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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-2018) is held from September 19 to 23, 2018 in Kiev. ICOEST 2018 provides an ideal academic platform for researchers to present the latest research findings and describe emerging technologies, and directions in Environmental Science and Technology. The conference seeks to contribute to presenting novel research results in all aspects of Environmental Science and Technology. The conference aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Environmental Science and Technology. It also provides the premier interdisciplinary forum for scientists, engineers, and practitioners to present their latest research results, ideas, developments, and applications in al lareas of Environmental Science and Technology. The conference will bring together leading academic scientists, researchers and scholars in the domain of interest from around the world. ICOEST 2018 is the oncoming event of the successful conference series focusing on Environmental Science and Technology. The scientific program focuses on current advances in th eresearch, production and use of Environmental Engineering and Sciences with particular focus on their role in maintaining academic level in Science and Technology and elevating the science level such as: Water and waste water treatment, sludge handling and management, Solid waste and management, Surface water quality monitoring, Noise pollution and control, Air pollution and control, Ecology and ecosystem management, Environmental data analysis and modeling, Environmental education, Environmental planning, management and policies for cities and regions, Green energy and sustainability, Water resources and river basin management. The conference's goals are to provide a scientific forum for all international prestige scholars around the world and enable the interactive exchange of state-of-the-art knowledge. The conference will focus on evidence-based benefits proven in environmental science and engineering experiments.

Best regards,

Prof. Dr.Özer ÇINAR

Environmental Risks Of Bumblebee Commercialization And Suggestions For Prevention	TURKEY	21.
An Environmentally Friendly Plant In Terms Of Oxygen Supply: Hemp	TURKEY	22.
The Effects Of Environmental Pollutants On Honeybees (Apis Mellifera L.)	TURKEY	23.
Determination Of Acaricidal And Insecticidal Effects Of Lupin (Lupinus Albus L.) Seed Extract On Tetranychus Cinnabarinus (Boisd.), Callosobruchus Maculatus And Plodia Interpunctella	TURKEY	24.
Determination Of Optimum Operational Conditions For The Removal Of 2-Methylisoborneol And Geosmin From Drinking Water By Peroxone Process	TURKEY	25.
Removal Of Indigo Carmine Dye From Aqueous Solutions Using Cinnamon Shell As An Agricultural Waste	TURKEY	26.
Multiple Criteria Analysis Of Waste-To-Energy (Wte) Technologies For The Treatment Of Municipal Solid Waste : Promethee/Gaia	TURKEY	27.
Use Of Alginate – Clinoptilolite Beads For The Removal Of Mixed Heavy Metals: Effect Of Clinoptilolite Size And Alginate – Clinoptilolite Ratio	TURKEY	28.
Use Of Alginate – Clinoptilolite Beads In An Adsorption Column For Copper Removal: Effect Of Metal Concentration	TURKEY	29.
Improving Water Quality Parameters By Using Hydraulic Structures	TURKEY	30.
Social And Economic Effects Of Hydroelectric Power Plants: Keban Hepp Sample	TURKEY	31.
A Mathematical Programming Application For Managing Municipal Solid Waste	TURKEY	32.
The Importance Of Indoor Air Pollution For School Children	TURKEY	33.
The Imporance Of Ventilation For Indoor Air Quality	TURKEY	34.
Investigation Of The Use Of Adsorbents Derived From Waste Shells With Addition Of Pan/K2s2o8 In Laundry Wastewater Treatment By Adsorption Methods	TURKEY	35.
Investigation Of Bisphenol A Solutions Treatability By Using Ozone Based Oxidation Processes	TURKEY	36.
Activated Carbon Production From Local Agricultural Residue	TURKEY	37.
Kinetic Study Of Dye Adsorption On Activated Carbon Produced From Bitter Orange Peels	TURKEY	38.
Prevalence And Antimicrobial Resistance Of Aeromonas Spp. Isolated From Drinking Waters From Eastern Turkey	TURKEY	39.
Developing A Methodology For Soil Stabilization Using Palm Mat Bio-Geotextiles For Preventing Soil Loss And Slope Failure At Erosion Prone Sites In Ebonyi State, South East Nigeria	NIGERIA	40.

