintentional fishing gear losses were occurred according to the results of the interviews with the fishermen in the Black Sea. The total estimated loss was about 1279 nets (17.06 panels per vessel), equal to 69.833 km in length for turbot nets. The total lost bonito nets were 374 panels (2.11 panels per vessel) equal to 61.261 km. Both net type showed a positive relationship between the number of nets used and the number of nets lost. With an increase in the number of nets used, the number of lost fractions also increase.

The results of this study indicate the intensity of the artisanal fishery and clearly illustrate that a significant amount of turbot and bonito nets were lost in this region. However, there is no overall figure for the proportion of nets that lost or abandoned in marine litter. Further studies are necessary to determine whether the lost gears are still fishing, or not and if so, the rates of mortality they cause.

Keywords: Lost Fishing Nets, Ghost Fishing, Black Sea

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EXPERIMENTAL STUDY USING REACTIVE DISTILLATION COLUMN FOR BIODIESEL PRODUCTION

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Abstract:

Biodiesel from vegetable oils has attracted increasing interest among government, industry, and the general public. It has been shown to be the best supplement to fossil-based fuels due to environmental advantages, renewable resource availability, and the ability to lessen the dependence on imported oil. There is a great demand for the commercialization of biodiesel production, which in turn calls for a technically and economically sound reactor technology. Reactive distillation (RD) is a chemical unit operation in which chemical reactions and separations occur simultaneously in one unit. It is an effective alternative to the traditional combination of reactor and separation units especially when involving in reversible reactions, such as vegetable oil transesterification, or consecutive chemical reactions. The significant advantages of the RD over the conventional sequential process are the high chemical conversion rate and low capital and operational cost. The performance of a reactive distillation column is influenced by several parameters, e.g. operating temperatures, size of reactive and separation zones, reflux ratio, feed rate and location, etc, which were thoroughly investigated.

In this experimental studies, a reactive packed distillation column was used for production of fatty acid methyl ester (FAME) . The FAME considered as biodiesel was produced from transesterification reaction between sunflower oil and methanol by using packed heterogenous basic CaO catalyst. Steady-state and dynamic studies was investigated in the system. The effect alcohol-oil ratio on the system was investigated. Experiments have shown that the RD process can produce biodiesel at a production of %90 (%m/m) continuously with an alcohol-oil ratio of 6:1.

Keywords: Biodiesel, Reactive Distillation, Experimental Studies

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INVESTIGATION OF THE MECHANISM OF RESIDENTIAL WASTE VEGETABLE OIL COLLECTION

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Abstract:

Since the mid-19th century industrialization process in the rapidly evolving world of individuals have led to more consumption, as a result of which the amount of waste produced has increased very rapidly. In particular, how it has become an important issue of settlements removed from urban waste. People irregular storage of waste in areas close to settlements inhabited by methane gas originated led to the explosion. For this reason, on the the environmental pollution has emerged sourced from waste problem requires more emphasis. 1,500,000 tons of vegetable oil per year are used for food purposes in Turkey. It consists of approximately 350,000 tons of oil waste oil. Vegetable oils used in the frying time operation losing physical and chemical properties means waste oil case. Oils lost due to repeatedly use the feature has carcinogenic effects on human health. Waste oils, covers the surface of the water when poured into sewers, damage to the water system, prevents oxygen transfer from air to water, degrade in water over time will accelerate the depletion of oxygen in water and increases the operating cost of wastewater treatment plant. Sticking section of pipe waste water drain pipe leads to narrowing and blockage. It must be necessary to reduce the amount of waste that application of techniques to produce a minimum waste, the energy recovery of waste and / or the provision of material. According to the principle of recycling, it must be deposited in different storage devices to healthy and efficient recovery system back to create in housing, in the workplace, in schools, in hotels and in holiday villages.

Keywords: Waste Vegetable Oil, Recycling, Residential

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DEPENDENCE OF POWER ON COAL - PRESENT SCENARIO AND FUTURE SUSTAINABILITY, AN ANALYSIS AND OPTIONS

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Abstract:

More than 40% of global power comes from coal plants. Top most populated world countries China and India, jointly contribute for more than 36% of global population and more than 42% of global power generation, 60-70% of which comes from coal plants. These plants greatly contribute for carbon dioxide (CO₂) emissions.

With increasing threat of global warming and climate change, these plants have become the main target for minimizing anthropogenic emissions of CO₂. Coal plants with high conversion efficiency and zero discharge/emissions only are said to be continued in coming future, however commercialization of these plants is a great challenge in today's scenario. Closure of coal plants will badly affect the 48% of global population living in top ten coal power producing countries, thus not at all possible.

Study has been made for the growth in level of CO₂ in atmosphere along with growth in installed capacity of coal plants in last 125 years to estimate the contribution of coal plants in enhancement of atmospheric CO₂. Enhancement of conversion efficiency/reduction in specific CO₂ emissions with change in technology for conventional operating coal plants have been considered simultaneously including old sub critical, subsequent supercritical and finally conventional ultra supercritical technology. A comparison has also been made with the period of 125 to 250 years back, post industrial revolution period, when there was no coal power plant.

Techno economic feasibility of recent state of art coal power technologies with zero emissions/discharge has been reviewed and issues / constraints for their maturity and commercialization have been analysed, including advanced ultra super critical technology/integrated gasification combined cycle technology with carbon capture and sequestration (CCS) and retrofitting of CCS system in existing commercial coal plants. The study consolidates issues and challenges for continuation of coal power plants as an attractive option in future.

Keywords: Coal Power, Zero Emissions, IGCC, Retrofitting Ccs

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REPLACEMENT OF FUEL FIRED THREE WHEELERS WITH BATTERY OPERATED THREE WHEELERS, AN ANALYSIS OF ITS ACTUAL ENVIRONMENTAL IMPACTS: A CASE STUDY FOR A COUNTRY LIKE INDIA.

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Abstract:

Internal combustion engine based three wheelers (Auto Rikshaws) running with various fuels are common for public and private transport, especially in developing countries. These vehicles are being replaced by electric driven three wheelers (Electric Auto Rikshaws) in many of the world's cities due to their contribution in polluting city's environment, the criteria for which is based on ambient air quality (AAQ). Standards for SO₂, NO₂, Particulate matters, ozone, CO and heavy metals have been fixed to maintain AAQ and no standard of CO₂ has been fixed by most of the countries and international bodies. Charging of Electric Auto Rikshaw consumes electricity. Average loading of carbon dioxide to atmosphere on consumption of electricity in different countries varies depending on the share of different power generating resources in total installed capacity of that country. Charging the battery of an Electric Auto Rikshaw may emit more less or equal amount of CO₂ comparing with CO₂ emitted by a conventional Gasoline, Diesel, CNG or LNG fired Auto Rikshaw, if used for the same application, based on which, the replacement of conventional Auto Rikshaw by Electric Auto Rikshaw may reduce or enhance global CO₂ loading.

A study has been performed in Indian scenario considering power, torque, two/four stroke engine, mileage and CO₂ emissions for conventional Auto Rikshaws of different models and specifications presently on road and possibilities of their replacement by relatively lighter Electric Auto Rikshaws or by a more lighter three wheeler vehicle, called E-Rikshaw from the point of view of improvements in local environment and reduction/enhancement in long term global CO₂ loadings. Other issues and constraints pertaining to mass replacement of conventional Auto Rikshaw by Electric Auto Rikshaw/E-Rikshaw including economics, efficiency and availability of Battery Chargers, the charging time and environmental impacts of disposal of batteries have also been analysed.

Keywords: Electric Auto Rikshaw, E-Rikshaw, Specific Co₂ Emission, Aaq

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OPTIMIZATION OF AN ALPHA TYPE STIRLING ENGINE WITH SCOTCH YOKE MECHANISM BY USING ISOTHERMAL NODAL APPROACH

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Abstract:

The use of fossil fuels affects the global warming dramatically. To minimize this effect, renewable and environmental friendly energy sources such as radioisotope energy, solar radiation, geothermal energy etc. should be utilized. In order to obtain useful energies such as electricity and mechanical energy from these renewable sources, Stirling engines has a great potential because of their high thermal efficiency. In this study an alpha type Stirling engine with Scotch Yoke mechanism has been optimized by using isothermal nodal approach. This conceptual engine consists of two separate cylinders positioned parallel to each other. The motion of pistons takes place with a nominal phase angle of about 90°. Pistons were connected to the crankshaft by means of slot bearings. While carrying out the thermodynamic analysis of the engine, the working space has been divided into 15 nodal volumes. These are hot cylinder volume, cold cylinder volume, heater volume, cooler volume and regenerator volumes. The hot cylinder and heater temperatures were assumed to be 1000 K. The cold cylinder and cooler temperatures were assumed to be 400 K. The regenerator temperature was varied from 1000 K to 400 K step by step with 50 K decrements. As optimizing the power output of the engine; the area ratio of hot and cold pistons, the crank radius ratio of piston pins and the phase angle between hot and cold pistons were considered. When area ratio of hot and cold pistons was 1.73, the power output of the engine was increased by 5.5%. The influence of crank radius ratio on the power was found to be about one percent which might be null. The effect of the phase angle was found to be 2.4% which corresponds 77 degrees.

Keywords: Alpha Type Stirling Engine, Scotch Yoke Stirling Mechanism, Isothermal Nodal Analysis, Power Optimization

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BIOMETRY ANALYSIS OF LITTLE TUNNY JUVENILES (*EUTHYNNUS ALLETTERATUS*, RAFINESQUE, 1810) IN THE EASTERN MEDITERRANEAN SEA

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Abstract:

Body shape of a fish provides some information about life style such as feeding and swimming speed due to their body vary according to environmental conditions and type of feeding. These body shapes vary not only among species but also individuals of same species living in the different biotopes, between males and females, and between juveniles and adults of a species. The main objective of this study was to analyze the differences and similarities in morphometric characteristics among specimens of juvenile little tunny (*Euthynnus alletteratus*) that were collected from commercial hand line fisheries of Turkish waters (Eastern Mediterranean Sea) between July and October, 2012-2013.

A total of 304 specimens were collected during the study period. The fork length ranged 14.1 to 26.4 cm with a mean of 20.19 ± 1.19 cm. Total weight varied from 33.64 to 262.81g. The mean values and standard deviations (SE) of total weight were 123.29 ± 2.52 g. A total of 11 morphometric parameters (fork length-FL, head length-LH, first predorsal length-LD1, length of pectoral fin-LP, preanal length-LA, second dorsal fin height-HD2, caudal fin width-CC', maximum body height-H, snout length-SL, eye diameter-ED, and postorbital length-PO) were used for analyses. Length-length and length-weight relationships were determined by the least squares method to fit a simple linear regression model.

Morphometric characters were strongly positively correlated except for PO ($p < 0.05$). The best fit for length-length relationships was recorded between LP and FL ($r = 0.477$). The lowest value of correlation coefficient was found between LD1 and FL ($r = 0.125$). The length-weight relationship is described $W = 0.0034 \times FL^{3.4744}$ ($r = 0.98$).

Keywords: Biometry, Little Tunny, *Euthynnus Alletteratus*, Eastern Mediterranean Sea

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ANALYSIS OF GREEN BUILDING CERTIFICATION SYSTEM IN KONYA SPORTS AND CONGRESS CENTER

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Abstract:

Many problems such as environmental pollution, greenhouse emission, ozone layer depletion, and unconscious consumption of fossil fuels have emerged with the Industrial Revolution throughout the world. Since the concept of “sustainable development” was first introduced in Brundtland Report, released in 1987, many studies have been carried out and many decisions have been taken on sustainability all around the World, including Europe and Turkey. Within these thirty years, it has been understood that applicability of these decisions would be possible through the inspection and encourage of the local authorities and individual efforts.

Green Building Certification System, which encourages sustainable building design, has been created to help the building sector to solve these mentioned problems. Leadership in Energy and Environmental Design (LEED), established by USGBC in the USA, has become the most common used certification system around the world.

LEED certification system was introduced to Turkey in 2009. In this study Konya Sports and Congress Center is chosen as the research field. Within the scope of this research, LEED criteria (Sustainable Sites, Water Efficiency, Energy & Atmosphere, Material & Resources, Indoor Environmental Quality, Innovation, Regional Priority Credits) of this certified building was analyzed. Defining the local problems in certification system which was generated based on American data, some important conclusions are obtained that would guide designers and construction sector of green buildings in Konya.

Keywords: Ecological Architecture, Green Building, Green Building Certification Systems, Leed, Sustainability

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UP FLOW HETEROTROPHIC - COMPLETELY STIRRED AUTOTROPHIC SEQUENTIAL SYSTEM FOR NITRATE REDUCTION.

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Abstract:

Nitrate was identified as significant water contaminants in all over the World and biological denitrification is one of the best nitrate removal methods. In this study, evaluating the performances of heterotrophic-autotrophic sequential denitrification process for denitrification was aimed. The heterotrophic reactor was up-flow anaerobic reactor whereas autotrophic reactor was completely stirred membrane bioreactor. The nitrate reduction was initiated in the heterotrophic reactor and remaining nitrate/nitrite was further removed in the following autotrophic process. The CH₃OH/NO₃-N ratio varied between 1.24 and 1.85 while influent NO₃--N was 25 and 50 mg/L respectively. When influent NO₃--N concentration was 25 mg/L, heterotrophic and autotrophic reactors effluents were 12.3±6.1 and 2.57±2 mg NO₃--N/L corresponding to 90% denitrification performance. Sequential denitrification system has several advantages include effluent sulfate, acidity and low risk of organic effluent. Throughout the study, average effluent sulfate concentration was below the drinking water standard level of 250 mg/L and pH was in neutral level.

Keywords: Denitrification, Heterotrophic Reduction, Autotrophic Reduction, Sequential System

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SULFATE REDUCTION IN UPFLOW ANAEROBIC REACTORS AND METAL RECOVERY

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Abstract:

Acidic mine drainage occurs when water and air contact with metal sulfides such as pyrite, and is a low pH water containing high metal and sulphate. Sulfate reduction can be achieved by supplying an electron donor to the wastewater and metals can be precipitated with the resulting sulfide. In this reaction, alkalinity is produced which increases wastewater pH. In this study, sulfate reduction was studied comparatively in two upflow reactors fed with acetate and ethanol. Reactors were operated in parallel for 148 days and the influent 2000 mg/L sulfate was decreased to 51 ± 7 and 31 ± 6 mg/L in ethanol and acetate fed reactors, respectively. With the produced sulfide, metal precipitation in a stimulated AMD containing both copper and nickel was studied. Copper was precipitated at low pH by the sulfide transported from reactor effluent via N₂ gas. ICP analysis showed that Cu precipitation was completed within 35 min and Ni didn't precipitated during Cu removal. Nickel recovery was studied at higher pHs using reactor effluent containing sulfide and alkalinity. Structural identifications of the precipitates were carried out using XRD in the range of 2θ , between 10° and 70° . The XRD peaks at 2θ values of 29.38° , 31.88° , 32.71° and 48.12° can be attributed to respectively (102), (103), (006) and (110) formations of CuS (JCPDS card no. 01-075-2233). Similarly, for the nickel precipitates, values of 26.97° , 31.75° , 45.41° and 56.49° indicates (111), (200), (220) ve (222) of Nis precipitates (JCPDS card no. 00-011-099). Results shows that complete removal of Ni and Cu in separate settling tanks is possible with an optimized reactor configuration.

Keywords: Acid Mine Drainage, Separate Recovery, Nickel Precipitation, Copper Precipitation

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MATHEMATICAL MODELING OF SOLAR DRYING OF TOMATOES

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Abstract:

Drying is one of the main techniques of preservation of agricultural and food products. Many food products are dried to increase their life and improve the appearance. In this work, the effect of different drying parameters (air drying, forced convection, solar drying and velocity drying) on drying kinetics of tomatoes are studied. For this purpose the mathematical model is developed to predict the drying behavior and activation energy on the range of temperatures usually encountered in industry. The results show that the solar drying with forced convection at temperature 55°C of and air velocity 2m/s were the best drying data of tomatoes solar drying.

Keywords: Solar Drying, Tomatos, Modeling, Forced Convection.

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CONTRIBUTIONS TO BIOSYSTEMATIC PROPERTIES OF CHAMERION STEVENII (BOISS.) HOLUP (ONAGRACEAEA) IN TURKEY

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Abstract:

This study presents contributions to morphology palynology, chorology and threat category of *Chamerion stevenii* (Boiss.) Holub for the first time in Turkey. All samples used for the study are stored in the Herbarium of Recep Tayyip Erdogan University, Department of Biology (RUB). Locality information was compiled from the records of Flora of Turkey, the samples stored in national and international herbaria and author's own collections. Distribution maps were created using ArcGIS 9.3 program and calculation of extent of occurrence (EOO) and area of occupancy (AOO) were carried out, and the threat categories were assessed according to red list criteria and categories of IUCN. Plants are perennial and characterized with linear-lanceolate leaves and densely strigillose hairs. Pollens are monad, trizonoporate, subisopolar and bilateral symmetrical and baculate ornamentation. *C. stevenii* was recorded from 28 distinct populations mainly in east part of Anatolia and the EOO is < 133,944 km² and AOO is <35 km². The morphological and palynological observations showed that *C. stevenii* differs from closely allied taxa *C. dodonaei* (Vill.) Holub. Due to size and population number, habitat qualities and threats in the habitat such as flood, *C. stevenii* is assessed under the Least Concern category (LC) in Turkey.

Acknowledgement: The authors extend their thanks to TUBITAK (113Z782) for financial support.

Keywords: Anatolia, *Chamerion*, Pollen, Conservation Status

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RELATIONSHIPS AMONG TURKISH VINCETOXICUM WOLF (APOCYNACEAE: ASCLEPIADOIDEAE) INFERRED FROM CPDNA TRNT- TRNL DATA

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Abstract:

The present study aimed to explore phylogenetic relationships among *Vincetoxicum* Wolf distributed in Turkey based on cpDNA trnT–trnL sequences data. Total genomic DNAs were extracted by using silica gel-dried healthy leaves collected from natural habitats between 2012 and 2014 according to CTAB extraction protocol. Sequence analysis of PCR products were performed by Macrogen Inc. All the sequences were aligned with the Bioedit v.7.0 and then analyzed with MEGA v7 software. Average length and GC % content of trnT–trnL regions of the examined 20 samples were found to be 804 bp and 25.7 %, respectively. A data set of 804 bp belong to *Vincetoxicum* samples indicated that trnT–trnL regions contained 1 bp (% 0.12) parsimony informative sites, 2 bp (% 0.25) variable sites and 802 (% 99.75) conserved sites. Phylogenetic trees from both MP and ML analyses showed that all examined taxa fall into two distinct clades. While members of *V. tmoaleum* Boiss. and *V. canescens* (Willd.) Decne were grouped in Clade I, the remaining members belong to examined *Vincetoxicum* taxa were clustered in Clade II. However present findings did not provide enough data to separate *Vincetoxicum* taxa at interspecific level.

Acknowledgement: The authors extend their thanks to RTEUBAP (Project number 2015.53007.102.03.06) for the financial support.

Keywords: Taxonomy, Trnt–Trnl, Turkey, *Vincetoxicum*.

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THE FINGERPRINTING APPROACH IN THE ASSESSMENT OF HYDROCARBONS AND CRUDE OIL MARKERS IN DEEP SEDIMENTS OF PERTUSILLO LAKE (BASILICATA, ITALY)

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Abstract:

Heavy hydrocarbons and specific petroleum molecular markers were investigated in the deep sediments of Pertusillo Lake. The main goal was to evaluate the impact of the pollution sources on the lacustrine environment through the years, to recognize the contribution related to oil extraction and treatment. The Pertusillo Lake is a manmade lake located in the Agri Valley (Italy) that reaches the maximum capacity of 155 million m³ of water. It was completed in 1963 to supply water for drinking and irrigation and to provide hydroelectric energy. Lake Pertusillo lies within the National Park of Appennino Lucano-Val d'Agri –Lagonegrese and is a Special Protection Area. The largest onshore oil field of Western Europe is located in the Agri Valley. Pollution sources include a first treatment oil plant, 22 oil wells, one reinjection well, vehicular traffic, wastewater treatment plants, landfills, farms, plastics and other industries. Four sediment cores were collected, the sampling points were chosen based on hydrogeological considerations. Specifically, C₁₀-C₄₀ hydrocarbons and markers, typical of the Agri Valley crude, were detected by using gas-chromatography with triple quadrupole mass spectrometer as a detector. The oil fingerprinting approach was used to trace the impacts of hydrocarbon extraction on lacustrine sediments. The general comparison between chromatograms from different sources or sediment samples is poorly effective, because physico-chemical and biological processes could produce modifications to the chromatographic patterns. By contrast, the fingerprinting approach has proved effective. Finally, the concentrations of the organic compounds measured in the cores collected in the accumulation zone of the reservoir, were correlated with time by means of the sedimentation rate. Main results indicate that trace amounts of markers of the Agri Valley Oil appear quite spread in sediments. Markers are detectable even in the deepest examined sediment layer, presumably attributable to early 90's, before oil treatment plant activities started.

Keywords: Lacustrine Sediments, Fingerprint, Hydrocarbons, Water Resource, Lake, PASH.

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ASSESSMENT OF PCDD/F LOADS FROM DIL DERESI TO IZMIT BAY

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Abstract:

The PCDD/F loadings through Dil Deresi stream to Izmit Bay are assessed in details with respect to possible sources, congener distributions and seasonal changes. PCDD/F loads are estimated by monitoring the PCDD/F concentrations in the sediments carried by Dil Deresi to Izmit Bay during a year. Sediment samples are collected biweekly by a sediment trap placed in the mouth of the stream and analysed for 2,3,7,8-substituted PCDD/F congeners. Total PCDD/F concentrations vary 4.9-7074.5 pg/g dry weight, corresponding to 0.8-376 pg TEQ/g dry weight. Results indicate that PCDD/F loads may increase to significant levels from time to time, possibly due to the industrial discharges to the stream. Estimation of the PCDD/F loads to the bay shows that PCDD/F input by Dil Deresi stream flowing across a dense industrialized area, i.e., Dilovasi, constitute a significant part of the total PCDD/F loads to the bay from another sources including wastewater from about two million inhabitants around the bay, other industrial sources etc.