Toxic Effects Of Sewage On Caenorhabditis Elegans	SAUDI ARABIA	41.
Experiences On Sustainable Tourism Development In Turkey	TURKEY	42.
Temporal Coastal Change Analysis In Kizilirmak Delta And Yesilirmak Delta	TURKEY	43.
Ammonia Removal From Landfill Leachate Using Map Precipitation Method	TURKEY	44.
Assessment Of Some Physical And Chemical Characteristics Of Soil In Samsun Tekkekoy Region With Cbs	TURKEY	45.
Effect Of Common-Rail Diesel Engine Bioethanol-Biodiesel-Eurodiesel Mixtures On Engine Performance And Emissions	SWITZERLAND	46.
The Microwave Oven Curing Of Fly Ash-Based Geopolymer Mortars	TURKEY	47.
Effect Of Nano-Silica Addition On Kaolin-Based Brick Properties	TURKEY	48.
Methane Production Enhanced Through Ozone Pretreatment In Anaerobic Digestion	TURKEY	49.
Aminoglycoside Resistance Genes Treated By Sequencing Batch Reactor Type Wastewater Treatment Plants	TURKEY	50.
Antimicrobial Activity Of Trgonosciadium Lasiocarpum (Boiss) Alava, An Endemic Plant From Turkey	TURKEY	51.
Removal Of Diclofenac From Aqueous Solution By Microwave Enchanced Persulfate Oxidation: Optimization Using Taguchi Design	TURKEY	52.
Microwave Assisted Sludge Disintegration: Optimization Of Operating Parameters	TURKEY	53.
Assessment Knowledge Of Production Companies About Reverse Logistic And Waste Management: Example Of Bolu Province	TURKEY	54.
Multi-Response Optimization Of Nanofiltration Process For Carbamazepine Removal	TURKEY	55.
A New User Based Approach And Interdisciplinary Planning Process On Spatial Design	TURKEY	56.
Operational Efficiency Of Coagulation Units In Varied Full-Scale Plants By Fluorescent Signal	TAIWAN	57.
Use Of 3d City Modeling Techniques In Urban Planning: A Case Study Of Selahiye	TURKEY	58.
Balance Analysis For Land-Energy-Economy-Environment Correlation In Taiwan	TAIWAN	59.
The Impact Of Fine Particulate From Mobile Source To Air Quality In Urban Area	TAIWAN	60.

Occurrence Of Micropollutants In Wastewater Treatment Plants: Antalya, Turkey Case Study	TURKEY	61.
Evaluation Of Usability Of Biosensors As Environmental Monitoring Techniques	TURKEY	62.
Examination Of The Effect Of Filamentous Microorganisms On Mbr And Activated Sludge System	TURKEY	63.
Petaloid Monocotyledonous Flora Of Bingol Province (Turkey)	TURKEY	64.
Effects Of Catalytic Properties Of Copper, Iron And/Or Manganese Impregnated Ti-Pillared Bentonites On The Activities For Ethanol OxidationEr	TURKEY	65.
Micro- Mesopore Analysis Of Ti-Pillared Bentonites	TURKEY	66.
Application Of Microwave Assisted Reaction System On Clean Hydrogen Production	TURKEY	67.
Activities Of Cobalt Incorporated Mesoporous Silicate Catalysts On Ammonia Decomposition Using Microvave Heated Reactor System	TURKEY	68.
A Case Study For Waste To Energy Conversion: Mcw Plasma Gasifier	TURKEY	69.
Microwave Plasma Gasification Process Of Polyethylene	TURKEY	70.
Comparison Of Performance And Combustion Characteristics Of Methyl Ester And Ethanol Used In A Common Rail Diesel Engine	TURKEY	71.
Treatment Of Textile Wastewater Using Electrocoagulation Process With Fe Electrode: Treatment Performance, Cost Analysis And Sludge Characterization	TURKEY	72.
Treatment And Reuse Of Grey Water Using Membrane Processes	TURKEY	73.
Adsorption Of Organic Matter From Confectionery Industry Wastewater By Activated Carbon: Equilibrium And Kinetic Studies	TURKEY	74.
Landscape Design Project Of The Seyhamami Geosite Of Kizilcahamam-Camlidere Geopark	TURKEY	75.
Determination Of The Microbial Composition Of 1-Year Shelf-Life Lyophilized Bacteria With Dgge Method	TURKEY	76.
Quantification Of Microorganism Composition Of Biohydrogen Production From The Dry Fermentation System By Real-Time Q-Pcr	SPAIN	77.
A Study On The Determination Of The Effects Of Carbon Structures Of Fame Fuels On Fuel Properties	TURKEY	78.
Modelıng Of Near Fıeld Dılutıon Of Wastewater Dıscharges In Oludenız	TURKEY	79.
Production Of Functional Catechin Extracts From Waste Green Tea	TURKEY	80.