Keywords: PCDD/Fs, Izmit Bay, Sediment, Dil Deresi.

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AMMONIA REMOVAL FROM LANDFILL LEACHATE IN CLOSED REACTOR BY USING STRUVITE PRECIPITATION

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Abstract:

In this study, ammonium removal from landfill leachate to minimize the inhibition effect on anaerobic condition was conducted by forming struvite known as magnesium ammonium phosphate precipitation. The experimental conditions were statistically evaluated by Response Surface Methodology (RSM) and optimized by three factor-five coded level Central Composite Design (CCD). Optimum conditions based upon remaining PO₄, SO₄, Mg, Al, Ca, Cr, Cd and cost of the treatment were determined with 20 experimental runs under closed reactor conditions. The results were generally statistically fitted well to second-order polynomial functional model. Maximum ammonium removal efficiency (minimum ammonia remaining) was 90% at a molar rate of 2.0 for Mg/N, 1.1 for N/P and pH 9.0 value. The analyses of SEM-EDX, XRD and ICP on the precipitated sludge were concluded that struvite is the main constituent of the sludge with 72%.

Keywords: Optimization, Landfill Leachate, Ammonia Removal, Central Composite Design (CCD), Response Surface Methodology (RSM), Struvite,

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EFFECT OF DIFFERENT CHEMICALS ON SULFATE REMOVAL FROM LANDFILL LEACHATE: OPTIMIZATION OF EXPERIMENTAL CONDITIONS

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Abstract:

In this study, Sulfate removal from landfill leachate to minimize the inhibition effect on anaerobic condition was optimized by performing chemical precipitation. The effect of Ca(OH)₂, CaCl₂, CaO as calcium source, AlCl₃, Al₂O₃ as aluminum source, pH value, reaction time, temperature and sulfate concentration were observed. Response Surface Methodology (RSM) was used to statistical analysis of the experimental results. Five experimental set were applied that three factor-five coded level Central Composite Design (CCD) was applied apart from the last set. The last set was optimized under a wide range of six factor (Ca/SO₄, Al/SO₄, pH, time, temperature and sulfate concentration)-five coded level 80 experiments. SO₄, PO₄, NH₃-N, COD, Na, K, Ca, Mg, Al, Cr, Ni, Cu, Cd and Pb were analyzed in leachate samples. The properties of sludge samples were also analyzed by using SEM-EDX, XRD and ICP-MS methods.

Keywords: Landfill Leachate, Sulfate Removal, Central Composite Design (CCD), Response Surface Methodology (RSM), Optimization

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THE DISTRIBUTION AND COMPOSITION OF MARINE LITTER ON THE TURKISH COAST OF THE WESTERN BLACK SEA

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Abstract:

The Black Sea, a genuine inland sea, is connected to the Sea of Marmara via the Bosphorus in the southwest, and from there, to the Aegean Sea via the Dardanelles, and to the Sea of Azov in the north through Kerch Strait. This situation limits the natural water circulation in the Black Sea, leading to insufficient self-cleaning for the sea. On the other hand, millions of tons of organic and inorganic substances enter this basin every year, from the Tuna River in the west, the Dnieper and Dniester in the north and the Kizilirmak, Yesilirmak and Sakarya in the south (Turkish coasts). Certain factors which lead to the degeneration of natural structure in the Black Sea are recent overfishing, increasing sea transport, mining activities, hydroelectric plants and other industrial wastes.

In this study, which was carried out in 2016 summer season to determine the situation of marine litter in the Black Sea, bottom trawling operations were performed in 20 stations within the scope of Integrated Marine Pollution Monitoring Project (CSB/CEDIDGM-TUBITAK/MAM, 2014-2016). The solid wastes obtained from each haul were separated into nine categories based on the MEDITS protocol.

As a result, nylon bags, auto tires, plastic, metal and glass bottles, ceramic pots, textile and natural fibers were determined as solid waste at 14 stations. The amount of bag pieces and plastic bottles, evaluated in the plastic class, were higher than the other groups and it accounted for 52% of the total solid wastes. Comparatively lower in amount and higher in weight, auto tires represented 74% of the tire-rubber group in terms of weight. The quantity of solid waste per unit area varied between 42-994 pcs/km² and the weight of this waste between 3.7-3128.7 kg/km².

Keywords: Marine Litter, Composition, Density, Black Sea

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INVESTIGATION OF THE EFFECT OF INTAKE MANIFOLD DESIGN ON FLUID PARAMETERS BY FINITE ELEMENTS METHOD

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Abstract:

The amount of fuel/air mixture in internal combustion engines directly affects performance, power, fuel economy and emissions. Nowadays increasing performance necessity for vehicles require fuel/air mixture getting in cylinder more quickly. The mixture is taken into cylinder via intake manifold. The high vacuum effect created by difference internal pressure and external pressure the cylinder ensures the continuous flow of the mixture. In this study, velocity changes of the mixture at the cylinder entrance and vacuum pressure in the cylinder were investigated considering five different engine speed and four different valve lift amounts, depending on two different intake manifold geometries design for an internal combustion engine with four-cylinder spark plug ignition. Analyses were carried out using a finite element method at cylinder diameter of 75 mm and maximum valve lift of 7,5 mm. Air was used as a fluid in the analyses. When the results are examined, velocity of fluid was found to be 20.48 m/s at 1000 rpm and 104,108 m/s at 5000 rpm for maximum valve lift of intake manifold having cylindrical geometry. In the other design, velocity of fluid was 20.87 m/s at 1000 rpm and 104 m/s at 5000 rpm for maximum valve lift. In addition, as the valve lift increase at all engine speeds, vacuum pressure was increased in the cylinder in design of intake manifold having cylindrical geometry. However, in the other design, while the valve lift was increased, vacuum pressure was decreased in the cylinder. Nonetheless, as engine speed was increased, vacuum pressure was decreased in the cylinder for both design. It has been found that fluid was entered rapidly in the cylinder because of large pressure difference in the cylindrical geometry design.

Keywords: Intake Manifold Geometry Design, Internal Combustion Engine, Vacuum Pressure, Valve Lift.

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MAPPING OF A HOMOGENEOUS CHARGED COMPRESSION IGNITION (HCCI) ENGINE

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Abstract:

Growing population and technology over the world is resulted with increase of usage of the road vehicles which are mostly powered with fossil-based fuels. Concerns about fossil-fuel depletion and environmental aspects of the internal combustion engines are increasing rapidly. Exhaust emissions resulted from vehicles cause environmental pollution and global warming. Production of the engines with higher thermal efficiency and lower exhaust emissions has become mandatory because of these concerns. For these reasons a great attention has been focused on a revolutionary in-cylinder combustion strategy called as Low Temperature Combustion (LTC). In LTC operation, which was first introduced as homogeneous charged compression ignition (HCCI), air and fuel are premixed as in spark ignition engines and the mixture is compressed until entire mixture reacts as in compression ignition engines.

In this study, engine was tested in HCCI combustion mode at intake temperature of 40 oC by using reference fuels having different research octane numbers (RON0, RON20 and RON40). Operation range of the HCCI engine were determined and brake specific fuel consumption maps were obtained for different RONs. The effects of the RON on combustion were also examined at a stable engine speed of 1000 rpm. During the experiments engine was operated at naturally aspirated mode. In-cylinder pressure and heat release rate traces were obtained at a lambda value of 2.15. It was determined that increasing RON was reduced the speed range of the engine while the load range was increasing. The lowest BSFC values of RON0, RON20 and RON40 were obtained as 238.7, 251.3 and 276.6 respectively. It was also found that the start of combustion (SOC) was retarded with increasing octane number. The best CA50 value was obtained as 6 crank angle degree after top dead center with RON40 because of slower combustion compared to RON0 and RON20.

Keywords: HCCI Engine, LTC Mode, Fuel Consumption, Internal Combustion Engine.

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DETERMINATION OF SUITABLE AREAS FOR ORGANIC AGRICULTURE IN KELKIT BASIN AND MAPPING BY GEOGRAPHICAL INFORMATION SYSTEMS

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Abstract:

Kelkit Basin contained 17 district within boundaries of Tokat, Amasya, Gumushane, Giresun and Sivas provinces. The Basin located in Middle Blacksea Region of Anatolia, at 40.9968 North, 30.8491 East, 36.0482 South and 36.6943 West coordinates. Total area of the basin is 16 244,45 hectares. Altitude of the basin surrounded by high mountains ranged from 200 m (base of valley) to 1200 m (high plain). The height of the mountains gradually increased from west to east until 2400 m. There are not any major industries at limiting level of organic agriculture in the basin. The main livelihood of the people in the region is agriculture. Our study aimed to determine the appropriate fields for organic agriculture in the basin and mapping the areas.

In the study, land surveys were conducted, point data were collected with GPS and the 1230 point value is calculated. On the calculation of point value, Land Use Capability, land pollution situation, erosion risk groups and soil groups are used as criteria. In line with regulation of organic farming practices, in calculation the amount pollution in compliance with organic farming, intense agricultural activity, the impact of roads, settlement influence, water resources, the effects of soil pollution and industrial-mining areas were taken into account. By using these calculated values, maps were created in the program ArcGIS (9.3) by analysis of IDW (Inverse Distance Weighted). According to the generated maps, organic agricultural potential of the region were put forward.

Keywords: Kelkit Basin, Organic Agriculture Potential, Geographical Information Systems, Idw

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THE INFLUENCE OF WINE MICROFLORA ON SENSORY AND BASIC ANALYTICAL PARAMETERS OF WINE

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Abstract:

Fermentation is one of the key processes in the production of wine. Spontaneous fermentation is characterised by variability of yeast populations and their taxonomic composition. Quality apiculate microflora creates wines typical of the given terroir. Yeast starter from active dry wine yeast (ASVK) is characterised by lower production of undesirable metabolites in wine and reliability of complete fermentation. However, the nature of the wine is greatly influenced by the yeast strain used.

The aim of the experimental work was to compare the use of active dry wine yeast (Filtrafarm Gruner Veltliner, f. Lallemand) against the use of the microflora occurring naturally in the vineyard (spontaneous fermentation) in terms of their influence on the basic analytical parameters of the wine. The varieties Gruner Veltliner and Pálava were used for the experiment. Grapes of these varieties were harvested in October 2016 in the wine-growing village of Lednice (Wine Region Morava, Czech Republic). All analyses and sensory assessments were conducted in March 2017. We focused on the determination of alcohol content, all titratable acids, reducing sugars, glycerol, acetic acid, malic acid and lactic acid. These parameters were determined by Fourier transform infrared spectroscopy (FTIR).

The analytical and sensory results clearly confirmed that the fermentation method significantly affected the quality of the resulting wine. Differences were also noted between the studied varieties. The method of spontaneous fermentation is a return to authenticity, yearly variability, originality and biodiversity.

Keywords: Wine, Yeast, Fermentation

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A DECOMPOSITION TECHNIQUE OF CHRYSOTILE ASBESTOS BY THERMO-CHEMICAL TREATMENT AND CARBONATION

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Abstract:

Asbestos minerals possess unique and useful properties, so they were widely used in the past especially for the manufacture of building materials. Nowadays, asbestos is generally known that asbestos possesses carcinogenic properties. As a result, in the most countries the mining, refinement and use of asbestos have been banned, apart from some exceptional applications.

Chrysotile, a fibrous variety of serpentine with chemical formula $2[Mg_3Si_2O_5(OH)_4]$ is the most important source of commercial asbestos. Most importantly, the aims of this study were to investigate significant changes in the surface morphologies of fibrous chrysotile to a non-hazardous material under economically viable and safe conditions through the thermo-chemical treatments and the direct mineral carbonation. A novel pretreatment method for the mineral chrysotile was proposed to develop an effective carbonation process for CO₂ sequestration. Basically, the method involved preheating a mixture of NH₄HSO₄ or NaHSO₄·H₂O and chrysotile and the subsequent aqueous carbonation. XRD analysis revealed that the starting material was pure chrysotile and it transformed into effremovite or boussingaultite by heat treatments with NH₄HSO₄ in reaction temperature 100°C~200°C for 2hr and trisodium hydrogen sulfate and ferrinatriite with 3M NaHSO₄·H₂O in the range of 60°C~200°C for 30min. After thermos-chemical treatments of chrysotile with 3M NaHSO₄·H₂O, FT-IR spectrum of the special chrysotile were not observed except the band of 952cm⁻¹ according to Si-O-Si stretching vibration and this peak became considerably weak and exhibited broadening. Highly crystalline magnesite of the typical rhombohedral morphology could be obtained after the carbonation for 2h at 200°C using sample thermo-chemical treated with 3M NaHSO₄·H₂O at 60°C. Results obtained with XRD, FTIR and SEM analyses indicated that applied proposed method changed the chemical composition as well as the morphological and structural of chrysotile.

Keywords: Asbestos, CO₂ Sequestration, Chrysotile, Non-Hazardous, Thermos-Chemical Treatment

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CO₂ MINERALIZATION USING BRINE FROM DESALINATION PLANT

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Abstract:

CO₂ mineralization is a method of sequestering CO₂ in the form of carbonated minerals. In this reaction, Mg and/or Ca react with ionized CO₂ to produce CO₃²⁻, with the divalent ions commonly being supplied from industrial waste such as slag from steel production. However, brine discharged from seawater desalination is another potential source of Mg and Ca. The concentrations of Mg and Ca in brine are twice those in ordinary seawater. This study used a cycle for CO₂ mineralization that involves an increase in the pH of the brine, followed by CO₂ bubbling, and finally filtration. To the best of our knowledge, this is the first time real brine from a seawater desalination plant has been used for CO₂ mineralization. The resulting precipitates were CaCO₃ and hydromagnesite, with these materials being identified by FTIR and TGA-DTA. In addition, we estimated that the Mg and Ca ions in the brine were carbonated to hydromagnesite and calcite with the yields of 86% and 99%, respectively. This study practically demonstrates that brine from seawater desalination plants can be used for CO₂ mineralization.

Keywords: CO₂ Mineralization; Desalination; Carbonates; Brine; Seawater

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PHOTOCATALYTIC DEGRADATION OF METHYLENE BLUE USING ZNO NANOPARTICLES IN WATER PURIFICATION

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Abstract:

The treatment of water has become a critical issue because of deterioration in water quality caused by human being. While different techniques remain impotent against certain pollutants, photocatalysis seems to be a promising technology. This method proves to be perspective and advantageous due to its high efficiency, low cost and easy utilization in different type of water purifying devices. In this work, we study the photocatalytic activity of zinc oxide "ZnO" on model pollutants such as methylene blue. The effect of concentration and temperature of the dye were investigated. The photocatalytic efficiency was calculated from absorption spectra using UV-visible spectroscopy.

Keywords: Zno, Photocatalysis, Methylene Blue, Water UV-Visible Spectroscopy

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THE HYGIENIC IMPROVEMENT OF FOOD STALLS AROUND NAKORN RATCHASIMA ZOO, THAILAND

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Abstract:

Due to the provincial tourism promotion to boost local economy, the number of food stalls around Nakorn Ratchasima Zoo, which is the famous tourist attraction and learning center for students in the north eastern part of Thailand, are increasing. Therefore, food hazards and food borne disease prevention are necessary and the standards of food stalls should be done according to the criteria of food sanitation. However, the number of local staffs are not enough. The university students and other the public health volunteers should be trained to assist the local staffs to continue this project sustainable. A total of 50 food stalls around Nakorn Ratchasima Zoo were investigated by using food sanitation inspection form including the physical hygienic conditions. Food, utensils and the food handlers contamination were examined by determining coliform bacteria. Measurements were done before and after intervention. The physical hygienic conditions of the food stalls has been improved throughout this project. The result was statistically significant at p -value < 0.05 . Before the study coliform bacteria were found in food samples (24.8%), utensils (15.2%), and on the hands of the shopkeepers (20%), respectively. Whereas, after the intervention coliform bacteria were found in food samples (10.9%), utensils (9.4%), and on the hands of the shopkeepers (8%), respectively. This is a statistically significant decrease of coliform bacteria contamination (p -value < 0.05). It can be concluded that the university students and the volunteers can help the food stalls improve food hygiene.

Keywords: Food Sanitation, Food Stalls, Coliform Bacteria

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ACTIVATED PERSULFATE OXIDATION FOR THE TREATMENT OF CONCENTRATED LEACHATE FROM MEMBRANE PROCESS

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Abstract:

The combined use of biological treatment and membrane processes has been successfully applied in leachate treatment. But the disposal of the leachate concentrate from the membrane proseses is a major problem. Landfill recirculation of concentrated leachate is not preferred because it reduces methane production in the landfill area. Therefore, the concentrated leachate should be treated. In this study, treatability by persulfate oxidation of concentrated leachate with high salt and high refractory organic matter content was investigated. Microwave irradiation were used as persulfat activator where Ag + 1 salt were used As a catalyzer. Result of the study, color removal was 87.6% by microwave-activated persulfate oxidation, whereas it was 18.4% by Ag-catalyzer persulfate oxidation. By using this microwave activator and Ag + 1 catalyzer together, this value has increased to 93%. It can be seen that color removal kinetics followed the first-order reaction kinetics well. The first-order reaction kinetics constant were calculated as 0.3802 min⁻¹ and 0.6422 min⁻¹ for (PS+MW) and (PS+Ag+MW) treatments, respectively. Removal kinetics for (Ag+PS) treatment is obviously no kinetics did not fit.

Keywords: Concentrate Leachate, Microwave, Persulfate Oxidation, Ag-Catalyzer,

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OPTIMIZATION OF OPERATIONAL PARAMETERS BY TAGUCHI DESIGN FOR IMIDACLOPRID OXIDATION BY ULTRAVIOLET (UV) LIGHT - ACTIVATED PERSULFATE

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Abstract:

Ultraviolet light (UV) activated persulfate (PS) oxidation was investigated to degradation of imidacloprid. Aqueous Imidacloprid solution was exposed to UV light at different persulfate concentration, contact time and pH. Taguchi's robust design approach was used to optimize the imidacloprid oxidation. Experiment was planned as per Taguchi's L9 orthogonal array. The optimum levels of control factors for maximum imidacloprid oxidation were found as, contact time at 30 min, persulfate concentration at 1.875 g/l and pH at 5.2. The ANOVA analysis shown that the the most effective control factor is persulfate concentration. A confirmation experiment was performed to verify the effectiveness of the optimal combination. While the Taguchi set experiments had the highest yield of 64.5%, this value increased to 73.86% as a result of the verification experiment.

Keywords: Ultraviolet, Persulfate Oxidation, ANOVA, Optimisation

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IN VITRO PRODUCTION OF ESSENTIAL OILS IN SAGE (*SALVIA OFFICINALIS* L.) WITH USING MELATONIN

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Abstract:

Biotechnological production of secondary metabolites in callus cultures is an attractive alternative to the extraction of the whole plant material. Elicitation is recognized as the most practically feasible strategy for increasing the production of desirable secondary compounds from cell, organ, and plant systems. In recent years, studies on melatonin in plants have been increased and become very interesting. Melatonin (N-acetyl-5-methoxy-tryptamine) is an indoleamine neurohormone and it has since been identified playing important roles in many plant responses including growth, reproduction, development, and stress. There is not any research on the effect of melatonin on enhancing essential oils as an elicitor. Sage, *Salvia officinalis* L. (Lamiaceae) is an aromatic perennial plant and has antibacterial, antiviral, anti-inflammatory, antihydrotic and antioxidant properties. This study describes the effects of melatonin phytohormone on essential oils accumulation in callus culture of *Salvia officinalis* L. Calli were obtained from sage leaves on MS media added 2.0 mg/l naphthaleneacetic acid (NAA), 1.0 mg/l. benzylaminopurine (BAP) and different concentrations of melatonin (0.0, 100.0 and 200.0 μ m). Essential oil content was measured by the high performance liquid chromatography (HPLC). After 6–7 weeks the percentages of callus induction were determined from all treatments. But, melatonin decreased the calli production of sage explants gradually. However, accumulation of essential oils changed by various percentages in which melatonin presented medium. Also, quantification of polyphenols by HPLC exhibited changes in rosmarinic acid in callus compared with control group. Besides, the levels comparable to those founds in leaves of naturally growing plants.

Keywords: Callus Culture, Essential Oil, Melatonin, Sage, *Salvia Officinalis* L.

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EFFECT OF MELATONIN ON SECONDARY METABOLITES OF ROSEMARY (*ROSMARINUS OFFICINALIS* L.) - POSSIBLE NEW ROLES AS AN ELICITOR

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Abstract:

Melatonin (N-acetyl-5-methoxytryptamine) is a well known compound found in animals, but is newly investigated in the physiology of plants. It seems that melatonin plays a crucial role in protecting plants from abiotic stress caused by heavy metals, UV radiation and temperature fluctuations. Today melatonin is known to be an agent with antioxidant activity that functions by stimulating antioxidant enzymes, although, in general, research into melatonin in plants is still clearly insufficient. There is no study on the effect of melatonin on rosemary secondary metabolites. Rosemary (*Rosmarinus officinalis* L.- family, Lamiaceae) is one of the most popular perennial culinary herbs cultivated all over the world. Secondary metabolites of rosemary dominated by 1,8-cineole, α -pinene, camphene, α -terpineol, and borneol as principal constituents are also responsible for various pharmacological effects of the general antioxidant and antimicrobial properties known for many essential oils, as well as other effects including anticarcinogenic activities. This study reports the effects of melatonin on callus induction and secondary metabolite contents in callus culture of rosemary. Leaves were used as explants and cultured on MS medium supplemented with 2.0 mg/l naphthaleneacetic acid (NAA), 1.0 mg/l. benzylaminopurine (BAP) and different concentrations of melatonin (0, 100 and 200 μ m). Calli formed after 6 weeks and subcultured two times each of 4 week duration. Secondary metabolite content was measured by the high performance liquid chromatography (HPLC). Precious results were obtained by culturing rosemary with melatonin that increased important essential oils in rosemary calli. Another striking result is that some essential oils were seen in the results with melatonin that not found in the control group. These findings are the first report of the effects of melatonin on rosemary secondary metabolites and shows that melatonin promote essential oils as an elicitor in rosemary callus cultures.

Keywords: Callus Culture, Melatonin, Rosemary, *Rosmarinus Officinalis* L., Secondary Metabolite

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AN INVESTIGATION OF THE EFFECT OF OCCUPANT BEHAVIOUR ON INDOOR THERMAL ENVIRONMENT AND BUILDING ENERGY PERFORMANCE GAP

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Abstract:

Building energy performance gap is one of the significant issues associated with assessment of energy use in the built environment. Defined as the discrepancy between the design and as-built performance of buildings, building energy performance gap is still significant due to an array of reasons such as occupant behaviour, simulation model simplifications, poor assumptions, etc. The inherent uncertainty within these factors and their effect on overall consumption patterns are distinctive for each building. This study focuses on investigating the effect of occupant behaviour through measurement and simulation and their possible implications on building performance gap, through a case study of an office building in Eskisehir, Turkey. Short term building energy performance monitoring data and a calibrated simulation model in EDSLtas are used to investigate whether: (1) occupant behaviour is inherent in indoor thermal environment monitoring data to a certain extent, (2) modelling occupant behaviour in further detail contributes to narrow the building performance gap, and (3) post occupancy evaluations are necessary, both qualitatively and quantitatively to exploit determinants of performance gap.

Monitoring data and measured U-values are used to calibrate the building simulation model, focusing on the indoor thermal environment and occupancy presence and lighting use, along with the hourly energy consumption data retrieved via monitoring. The difference between the calibrated simulation model outcomes and the monitoring data indicates the performance gap in simulation outcomes, which are evaluated and discussed through statistical analysis. The magnitude of the alteration in indoor thermal environmental conditions due to various modes of occupancy and the effect of detailed occupancy modelling on the simulation results are discussed regarding building performance gap. In this respect, this study aims to provide a contribution to studies on occupant behaviour and underscore the significance of the possibility in narrowing the building performance gap through accurate modeling of occupant behaviour.

Keywords: Occupant Behaviour, Energy Performance Modelling, Building Performance Gap, Monitoring, Simulation

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SHEAR FLOW OF A MICROSTRETCH FLUID WITH SLIP

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Abstract:

In this study, the effects of slip boundary conditions on the shear flow of the microstretch fluids are investigated. The field equations of the microstretch fluids are solved under slip boundary conditions which are physically more realistic than no-slip boundary conditions. Exact analytical solutions are obtained for the velocity, microrotation, and microstretch fields for the case of a flow between two parallel plates. It has been shown that the previous solutions corresponding to pure Newtonian fluid and micropolar fluid appear as the special cases of the present analysis. Results are represented graphically for the velocity, microrotation, and microstretch for various values of the slip and micropolar parameters.

Keywords: Microstretch Fluid, Shear Flow, Analytical Solution, Slip Boundary Conditions.

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AXIAL COUETTE FLOW OF A MICROSTRETCH FLUID IN AN ANNULUS

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Abstract:

The aim of the present analysis is to determine the axial Couette flow of a microstretch fluid between two concentric cylinders, with the inner cylinder is suddenly accelerated from rest and the outer cylinder fixed. The governing partial differential equations are written in a nondimensional form using suitable transformations and exact analytical solutions are obtained for the velocity, microrotation, and microstretch fields. Effects of flow parameters on these kinematical variables are analyzed with the help of graphical results. It has been shown that the previous solutions for a pure Newtonian fluid and a micropolar fluid are special cases of the present analysis.

Keywords: Microstretch Fluid, Axial Couette Flow, Analytical Solution, Annular Region.

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ACTIVITY OF TITANIUM DIOXIDE ON COGON GRASS SILICA FOR PHOTOCATALYTIC DEGRADATION OF PARAQUAT

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Abstract:

Cogon grass silica (CGS) was prepared from a weed cogon grass by leaching with hydrochloric acid and calcinations. Cooperation of silica (SiO₂) with titanium dioxide (TiO₂) can improve photocatalytic activity because SiO₂ increased surface area and introduced Si–O groups enhanced paraquat adsorption on TiO₂. Herbicide paraquat which is widely used for cassava cultivation in Thailand is highly toxic, persistent and easy to contaminate into groundwater. The objective of this work was to investigate activity of TiO₂ supported on CGS material for photocatalytic degradation of paraquat. The photocatalysts were prepared by grafting the support with TiO₂ sol from an acid catalyzed sol-gel formation method containing 20, 30 and 40 wt% TiO₂/CGS. X-ray fluorescence spectrometer was used to confirm TiO₂ amount. All prepared catalysts showed only crystalline phase of anatase which is composition of Ti⁴⁺ and Ti³⁺. Photocatalytic testing was performed in a batch-type experiment with Xenon lamp (1100-1200 W/m²). Changes in the paraquat concentration were determined by a UV-Vis spectrophotometer at λ_{max} of 256 nm. The degradation ability decreased in the following order: TiO₂/CGS > un-supported TiO₂ > CGS. CGS can slightly decrease paraquat concentration after irradiation. The result indicated that CGS can improve the photocatalytic activity of TiO₂ due to increase adsorption and photocatalytic degradation. The best photocatalyst was 20 wt% TiO₂/CGS due to high amount of TiO₂ might increase accumulation.

Keywords: Cogon Grass, Silica, Titanium Dioxide, Paraquat, Photocatalytic Degradation

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COST EVALUATION OF AQUEOUS SOLUTIONS CONTAINING OF ANIONIC SURFACTANT BY US PROCESS TREATABILITY

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Abstract:

In this study; treatability of Linear alkyl benzene sulphonic acid (LABSA) from anionic surfactants were made by ultrasound method from advanced oxidation processes and cost analysis. Treatment of LABSA were evaluated by detergent removals. The removal efficiency and cost effects were investigated for concentration (5-20 mg/L), pH (5-10), reaction time (0-120 min), amplitude ($A_m=60-80\%$) and energy consumption parameters. The highest removal efficiency was found 76% for 20 mg/L LABSA concentration, pH=5, 90 min reaction time, 80% amplitude and consumption of 0.105 kWh energy. As a result of the cost analysis; in the same experiment conditions for 60 min reaction duration time by 0.065 kWh energy consumption 75% recovery yield was obtained and the unit cost of the treatment was determined as 0.168 Euro/gLABSA.

Keywords: Anionic Surfactant, Cost, Treatment, Ultrasound Method

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REMOVAL OF LINEAR ALKYL BENZEN SULPHONIC ACID BY SONICATION PROCESS

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Abstract:

In this study, treatability of linear alkyl benzene sulphonic acid (LABSA) from aqueous solutions were investigated by sonication process. The effects of initial LABSA concentration, pH and reaction time which are process independent variables were investigated on the yield. Removal of LABSA was followed by absorbance analysis. The system optimization was made with experimental design by using the surface response method in this study. It was determined that the independent variable that most affects LABSA removal was the reaction time. The reaction time and initial pH value of the solution showed a positive effect on the removal yield. The initial LABSA concentration had a negative effect, and as the concentration increased, the yield decreased. The predicted maximum absorbance removal was 64% at the optimum conditions of pH 5.5, initial LABSA concentration of 9 mg / L and reaction time of 60 min. Only 11% of total variability can't be explained by this model.

Keywords: Anionic Surfactant, Linear Alkyl Benzene Sulfonic Acid, Optimization, Response Surface Methodology, Ultrasonic Degradation.

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TWO TOURISTIC AREAS: MONITORING CHEMICAL AND BIOLOGICAL POLLUTANTS IN MEDITERRANEAN MUSSELS IN IZMIR PROVINCE COAST, TURKEY

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Abstract:

The shellfish industry is very important in Turkey and *M. galloprovincialis* is widespread in mussels in Aegean Sea. Izmir Bay is on the west coast of Turkey. Mordogan and Foca are located on the outer bay. Fishing and tourism are the main sources to cover the living expenses of the people in Foca and Mordogan. *Giardia intestinalis* and noroviruses are important food-borne pathogens that can be transmitted to humans through consumption of mussels. Organotin compounds and organochlorine pesticides may penetrate tissues and enter to the central nervous system.

In this study, we aimed to determine the relation between pollution levels of organochlorine pesticides, tributyltin and two biological organic pollutants (*Giardia intestinalis* and norovirus) in Foca and Mordogan. After the mussels are collected, they were measured, pooled and divided equally in order to analyze their chemical and biological pollutants. Gas chromatography was used for detection of organochlorine pesticides and tributyltin. RT-booster PCR was used for detection of norovirus and nested PCR was used for *Giardia*. All the mussel samples investigated in this study were negative for *Giardia*. Mordogan station was positive for norovirus in all seasons except November 2009. Foca was clear. Tributyltin levels were the highest in Foca in all seasons. The lowest concentration was in spring 2009 in Mordogan. All mussels samples showed the values, which are below the “tolerable average residue level” as currently accepted. When mussel samples were examined in terms of organochlorine pesticides, it was observed that the Foca station reached the highest heptachlor value during the monitoring period in February 2010.

The results of this study showed the existence of biological and chemical pollution in two touristic area on the west coast of Turkey. Furthermore, this study may be useful in larger future studies aim to combat and control the biological and chemical pollution.

Keywords: Foca, Mediterranean Mussels, Mordogan, Pollutants

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PHOTODEGRADATION STUDIES OF CIPROFLOXACIN ANTIBIOTIC VIA GRAPHENE OXIDE MAGNETITE UNDER SUNLIGHT

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Abstract:

Antibiotics are one of the most important groups of pharmaceuticals. They often have no biodegradability and can have toxic effects on bacteria. They can also contribute to the development of resistant bacteria in aqueous systems. Fluoroquinolone antibiotics (FQ) are an important type with undetectable biodegradability. Graphene oxide (GO) is a kind of novel two-dimensional graphene-based material, was developed for the removal of pollutants in the aquatic environment which have dispersibility and beneficial to remove pollutants in wastewater because of different functional groups, such as hydroxyl, carboxyl and epoxy groups. These functional groups make GO suitable to remove the pharmaceuticals with low cost. Magnetic Fe₃O₄ has the advantage for the usage as support material of composite adsorbent because it can be easily manipulated by an external magnetic field. The combination of GO with magnetic Fe₃O₄ nanoparticles to produce a magnetic graphene-based composite and it will be separated from the matrix rapidly and easily by an external magnetic field. In this paper, photocatalytic treatment of Ciprofloxacin (CIP) and was studied with Nano-GO/M composite under sunlight. The effects of increasing Nano-GO/M concentrations (0.5, 2, 3.5, 5, and 10 g/L) developed under laboratory conditions, increasing of CIP concentrations (1, 3, 5, 25, 500 and 1000 mg/L), increasing irradiation times (30, 120, 250, 350 min and 24 h) and the effects of acidic (pH=4), basic (pH=10) and neutral (pH=6.5) conditions on the photocatalytic removal efficiencies of CIP were studied. For maximum removal efficiency (80%) of 1 mg/L initial CIP concentration, 250 min irradiation time were obtained as optimum time for photooxidation via sunlight. The sunlight power was measured as 80 W with a light-meter (at hours 08.00-17.00 in August). Best results were obtained at 1 mg/L initial concentration of CIP, at original pH of CIP solutions (6.5).

Keywords: Ciprofloxacin, Graphene Oxide, Magnetite, Photooxidation, Sunlight

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IMPORTANCE OF THE CURRENT EFFECTS ON MARITIME TRANSPORTATION AND MAKING SCHEMA ABOUT ENVIRONMENTAL PLANNING AT THE TURKISH STRAITS

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Abstract:

The Turkey is in a great position which has the cultural and commercial gates that connected the Asian and Europe continents. And also has the Turkish Straits sea area which is consist of Strait of the Istanbul (Bosphorus), Strait of the Canakkale (Dardanelle) and also Sea of The Marmara. The Straits of Istanbul and Strait of Canakkale are connecting the Black Sea with the Aegean Sea through by Sea of The Marmara. From the history, the Turkish Straits has great importance not only geopolitics but also strategic and geographic situations. Also rapidly increasing importance for maritime transportation, especially international energy transportation. Petroleum, LPG, LNG, gas, oil and oil products transportation has high level risk management about maritime transportation and marine environment cleaning at the Turkish Straits Sea Area. The Turkish Straits have been governed by the Montreux convention, since the 1936. Beside legal binders, local traffic, innocent and transit passages have really great parameters such as safety navigation and ballast management for maritime transportation and environmental management. With all these parameters and circumstances, need to deeply survey at the Turkish Strait about marine and environment sciences. These results could have chance to not only making environmental planning and management but also maritime transportation safety and decrease marine pollution, protect all the straits shoreline by the national and international regulations. With this working, try to explain the current effects and their surveys importance for maritime transportation and environmental management, planning at the Turkish Strait.

Keywords: Maritime, Hydrography, Enviroment

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ARTIFICIAL NEURAL NETWORK MODELING FOR PREDICTING BROMATE REMOVAL IN DRINKING WATER

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Abstract:

The increase in world population, industrial/agricultural activities threaten water resources. The most important steps of domestic/drinking water treatment are removed of pathogenic microorganisms. However selected disinfectant may also react with some organics and harmless microorganisms as well as pathogens and finally some by-products emerge. Bromate ion, trihalomethane with bromine, acetic acid with bromine and chlorine mixtures are by-products due to the results of ozonisation and chlorination of drinking water. These products have carcinogenic effects. Various adsorbent column, anaerobic bacteria and membrane reactors have been used for this purpose. In this study, adsorbent column with technical and modified activated carbon was used for the experiments. Within this context effect of particle size and amount of activated carbon, height and diameter of column, volumetric flow rate and initial concentration on bromate removal was investigated. This study was also carried out with real samples taking from three different points in Corum/Turkey. After the experiments, artificial neural network (ANN) was used to predict to bromate removal percentage by using the observed data. Within this context, feed-forward back-propagation artificial neural network is chosen in the present study. Moreover, transfer function was selected as tangent sigmoid and 3 neurons were used in hidden layer. Particle size and amount of the activated carbon, height and diameter of the column, volumetric flow rate and initial concentration were selected as input variables. Bromate removal percentage was selected as output. It was found that the model with the R value of 0.988, RMSE value of 3.47 and the mean absolute percentage error of 5.19% in test phase. Consequently, it can be said that ANN is an effective tool in predicting bromate removal in drinking water.

Acknowledgement: This study was supported by Hitit University Scientific Research Foundation (Project No: MUH19004.13.003)

Keywords: Artificial Neural Networks, Bromate Removal

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DEMERSAL FISH ASSEMBLAGES OF THE GOKCEADA ISLAND, (NORTH AEGEAN SEA) TURKEY

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Abstract:

Demersal fish species have a high value in the world, however the catch ratios of the demersal fish species are low according to the pelagic fish species. The Aegean Sea has a unique value in the Mediterranean having precious status, hydrographic, ecologic and geomorphologic structure. The Black Sea waters which flowing to the north Aegean Sea by the Turkish strait system, makes there productive region. By this reason the fishing activities and commercial species are important in the north Aegean Sea. Gokceada is one of the most important fishing ground of the north Aegean Sea. It is located in the north Aegean Sea and is an important fishing ground as it is surrounded with high nutritious waters.

Samples were collected by commercial trawl fishing boat from September 2013 to April 2016 fishing seasons around the Gokceada Island. A total of 78 trawling operations were carried out. The european hake (*Merluccius merlucciusus*), red mullet (*Mullus barbatus*) and striped red mullet (*Mullus surmuletus*) were the target species. At the end of the study, 123 species belonging to 78 family were determined. Of the total catch (3906.92 kg), 74 species were belong to Osteichthyes (66.9 %), 12 species were belong to Chondrichthyes (5.74 %), 13 species were belong to Crustacea (20.91 %), 12 species were belong to Echinodermata (1.01 %) and 12 species were belong to Mollusca group (5.43 %). Of these species 21 were found continuous, 23 were frequent and 79 were rare.

Keywords: Biodiversity, Catch Composition, Trawl, North Aegean Sea

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INFLUENCE OF MELATONIN ON SECONDARY METABOLITE ACCUMULATION IN CALLUS CULTURES OF OCIMUM BASILICUM L.

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Abstract:

Plant cell culture is an adorable alternative source to whole plants for the production of beneficial secondary metabolites. The accumulation of secondary metabolites in plant tissue cultures can be stimulated by the elicitors. In the present study, the effects of different concentrations of exogenous melatonin (as an elicitor) on the callus induction and secondary metabolite production of basil (*Ocimum basilicum* L.) were tested. Donor plants were grown in the plant growth chamber at 18–20°C with a 16/8-hour (day/night) photoperiod, 12 klux light intensity, 51–54% humidity. Leaf explant of basil were cultured on MS medium supplemented with melatonin (0, 100.0, 200.0 µM), NAA (2 mg/l) and BAP (1 mg/l). Cultures were incubated at 28°C in the dark. Callus induction was observed within four to five weeks after 2-3 times subcultures. The results showed that the supplement of melatonin at 100.0 µM and 200.0 µM in the MS medium decreased the frequency of callus induction compared with the control (MS medium without melatonin). Lower concentration (100.0 µM) of melatonin added in the medium could increase the differentiation frequency of adventitious buds from callus, however higher level of melatonin (200.0 µM) inhibited the bud differentiation. Also, secondary metabolite levels of callus were determined in control, 100.0 and 200.0 µM melatonin treatments. Results showed that the addition of melatonin affected either phenolics (like caffeic acid, rosmarinic acid, cinnamic acid, p-coumaric acid and vanilin) or aromatics (like 1,8-Cineole, dl-Limonene, Methyleugenol, 3-Methylbutanal, 2-Methylbutanal, Hexanal, 2-Furancarboxaldehyde, Benzaldehyde, Bergamotene) accumulation in various degrees.

Keywords: Basil, Callus, Melatonin, *Ocimum Basilicum* L., Secondary Metabolite

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EXPLORING SOLUTIONS TO OVERCOME THE BARRIERS OF HOUSEHOLD WASTE SEPARATION BEHAVIOUR

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Abstract:

The aim of this paper is to identify the barriers of the household waste separation behaviour and then to generate solutions to overcome these barriers. Solid waste management gains importance for the economy because the value recovered from waste can provide low-cost input (e.g. plastics, glass, paper, metals etc.) to the firms' original product production. The re-use of these inputs results in source reduction, helping firms achieve sustainable development. However, two reverse logistics costs – waste collection and sorting – should be considered because the escalation of these two costs due to poor solid waste management might obscure the economic advantages abovementioned. At this point, households have important role in decreasing the waste collection and sorting costs. Encouraging households to get used of separating their wastes and bringing these wastes to collection points can provide a significant cost savings. In order to support the waste separation behaviour, this study first conducts a survey to explore the barriers inhibiting waste separation behaviour of households. Then, the data analysis reveals the major barriers with respect to social and economic factors. Last, the problem-solving meeting with the participation of this problem's stakeholders (e.g. municipality, firms, households etc.) is organized to interpret the outcomes of data analysis and to propose solutions in order to enhance waste separation behaviour. This study discusses the theoretical and managerial implications of the results as well.

Keywords: Reverse Logistics; Circular Economy; Closed-Loop Supply Chain; Sustainable Production

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MICROBIAL CONTROL STUDIES ON CAPNODIS TENEBRIONIS (COLEOPTERA: BUPRESTIDAE)

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Abstract:

Capnodis tenebrionis is one of the most important agriculture pests that cause serious damages on the trees such as cherry, apricot, apple, and pear trees. Up to now, it has been controlled by chemical methods only. This method is not sufficient enough to control C. tenebrionis. In order to find a more effective and safer control agent against this pest, first of all, we isolated and characterized 21 bacterial isolate from larvae and adults of C. tenebrionis. Morphological, physiological, biochemical and molecular characteristics of bacterial isolates were determined. Due to this characterization studies, the bacterial flora of C. tenebrionis was defined as, Bacillus cereus (E-1, E-4, E-5, E-6, OL-4, L-2, L-5, L-6) Bacillus mycoides (OL-1), Bacillus pumilus (L-7), Paenibacillus xylanilyticus, (L-8), Bacillus flexus (L-9), Bacillus simplex (L-10, OL-5), Raoultella terrigena (L-1), Enterobacter cloacae (L-3), Bacillus anthracis (L-4), Klebsiella oxytoca (E-2), Bacillus safensis (E-3), Bacillus amyloliquefaciens (OL-2), Bacillus aryabhatai (OL-3). Insecticidal effect of these bacterial isolates on the larvae on elm leaf insect (Pyrrhalta luteola), the mealworm (Tenebrio molitor) and the honeycomb moth (Galleria mellonella) were investigated. It was detected that isolates with a number of E-4 and E-5 have %87 lethal effect on the P. luteola. OL-4 had 60 and 33% insecticidal activity on the G. mellonella and T. monitor, respectively. These isolates are considered as an effective pest control agents.

Keywords: Microbial Control, Capnodis Tenebrionis, Coleoptera, Pyrrhalta Luteola

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SCREENING OF THE VIP GENES FROM BACILLUS THURINGIENSIS KURSTAKI ISOLATES

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Abstract:

B. thuringiensis preparations are used commercially against to pests belongs mainly to lepidoptera order. *B. thuringiensis* crystal and secreted soluble toxins are highly specific for their hosts and have gained worldwide importance as an alternative to chemical insecticides. Despite the wide success of Cry proteins in agricultural control, increased insect resistance and narrow insecticidal spectrum threaten the long term sustainability of Bt technology. Therefore, new insecticidal proteins with different characteristics from known Cry proteins (Vip, etc.) to identify and order to characterize has seen an increase in work related to the investigation of new isolates of *B. thuringiensis* from a variety of habitats.

Vegetative insecticidal protein (Vip) constitutes a family of insecticidal proteins secreted during the vegetative growth phase of different *Bacillus* strains and mainly by *Bacillus thuringiensis* (Bt).