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19-23 September 2018 Kiev

THERMOPHILIC DIGESTION OF ORGANIC FRACTION OF SOLID WASTES AND SOME AGRO BASED ORGANIC WASTES

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Abstract:

In this study, organic fraction of solid wastes and some agro based organic wastes were studied. Majority of the literature on the anaerobic idigestion of organc wastes are about mesophilic digestion. On the other hand , thermophllic anaerobic digestion has additional benefits suchs as better hygenization and faster biochmemical reaction. Solid wastes and agro based wastes have been produced in vast amount all over the world and they have great potential for the producton of sustainable and renewable bioenergy . Therefore, organic fraction of solid wastes, cattle manure and olive mill effluent were tested for their bioenergy potential under thermophilic anaerobic conditions . Bochemical Methane Production testes (BMP)indicated that 988 L, 303 L and 721 L of biogas per kg of volatile organic solid matter coudl be produced, respectively. Annual organic waste production is over 130 million tones in Turkey .Anaerobic digestion offers a great potental for the valorisation fo these wastes into renewable energy sources and sustainable fertilizer. These results will be employed in the design of new novel anaerobic biorprocess configuration, namely Dry Anaerobic Digestion which eliminates cotsly management of digestate .

Keywords: Thermophilic Anaerobic Digestion, Solid Wastes, Olive Mill, Cattle Manure, Bmp

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DETERMINATION OF THE EFFECT OF MIXED ORGANISM CULTURE OBTAINED FROM THE PETROCHEMICAL INDUSTRY WASTEWATER ON THE BIODEGRADATION OF PTA IN CSTR STIRRED TANK AFTER 15-MONTHS STORAGE

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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, we used the highly effective mixed organism culture produced in presence of suitable and economic substrates in bioreactor systems. Mixed organism culture has high capacity of degrading various hydrocarbon compounds. In terms of representing the actual conditions, 10 liters continuous stirred tank reactor (CSTR) model was chosen as the laboratory scale reactor. After the active sludge process, mixed organism culture was tested. Microorganisms were stored at 4°C for 15 - months were added to the activated sludge system. The initial cell concentration was changed from 108 to 107. After TA, p-Tol and 4-CBA was added to the activated sludge system. Biodegradation efficiencies of the samples were determined by High Pressure Liquid Chromatography (HPLC) analysis. It was shown that the biodegradation rate in the microorganism-added reactor give better result than in the control reactor.

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

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CHEMICAL AND MINERALOGICAL PROPERTIES OF SALT AND SODA LAKE MUDS USED AS PELOIDS IN KONYA BASIN, TURKEY

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Abstract:

Tuz Golu is the largest Salt Lake of Turkey and there are also some soda lakes of different sizes near the Salt Lake located in the closed Konya Basin in Central Anatolia. These lakes are formed in tectonically controlled and parallel subsidence basins. Salt and soda production have been mining in the summer season by taking of a few centimeters thin layers. The muds formed under these salt and soda layers and around the lakes, and are used by the local people in various diseases in different forms such as mud baths, masks, and cataplasms. The purpose of the study is to determine the mineral types and chemical composition of the muds. The mineralogical compositions of the muds were investigated using X-ray diffraction, and chemical composition of waters and muds were determined by ICP-EAS to determine possible toxicity and suitability of the muds for pelotherapeutic cures. The water of the Salt Lake are enriched by Mg-Na-Cl-SO4, Mg-Cl and Na-Cl and their electrical conductivity (EC) values range from 141500 to 227000 µS/cm. The soda lakes are enriched by Na-Mg-Cl-SO4 and Na-Mg-SO4-HCO3, respectively. EC values of the lakes are between 148000 and 20200 µS/cm. The mineralogical composition of the salt lake are composed of halite, thenardite, mirabilite, glauberite, gypsum/anhydrite, calcite, aragonite, and partially dolomite, while konyaite, hexahydrite and lesser amounts of bloedite and starkeite while smectite, paligorskite, sepiolite, illite, kaolinite, are most abundant clay minerals in the lakes. According to the preliminary results, it was determined that it would cause no problems in terms of chemical composition but it may cause some skin problems such as scratching, dryness, and redness of the skin especially due to the high content of non-clay minerals.

Keywords: Clay, Konya, Muds, Peloids Turkey, Tuz Golu

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MINERALOGICAL, CHEMICAL AND PHYSICAL PROPERTIES AND SUTABILITY FOR THERAPY OF PELOIDS IN SUSURLUK (BALIKESIR, TURKEY)

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Abstract:

The mineralogical, chemical and physical properties of the peloids used for treatment and therapy purposes in the Susurluk province of Balikesir were investigated for their suitability. Patients enter the mud pools for peloid therapy. Since ancient times thermal muds have been used for aesthetic purposes as it has been used for treatment / therapy in the treatment of some problems, especially matured nearest ate of thermal springs. Morphological characteristics, mineral species and composition and chemical composition of the peloids were investigated by scanning electron microscopy, X-ray diffraction, and ICP-EAS, respectively. The peloids are composed of clay-silt-sized material and are generally composed of clay minerals (smectite, illite and kaolinite) calcite, quartz, feldspar and rarely gypsum, halite and more rarely pyrite minerals. Due to mineralogical composition controls the physical properties (viscosity, consistency limits, surface area, abrasivity, thermal properties, etc.) of the peloids have been examined. The cation-anion content of thermal waters is similar and generally SO4-CO3 is enriched. Pelloids are high plastic and semi-rigid properties, with a cation exchange capacity of 28 meq / 100g and a BET surface area of 26-20 m2/ g, show similar viscosity and thixotropic properties as well as good fluidity. It has been determined that the peloids can maintain the heat for 15-20 minutes according to the original cooling values and the cooling kinetics, but the specific heat values are low. It has been determined that abrasive capacities may be partly a risk of skin starch, and water absorption and oil absorption capacities are close to natural peloids. According to the abovementioned properties, it is found that peloids used in the baths are not suitable for grain size and low clay content, chemical composition may not cause any problem and it can be used in therapy for some muscle problems in term of heat capacities.

Keywords: Clay, Peloid, Thermal Mud, Therapy

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GEOLOGICAL, MINERALOGICAL AND GEOCHEMICAL FEATURES OF THE KIZILTEPE (ALADAG) SKARN DEPOSIT (EZINE/CANAKKALE-NORTH WEST TURKEY)

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Abstract:

Aladag Skarn Mineralization located 35 km south of the Canakkale city center and 8 km southwest of Ezine County (Canakkale-Turkey) near the Kestanbol Pluton. Cambrian to Holocene aged magmatic, metamorphic and sedimentary rocks crop out in the study area. The basement of the study area is formed by Pre(?)-Lower Cambrian metasandstone, metaconglomerate, phyllite and chalcschist of low-grade metamorphic Geyikli formation. Recrystallized limestones of the Middle-Late Permian Bozalan Formation cover the Geyikli Formation. Cretaceous Denizgoren Ophiolites thrusted over the older units. Upper Oligocene-Lower Miocene Hallaclar Volcanics composed of altered andesite and rhyolite. Kestanbol Pluton, same aged with Hallaclar Volcanics and represented by mainly quartz-monzonite, monzonite, monzodiorite porphyry, syenite porphyry and quartz-syenite porphyry are cut the older units. Lower- Middle Miocene Ezine Volcanics composed of pyroxene-andesite and trachyte. Hallaclar Volcanics and Denizgoren Ophiolites were affected by alteration produced by the intrusion of acidic and neutral rocks of Kestanbol Pluton. A skarn zone was developed close to Kestanbol Pluton contacts with the carbonaceous rocks of the Bozalan Formation and Denizgoren Ophiolites. Therefore Ca-silicates and some metallic enrichment such as iron, copper, zinc and lead were developed in this altered zone. Mainly garnet (grossular), tremolite/actinolite, epidote and zoisite/clinozoisite paragenesis was observed while minor amount of talc, wollastonite, augite, diopside were determined in the skarn zone Main ore minerals are magnetite, hematite, chalcopyrite, sphalerite, galenite, cerussite, covellite, digenite, malachite and pyrite. Chemical data obtained from samples reveal that Cu-Pb-Zn>1% ppm and gold, silver, cadmium, molybdenum and iron-oxide (Fe2O3) contents reach up to 67.30 ppb (Au), 72.20 ppm (Ag), 709.90 ppm (Cd), 936.30 ppm (Mo) and 87.95 % (Fe2O3). Many ancient mining exploitation cavities were coincided located near the Kiziltepe area. 1110 ppb and 724.90 ppb Au values were detected from two samples taken from skarn mineralization.

Keywords: Skarn-Type Mineralization, Geology, Geochemistry, Ore Deposits, Aladag, Kiziltepe, Ezine

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A SKARN DEPOSIT IN THE KAZDAGLARI REGION: SARICAYIR (YENICE/CANAKKALE -NORTHWEST TURKEY) IRON-COPPER SKARN DEPOSIT

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Abstract:

Saricayir skarn deposit is located around the Saricayir village of Yenice County, 70 km southeast of Canakkale and northeast of the Kazdaglari Region in the northwestern Turkey. Triassic to Oligo-Miocene magmatic, metamorphic and volcanic rocks crop out in the study area. The Karakaya complex is the structural basement of the study area and represented by the Nilufer and Hodul units which are metamorphosed to green schist facies. While Nilufer unit mostly consists of metabasic rocks, Hodul unit dominated by arkosic sandstones was emplaces over the Nilufer unit. Karakaya complex are cut by Oligocene Karadoru granitoid and Saricayir alkali granites and covered unconformably by the Oligocene Can volcanics, consist of andesitic pyroclastics and lavas. It is aimed that to explain geological, mineralogical and geochemical properties of the skarn zone between the Karadoru Granitoide and and the Karakaya Complex's Nilufer and Hodul units in this study.

Owing to Nilufer and Hodul units were affected by the intrusion of Karadoru granitoide and Saricayir alkali granite contact metamorphism and skarn zones have been developed between the Karadoru granitoide and the Nilufer and Hodul units. Contact metamorphism appears to have extended from albite-epidot hornfels to hornblend hornfels facies. Skarn zone, on the other hand, appears to have developed in the type of garnet-epidot skarn.

Calc-silicate minerals such as garnet, tremolite and epidote were determined in the skarn zone based on the field observations, mineralogical and petrographical analyses. In addition, pyrite, chalcopyrite, sphalerite, galena, digenite and cinnabar were observed as ore minerals. Chemical data obtained from skarn zone samples reveal that copper, lead, zinc, gold, silver, arsenic and iron-oxide contents reach up to % 57.54 for Fe2O3, 8101 ppm for Pb, 4656 ppm for Cu, 3700 ppm for Zn, 2500 ppm for As 8.3 ppm for Ag and 60.6 ppb for Au.