In this study, determination of vegetative insecticidal protein (vip) gene contents of some local *B. thuringiensis kurstaki* isolates is aimed. For this purpose, local *B. thuringiensis kurstaki* (MnD, BnBt) strains which were isolated and characterized in previous studies were used. HD1 strain was selected as the reference strain. Bacteria were screened by PCR for the detection of vip (vip1, vip2, vip3) genes. The genes obtained by PCR were cloned into pGEM-T vector. The plasmids obtained by cloning were sequenced and the results were evaluated by using BLAST. Study results show that the presence of the vip3 genes in MnD and BnBt strains.

This research was supported by KTU-BAP (Project No: 6846)

Keywords: Vegetative Insecticidal Protein, *Bacillus Thuringiensis*, Microbial Control

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LANDFILL GAS PRODUCTION IN LANDFILL BIOREACTORS CONTAINING MUNICIPAL SOLID WASTE AND SEWAGE SLUDGE

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Abstract:

Pilot scale anaerobic landfill bioreactors were constructed to investigate their efficiencies in terms of LFG production. Two of the reactors (R1 and R2) contained sewage sludge and municipal solid waste, while the other three (R3, R4, and R5) did not contain any sewage sludge. R2, R3 and R4 also contained a geotextile filter in their drainage layers. After 420 days of operation, the cumulative LFG productions were 7454, 21398, 902, 1412, and 9067 liters for R1, R2, R3, R4, and R5 respectively. It was concluded that the addition of sewage sludge into the municipal solid waste and inserting a geotextile filter in the drainage layer effectively increased the cumulative LFG volume in R1 and R2.

Keywords: Municipal Solid Waste, Landfill Bioreactors, Landfill Gas, Sewage Sludge

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VARIATION OF LEACHATE QUALITY IN PILOT SCALE LANDFILL BIOREACTORS CONTAINING MUNICIPAL SOLID WASTE AND SEWAGE

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Abstract:

Pilot scale landfill bioreactors containing municipal solid waste and sewage sludge were operated for 420 days to investigate the effect of sewage sludge and geotextile filters on the quality of leachate. Reactors R1 and R2 contained sewage sludge but the other reactors contained only municipal solid waste. A geotextile filter was also inserted in the drainage layers of R2, R3 and R4 to see if there was any improvement in the leachate quality due to the geotextile filter. After 420 days of operation, COD removal rates for R1, R2, R3 and R4 were 88.1%, 92.42%, 89.7%, and 92.4% respectively. BOD5 removal rates for all reactors were above 97%.

Keywords: Solid Waste, Landfill Bioreactors, Leachate, Geotextile Filter

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NOTES ON TRAGOPOGON PORRIFOLIUS L. COMPLEX (ASTERACEAE) IN TURKEY

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Abstract:

With the present study, we aim to contribute to the taxonomy of *Tragopogon porrifolius* L. (Asteraceae) in Turkey. This taxa is mainly distributed in Mediterranean regions of Europe including Turkey, however it is also growing in other parts of northern Europe. Plant samples using in the present study were collected during the field trip between 2014 and 2016 in Turkey and identified by using all relevant literatures. The plants are 24–92 (–120) cm in height, sometimes branched in upper parts and leaves are somewhat grass like. According to recent literatures, this complex consists of five subspecies excluding subsp. *abbreviatus* (Boiss.) Coskunc. & M. Gultepe endemic to Turkey, but present findings shows that subsp. *eriospermus* (Ten.) Greuter (*T. porrifolius*) should be distinct species rather than as subspecies and subsp. *longirostris* (Sch.Bip.) Greuter (*T. longirostris* Sch.Bip.) should be treated under the *T. coelesyriacus* Boiss. due to priority of fundamental principle in botanical nomenclature. Furthermore subsp. *abbreviatus* regarded as a synonym of subsp. *longirostris* according to several online taxonomic database and literatures, should be distinct subspecies of *T. coelesyriacus*. Thus it was combined as *T. coelesyriacus* subsp. *abbreviatus* (Boiss. ex Coskunc. & M. Gultepe) Coskunc. & M. Gultepe in the present paper.

Acknowledgement: The authors express their thanks to the TUBITAK (110T954) for financial support.

Keywords: Anatolia, Compositae, Salsify, *Tragopogon*

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HISTO-CYTOLOGICAL STUDY OF STERNBERGIA LUTEA (L.) KER-GAWLER EX SPRENGEL IN NATIONAL PARK OF LLOGORA, ALBANIA

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Abstract:

In this paper was realised histo-cytological study of *Sternbergia lutea* (L.) Ker-Gawler ex Sprengel in National Park of Llogora. The study was conducted in the framework of PhD thesis on the diversity of flora of Vlore area in Albania. The karyotype of *S. lutea* L. was examined for first time in this habitat. For histological analysis was performed the Colloidal Technique with nail polish, through which we determined the type of leaf, the distribution of stomata per unit area and the type of stomata. This technique consists in obtaining the stomatal traces in the upper and the lower epidermis of the leaves of *S. lutea*. For chromosome analysis (chromosome number and morphology of chromosomes) was performed the Squash Technique. Preparations were made from root tips pretreated with colchicine and stained with aceto-orcein. Histological analysis showed that the leaves are of the amphystomatic type, the stomata are of the tetracytic type and the distribution of the stomata per unit area is higher in the lower epidermis. Karyological analysis revealed the chromosome number $2n = 22$. In metaphasic cells was observed 2 large metacentric chromosomes (one of them with satellite), 4 small metacentric chromosomes (one of them with satellite), 9 submetacentric and 7 subtelocentric chromosomes.

Keywords: *Sternbergia Lutea*, Histological Analysis, Cytological Analysis, Squash Technique, Colloidal Technique

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THE DETERMINATION OF THE MUCOSUBSTANCES IN THE EPIDERMAL CELLS OF THE LEECH (HIRUDO MEDICINALIS) BY CONVENTIONAL HISTOCHEMISTRY

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Abstract:

The mucosubstance, which are essential components of the mucous of many cell types, are taken part in many functions including osmoregulation, cell to cell recognition, binding of hormones, protection of cells from phagocytosis and dehydration, differentiation, defence and ion transport. The aim of this study was to characterize histochemically the nature and regional distribution of the mucosubstances secreted by epidermal cells in *Hirudo medicinalis* (Annelida, Clitellata). This study was carried out in 10 adult specimens of *Hirudo medicinalis* (Annelida, Clitellata), which are provided by ourselves from a local supplier. After killing, the specimens were divided into four parts from anterior to posterior (I, II, III, IV) immediately immersed in Bouin's fluid, and fixed for 18-24 hours at room temperature. After fixation the tissues were dehydrated, cleared in xylene and embedded in paraffin. Serial sections, 5-7µm in thickness were taken. The histochemistry was carried out using standard histochemical methods (Alcian Blue (AB) pH 0.5, 1.0, 2.5, Periodic Acid Schiff (PAS), Aldehyde Fuchsin (AF), PAS/AB, KOH/PAS). Histochemical staining properties of mucosubstances in epidermal cells was determined region by region. The epidermis of all regions contained cells had positive reaction various degrees from very weak to strong to PAS and AB pH 1.0 and from negative to weak to AB pH 0.5 and 2.5. On the contrary, the epidermis of all regions did not contain any AF positive cells. The epidermis of the second, third and fourth regions had weak to very strong KOH/PAS positive cells. It was detected that PAS reaction was more dominant than AB reaction in the epidermis of first, second and fourth regions by PAS/AB staining. Consequently, this study provided a comprehensive information of the regional distribution patterns of the mucosubstances, and an opportunity to compare their distributional patterns in other leech species.

Keywords: Mucosubstance, *Hirudo Medicinalis*, Epidermal Cells, Histochemistry

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COMPLEX INVESTIGATION OF LAKE SEDIMENT CORES FROM CAINENI LAKE, EASTERN ROMANIAN PLAIN

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Abstract:

The lake sediments provide information on the various processes such as sedimentation, water dynamics, sediment contaminant interaction, sediment-organism interaction and historical indicators. The chemistry of lake sediments represent a lot of data arising from the soil geology, weathering, erosion processes and anthropogenic sources, as well. This study aims to determine the elemental composition and the morphological structure of lake sediments collected from the Romanian Plain (e.g. Caineni Lake), in order to characterize their origin and evolution. For this study it was considered this salt lake due to higher salinity (~ 50 g/L) there are no benthic fauna and, as a consequence, no bioturbation. By taking into account the extremely reduced sedimentation rate (few mm/100 y) as well as previous ¹⁴C data which indicated for the most mud layer an age of about 19 ky, it is expected the sediments to preserve the climate transition from glacial to the actual interglacial, transition which took place about 10.5 – 11.0 ky ago. Sediments cores will be collected from Caineni Lake (Romanian Plain) by means of a floating platform and vibrating corer. The qualitatively and quantitatively determining of chemical composition and distribution of elements on the surface of samples, as well as the surface morphology of sediments was performed by Scanning Electron Microscopy - Energy Dispersive Spectrometry (SEM-EDS), Attenuated Total Reflectance - Fourier Transform Infrared Spectrometry (ATR-FTIR), as well as Raman spectrometry and Inductively Coupled Plasma Mass Spectrometry (ICP-MS), with the triple internal standard elements Ge, In and Bi. Reference Materials NIST SRM 2710a Montana Soil I, and SRM 2702 Inorganics in Marine Sediment were used for a well interpretation. Some fragments of plants from sediment samples were analyzed to the IFIN-HH AMS Laboratory for a ¹⁴C dating.

Keywords: Salt Lake, SEM-EDS, ICP-MS, ATR-FTIR, ¹⁴C Dating

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DDT DERIVATIVES IN FISH AND SEDIMENT SAMPLES COLLECTED FROM GALINDEZ ISLAND (ANTARCTIC PENINSULA)

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Abstract:

Antarctic considered as a non-polluted ecosystem. However, in the last few decades, organic pollutants started to show up in this environment. Pesticides, which are resistant to environmental degradation, may travel great distances by water currents and air movements. Currently, hundreds of different pesticide congeners are being used all over the world except Polar Regions. Therefore, in the present study, we have investigated the existence of DDT and its derivatives in fish and sediment samples collected from Galindez Island in Antarctic Peninsula, the nearest part of Antarctica to South America, on 6-7 April, 2016 during the First Joint Turkish-Ukraine Antarctic Research Expedition. The muscle tissue of fish species (i.e., *Trematomus bernachii* and *Notothenia coriiceps*) and sediment samples which were collected from five sites were used for analysis. Freeze dried samples powdered by porcelain mortar and pestle and analyzed by GC MS/MS and LC MS/MS after clean-up procedure. Existence of o,p'-DDT, p,p'-DDT, o,p'-DDD, o,p'-DDE, and p,p'-DDE were determined in both fish species while p,p'-DDD only in *T. bernachii*. o,p'-DDT had the highest concentration in the muscle tissue of *N. Coriiceps*. The possible transport mechanism of the pesticides should be atmospheric movements and water currents. On the other hand, DDT and its derivative levels were found below detection limits in all sediment samples. Like pesticides, organic contaminants tend to accumulate in fatty tissues. In fact, both fish species have a considerable amount of fat tissue and the DDTs seems to be bioaccumulated by feeding via the food chain. Although, the DDT usage banned after 1970s based on a number of ecological concerns, its derivatives interestingly can be found at detectable level in a pristine ecosystem of the world. Therefore, further researches are needed to determine the transportation pathways of pesticides to Antarctic Continent.

Keywords: Pesticide, Ddt, Fish, Galindez Island, Antarctic Peninsula

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RELIGION AND ENVIRONMENTALISM: A SEARCH FOR THE RELIGIO-PHILOSOPHICAL BASIS OF ENVIRONMENTALISM

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Abstract:

One of the most important matters in today's world is the environmental problems. People believe is right and wrong environmental degradation such as environmental pollution, deforestation, global warming and source water pollution are arise from human's environmental worldview. Most of the environmental problems although scientists have warned us for decades about the potentially devastating consequences of climate change. The purpose of this study is examining the relationship between religious behavior and environmental worldview. People have customs, thoughts, philosophies, variety of life styles cultures, and beliefs. According to authors the religious world view of the people is their way of approach at environment. These approaches make different postulates about the world and create views that perceive the world differently. People really want to know the high being who holds this cosmos and controls human life. In understanding the role religion has, it can then be determined if religious social structures are a viable option to promote positive environmental behavior. Every religion or ideology has its own environmental purposes and functions. According to Islamic view man is responsible for protecting the environment that was delivered him. As a result if we are to reverse the deterioration of our environment then we have to make some hard choices and change our practices. In other words, ecological change calls for personal change.

Keywords: Religion, Environmentalism, Worldview, Philosophy, Secularization

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EFFECTS OF DIFFERENT DRYING METHODS ON MODELLING AND FINAL QUALITY OF QUINCE (CYDONIA OBLONGA) SLICES

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Abstract:

Development of the agricultural sector is dependent on rapidly increasing population on the world. Quince is use in medicine, paint industry, cosmetics are very commonly. Drying is one of the oldest methods of conservation. In this study, quince 8 and 16 slices were separated and two different drying methods (oven drying, sensitive drying) was used. Two different drying air temperatures (40°C and 60°C) will be used in dryers. In addition to fixed temperature, increasing temperature from 40°C to 60°C will be used. The experiments was started at a drying temperature of 40°C and increased to 60°C on an equal footing. Drying air increasing evenly in 3, 6 and 9 hours after to 60°C and continued at the same temperature until the end of the experiment. Drying performance (drying duration, final moisture content), drying kinetics, color analysis, chemical analyses were performed for all drying methods. Fresh samples reached to desired moisture contents in 7-79 hours. To define time-dependent changes in moisture contents, Page, Wang and Sing, Logarithmic and Midilli-Kucuk equations were used. Page equation yielded the best estimations. There were not significant differences in "b" yellowness values of fresh samples (16,79), 65°C of Sensitive dryer (17,71) statistically. Sensitive dryer yielded the closet pH values to fresh samples. Based on current findings, it was concluded that oven drying and sensitive drying were suitable for drying Quince variety.

Keywords: Quince, Drying Kinetics, Mathematical Modeling, Chemical Analysis, Color Analysis

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THE EFFECTS OF VARIOUS DRYING METHODS ON THE DRYING TIME AND QUALITY OF WALNUT (JUGLANS REGIA L.)

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Abstract:

Drying is one of the most common postharvesting method used to extend the consumption and storage period of various fresh agricultural products. Walnut is a kind of fruit known and produced since ancient times. Walnuts are consumed as dry in very large proportions. Drying is one of the oldest methods of conservation. In this study, walnut were drying two different methods (oven drying, vacuum oven drying) was used. Two different drying air temperatures (25°C and 42°C) will be used in dryers. Crusty walnut and walnut will be used same drying methods. Drying performance (drying duration, final moisture content), drying kinetics, color analysis were performed for all drying methods. Fresh samples reached to desired moisture contents in 24-61 hours. To define time-dependent changes in moisture contents, Page, Alibas, Demir, Diffussion approach, Jena-Das, Lewis, Midilli-Kucuk, Modified Page, Wang-Sing, Weibull and Yagcioglu equations were used. Modified Page equation yielded the best estimations. There were not differences in "L" brightness values of fresh samples (43,36), all of the drying methods without 42°C of vacuum oven dryer (30,21) statistically. In "b" yellowness values all of the drying methods were significant differences statistically. Based on current findings, it was concluded that oven drying were suitable for drying walnut variety.

Keywords: Walnut, Drying Kinetics, Mathematical Modeling, Color Analysis

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THE EFFECTS OF DIFFERENT IBA DOSES ON THE ROOTING OF WOOD-CUTTINGS OF SOME MULBERRY SPECIES

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Abstract:

In this study, the effects of different IBA doses on the rooting of hardwood cuttings of three mulberry genotypes including in different species, *Morus alba* (purple mulberry), *Morus rubra* (red mulberry) and *Morus laevigata* (red mulberry), were evaluated. The cuttings were planted rooting medium filled with perlite after treated with 0, 1000, 2000 and 3000 ppm IBA. The trial was established in a completely randomized plot design with three replications, and with 10 cuttings for each replicate. During the rooting process, bottom part of the rooting medium kept at 22±2 °C. Survival rate, callus rate, rooting rate, root number, root length and diameter values of cuttings kept three months in rooting medium were determined. In all treatments including control, *Morus laevigata* cuttings had a rooting ratios over ninety percent. In generally, rooting abilities of *Morus alba* and *Morus rubra* cutting were lower than *Morus laevigata*. IBA applications significantly increased the rooting rate of cuttings from *Morus alba* and *Morus rubra* species relatively to control cuttings.

Keywords: Mulberry, Dose, IBA, *Morus Rubra*

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THE EFFECTS OF MIGRATIONS ON ENVIRONMENTAL INFRASTRUCTURES

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Abstract:

The world history has witnessed countless immigration movements. These population movements, which arise due to a wide variety of reasons, are accompanied by a large amount of problems in the migrated regions. Some of these problems can be predicted, while others are unpredictable. The only common thing about these two kinds of problems is that they deeply influence current and future situations of countries. Important issues such as sociological, economic, structural and cultural issues are just some of these problems. One of the most important elements influenced by migration movements is environmental infrastructures of a country, such as wastewater treatment plant, solid waste landfill sites and drinking water treatment and distribution plants.

As a result, environmental influences from migratory movements are inevitable. This situation requires that migrants live in the environmental dimension, with a new perspective, to be evaluated in detail and in all aspects. In the area of research, the environmental infrastructures of the settlement areas have a distinct and important place in terms of the continuity of life.

Turkey now hosts the largest refugee population in the world. Turkey has been accepting refugees from Syria since the clashes in Syria started in 2012. Turkish authorities showed a unique response to the crisis and followed an “open door” policy. Cities near Syrian border, i.e. Sanliurfa, Kilis, Gaziantep, Hatay, Kahramanmaras, and Mardin are the most affected cities. With this in mind, the impacts of immigration on environmental infrastructure should be evaluated in terms of affected cities near border.

Keywords: Migration, Environment, Effects.

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THE RELATIONSHIP BETWEEN ANAEROBIC REACTOR PERFORMANCE AND MIXING

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Abstract:

Methanogenic anaerobic digesters have an inherent degree of mixing from the continuous stream of biogas bubbles that rise within the reactors, however this natural mixing is usually considered to be rate limiting for efficient mass transfer. Consequently, contact between the organic matter and the microorganisms should be improved by enhanced mixing, leading to higher reactor performance. The level and the type of mixing also affects the growth rate and distribution of microorganisms within the sludge, substrate availability and utilization rates, granule formation and gas production (Smith, 1991).

It is well known that excessive mixing could actually lead to a reduction in reactor performance. Inhibition of the syntrophic oxidation of volatile fatty acids, possibly by disrupting the spatial juxtaposition of syntrophic bacteria and their methanogenic partners is a result of excessive mixing. It also results in short-circuiting of the reactor, leading to unconverted substrate appearing in the reactor effluent. In practice, an intermediate degree of mixing appears to give the best substrate conversion by striking a balance between the adverse effects. Therefore, researchers should decide the mixing ratio to get desired performance. The relationship between performance and mixing can be quantified using spikes of lithium tracer in the reactor feed to indicate mixing efficiency.

Keywords: Anaerobic Reactors, Performance, Mixing, Lithium Tracer.

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IMMOBILIZATION OF PB IN CONTAMINATED MINE TAILINGS USING WASTE RESOURCES

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Abstract:

Lead (Pb) is known to be very toxic and carcinogenic to human beings. It can harm the brain, red blood cells, kidneys and the nervous system. Pb contamination in mine tailings is a serious problem because it causes rice paddy soil contamination. In the Republic of Korea approximately 2,600 abandoned mines are present and 50% of them are associated with serious heavy metal release problems. In this study, the stabilization technique was applied in order to immobilize the Pb in the contaminated mine tailings. The stabilization process has been widely and reliably used to remediate heavy metal contaminated waste and soils. The waste resources including the waste oyster shells and the biochar derived from spent coffee grounds were used as stabilizing agents. Two types of waste oyster shells (WOS) were used; natural state (WOS) and calcined state (COS). The contaminated mine tailings were treated with waste resources in the range of 0 to 10 wt% and cured for 1 day and 28 days. The effectiveness of the stabilization process was evaluated by the toxicity characteristic leaching procedure (TCLP) test. The stabilization results showed that the TCLP Pb concentrations decreased upon increasing dosage of waste resources. The WOS and COS treatments were very effective in immobilizing Pb in the contaminated mine tailings. Specifically, a TCLP Pb concentration of 6.5 mg/L in the control sample was reduced to 0.95 mg/L and 2.09 mg/L upon treatments of 10 wt% WOS and 5 wt% COS, respectively. The treatments of WOS at 4% and COS at 2% were required to pass the TCLP regulatory level of 5 mg/L. In the case of spent coffee grounds biochar, a treatment of 5 wt% was required to pass the TCLP regulatory limit.

Keywords: Stabilization, Immobilization, Pb, TCLP, Oyster Shells, Biochar

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ESTIMATION OF SEASONAL CORRECTION FACTORS FOR INDOOR RADON CONCENTRATIONS IN KOREA

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Abstract:

Radon is the second leading environmental cause of lung cancer after smoking. To confirm a relationship between indoor radon exposure and lung cancer, estimating an individual's exposure to cumulative indoor levels of radon is necessary. In this study, we developed a model for estimating annual average radon concentrations in consideration of indoor radon concentrations and outdoor temperatures. We utilized national data on indoor radon concentrations throughout the four seasons in Korea. Radon levels were measured using passive alpha-track detectors in 2005 and from 2010-2011 by the Korea Institute of Nuclear Safety (KINS) and the National Institute of Environmental Research (NIER), respectively. Based on the seasonal correction model suggested by Daraktchieva (2016), a model for estimating annual average radon concentrations was developed. For estimating seasonal correction factors, we used the measurement data (n=2518) from the KINS and meteorological data on outdoor temperature from the National Climate Data Service System. Indoor radon concentrations were negatively correlated with outdoor temperatures ($r=-0.84$). Estimated regression coefficients in the regression model were used to calculate seasonal correction factors. Our model was then applied to estimate annual average radon concentrations for each house measured in by KINS (n=2518) and NIER (n=415). The mean absolute errors between calculated levels and the actual measurement data from KINS and NIER varied from 0.00006 to 26.42 Bq/m³ (AM=0.56±1.11, median=0.30) and 0.005 to 4.57 Bq/m³ (AM=0.71±1.00, median =0.54), respectively.

In this study, we developed a model for estimating annual average radon concentrations in Korea. The calculated values incorporating seasonal correction factors agreed very well with actually measured values. This model can be used to evaluate effective annual doses of radon exposure using dosimetric methods. For better model performance, further studies are needed to consider additional factors, such as region and type of house.

Keywords: Seasonal Correction, Annual Average Radon Concentration, Indoor Radon, Outdoor Temperature

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TROPHIC LEVEL DETERMINATION OF PORSUK DAM LAKE

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Abstract:

Approximately 98 % of available water resources on earth are collected in lakes. Lakes used for domestic and industrial water supply and recreation, flood control, commercial fishing , irrigation and energy production. The lakes are partly closed ecosystems, so there is a constant exchange between lake and its surrounding areas. Increase of anthropogenic effects in lake ecosysytmes, phosphorus and nitrogen induced inflows lead to accelerated eutrophication in many lakes. The concentration of nutrient, chlorophyll-a, phytoplankton biomass and light transmittance are considered to determine throphic level in the lakes. In this study, the water samples are taken from three station on Porsuk Dam Lake in the summer of 2016 and total phosphorus, total nitrogen, chlorophyll-a and sechi disc depth measurements were analysed. Total phosphorus, total nitrogen, chlorophyll-a levels in water samples were analyzed with Hach Lange DR2800 and the sechi disc depth are measured with sechi disc. According to Turkish Regulations, result of analyses show that Porsuk Dam Lake was hypertrophic in terms of all measured parameters.

Keywords: Porsuk Dam Lake, Water Quality, Water Pollution

**This study was supported by the Project numbered as 1509F625 accepted by Anadolu University, Commission of Scientific Research P*

PRODUCTION OF PROCESS WATER FROM MEMBRANE BIOREACTOR (MBR) TREATED WASTEWATER BY USING VARIOUS COMBINATIONS OF REVERSE OSMOSIS (RO) AND NANOFILTRATION (NF) MEMBRANES

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Abstract:

The aim of this paper was to investigate the possibility of reusing wastewater for several industrial purposes such as production of cooling water, steam generation and boiling water for power generation. For this, pilot-scale experiments were carried out at wastewater treatment plant of ITOB-Industrial Organized Zone (ITOB-OSB) located at Izmir, Turkey. The MBR effluent of wastewater treatment plant with high salinity was treated using pilot-scale NF and RO systems consisting three TM720D-400 membranes (RO unit) and three TM620-400 membranes (NF unit). Different combinations for both RO and NF membranes were used to find out suitable operational conditions. These combinations are as follows: a) concentrate of first membrane was fed to third membrane (RO2 and NF2), b) concentrate of second membrane was fed to third membrane (RO3 and NF3), c) concentrate of first and second membranes were fed to third membrane (RO1 and NF1). The NF system was operated at an applied pressure of 10 bar while the RO system was run at 15 bar. When the permeate qualities were checked, there was not any distinct difference observed for the tests performed using different membrane combinations. The permeate of RO system agreed well with the required qualities for cooling water and low pressure steam generation. Also, the standards for cooling water and boiling water for power generation were obeyed by RO membranes. The NF permeate was suitable for cooling water and low pressure steam generation except TDS parameter. In addition, the NF permeate was generally suitable for cooling and boiling water in power generation while there was still high TDS problem. On the other hand, an integrated process combining NF with RO membranes can be an alternative strategy for utilization of these processes in a wider range of industrial applications. This study was supported by TUBITAK (Project No. 114Y500).

Keywords: Wastewater Reuse, Process Water, Nanofiltration, Reverse Osmosis

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THREE DIMENSIONAL SIMULATIONS OF TRANSPORT PHENOMENA IN PROTON EXCHANGE MEMBRANE FUEL CELL

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Abstract:

In this paper a three-dimensional isothermal model of a proton exchange membrane fuel cells (PEMFC) is presented. This model was developed to improve the fundamental understanding of the transport phenomena in the PEMFC. The effects of various operating parameters on the performance and efficiency of the PEMFC are also examined. This model was implemented in the commercial CFD software Fluent and its PEMFC module. It takes account of the most transport phenomena, including: proton and water transport in the membrane, transport of electrons in the gas diffusion layer (GDL), diffusion of multi-component in the GDL; convective mass and momentum transport in the gas flow channels. The simulations were accomplished for an isothermal system with a single phase. The distributions of the velocity in the gas flow channels, the concentration of species, the current density are presented and analyzed. The model predicts the polarization and power curves of fuel cells for different operating conditions. To examine the effect of various parameters such the air flow rate, the porosity of the GDL and the operating pressure, a parametric study was carried out.

Keywords: Proton Exchange Membrane Fuel Cell, Three-Dimensional Model, Fuel Cell Performance, Single Phase, Transport Phenomena.

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DETERMINATION OF NOISE LEVELS AT CENTRAL BALIKESIR HOSPITALS

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Abstract:

In this study, our goal was to determine of noise sources and emission levels from very sensitive environments, such as hospitals, at downtown of Balikesir. In the city centrum, it was also aimed to create noise pollution maps as the first time for those full-scale hospitals in Balikesir by carrying out of this scientific study. According to the study results, it was determined that the noise level in Balikesir State Hospital, where is located to closer to the city center, was higher than the noise level in Ataturk State Hospital.

In general, the predicted noise values at Balikesir State Hospital were as high as about 9% (or approximately 7dBa) than the actual measured values, whereas the predicted value (61.0 dBA) in Ataturk State Hospital is about 7% (or approximately 5dbA).

Keywords: Noise, Balikesir, Hospitals, Cadnaa

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ANALYSIS OF AIR POLLUTANS LEVEL IN BALIKESIR USING ADVANCED LEVEL AIR DISPERSION (AERMOD) AND LONG-TERM METEOROLOGICAL DATA PROCESSOR (AERMET) MODELS

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Abstract:

It is a known fact that air pollutants have adverse effect to human health and to environment due to rapid development in industrial sites and increasing population density more likely in downtown of cities. In this unsuitable conditions, any protection approaches for controlling air pollutants within their standard limits have more importance than ever before. Nowadays, the major air pollutants are being emitted in downtown sites of cities. In particular, high level air pollution episodes occur in Balikesir during both cold and warm meteorological conditions that may cause severe asthma and allergic symptoms. The main effect of industrial, commercial-residential sites and mobil sources on the related air pollutant levels will also be evaluated by using both AERMOD (AMS/EPA Regulatory Model) dispersion model and long-term meteorological data processor (AERMET). The output of AERMOD and AERMET models will be expected to understand how to disperse long term pollution levels in the city.

Keywords: Aermod, Balikesir, Aermet, Air Pollution

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LONG-TERM EFFECTS OF FERTILIZER APPLICATIONS ON NATURAL GRASSLANDS WITHIN THE ASPECT OF ENVIRONMENTALLY SUSTAINABLE GRAZING SYSTEMS IN HIGHLANDS OF THE EASTERN TURKEY

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Abstract:

It was aimed to evaluate long term effects of artificial fertiliser applications on natural grasslands in highlands of the Eastern part of Turkey. For this purpose, an experiment was conducted to compare two grazing areas; one with naturally growing (NG) and the other one with artificial fertilizer applied (FG). Two grassland areas were chosen next to each other and FG area was fertilised with CAN fertilizer (Calcium Ammonium Nitrate) and TSP (Triple Super-Phosphate) at the rate of 180 and 190 kg/ha respectively. The experiment lasted for 3 years during the years 2005 and 2007. In order to monitor biomass and chemical composition of grass, 6 sub-plots (16 m²) were fenced within both areas to collect the soil and grass samples from non-grazed areas every two weeks. The results showed that there was no statistical differences ($P > 0.05$) in botanical composition between NG and FG areas. Mean biomass dry matter per quadrat and sward height in NG and FG was statistically significant ($P < 0.05$) only for the first year. While there were no significant differences in crude fibre and dry matter content of grass samples, there were significant differences in N, Mg, K and P content of both areas. However, there was no statistical significant differences ($P > 0.05$) in organic matter and mineral content of the soil between NG and FG during the experimental period. Therefore, it was concluded that there was no subsequent effect of artificial fertiliser application to improve grassland conditions in the region, which should be reconsidered in terms of environmentally sustainable natural grasslands.

Keywords: Fertiliser, Grazing, Grasslands, Environment, Conservation

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CASPIAN HYRCANIAN FOREST SPATIOTEMPORAL CHANGES (1982-2017)

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Abstract:

Caspian Hyrcanian Forest, also called Hyrcanian vegetation zone, covers the south coast of Caspian Sea and the northern slopes of the Alborz Mountain range in northern Iran and southeast of Azerbaijan. This forest is one of the last remnants of natural deciduous forests in the world. Over the last decades, Hyrcanian Forest is degrading rapidly due to population growth and the correspondingly growing demand for settlement area, arable land, timber products and more recently desultory tourism development.

In this study, an attempt has been made to trace the dynamics of Hyrcanian Forest changes in 35 years based on the Normalized Difference Vegetation Index (NDVI) derived from NOAA AVHRR surface reflectance product imagery. NDVI is a widely used index in remote sensing field for vegetation monitoring which shows the trend of vegetation changes at large scales very well.

The derived NDVI for every 5 years over the study area indicate that the Hyrcanian Forest vegetation cover has been dramatically reduced over the last few decades. The results show that the Hyrcanian vegetation zone is declined about 37% over the period of 1982–2017. From the empirical point of view, the most clear temporal area changes have been observed over the period of 1982-1997 (about 19% reduction) because of the rapid deforestation caused by timber illicit felling.

The presented results could support the decision makers in order to form more effective guidelines considering the ongoing discourses on planning and implementing conversational projects for Hyrcanian Forest.

Keywords: Hyrcanian Forest, Spatiotemporal Change, Ndvi

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MICROEMULSION-BASED BIOFUELS FROM RICE BRAN OIL AND ETHANOL: PRODUCTION AND FUEL PROPERTIES

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Abstract:

Due to environmental concerns and current fossil fuel situations, liquid biofuels have been increasingly explored and vegetable oils are the option of choice. Apart from their renewability and biodegradability, they have high oxygen but have no sulfur and aromatics, which is the main advantage of better fuel quality over the fossil fuel. However, the limitations of their use are the operation problems from low volatility and high viscosity of vegetable oil. The viscosity of vegetable oils can be reduced by a number of ways. However, biofuel is an effective alternative energy which produced by using natural substances. This study aims to investigate the new microemulsion of rice bran oil and ethanol as main constituents emulsified by Tween 80 and Span 80 together with co-emulsifier, 1-Octanol, at different molar ratios of 1:5, 1:10, 1:20, and 1:30. Ternary Phase Diagrams of rice bran oil, ethanol, and emulsifier/co-emulsifier revealed that Span 80 exhibits an excellent emulsification as microemulsion region is larger than obtained from Tween 80. This is due to the lower Hydrophilic-Lipophilic Balance (HLB) of Span 80 thus, it can greatly emulsify when a large amount of oil present in the mixture. In addition, 1-octanol assisted and is capable working with both Tween 80 and Span 80. The increase in amount of 1-Octanol significant increases the microemulsion region. In an aspect of fuel properties, the kinematic viscosity, higher heating value, and emission test of microemulsion-based biofuels were investigated in this work. It can be observed that the high amount of emulsifier, the higher viscosity while higher ethanol amount could decrease the kinematic viscosity. The higher 1-Octanol content resulted in larger value of higher heating value. The emission test revealed that NO_x release is less the fuel from commercial diesel while zero sulfur gasses are observed.

Keywords: Biofuel, Microemulsion, Rice Bran Oil, Surfactant

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THE SOIL DUST EMISSIONS AND THEIR REDUCTION BY PLANTING WINDBREAKS

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Abstract:

Recently, long periods of drought are being observed more often during summer and temperature fluctuation around freezing point in the winter. Such conditions together with unsuitable agricultural management promote increased soil vulnerability to wind erosion. Loss of dust soil particles is a degradation process that causes damage to soil, crops, surface water bodies and it can be connected with numerous health hazards. Windbreaks represent effective protection measure, acting as a natural barrier with enormous ability of wind speed reduction. In this study, measurement of wind speed along windbreaks at 3 experimental plots was carried out. The wind speed was measured by anemometers at height of 1 m above surface. 3 anemometers were set at the windward side and 5 anemometers at leeward side of the windbreak. The effect of windbreak on wind speed reduction was assessed and put in context using data describing value of optical porosity, height of the windbreak and took into consideration the specification of windward and leeward side. A substantial effect was observed at the leeward side at distance of 12 times the windbreak height. The effect at the windward side was less eminent. The size of protected area correlated with the value of optical porosity that mostly influences wind speed reduction. The porosity is influenced by seasonal changes and by level of foliage density.

Keywords: Windbreak, Air Flow, Wind Erosion, Soil Degradation

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CARBON FOOTPRINT ANALYSIS OF EGE UNIVERSITY IN THE FRAME OF SUSTAINABILITY

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Abstract:

There is a significant need to promote sustainability move in universities to manage and reduce carbon to provide sustainability. Universities and education institutions have significant social responsibilities besides technical roles to activate sustainable development and should be a leader or co-organizer for their stakeholders. Ege University, which was established in 1955 in Izmir city, has a vision to be a sustainable and green campus. The objectives of Ege University are to provide a sustainable waste management, sustainable transport and education and to reduce carbon emissions. In this study, the corporate carbon footprint of Ege University which has 70.000 students, 5000 academic and administrative staffs was calculated for the first time in Turkey. Carbon footprint was calculated by using the life cycle assessment-(LCA) used for the assessment of environmental impact throughout the life cycle. The principle of the study was based on CO₂ equivalent of each process. Analysis were carried out according to Greenhouse Gas Protocol Corporate Accounting and Reporting Standard and ISO14064/1-2 standards with SimaPro software. It was determined that the total carbon emission of Ege University for the year 2016 is 31350 tCO₂e including the travels of academic personnel. Medical Hospital is responsible 61% of total carbon emissions which is mainly due to electricity use, heating and cooling services use. In conclusion, it was determined that Ege University should gradually switch fossil fuels with renewable energy sources such as photovoltaic, should use sustainable transport alternatives such as bicycles and shuttle rings running on electricity in the campus. Besides, awareness of students and staff on environmental protection and sustainability issues should be increased by the help of courses and seminars.

Acknowledgement: The authors wish to thank Ege University Scientific Researches Fund under the grant No 16/CSUAM/003 for the financial support of this study.

Keywords: Carbon Footprint, Sustainability, Ege University

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INVESTIGATION OF POLLEN VIABILITY AND GERMINATION OF SOME APPLE CULTIVARS AND GENOTYPES

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Abstract:

Apple (*Malus domestica* Borkh.) is one of the most economically important pome fruits worldwide and Turkey is within origin center of apple. Central Asia is an important origin region for apples. Within this region, mountainous and forestlands of Kyrgyzstan constitute a significant source for wild apple species. Because of several problems (especially self-incompatibility), appear for fertilization and fruit set, researches on pollen quality and fruit set may be essential. In the present study pollen viability and germination of 18 apple cultivars and genotypes were investigated. Apple cultivars were 'Granny Smith', 'Royal Gala' and 'Spur Golden', and 15 apple genotypes studied were collected from Kyrgyzstan. Pollen viability assessment was carried out using 1% 2, 3, 5 triphenyl tetrazolium chloride (TTC) test. Pollen germination capability was investigated agar in petri method by using 1% agar and 15% sucrose. The highest pollen viability level obtained from genotype 65 with 88.94 %. The lowest viability level was assayed for genotype 67. 'Granny Smith' was the best material for pollen germination with 61.95% of germination. On the other hand, 'Royal Gala' had the lowest value of pollen germination (14.10%). According to results there was high level of variation apple materials studied for pollen viability and germination.

Keywords: *Malus Domestica*, Pollen Quality, Wild Apple

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MORPHOLOGICAL AND PHENOLOGY CHARACTERIZATION OF YAMULA EGGPLANT GROWN AT CENTRAL ANATOLIA OF TURKEY

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Abstract:

Turkey has genetic diversity with regard to genetic resources. One of these genetic resources is yamula eggplant grown in the central Anatolia region of Turkey (Kayseri). Yamula eggplant cultivar is prominent with its specific striped structure and hard fruit flesh, especially it was consumed by our ancestors in its growing regions as fresh, dried and pickled. However, its production has started to be restricted because of the decrease in yield and the spread of new eggplant diseases due to the fact that production was done with growers' own seeds. It is often seen that non-uniform fruit length and color occur at the same time. Uniform fruit, disease resistance and high yielding genotypes are the most important factors for marketable products. But, it is inevitable to have genetic differences because of producing with self-obtained seeds. In this study, we investigated some morphological and phenological features of 13 yamula eggplant genotypes and 4 control varieties (1 Manisa eggplant and 3 Anamur eggplant types). The results showed that there was significant variation among yamula eggplant genotypes and also between control genotypes and yamula genotypes. Especially, yamula eggplant genotypes are prominent with their specific striped structure and hard fruit flesh when compared with other varieties.

Keywords: Yamula Eggplant, Characterization

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THE IMPORTANCE OF WASTE AND ENVIRONMENT MANAGEMENT IN PRINTING SECTOR

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Abstract:

All kinds of materials that become useless during production activities, damage the environment and must be exterminated are generally called waste. Waste is also defined as all materials thrown away by its manufacturer or a person or entity who owns it and causes a harmful change at environment. The most important of the solid, liquid and gaseous wastes produced in the printing industry before, during and after the printing process are waste ink, ink sludge and solvents emerging after machine washing, waste water of water-based ink, block and film developer and fixer solutions, waste papers, waste films, faulty prints, cleaning solvents and volatile organic compound (VOC) emissions emerging from IPA use. Some of these wastes fall into the hazardous waste category due to their processing characteristics during the production process. Effective and regular extermination of these wastes is necessary to protect the environment and employee health. This can be provided only by the application of waste management. Some wastes are recycled and reused at printing industry, but in some cases that recycling is impossible, these wastes should be eliminated without harming human health and environment. Especially the materials whose disposal is compulsory should be classified at the source and sent to licensed disposal companies. As a new sector, waste management sector should develop new and special processes for printing technologies wastes. Owners of printing companies should be informed about waste management. At waste management process, the most appropriate clean production techniques should be used, waste production should be prevented or minimised and wastes should be recycled effectively. The aim of this study is to provide suggestions and contributions for the possible best ways of preventing the wastes from harming the nature and disposing or recycling of the wastes generated during production in the printing sector.

Keywords: Printing Wastes, Waste Management In Printing, Paper And Ink Wastes

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APPLICATION OF ADAPTIVE NEURO FUZZY INFERENCE SYSTEM AND ARTIFICIAL NEURAL NETWORKS IN WATER QUALITY MONITORING

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Abstract:

Water is one of the most important sources of human and ecosystem health. It is also necessary for drinking, personal hygiene, agriculture, industry and hydroelectric power generation. Water quality is used to describe the physical, chemical and biological properties of water in terms of ecosystem and human health. Dissolved Oxygen (DO) is one of the most important parameters for evaluating water quality in aquatic systems. In this study, Adaptive Neuro Fuzzy Inference System (ANFIS) and Artificial Neural Networks (ANN) are used to predict dissolved oxygen in the Sakarya River. Temperature, pH, electrical conductivity, ammonium nitrogen, nitrite nitrogen, nitrate nitrogen and total phosphorus values are defined as input parameters of the system. These parameters are measured from stations selected from Sariyar, Gokcekaya and Yenice dam lakes on the Sakarya River. Sensitivity analyzes are performed to determine the effect of the input parameters. The results of the ANFIS model are compared with the ANN model.

Keywords: Water Quality, Dissolved Oxygen, Artificial Neural Networks, Adaptive Neuro Fuzzy Inference System

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THE BIOMASS ENERGY POTENTIAL FROM AGRICULTURAL PRODUCTION IN THE BLACK SEA REGION OF TURKEY

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Abstract:

The objective of this study is to determine the agricultural residues potential in terms of types, quantities and mapping in The Black Sea Region of Turkey. The Black Sea Region consists of 18 provinces in the north of Turkey. The quantities of residues from the agricultural crops cultivated in Turkey, in tons of dry matter per year, were calculated and estimated using production data of crops with Turkish Statistical Institute for the 2016 seasonal years. The annual gross potential of agricultural residues was determined by using residue to product ratio. The energy potential of residues for each province was calculated by multiplication of the calorific values of agricultural residues with the available residue amount. In this paper, the energy potential of annual crop residues was evaluated with ArcGIS[®] which geographical information system program. The total amount of unused agricultural crop residues was approximately 1.86 Mt.year⁻¹. It was found that the total calorific value of the agricultural residues was around 33.60 TJ.year⁻¹ for the production period of 2016 in the region. When provinces put in order according to the amount of agricultural residues, the top five provinces of the region are Samsun (370.3 kt), Ordu (326.22 kt), Corum (169.53 kt), Giresun (166.60 kt) and Tokat (134.07 kt). The major crops included in the ratio of the total calorific value were hazelnuts (53.54%), maize (13.68%), wheat (12.22%), and paddy (7.69%).

Keywords: Biomass Energy, Agricultural Residues, Black Sea Region, Turkey

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DETERMINING AND MAPPING AGRICULTURAL BIOMASS ENERGY POTENTIAL IN SAMSUN PROVINCE OF TURKEY

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Abstract:

The aim of this study was to determine the biomass potential and the energy value, being produced from agricultural residues in Samsun province. Samsun is a province of Turkey on the Black Sea region. Samsun province is divided into 17 districts. The amounts of residues from the agricultural crops cultivated in Samsun province were calculated using production data of crops with Turkish Statistical Institute for the 2016 seasonal years. The annual gross potential of agricultural residues was determined by using residue to product ratio. The energy potential of residues for each districts was calculated by multiplication of the calorific values of agricultural residues with the available residue amount. The total amount of agricultural residues was approximately 366.60 kt.year⁻¹. It was found that the total calorific value of the agricultural residues was around 6.46 TJ.year⁻¹ for the production period of 2016 in the region. When districts put in order according to the amount of agricultural residues, the top three districts of Samsun are Bafra (87.43 kt), Carsamba (82.80 kt), and Terme (15.02 kt). The major crops included in the ratio of the total calorific value were hazelnuts (42.32%), maize (20.60%), paddy (19.53%) and wheat (10.79%).

Keywords: Biomass Energy, Agricultural Residues, Samsun Province, Turkey

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DETERMINATION OF THE GENOTOXIC ACTIVITY OF RHODODENDRON HONEY CONTAINING GRAYANOTOXIN III IN BONE MARROW CELLS OF MICE USING MICRONUCLEUS ASSAY

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Abstract:

Rhododendron Honey (RH) called as “mad honey” is contains an ingredient from rhododendron nectar and grayanotoxin, a natural neurotoxin and traditionally used to treatment of inflammatory conditions, pain, gastro-intestinal disorders, common cold, asthma, skin disease. The aim of the present study was to investigate the genotoxic effect of RH on bone marrow cells of mice by micronucleus assay after short-term (24h) exposure to RH. Male mice were divided into six groups (6 animals each). One of these was the positive, and the other one was the negative control group. Three of these were experiment groups. Groups 3, 4 and 5 were respectively given Rhododendron honey (RH) at doses of 25, 50, and 75 mg/kg via oral gavage. Group 6 was treated with 0.01 mg/kg of Grayanotoxin-III (GTX-III) via intraperitoneal injection. The slides were prepared and stained with May Grunwald for 3 min, May Grunwald:distilled water (1:1) for 2 min, 10 % Giemsa in Sorensen buffer for 10 min. A total of 2000 erythrocytes were scored for each animal at a magnification of x1000. The numbers of micronucleated polychromatic erythrocytes (MNPCE) and micronucleated normochromatic erythrocyte (MNNCE) were counted. PCE/NCE ratio was calculated. The results of the present study revealed that there were significant increases in MNPCE at the highest concentration of RH (75mg/kg) and 0.01 mg/kg of GTX-III for 24 h when compared with negative control. Furthermore, RH and GTX-III significantly decreased the PCE/NCE ration at the same concentrations for 24. However, in low doses RH group, such an increase and decrease were not observed respectively MNPCE and PCE/NCE ratio. Therefore, low doses (25 and 50 mg/kg) of RH produces no genotoxic and cytotoxic potential ratio in the bone marrow cells of mice.

Acknowledgment: This work was supported by Duzce University, BAP [Project Number=2013.01.01.199].

Keywords: Grayanotoxin, Mad Honey, Rhododendron Honey, Micronucleus Assay

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MICROBIAL CONCENTRATIONS IN CLASSROOM USING AIR AND SURFACE SAMPLING

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Abstract:

The presence of undesirable microbe is often associated with sick building syndrome (SBS) and building related illnesses (BRI). This study is to assess microorganisms from indoor surfaces and indoor air in university classroom. Bioaerosol was measured by using portable impactor method in six classrooms with different classroom sizes (30, 40, 60, 90, 150, and 300-student classrooms). Detecting microorganisms on surfaces (desks, microphones, and door handles) was used swab test method. The results found that concentrations of total bacteria and total fungi in indoor air were 68-196 CFU/ m³ and 15 – 35 CFU/ m³. Additionally, total bacteria in all classrooms were higher than total fungi. Total fungi on surfaces was found on desks (41.9%), microphone (31.8%) and door handles (26.3%). Classroom is one important public buildings where numerous people are exposed to bioaerosol. Thus, brainstorming and design about suitable and effective cleaning system and maintenance of air condition systems for the classrooms should be apply in order to improve the hygiene in public places and to reduce microorganisms.

Keywords: Microbial Concentration, Indoor Air, Microorganisms On Surfaces, Classroom, Bioaerosol, Indoor Surface

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TEMPORAL TRENDS OF HEAVY METALS CONCENTRATIONS IN MOSSES COLLECTED IN ROMANIA

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Abstract:

The passive moss biomonitoring technique was used to assess the heavy metal atmospheric deposition in Romania. Moss samples, *Pleurozium schreberi*, *Hylocomium splendens*, *Hypnum cupressiforme*, and other species, were collected during the dry seasons of summer and autumn of 2010 and 2015, from the sampling sites evenly distributed over 75% of the Romanian territory. The concentrations of Al, V, Cr, Fe, Ni, Cu, Zn, Cd and Pb in moss samples were determined by complementary analytical techniques: instrumental epithermal neutron activation analysis (ENAA); graphite furnace/flame atomic absorption spectrometry (GFAAS /FAAS) for samples collected in 2010 and inductively coupled plasma mass spectrometry (ICP-MS) for samples collected in 2015. The obtained data were statistically processed and the spatial distribution maps of factor scores based on elemental concentrations together with the spatial distribution maps of heavy metals in moss were drawn. The site specific temporal trends for many elements were observed between the two moss surveys. In general, the concentration of metals in moss slowly decreased between 2010 and 2015; the highest decrease was observed for Pb and Cd. The results revealed that the atmospheric deposition of the analysed metals is a considerable problem in the northern and north-western parts of Romania.

Keywords: Heavy Metals, Moss, Biomonitoring

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MICROPOLLUTANTS ADSORPTION WITH USE OF BIOPOLYMERS IN CONTAMINATED EFFLUENTS

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Abstract:

Currently the presence of emerging organic micropollutants in the environment has aroused interest from international health agencies, because they may cause serious environmental and public health problems. The use of these drugs can be administered to patients with the most varied needs and due to this, It uses a lot of organic micropollutants in water resources is being deposited causing your contamination. The conventional wastewater treatment system does not deprive these kinds of pollutants and when untreated, are contaminants in surface waters and groundwater. Some examples are endocrine disruptors that can bring serious risk to public health to be released directly into the sanitary sewage network and reach the water supply system. This work aims at the removal of micropollutants through low-cost arrays and natural ways to adsorption, as well as adsorbents that alginate is extracted from algae and chitosan from the chitin of shellfish, have shown good results. The drugs used were "Ciprofloxacin(Cp)", "Ibuprofen(Ib)" and "Cycle 21" (ethinyl estradiol-Et) and for dilution were used distilled water and saline. In chromatography, the spheres of biopolymers will adsorb micropollutants and analyses of absorbance at $\lambda = 280\text{nm}$ were the spectrophotometer. The best results were the Cp diluted in saline with alginate and chitosan, and Ib diluted with saline and water both in the alginate and chitosan. In the infrared, we use with KBr, to chitosan and alginate liquid. For "Et" the best adsorbent was chitosan. For Cp, the best analysis was with saline and water on chitosan. With Ib the best results was with water on chitosan. We conclude that the use of low-cost adsorbents for recovery of micropollutants, is a good choice to make and costs processes in polluted watersheds. So far, the partial results indicate that both beads have shown promising results and that apparently showed significant results chitosan.

Keywords: Chitosan, Alginate, Micropolluents

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DIFFERENT IRRIGATION METHODS AND DROUGHT EFFECTS ON CHLOROPHYLL CONTENT AND LEAF RELATIVE WATER CONTENT IN CORN (ZEA MAYS)

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Abstract:

In arid and semi-arid regions, because of inadequate and irregular rainfall desired yields can not be obtained. Therefore, there is need to irrigation water. Application of irrigation water with appropriate irrigation method is important in terms of effective use of water resources. In this research, the effects of three different irrigation quantities (100%, 67%, and 33% of available soil water) on the chlorophyll and leaf relative water content in silage maize irrigated with drip and furrow methods were investigated in semi-arid conditions. At the end of research, chlorophyll content was the highest in the drip irrigation full-irrigated, and it was obtained the lowest in the furrow method irrigated with 33% of available soil water. In addition to, it was determined that in both irrigation methods chlorophyll and leaf relative water contents were decreased as drought stress increased.

Keywords: Irrigation Methods, Drip Irrigation, Water Deficit, Chlorophyll Content, Leaf Relative Water Content

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THERMAL COMFORT IN PUBLIC BUILDINGS: A FIELD STUDY OF ESKISEHIR OSMANGAZI UNIVERSITY FACULTY OF ENGINEERING AND ARCHITECTURE DEAN'S BUILDING

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Abstract:

A healthy and comfortable life is the basic requirement for humans. Currently, humans spend most of their time indoors, thus indoor environmental conditions become important. When indoor environmental conditions fail to provide comfort, health problems could be witnessed for occupants. Parameters such as temperature, humidity, acoustics, radioactivity, electrical fields, magnetic fields, light, gas and particles are effective in occurrence of adverse effects. One of these parameters is the provision of thermal comfort in indoor environment. Particularly, in buildings where central heating is used, temperature spreads evenly across all spaces, thus creates a thermal monotony and diverse comfort conditions in spaces facing different directions of the building. The spaces that fail to provide comfort are heated more and a comfortable temperature could be perceived. This heating regime causes the spaces facing other directions to be excessively overheated. As temperatures rise markedly, a decrease in relative humidity and airflow occurs and dust and bacteria accumulate more in indoor environment. Indoor temperature and humidity levels that do not provide comfort also cause fatigue, depression, tension disorders, sweating irregularities and various allergies in humans. In this context, temperature and relative humidity levels were recorded with ten minutes intervals at forty locations in different spaces for a year in Eskisehir Osmangazi University Faculty of Engineering and Architecture Dean's Building, which is an uninsulated, north-south oriented building. By systematic analysis of the obtained data, percentage of hours outside the comfort range were obtained according to limit values that provide thermal comfort. In this context, thermal comfort conditions for hours of occupancy during heating, cooling and free running periods were scrutinized. In the light of the obtained data, thermal comfort of spaces in the north and south were compared and the effects of orientation on the indoor thermal environmental conditions were analyzed.

Keywords: Thermal Comfort, Measurement, Orientation

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NEW CONODONT AND AMMONOID DISCOVERIES IN THE TRIASSIC OF THE KARACAHISAR AUTOCHTHONOUS, CENTRAL - WESTERN TAURIDES OF TURKEY

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Abstract:

34 stratigraphic sections were measured and sampled in the Beydaglari-Karacahisar autochthon, originally coined "Karacahisar unit" by Dumont and Kerey (1975) and "Geyik Dagi Unit" by Ozgul (1976), and seen as a tectonic window under the Antalya Nappes (Senel et al., 1996). The succession consists mainly Precambrian-Cambrian, Carboniferous and Middle Triassic-Lower Paleocene units. Our research in the Karacahisar Autochthonous resulted in findings of Triassic ammonites and conodonts. The nodular limestones in the uppermost level of the Basakdere Marble yield fish remains and conodont-ramiforms of family Gladigondolellidae as well as Sephardiella mungoensis (Late Ladinian). The Kartoz Formation that consists of conglomerates, sandstones, siltstones, claystones and limestones, clayey limestone yields the Anisian - Ladinian conodonts Gladigondolella sp. and Cratognathodus kochi. A yellow-green clayey limestone level yields the Pelsonian-Illyrian conodonts Nicoraella kockeli and Paragondolella spp. The overlying Kasimlar Formation consists in the Yolayirdim Member of yellowish - grey limestones that yield ammonites and bivalve fragments of Carnian-Norian age. The faunal spectrum suggests rather normal marine and pelagic environment.

Keywords: Taurus, Karacahisar, Triassic, Conodont, Ammonite

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THE CONODONT SUB-FAMILY MARQUEZELLINAE IN THE TARASCI VILLAGE (SEYDISEHIR, KONYA-TURKEY)

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Abstract:

The area of Seydisehir (Southern Turkey) is considered a fragment of the African - Arabian plate below the Taurus Nappes. Its Triassic sequence yields faunas characteristic for the "Sephardic Province" that is restricted to the Southern Tethys. A number of alpinotype Tethyan faunal elements provide clues as to their age, including Late Anisian, Fassanian, Longobardian and Julian. The subfamily Marquezellinae (Family Gondolellidae) originated in the Late Anisian and got extinct during the Early Julian (Early Carnian). The "Sephardic Province" is replaced by a dominantly evaporitic facies. However, the subfamily extended during Late Ladinian–Early Carnian to the Southern Alps, Dinarids, Taurides and the Cimmerian terranes. The Tarasci Limestone is a dark well bedded protected-bay limestones with intercalated lenses of white massive biogenic Emir Kaya Limestone (Ladinian). It is overlain by the Sarpyar Dere Formation of turbiditic marls, sandstones and micro-breccia (probable Carnian). The Tarasci Limestone consists of four superposed fossiliferous horizons, Anisian, Early Ladinian age, and Late Ladinian. Nicora (1981) found in the Tepearasi Valley, Osmanin Dag, in a sample from the upper Tarasci Limestone, a quite abundant *Pseudofurnishius murcianus* fauna, with a Longobardian *Protrachyceras* sp. and Pelecypods. The first conodont and ammonite findings in black limestones of the Tarasci Formation of the Geyikdagi Autochthonous were located precisely in the Sarpyar River, north of the Tarasci Village, Seydisehir district, South of Lake Beysehir. The fauna includes ammonites and conodonts that indicate a Ladinian age.

Keywords: Taurus, Geyikdagi, Triassic, Conodont, Ammonite

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THE IMPACTS OF SOIL DRAINAGE ON HYDROLOGICAL CYCLE AT THE MODEL SITE ŽELEZNÁ (PLA ČESKÝ LES, CZECH REPUBLIC)

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Abstract:

Alteration of water and gas cycling in soil through artificial drainage induces fundamental changes in overall hydrological cycle and therefore in local climate. Comparison of moisture, temperature and soil water potential parameters in soil profiles of drained and natural pseudogley modal soils provides information on relationship among these parameters under altered physical conditions. Continuous data were recorded using sensors permanently placed in soil profiles and complemented by data from meteorological station placed on site. In this paper, 10-day data set was used that covered dry period followed by a sudden rainfall episode. Differing course of changes in monitored parameters shows lower ability of drained profile to balance climate change effect than that of natural water regime. Under naturally dry conditions, soil moisture of pseudogley modal reached approximately 40 % in all soil horizons (Ad, En, Bm), whereas in the drained pseudogley profile, soil moisture reached only 30 % in all the horizons. The change in volumetric water content during the rainfall episode was negligible and lasted for shorter time under natural conditions than in profile with altered hydrological regime. The Ad horizon of the natural pseudogley shows more gradual decrease in temperature, which ensures stable environment for plants and higher average temperature (15.5°C). Water accessibility for plant transpiration during the dry period noticeably decreases in the drained soil profile to as much as -243,2 kPa. On the other hand, natural soil profile was able to maintain soil water potential in range that corresponded with field water capacity value (-10 kPa).

Keywords: Soil Water, Soil Drainage, Temperature, Moisture

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ASSESSMENT OF LOW CARBON DEVELOPMENT OF OECD COUNTRIES BY FUZZY CLUSTERING ANALYSIS

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Abstract:

Climate change, in other words global warming, has become one of the most fundamental issues of our time. It not only threatens the survival of people and development of countries, but also poses strong challenges to our posterity. The main reason of global warming is the excessive energy-related carbon dioxide emissions. Growing emissions of carbon dioxide have so far been associated with the growing global population in amount and improving of living standards and industries of countries and regions. Therefore, to prevent adverse effects from climate change, countries should reduce carbon dioxide emissions while maintaining their economic growth. Efforts to reduce carbon dioxide emissions while maintaining economic growth of the countries have led to the emergence of a new concept called low carbon development. There is no internationally agreed definition of low carbon development. Its ultimate aim is to mitigate emissions to avoid dangerous climate change, while at the same time achieving social and economic development. The aim of this paper is to evaluate low carbon development of OECD countries by using fuzzy clustering analysis. Clustering analysis is a statistical technique that can be used to organize data into clusters based on similarities among the individual data items. The clusters developed by clustering analysis denote a high level of homogeneity within each cluster and high level of heterogeneity between clusters. The conventional clustering methods are based on classical set theory and restrict that each point of the data set belongs to exactly one cluster. In fuzzy clustering, the data points can belong to more than one cluster at the same time. In this paper, 35 OECD Countries are classified by fuzzy clustering algorithm according to the low carbon development indicators.

Keywords: Low Carbon Development, OECD Countries, Fuzzy Clustering Analysis

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THE IMPACT OF TREATED WASTEWATER IN AGRICULTURAL IRRIGATION TO SOME PHYSIOLOGICAL PARAMETERS OF SILAGE MAIZE (ZEA MAYS L.)

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Abstract:

Nowadays, for arid and semi-arid regions, treated wastewater is become prominent as an alternative water source in agricultural irrigation. However, it is necessary to use treated wastewater without damaging the environment. The use of wastewater by subsurface drip irrigation method, which is one of the irrigation methods, minimizes the damage to the environment. The aims of the study are determining to the effect of use of treated wastewater in agricultural irrigation. Therefore, silage maize plant cultivated as animal feed was used in the present study. Treated wastewater and freshwater (Control) were used to irrigation by subsurface drip irrigation method. At the end of the study, plant height, stem diameter, leaf number, leaf weight and total wet weight values were found to be statistically significant in the treated wastewater application. As a result, it has been determined that the treated wastewater can be used for irrigation as long as be under control and using suitable irrigation method and it contributes to the plant development because of containing organic and inorganic compounds (nutrients).

Keywords: Wastewater, Subsurface Drip Irrigation, Zea Mays L.

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IRRIGATION METHODS USED IN AGRICULTURAL AND WATER-YIELDS RELATIONSHIPS

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Abstract:

Nowadays, the world population has exceeded 7 billion and it is expected to be 9.7 billion by 2050. The demand for food needs is increasing progressively with the increase of the world population and it is becoming necessary to use current resources in the most efficiently. According to the World Water Assessment Program (WWAP) report, while the amount of water resources in the last 50 years is the same, the low water has tripled. This means that one of the most important problems in the future will be water drought. The rate of agricultural water consumption in the world is 70% and this rate is 74% in Turkey. At the beginning of excess water consumption in agriculture is wrong irrigation method and system selection. Surface irrigation methods are the most widely used methods in agricultural irrigation in Turkey. Water application efficiency is low in surface irrigation methods and high in pressurized irrigation methods. This study will examine the water status in the world and Turkey and the water-yield relationships obtained by using the methods and methods used in agricultural irrigation.

Keywords: Irrigation Methods, Water Resources, Water Management

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EFFECTS OF TREATED WASTEWATER TO ANTIOXIDANT ENZYME ACTIVITIES IN SILAGE MAIZE (ZEA MAYS L.) UNDER DROUGHT STRESS

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Abstract:

The responses of the antioxidant system to treated wastewater and drought stress were studied in OSSK-644 hybrids silage maize (*Zea mays* L.). In the experiment three different levels of irrigation quantity (33%, 67%, and 100% of the available water) and two different water quality (fresh and treated wastewater) were applied by a drip irrigation system. In this study, superoxide dismutase (SOD), catalase (CAT) and ascorbate peroxidase (APX) accumulations were examined. It has been found that drought stress increased SOD, APX and CAT activities in silage maize. The antioxidant activity increased progressively with increasing intensities of drought stress and it was the lowest in full irrigation. Although, CAT accumulation was higher under fresh water, APX and SOD accumulation were higher in treated wastewater. As a result, drought and water quality appeared different results in maize plant in point of antioxidant enzyme activity.

Keywords: Antioxidant Enzymes, Deficit Irrigation, Silage Maize, Wastewater

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USING INNOVATIVE TREND APPROACH FOR EVALUATING CHANGE OF SEASONAL REFERENCE EVAPOTRANSPIRATION

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Abstract:

The GAP project is the largest investment in term of regional development throughout the history of Turkish Republic and the fourth largest irrigation project in the world. The development of the GAP region was originally deliberated on its water and land resources. Therefore, a probable drought event would cause the failure of the GAP because of the water resources development program as relating to the GAP consists of 13 groups of irrigation and energy projects. Severity of the drought will significantly increase with increasing temperature. Many researchers have been evaluating the effect of global warming in any given region by considering change in precipitation. But, it is reported that considering only precipitation in the analysis of climate change is inadequate whereas the reference evapotranspiration (ET_o) is more suitable than the precipitation to reflect the effect of global warming. In this study as material, climate factors from seven meteorology stations operated by Turkish State Meteorological Service were used in calculation of the ET_o. Although there are nine meteorology stations in the area, seven stations were taken into account in the study due to the two stations (Mardin and Sirnak) having too much missing values. After that, the monthly ET_o data of the 7 sites were arranged at four different categorical data sets, namely period one (from January to March), period two (from April to June), period three (from July to September), period four (from October to December). In this study, monthly ET_o time series were summed up to obtain the data set of each station. Variation in seasonal ET_o time series was detected by using innovative approach introduced by Sen (2012). The results of the study showed that data sets belonging to each station visually presented upward or downward trend in low, medium and high ET_o values.

Keywords: Gap, Reference Evapotranspiration, Sen Method

EFFECTS OF MICROWAVES ON SOME PHYSIOLOGICAL PARAMETERS AND MITOTIC DIVISION OF WHEAT

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Abstract:

Microwave is a type of electromagnetic radiation and has a lot of applications such as communication, cooking, radar and some agricultural applications including control of insects and microorganisms in stored grains, increased germination of seeds with thickened shells, grain drying and product processing. The aim of this study was to examine effects of microwave heating on wheat seeds in terms of physiological and mitotic division. Two winter wheat variety (*Triticum aestivum* L. cv Tir and Bezostaja) were subjected to heating in a microwave oven with a medium power level (460 W) for 30, 60 and 120 seconds. For control, non-treated seeds were used. Control and treated seeds were placed on petri plates including tissue paper and moistened with distilled water. Seeds were germinated at 25 ± 2 °C and 16-h light/8-h dark photoperiod. Germination percentage, root and shoot length, and fresh weight of germinated seeds were recorded. To observe mitotic division, after 2 days of germination, root tips were fixed with carnoy fixative and treated with 1 N HCl solution. Root tips were stained using acetic orcein and mitosis were watched using squash preparation method. Germination percentage of microwave oven-treated wheat seeds were significantly lower than non-treated ones. This effect increased when the time was prolonged. On the other hand, there was not a significant change in terms of physiological parameters. Also any abnormalities were not observed between mitotic phases. To conclude, inhibitory effect of microwave oven treatment on wheat seed germination was very clear, but it had no significant effect on other physiological parameters and mitotic phases.

Keywords: Microwave Treatment, Wheat, Germination, Mitotic Division

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DINOFLAGELLATE CYST ASSEMBLAGES IN THE SURFACE SEDIMENTS FROM ISKENDERUN BAY, NORTHEASTERN MEDITERRANEAN SEA

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Abstract:

In order to document and understand of dinoflagellate cysts assemblages, 6 surface sediment samples were collected from Iskenderun Bay, Northeastern Mediterranean. A total 28 cyst types were identified and cyst concentration was reached up to 144 cyst g⁻¹ dry weight sediment in Iskenderun Bay. Concentration of cysts were found lower compared to other areas of the Mediterranean. *Lingulodinium machaerophorum*, *Spiniferites bulloideus* and *Brigantedinium* spp. were the most abundant cysts in the sampling points. 3 stations had sandy sediment grain size, other stations showed muddy (silt+clay) sediment distribution. Only clay showed significantly positive strong correlation with total and heterotrophic dinoflagellate cyst concentrations, whereas no other strong correlation found between sediment grain size and dinoflagellate cysts. This study provides the first modern dinoflagellate cyst records from surface sediments of Iskenderun Bay, Northeastern Mediterranean.

Keywords: Dinoflagellate, Cyst, Sediment, Iskenderun Bay, Northeastern Mediterranean Sea

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ADSORPTION OF THORIUM (IV) IONS BY ZNO:AL NANO MATERIAL PREPARED WITH COMBUSTION SYNTHESIS: EMPIRICAL MODELING AND PROCESS OPTIMIZATION BY RESPONSE SURFACE METHODOLOGY (RSM)

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Abstract:

The adsorption is the most common method in reducing the activity of the waste, in converting to solid state and to cover less volume of the radioactive wastes from the liquid waste group caused to great distress for ecologic environment. In this research, the novel adsorbent was made of with synthesis by microwave-assisted combustion method for Thorium (IV) adsorption from aqueous media. Primarily, structural characteristics of prepared adsorbent such as FTIR, BET, Zeta-potential, XRD and SEM were analysed. Thorium (IV) adsorption from aqueous solutions was optimized by response surface method (RSM) of wide use in industrial investigations. Analyses of regression displays that all of the single factors were important for Thorium (IV) adsorption. Effective experimental conditions on adsorption yield: pH, temperature, concentration and amount of adsorbent. Central composite design was selected for planning of the experimental conditions. According to RSM data, it was reasoned that the design adapted second degree model and R² and R²_{adj} parameters pointing model consistence were 0.99 and 0.98, respectively. Adsorption capacity for ZnO:Al was obtained 192.3 mg/g in optimum conditions. Suitability of adsorption values to adsorption isotherms was searched and thermodynamic data were calculated. Made nano crystals with high sorption capacity were encouraged to remove Thorium (IV) compared to many adsorbents in the literature.

Keywords: Adsorption, Zno:Al, Thorium, RSM, Environment

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CHEMICAL SPRAYER TANK COMPONENT IMPROVEMENT FOR REDUCE FATIGUE OF USERS

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Abstract:

Farmers commonly use a chemical tank sprayer for to get rid of insects. However, using of a chemical sprayer tank results in pain and muscular injury at shoulder and lower back due to the weight of the chemical solution added to the chemical sprayer tank and the appearance of the device is not appropriate. The purpose of this study were to investigate fatigue feeling among chemical sprayer tank users and to improve equipment used with chemical tank sprayer for reduce fatigue of users. The subjects in this study were 20 farmers who use chemical sprayer tank. The problem of using of a chemical sprayer tank was asked using the body discomfort questionnaire to evaluate fatigue or discomfort. The questionnaire for satisfaction feeling of chemical sprayer tank using was asked to evaluate problem for using of chemical sprayer tank. The results from the body discomfort questionnaire indicated that most subjects experienced discomfort at shoulder and lower back. The problem for using of chemical sprayer tank were no lumbar support, the back sash too small and thin and it can't be adjusted. The improvement of chemical sprayer tank component was adding lumbar support, increase thickness and wide of back sash and make the back sash can be adjusted easier. After improvement of chemical sprayer tank component, the fatigue feeling at body part of subjects were decreased and satisfaction feeling of subjects also increased.

Keywords: Chemical Sprayer Tank, Body Discomfort, Back Sash

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SELECTIVE PRECONCENTRATION/SEPARATION AND SENSITIVE DETERMINATION OF AL(III), FE(II), CO(II), CU(II), CD(II) AND PB(II) IONS IN BEVERAGES BY FUNCTIONALIZED POLYMERIC MICROSPHERES

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Abstract:

The determination, preconcentration and separation of metal ions at trace level in food and water samples have become an important issue for both academic and industrial fields. For the extraction of metal ions from aqueous solutions, polymeric materials have been of great interest as adsorbents due to their excellent mechanical, thermal and chemical stability, and reusability. These materials can be prepared in various forms such as resins, microspheres (or beads), gels or disks. Among them, the crosslinked porous microspheres are mainly preferred due to their high surface areas, porosity, ease of preparation with desired size, durability, superior mobility and easy recovery from dispersion. In order to obtain further selectivity, affinity and capacity towards the metal ions, they are also functionalized by metal chelate forming agents or ligands, in which the ligand molecules are covalently bonded to the polymer active sites consisting of functional groups such as hydroxyl, carboxyl, amino, glycidyl, pyridine and chloride. By selecting an accurate combination of a ligand and an insoluble polymer support, functionalized polymers having triple functionality such as physical adsorption, chelate formation and ion exchange can be designed as sorbent materials with superior selectivity and capacity for the preconcentration, separation and determination of target trace metal ions.

In this study, 2-aminobenzothiazole (ABTAL) functionalized polymeric microspheres consisting of poly(glycidyl methacrylate-methyl methacrylate-divinylbenzene), GMA-MMA-DVB were prepared as solid phase adsorbent for selective preconcentration/separation and sensitive determination of Al(III), Fe(II), Co(II), Cu(II), Cd(II) and Pb(II) ions in beverages. The characterization of obtained microspheres was investigated by FTIR, BET, SEM and epoxide content analyses. The sorption properties of this functionalized microspheres were examined using flame atomic absorption spectrometry for the target metal ions at $\mu\text{g}\cdot\text{L}^{-1}$ level. The effects of some analytical parameters including pH, adsorption capacity of microspheres, adsorbent amount, sample volume and type of container were also studied.

Keywords: Trace Metal Sorption, Solid Phase Extraction, Functionalized Polymer Microspheres, Beverages.

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EVALUATION OF ENVIRONMENTAL EDUCATION IN THE NEW SCIENCE EDUCATION CURRICULUM IN TURKEY

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Abstract:

Gaining environmental awareness to students starts during primary education years in classroom environment. In Turkey, environmental education is generally taught in science courses in primary education. The evaluation of new Science Education Curriculum (2017) is so important for improvement of the environmental literacy. Therefore, this study intends to evaluate the objectives related to environment topics in the new curriculum in terms of knowledge and skills. Thus, the objectives related to environment were determined and analyzed in terms of four different aspects, namely science knowledge, environmental knowledge, sustainability, and attitudes, values and perspectives through document analysis.

Findings related to general structure of the objectives showed that there were objectives related to recognizing environmental problems; developing environmental awareness; making research; designing project; development of responsibility in this curriculum. In addition to these skills, some engineering skills were also emphasized unlike the previous curriculum. Thus, it can be said that the curriculum aims to adopt STEM (Science-Technology-Engineering-Mathematics) approach which has become popular recently. The inclusion of objectives that enable to associate this approach with environmental education can be considered as one of the strong aspects of the curriculum. However, the conceptions of soil and erosion were not included in this curriculum, implying a controversial situation.

When examined the objectives in terms of sustainability, it can be said that the objectives at 3th, 4th, and 5th grade level were not associated with sustainability, whereas some objectives at 6th and 7th grade level were. Besides, there were objectives directly related to sustainability in 8th grade level. Additionally, the objectives related to improvement of attitude, value and perspective were distributed almost equally across grade levels. Regarding environmental knowledge, it was seen that environmental knowledge is given at each grade level. On the other hand, objectives related to the science knowledge were more than the other aspects in each grade level. That is, similar to the previous curriculum, the science dimension of the environment concept is highlighted.

Keywords: Science Education Curriculum, Document Analysis

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IDENTIFICATION OF SITE VULNERABILITY FOR PHOSPHORUS

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Abstract:

Accelerated P concentration in soil by long-term application of fertilizers results in increase in crop yield up to a certain point. However, after that point P addition does not increase the yield, in fact it causes an environmental problem when it moves from agricultural land to surface waters sensitive to eutrophication. Soil test P (STP) is an important parameter for both agronomic and environmental reasons. Historically, soil scientists have focused on the agronomic aspects as they studied the factors involved in building and maintaining soil fertility. More recently, the study of P as a water pollutant has gained importance because of its role in eutrophication. Soil test P in the surface soil horizon is influenced by many factors including P fertilizer application rates and soil and management practices such as crop rotation, crop removal, tillage, and crop residue removal. Therefore, identification of site vulnerability has been crucial for implementation of cost-effective management strategies. There are several tools for this purpose, such as computer-based water-quality models, field studies, STP alone, and a PI. Field studies are time consuming, costly, and labor intensive. Therefore, there was a need for a simple, field-scale tool that can integrate soil properties, hydrology, and agricultural management practices.

Keywords: Phosphorus Losses, Soil Test P, P-Index, Eutrophication

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CASE SCENARIO SIMULATION CONCERNING EVENTUAL SHIP SOURCED OIL SPILL, EXPANSION AND RESPONSE PROCESS IN ISTANBUL STRAIT.

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Abstract:

Besides its substantial features, sensitivities like around 18 million populations in surroundings, military facilities, ports, oil lay down areas etc. also brings the high risk to use of Istanbul Strait. Based on the statistics of Turkish Ministry of Transportation, Maritime and Communication, although the number of vessel passage in Istanbul Strait is declining, tonnage of hazardous and flammable cargo like oil and chemical transportation is increasing and subsequently the risk of oil pollution, loss of life and property is also rising. Based on the mentioned above; it is crucial to be prepared for the initial and subsequent response to eventual ship sourced oil spill which may cause to block the Strait for an unbearable duration. In this study; preconditioned Istanbul Strait sensitive areas studies has been taken into account and possible oil spill scenario is loaded to PISCES 2 (Potential Incident Simulation Control and Evaluation System) decision support system for the determined specific sea area. Consequences of the simulation like oil expanding process and the effectiveness of the initial response had in hand and evaluated.

Keywords: Istanbul Strait, Initial Response, Oil Spill, PISCES Simulator.

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EFFECTS OF ZINC AND BORON FOLIAR APPLICATION IN SUGAR BEET UNDER TEKIRDAG ECOLOGICAL CONDITIONS

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Abstract:

The some soils of Turkey have deficient zinc and boron. This study aims at detecting the constituents of yield and quality obtained at different harvest times from boron and zinc fertilization.

The experiments were conducted during two years (2008 and 2009) in Hayrabolu, Tekirdag, Turkey. The sowing date was on March 1, 2008 and April 1, 2009. The sowing density was 45 x 25 cm. There were 6 rows in a plot, and each plot was 13.5 m². The study was conducted with three replications.

Zinc (zinc sulphate, 5.5 % w/w) and boron (boron-ethanolamine, 8 % w/w) were sprayed to sugar beet's leaves in the form of fluid and solution. Doses of zinc and boron were 0, 1000, 2000 and 3000 ml ha⁻¹. Zinc and boron were entitled as Zn₀, Zn₁, Zn₂, Zn₃ and B₀, B₁, B₂, B₃, respectively. The fertilizers were sprayed at three different times (the 60th, 120th and 180th day after sowing date as first time, second time and third time, respectively) to the plants' leaves. In both of the years, the crops were harvested on September 15th.

According to the results of the study; the presence of the highest sugar content was obtained in the dose of Zn₂B₁ (18.8 %) in the third applied time in 2008. The highest beet yield was obtained in the dose of Zn₂B₂ (89.87 t ha⁻¹) in the first applied time in 2008. The highest sugar yield was obtained in the dose of Zn₂B₂ (15.52 t ha⁻¹) in the second applied time in 2008. In this study, the effect of the nutrition elements of zinc and boron on the yield and quality of sugar beet was investigated.

Keywords: Sugar Beet, Zinc, Boron, Fertilizer

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THE EFFECT OF GROWTH PARAMETERS OF DIFFERENT BETAINE AND COMPOUND FERTILIZERS DOSES IN SUGAR BEET

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Abstract:

The aim of this study is to investigate the effects of different betaine doses in sugar beet. The research was conducted at North Dakota State University Agriculture Experiment Station Research Greenhouse Complex, Fargo, ND, USA. Betaine (B) and 10-34-0 (G) fertilizer and combinations of them were used in pot experiments. Both application doses were 0, 1, 2 and 3 l/da, have been and namely B0, B1, B2, B3 and G0, G1, G2, G3, respectively. According to the results; the highest plant height, wet weight and dry weight were B2G1 dose as 30.30 cm, 90.95 g and 41.74 g, respectively.

Keywords: Sugar Beet, Betaine, Fertilizer, Growth Parameters

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INVESTIGATION ON THE FLOOD RISK OF THE CAY STREAM

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Abstract:

Floods are the second most destructive disasters after earthquakes in Turkey. Determination of the size of flood and its influence are important for the determination of damage and its cost as well as for estimation of disaster counter measures. The aim of this study is to determine the flood risk of the Cay stream which flows through Cay Province of city of afyonkarahisar. In the study, Cay flood basin is digitized using CBS method and produced 3D numerical elevation modal. Then, using this data, flood discharges of the Cay stream which are differently given in the literature by using different synthetic methods is calculated. Flood capacity of the Cay stream is calculated by using HEC-RAS computer software. In the case of a flood, water velocities, water depths and energy levels are calculated along the channel of the Cay stream and shown in the stream profile. In addition, flood areas are determined and shown on the numerical modal. Finally, potential hazards in the flood region are examined using the results of this study and solution methods are provided.

Keywords: Hec-Ras, , Flood Modelling, Cay Stream, Flood Risk

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KERNEL BASED EXTREME LEARNING MACHINE FOR TOTAL ORGANIC CARBON PREDICTION IN YESILIRMAK RIVER

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Abstract:

Kernel based extreme learning machine was used to predict the total organic carbon (TOC) concentration -measurement is very costly- in Yesilirmak River. For this purpose on-line monitoring data were collected from real time measuring stations during 2007-2009. Pollutant parameters, namely, luminescence dissolved oxygen, chlorophyll a, pH, conductivity, nitrate nitrogen, ammonium nitrogen, TOC, o-phosphate, turbidity, suspended solid, flow rate were measured at five minutes interval in on-line monitoring stations. Data were collected in central office in Ankara via General Packet Radio Service. Extreme Learning Machine (ELM) is new algorithm for classification and regression problems. ELM is more widely used than the other computational intelligence techniques due to some properties such as learning speed, ease of implementation and minimal human intervention. In ELM technique output weights were solved of single layer feed-forward neural network structure by minimizing the squared loss of predicted errors and the norm of the output weights in regression problems. According to basic ELM algorithm, in the first step hidden node parameters were generated as randomly and then hidden layer output matrix were calculated and in the third step output weight vector were calculated by simple inversion of hidden layer matrix or Moore-Penrose generalized inverse of matrix. In case of hidden layer feature mapping is not known, kernel implementation of ELM is used. Within this context, corresponding kernel instead of hidden layer feature mapping can be used.

One of the first applications of extreme learning machine in river water quality, normalized river water quality data were used to kernel based extreme learning machine design. The best result was obtained with radial basis function kernel. Number of neurons in hidden layer and kernel parameter were 140 and 0.006 respectively. Performance values of algorithm were calculated as $R=0.9840$, $RMSE=0.9655$ and $MAPE (\%) = 3.0119$ for test data.

Keywords: Extreme Learning Machine, River Water Quality, Real-Time Monitoring, Modeling

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FLOTATION SEPARATION OF PLASTICS MIXTURES FROM WEEE PRODUCTS

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Abstract:

The amount of WEEE (Waste of Electric and Electronic) has largely increased these years, for the concern of environment and human health, plastic recycling is very important. Traditional plastic recycling processes include sorting, grinding, washing and regeneration, in which sorting occupies a leading position. Among different treatments, density sorting and optical sorting are the most widely used methods. However, both of them have their disadvantages, thus, those plastics with dark colors or/and closed densities is more difficult to separate. Other limitations of plastic recycling exist as well, since many plastic are added with flame retardant to delay the flames and to prevent the spread of fire, which also sets difficulties to recycling process.

In this case of study, we deal with the most presentative plastics in WEEE as Acrylonitrile-butadiene-styrene (ABS), high impact polystyrene (HIPS) and polypropylene (PP), try to separate them by a technology from mineral industry called froth flotation, which is widely used in separation of minerals from gangue and selection of ores after grinding. An important criterion and also a difficulty is the change of material's surface wettability. The former laboratorial tests have been carried out and showed that this method has a potential for plastics mixtures sorting. The treatment criteria of the processes such as size of plastic particles, type of surfactant, etc., have crucial effects on separation process.

In this paper we will focus on the behavior of surfactants in order to control the wettability, try to improve sorting efficiency and find appropriate surfactant. In addition, we will discuss the connections of technological feasibility and environmental and economic performance.

Keywords: Plastic Recovery, Flotation, Waste Plastics, WEEE

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ENERGY USE IN ORGANIC AND CONVENTIONAL FARMING SYSTEMS

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Abstract:

Agricultural and food systems because of the significant amount of energy consumption plays an important role in fossil fuel consumption and climate change. Compared with organic and non-organic production in terms of energy use of different agricultural production systems of energy inefficiency and energy consumption, especially important to be aware of the potential to reduce the environmental impacts induced from climate change. Today, conventional farming, higher than the approach which aims to achieve high efficiency using inputs, the maximum possible yield with a minimum of inputs with optimum orientation or organic farming methods are gradually shows a correct shift to obtain. This situation, without using agricultural chemicals (fertilizers, pesticides etc.) provide to obtain low yielding but high quality products. In general, the last approach leads to lower energy consumption per unit of land area, thus lower cost manufacturing and reduced greenhouse gas (GHG) emission is provided. However, this situation has significantly decreased the risk of total production. Therefore, to improve the energy efficiency is of great importance. So, within the boundaries of the production of agricultural products per unit of production (by weight or volume) of primary energy consumption reduction is primarily to be taken into account is required. Improving energy efficiency, overall efficiency of crop production systems in terms of energy and greenhouse gas emissions is an important parameter affecting positively. In this study, depending on the pre-made results of research, in the transition from conventional production to organic production in terms of energy use and efficiency of these two production system a comparison is made.

Keywords: Organic Farming, Conventional Farming, Energy

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SOCIAL MEDIA AS MEANS TO SPREAD THE TOURISM AWARENESS AND ENVIRONMENTAL AWARENESS TO ACHIEVE THE THE ECODEVELOPMENT

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Abstract:

The last two decades has witnessed a renewed interest in social media as a source of information and as a means of marketing , it also plays an important role in influencing individuals and groups by influencing their ideas and in many cases on their convictions. This paper revisits the role of social media in spread the tourism awareness among individuals as a means of achieving the ecodevelopment, in fact we will be presenting analysis for testing the relationship Between the social media and the envirommental awareness, however, before presenting the results some useful points should be considered in order to carry out the analyses of this study, Accordingly, section 1 of this paper gives some definition and provide some data on the evolution of social media around the word, The importance of environmental awareness in ecodevelopment are defined in section 2, section 3 provides some analysis about the role of social media in the tourism awareness finally some concluding remarks are drawn up.

Keywords: Ecodevelopment, Sustainable Development, Envirommental Awareness, Social Media

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INVESTIGATION ON THE SEROPREVALENCE OF TOXOPLASMA GONDII INFECTION IN SHEEP AND GOATS IN SIIRT PROVINCE IN TURKEY

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Abstract:

Toxoplasmosis is a widespread zoonotic disease, caused by the protozoan parasite *Toxoplasma gondii*. This parasite is responsible for major economic losses in livestock through abortion, stillbirth and neonatal losses, especially in sheep and goats. Besides it has important implications for public health since consumption of infected meat can facilitate zoonotic transmission. Therefore toxoplasmosis is an important disease for both human and veterinary medicine.

This study was conducted to determine the seroprevalence of toxoplasmosis in sheep and goats which living in Siirt province/Turkey. In the study, blood samples were sampled randomly from a total of 450 small ruminants (250 sheep and 200 goats) from various localities in Siirt region. Samples were centrifuged for 10 minutes at 3000 rpm and sera were transferred to eppendorf tubes and stored at -20oC until they are used. All serum samples were analyzed by ELISA method for detection of *Toxoplasma gondii* antibodies. The data obtained at the end of the study were evaluated statistically.

As a result of the study, 28 (6,2 %) of samples were determined as seropositive, 12 (2,7%) of samples were determined as weakly positive, 17 (3,8%) of samples were determined as suspicious positive and 393 (87,3 %) of samples were determined as seronegative. The difference between results and breed was found statistically significant ($p < 0.05$). The difference between results and age was found to be statistically insignificant ($p > 0.05$). This is the first parasitological study to be carried out on sheep and goats in Siirt region in Turkey.

Keywords: Toxoplasmosis, Elisa, Sheep, Goat, Siirt, Turkey

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ESTIMATION OF MICROBIOLOGICAL QUALITY OF SEA WATER ON THE COAST OF VLORA, ALBANIA

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Abstract:

Estimation of microbiological quality of the recreational water is an important environmental health and resource management issue. In order to estimate the microbiology quality various indicator organisms have been used as surrogate markers of risk. The aim of the study: is to determine the hygienic quality of coastal waters in Vlora seacoast. Settings and Design: Is performed, a bacteriological and a chemical study during 2016 in Vlora bay. Seawater samples were taken bimonthly 7 stations evenly distributed on this coast line. Sea water was collected in sterilized and autoclaved bottles.

Total coliform, fecal coliform and fecal streptococci were estimated using MPN method, while environmental parameters where estimated using standard methods. Results: During the investigation period the temperature has been monitored as an environmental factor that has a strong impact on organisms. Our data show that during the year, bacterial indicators had highest concentration during August in most of the sampling stations. This could be due to the high number of people visiting the beaches in the coast line during summer time. High concentration of fecal bacteria was associated with high concentration of nitrite and ammonia.

The poorest water quality is especially in the urban discharged points and in the areas close to them. The present study indicates that seawater along the Vlora seacoast is under high anthropogenic impact.

Keywords: E. Coli, Environmental Parameters, Bacterial Indicators, Chemical Indicators, Sea Water Quality.

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RESPIRATORY SYMPTOMS IN AGRICULTURAL WORKERS - INFLUENCE OF EXPOSURE DURATION AND SMOKING

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Abstract:

One of the most important chemical-originated public health problem according to The World Health Organization are dangerous pesticides. Especially not using personal protective equipment, keeping unsafe conditions of medicines, being easily accessible and being able to mix with water and air is an important global public health problem. It is aimed to measure the influence of exposure duration and smoking on respiratory functions in agricultural workers. This is a cross-sectional epidemiological study. In our study, our universe is aged between 18-65 years registered in the Directorate of Food, Agriculture and Animal Husbandry. Farmers were included to work with simple random sampling method(n:91). In this study, a descriptive questionnaire developed by the researchers according to the literature as the measurement methods, and a portable spirometer for the respiratory function test were used. FVC,FEV1,FEV1/FVC and FEF25-75 of the subjects who were measured by the respiratory function test were measured. Participants indicate that they have been farming for an average of 23.91 ± 12.24 years. 40.7% stated that they also deal with livestock.62.6% of the participants were smokers and 45.1% of them smoked as much as one package a day or less. 20.9% and 15.4% of those who have any indication of respiration have experienced breathlessness in recent days. In 2016, 82.5% of the respondents stated that they applied the medication and 7.9% of the participants applied to the hospital after the treatment. It was found that only 39.6% of the participants wear gloves and masks, and 23.1% wear protective glasses. Participants were found to have FVC (%) of 95.24 ± 20.14 , FEV1 (%) of 92.72 ± 19.77 , FEV1 / FVC of 100.09 ± 17.06 and FEF25-75 of 84.68 ± 35.59 . The study findings favor the cause-effect association between job exposure and smoke to respiratory hazards, and development of persistent airway obstruction among dairy farmers.

Keywords: Agricultural Workers, Respiratory Function, Spirometry, Job Exposure

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REALIZATION OF LOW-COST IOT SYSTEM FOR ENVIRONMENTAL MONITORING: POTENTIAL AND CHALLENGES

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Abstract:

The concept of Internet of Things (IoT) creates breakthrough opportunities for seamless connectivity and ubiquitous integration of low-complex digital systems enabling alternative cost-effective solutions for various applications. The plethora of sensors available on the market, capable to detect and measure almost every physical quantity, substantiated by the availability of affordable digital architectures with respective processing and communication power, create new developmental horizons in the area of environmental monitoring, which nowadays is considered as one of the key mission critical application in the next-generation ICT systems. In this paper, we present analyses of low-cost IoT-based architectures and propose a solution for air quality monitoring. Furthermore, we discuss on the main challenges and constraints at different system design levels.

Keywords: Air Pollution, Monitoring, Iot, Low-Cost

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MODALITIES TO REDUCE THE POTENTIAL POLLUTION RISK FROM DAIRY FARMS TO AVOID AMBIENT ENVIRONMENT CONTAMINATION

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Abstract:

The surveillance, prevention, disproof and disposal of problems arised in livestock farms as a result of uncontrolled and unsafe feeding of animals is an objective in order to maintain the profitability of the production activity. The aim of the paper is to apply a complex but easy-to-integrate technology in the dairy cow production chain that enhances the digestive use of non-protein nitrogen sources (urea) by the addition of a natural mineral product represented by the volcanic tuff. Moreover, it has also been pursued to reduce the nitrogen pollution by retaining the ammonia released in the manure decomposition process using the volcanic tuff in chopped straw used as bedding in the dairy farm. In the experiment, 60 cows from the Holstein Friesian breed were used, which were divided into 4 batches, namely a control batch, for which the volcanic tuff was not used and 3 experimental batches for which both urea and volcanic tuff was used as a food additive in the ratio with the amount of 200, 350 and 500 g of tuff/head/day. Additionally, for the experimental batches the volcanic tuff was used and added to the chopped straw bedding in the amount of 400 g/head/week. It has been found that the volcanic tuff has reduced the release of ammonia in the external environment, improving the climate in the cow housing by reducing unpleasant odors and ammoniacal nitrogen emissions. Also, the use of urea and volcanic tuff has reduced the ammonia content of fresh manure, being observed an improvement in the organic nitrogen content of the manure, which will increase the efficiency and the degree of nitrogen absorption by the plants. In this way biowaste sources are obtained, respectively fertilizers containing nitrogen that will not be toxic to the environment.

Keywords: Volcanic Tuff, Uree, Dairy Farm, Nitrogen, Manure

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TOXICITY OF HBCD AND PFOS FOR RAINBOW TROUT (ONCHORHYNCHUS MYKISS)

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Abstract:

Hexabromocyclododecane (HBCD) and perfluorooctane sulfonate (PFOS) are hormonal disrupters and priority compounds, which are potentially dangerous in aquatic environment. HBCD is the third most used brominated flame retardant in the world. Due to its long half-life and low water solubility it adsorbs to the sediments and bioaccumulate on food chain. PFOS has been widely used in various industrial products and manufacturing processes such as coating additives and firefighting foams. PFOS is extremely persistent, half-life being more than 41 years in aquatic environment. Although the use of PFOS is prohibited, it is still continuously discharging to the environment among wastewaters and high concentrations have been measured from fish caught from the Baltic Sea. The aim of this study was to modify standardized toxicity tests for wastewaters including dangerous chemicals. Standard toxicity tests are commonly based on temperate species but in boreal environmental conditions and characteristics of natural waters makes reliable risk assessment more challenging, and therefore these tests were modified for boreal species. Methods were alternative to animal testing: experiments with fish embryos of rainbow trout (*Onchorhynchus mykiss*) and in vitro cytotoxicity tests with liver cell line of rainbow trout. For fish embryo, OECD 210 standard, and for the cytotoxicity Neutral Red retention (NRR) assay were used. Concentrations in the fish embryo test were 0.014, 0.14, 1.4 and 14 µg/l for HBCD and 0.058, 0.58, 5.8 and 58 µg/l for PFOS. In the NRR assay concentrations of HBCD were 0.4, 0.8, 1.6, 3.1, 6.25, 12.5 and 25 µg/l and PFOS 1.6, 3.1, 6.25, 12.5, 25, 50 and 100 mg/l. As a result HBCD and PFOS were not cytotoxic. For fish embryos HBCD affected to the yolk sac size. PFOS had only minor effects with these concentrations.

Keywords: HBCD, PFOS, Cytotoxicity, Fish Embryo, Rainbow Trout

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COD (CHEMICAL OXYGEN DEMAND) REMOVAL FROM WASTEWATER USING TI/IRO₂/RUO₂ ANODE

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Abstract:

In this study, it was investigated that COD (chemical oxygen demand) removal from Pistachio Processing Industry Wastewaters (PPIW) with high organic pollution. As anode material mixed metal oxide coated titanium (Ti/IrO₂/RuO₂) anode and as cathode material cathode stainless steel plate cathode were used. 5 anodes and 5 cathodes were positioned parallel to the fiberglass reactor and required electric current was ensured by a DC power supply. COD removal parameters were selected such as mixing speed and supporting electrolyte species. The effect of mixing speed on the COD removal efficiency has been studied in a wide range of range 0-600 rpm. In studies that examined the effects of the electrolyte support, COD removal efficiencies were investigated no-supporting electrolyte and supporting electrolyte types such as Na₂SO₄, NaNO₃, KCl and NaCl. All experiments were performed in wastewater natural pH (≈5,3), at room temperature and 5 mA/cm² in the presence of current density. From obtained results, mixing speed was not effective a parameter, whereas the type of supporting electrolyte was determined that the COD removal efficiency significantly increases.

Keywords: Supporting Electrolyte; Electro-Oxidation, Ti/Iro₂/Ruo₂ Anode, COD Removal, Pistachio Processing Industry Wastewaters (PPIW)

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STUDY OF THE ELECTROCHEMICAL OXIDATION OF ORGANIC DYES

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Abstract:

Dyes used in textile industries lead to many environmental problems. In this study, it was investigated that removal of organic dye by electro-oxidation using graphite rod anode and steel rod cathode. Experimental parameters were selected as effect of supporting electrolyte types and supporting electrolyte concentration in batch studies. Support electrolyte types were selected as NaCl, KCl, Na₂SO₄ and NaNO₃. Experimental results were showed that NaCl and KCl were very effective supporting electrolyte types than NaNO₃ and Na₂SO₄. In subsequent experiments, the effect of supporting electrolyte concentration using NaCl was studied. It was determined that increasing concentrations of NaCl was increased treatment efficiency, importantly.

Keywords: Color Removal, Electro-Oxidation, Graphite, Supporting Electrolyte, Steel Cathode

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INVESTIGATING THE RELATIONSHIP BETWEEN METEOROLOGICAL PARAMETERS AND OLIVE PRODUCTION IN CANAKKALE, TURKEY

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Abstract:

Olive is a common crop in Mediterranean countries including Turkey. Many studies investigated the relationship of meteorological parameters and olive yield, yet most of these studies are under irrigation scenarios. In our study site, Canakkale, Turkey, olive is mostly produced rainfed and many producers have theories on how climatic conditions influence yield. In this study we visited producers and asked about their observations on how climate influence olive yield. We later collected the climatic parameters (precipitation, wind speed and air temperature) from meteorological stations. We later obtained olive yield estimations from TUIK (Turkish Statistical Institute) as well as local producers who have been collecting their production data. We did both simple correlation tests and time series analyses and found that “precipitation”, “wind speed” and “air temperature” parameters are very influential on olive yield. This study is partly funded by TUBITAK TOVAG 213O147.

Keywords: Olive, Olea Europaea, Canakkale, Production

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STREETSCAPE REVITALIZATION FOR TURKISH TRADITIONAL URBAN TEXTURE IN BARTIN CITY

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Abstract:

The traditional urban texture that is rich in history, culture, and architecture holds cultural heritage qualifications that are important in terms of urban identity and sustainability. The city of Bartın is located in the Western Black Sea Region in Turkey. It is connected to the Black Sea by a natural watercourse which is called The Bartın River. It is one of the few rivers in Turkey that has an unchanged natural structure. Throughout history, Bartın has been shaped on a peninsula on the coast of the Bartın River, and it has a traditional urban texture that had generated its urban identity. Traditional urban texture today is majorly deteriorated. Moreover, only limited area in the urban center is in national status as Urban Conservation Area. Uzunyol Street that is located in Bartın's traditional urban pattern was selected as the research area. This study determines the characteristics of its traditional streetscape in urban texture. Based on the data about Bartın's traditional urban texture, the study did spatial analyses of the research area. In this context, variable problems were determined that is not compatible with the traditional streetscape. However, the research area is still the important attraction area with its organic street pattern in human scale. In conclusion, the study developed revitalization strategies addressed to the utilization of Bartın's traditional urban streetscape texture characteristics as a cultural heritage.

Keywords: Streetscape, Traditional Texture, Urban Design, Urban Identify, Urban Sustainability

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PROPOSAL FOR HISTORICAL PARK REVITALIZATION PROJECT: SADABAD (ISTANBUL)

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Abstract:

Rivers are one of the most important components of the urban green area system. They play an active role in the shaping of cities and cultures with their ecological, aesthetic, functional and economic values. In this statement, the Sadabad Recreational Area in Kagithane, Istanbul, which has a special design in terms of history, was chosen as a research area. In the past, it has become one of the most important recreational areas in the Ottoman Period Tulip Age with its water-based recreational activities and festival areas in Sadabad Kagithane Stream. Sadabad Recreation Area has remained as a park of Kagithane with rapid change of population from the past to present day. The Sadabad Recreation Area is a field that must be preserved with the cultural landscape values for reviving its past uses. In this context, landscape design project proposal has been developed in the light of the landscape analysis made for the area. With this study, Sadabad was designed as a cultural heritage site as a qualified recreation area by new regulations made in accordance with its historical identity. New areas of use were also created by improving the losses on the original texture. In the proposed revitalization project, the river landscape created by the Kagithane Stream has been brought to the forefront in terms of visual, aesthetic and ecological aspects. As an important element in Kagithane promenade, large meadow areas have been proposed, with wide green areas allowing large crowds to be collected in the city. Thanks to proposal revitalization project, it is expected to contribute to the city and urban not only presenting compatible green spaces in harmony with historical identity, but also urban green area system.

Keywords: Historical Park, Sadabad, Recreation Area, Revitalization, Landscape Design, Cultural Heritage

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METHYLENE BLUE DYE ADSORPTION FROM AQUEOUS SOLUTION ONTO SEMI-IPN HYDROGEL COMPOSITES

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Abstract:

Methylene blue (MB) is one of the most utilized dyes in many applications such as papermaking, cosmetics, printing, dyeing, wools and food coloring. Although MB has a low toxicity, it may pose some health problems including heartbeat increase, vomiting, sweating, cyanosis, eye injuries, tissue necrosis and abdominal pain in humans [1, 2]. And also, the effluents of the manufacturing and textile industries into the water sources cause critical environmental pollution. Up to now, adsorption techniques have been commonly used for the removal of dyes from aqueous solutions due to low-cost, ease of operation and effectiveness process [3]. Different types of hydrogels with a three-dimensional chemically cross-linked polymer networks have become significant as adsorbents for removal of dyes in recent years [4]. The hydrogel adsorbents have capability of swelling once immersed in aqueous solution owing to hydrophilic functional groups, and so the adsorption equilibrium is reached in a short time [5].

In this study, chemically crosslinked semi-IPN hydrogel composites were successfully synthesized as MB adsorbent. Acrylamide and methacrylic acid as a monomer, N, N-methylenebisacrylamide as crosslinker, ammonium persulfate as initiator, N, N, N', N'-tetramethyl-ethylene-1,2-diamine as accelerator were used in the hydrogel synthesis. Polyvinyl alcohol was used to obtain semi-IPN materials. And also, sodium humate and kaolin were utilized as filler.

Properties of as-synthesised semi-IPN hydrogel composites were determined by The Fourier transformed infrared (FTIR) spectra and scanning electron microscopy (SEM) analysis. Swelling capacity of the hydrogel composites was investigated by conventional gravimetric procedures in different environment conditions. MB adsorption experiments on the composites were carried out at 25° C with changing some parameters such as time, pH, and amount of hydrogel composites.

Keywords: Adsorption, Composite, Hydrogel, Polymer, Semi-Ipn

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DEVELOPING A NEW REALLOCATION MODEL FOR LAND CONSOLIDATION WORKS

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Abstract:

Reallocation studies that is one of the most important stages of land consolidation projects are the most complex part of the process. Block reallocation is a land reallocation and installation problem that there are complex datas and relationships, such as farmers requests, fixed installations, roads and irrigation network, optimal size of parcel, parcel geometry, size of parcel, consolidation of parcel shares, legal entity of village, the condition of pastures and treasure lands, so there isn't a single solution. For block reallocation, the problem has been tried to solve by using distribution model based on block priority, fuzzy logic method, spatial decision support system and by applying different solutions, such as genetic algorithm method. In this study; genetic algorithms and fuzzy logic method using fuzzy logic in that reasoning about methods of genetic algorithm was applied learning ability matching created a new model for the reallocation phase of the land reallocation phase. In the Konya-Cumra-Uchuyuk district project; As a result of the reallocation, 223 enterprises were assigned to the 1st preference, 14 enterprises to the 2nd preference and 3 enterprises to the 3rd preference. The preferred success rate was 76.61%.

Keywords: Land Consolidation, Block Reallocation, Optimization, Hibrid Method

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COCCINELLID PREDATORS AND PARASITOIDS OF APHID (HEMIPTERA: APHIDIDAE) SPECIES ON ORNAMENTAL PLANTS IN CENTRAL DISTRICTS OF KAYSERI PROVINCE

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Abstract:

This study was conducted during the years 2014 and 2015 in central districts (Melikgazi, Kocasinan, Talas, Hacilar, Incesu) of Kayseri Province in Turkey. Coccinellid species and parasitoids were obtained from Aphid colonies on trees and shrubs from park, road plantation and landscape areas in the districts.

At the end of the study, 11 species from Coccinellidae family as aphid predator were identified. These species are *Adalia bipunctata* (L.), *Adalia decempunctata* (L.), *Adalia fasciatopunctata revelierei* (Mulsant), *Brumus (Exochomus) quadripustulatus* (L.), *Chilocorus bipustulatus* (L.), *Coccinella septempunctata* L., *Hippodamia (Adonia) variegata* (Goeze), *Scymnus apetzi* Mulsant, *Scymus (Pullus) subvillosus* (Goeze), *Propylea quatuordecimpunctata* (L.) and *Oenopia (Synharmonia) conglobata* (L.). Also, A total of 10 parasitoids were identified, 1 of which was of the genus level. These species are *Aphidius hortensis* Marshall, *Aphidius matricariae* Haliday, *Aphidius* sp., *Aphidius urticae* Haliday, *Aphidius rosae* Haliday, *Binodoxys angelicae* Haliday, *Lysiphlebus fabarum* Marshall, *Lysiphlebus testaceipes* Cresson, *Praon abjectum* Haliday and *Praon volucre* Haliday.

Keywords: Natural Enemy, Fauna, Survey, Ornamental Plants, Aphid

**This study was supported by Erciyes University, Scientific Research Projects Coordination Unit, Project number FYL-2014-5341.*

INVESTIGATION ON SCALE INSECTS (HEMIPTERA: COCCOMORPHA) ON ORNAMENTAL PLANTS IN KAYSERI PROVINCE

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Abstract:

This study was conducted to determination of Cocomorpha (Coccidae, Diaspididae and Pseudococcidae) species on ornamental plants in park, road plantation and landscape areas in districts of Kayseri Province in Turkey between the years 2013-2015.

At the end of the study, seven species of Coccidae, six species of Diaspididae, and two of Pseudococcidae, total of fifteen Coccoid species were determined. These species *Eulecanium ciliatum* (Douglas), *Eulecanium tiliae* (Linnaeus), *Parthenolecanium corni* (Bouché), *Parthenolecanium persicae* (Fabricius), *Physokermes piceae* (Schrank), *Pulvinaria vitis* (Linnaeus), *Sphaerolecanium prunastri* (Fonscolombe), *Chionaspis salicis* (Linnaeus), *Diaspidiotus armenicus* (Borchsenius), *Diaspidiotus ostreaeformis* (Curtis), *Lepidosaphes malicola* (Borchsenius), *Pseudaulacaspis pentagona* (TargioniTozzetti), *Unaspis euonymi* (Comstock), *Planococcus vovae* (Nasanov), *Pseudococcus comstocki* (Kuwana).

Keywords: Coccidae, Diaspididae, Pseudococcidae, Kayseri, Ornamental Plant

**This study was supported by Erciyes University, Scientific Research Projects Coordination Unit, Project number FYL-2014-5139*

SOCIAL MEDIA AS MEANS TO SPREAD THE TOURISM AWARENESS AND ENVIROMMENTAL AWARENESS TO ACHIEVE THE ECODEVELOPMENT

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Abstract:

The last two decades has witnessed a renewed interest in social media as a source of information and as a means of marketing , it also plays an important role in influencing individuals and groups by influencing their ideas and in many cases on their convictions

This paper revisits the role of social media in spread thee envirommental awareness among individuals as a means of achieving the ecodevelopment, in fact we will be presenting analysis for testing the relationship Between the social media and the envirommental awareness, however , before presenting the results some useful points should be considered in order to carry out the analyses of this study, Accordingly, section 1 of this paper gives some definition and provide some data on the evolution of social media around the word, The importance of environmental awareness in ecodevelopment are defined in section 2, section 3 provides some analysis about the role of social media in the tourism awareness finally some concluding remarks are drawn up

Keywords: Ecodevelopment, Sustainable Development, Envirommental Awareness, Social Media

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AEROBIC BIODEGRADATION OF AROMATIC COMPOUNDS

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Abstract:

Aromatic compounds are hydrocarbons mostly originating from coal and petroleum, many of which are toxic and carcinogenic to living beings. They are characterized by planar heterocyclic rings to which they owe their distinct features, and a crucial step in their biodegradation is the cleavage of these ring structures. The mode of ring cleavage and other preceding reactions depends on the oxidation state of the environment in which biodegradation is occurring. When molecular oxygen is present, many of the peripheral and ring cleavage reactions are oxidative and involve molecular oxygen as a reactant. The goal of the peripheral pathways is to remove substituents on the aromatic ring and replace them with hydroxyl ions by using monooxygenases or dioxygenases to produce central intermediates (i.e., catechol, protocatechuate, and gentisate). The goal of the central pathways, on the other hand, is to cleave the central intermediates by using dioxygenases (i.e., catechol 1,2-dioxygenase, catechol 2,3-dioxygenase, protocatechuate 3,4-dioxygenase, protocatechuate 4,5-dioxygenase, and gentisate 1,2-dioxygenase) and convert them into precursor molecules or carbon dioxide. In addition, different types of cytochrome oxidases (i.e., NADH dehydrogenase, ubiquinone (Q), cytochrome cbb3, and cytochrome aa3) involved in the aerobic ETC are expressed, depending on the level of dissolved oxygen (DO) in the environment.

Keywords: Aromatic compounds, Catechol, Protocatechuate, Gentisate, Benzoic acid, Cytochrome oxidases.

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