Keywords: Saricayir Granite, Skarn-Type Mineralization, Yenice, Canakkale, Iron, Copper, Lead, Zinc

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LITHOFACIES AND GEOCHEMICAL PROPERTIES OF NEOGEN DEPOSITS AT SOUTH OF TUZGOLU-TURKEY

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Abstract:

The Tuzgolu Basin located at the Central Anatolia (Turkey) is bounded by Ankara uplift at the north, the Kirsehir massif from at the east and the Sivrihisar-Bozdag massive at the west. In the study area which is located at the South of the Tuzgolu, the Paleogene and Mesozoic marine carbonates and igneous rocks underlies the Neogene sequences. Neogene deposits consist of Kizilbayir, Katrandedetepe and Bestepeler formations which are conformable with each other. 10 different lithofacies were identified within the Neogene sequence by considering sedimentation conditions, lithology, sedimentary structure and fossil content.; Grain-supported conglomerate facies (Gcu), Convolute bedded sandstone facies (Sk), Thick-bedded sandstone facies (St), Gray-purple colored thick layered mudstone facies (Mt), Oolitic limestone facies (OC), Alternating gypsum-anhydrite-mudstone-micritic limestone facies (Cmag), Bituminous shale facies (Bs), Halite-mudstone facies (Hm), Massive and parallel laminated tuff facies (Pmlt), Alternating mudstone-sandstone facies (Ms).

The facies analysis show that sedimentation in the study area began with fluvial sediments (Kizilbayir formation) and followed by sediments of shallow lake which was often interrupted by sediments from land (Katrandedetepe formation) , and by the interbedded mudstone, sandstone, conglomerates and tuff at the closure of the lake (Bestepeler formation).

According to the geochemical analysis results obtained from lake carbonate and evaporite deposits (Halite, anhydrite and gypsum), REE, LILE and HFSE values are more abundant in clayey samples than those in other evaporatic sediments. The Sr contents of halites (1-1539 ppm) are lower than sulfate (183-4378.04 ppm) and carbonates (922-12365 ppm). Halite minerals contain very high Cl (505686-615905 ppm) and low Br (5-637 ppm) indicating that they are products of dissolution, mixing and re-precipitation.

Keywords: Tuzgolu, Halite, Gypsum, Anhydrite, Neogene Salt Lake

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A SENSOR APPLICATION FOR OCEANOGRAPHIC DRIFTER

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Abstract:

According to Marine Sciences, drifters have been used for warning, security and guidance. In addition to these areas, drifters are also used for scientific purposes like hydrographic and oceanographic today.

In this study, the oceanographic drifter designed to collect scientific data from the Istanbul Strait. The sensor system was designed for this purpose. In this study, an oceanographic drifter was designed to collect scientific data from the Istanbul Strait. Also sensor application has been made to be used in this drifter. With this design, the DH11 sensor and the Arduino Uno electronic card are used. Temperature, humidity and dew points were determined via the DH11 sensor. With Arduino Uno, the sensor information was sent to the serial port display every 2 seconds.

As a result of this study; the temperature, humidity and dew point information from the designed sensor system have shown that scientific data can be collected from the seas at low cost.

Keywords: Marine Sciences, Drifter, Lagrangian, Hydrography, Oceanography

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LOW COST SENSOR SYSTEM DESIGN FOR LAGRANGIAN DRIFTER AT TURKISH STRAITS

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Abstract:

Drifters are used not only for navigation and navigational safety of ships, but also for physical, chemical, biological, environmental and also meteorological investigations of the seas. In addition all, drifters and systems are used to verify hydrographic and oceanographic data obtained from the satellite as a local source.

With this study, Lagrangian type drifter data collection technique's, which is very common in the world, has been used to measure the parameters related to marine science and to use it more accurately for human being. Instead of the high cost sensor systems used for data collection, a low cost sensor system is designed for this work. As a great sample The Istanbul Strait which is a part of Turkish Strait Sea Area, was chosen as a place to collect data with the designed Lagrangian drifter.

As a result, it is well understood that it is possible to collect scientific data from the sea and ocean at lower budget.

Keywords: Lagrangian, Drifter, Hydrography, Oceaonography, Turkish Straits

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GREEN EXTRACTION OF BIOACTIVE FOOD COMPONENTS

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Abstract:

Global warming, climate changes, acidification and rapid depletion of food resources are current threats and considerations faced by food processing industry. New and improved processing techniques, therefore, involve in eco-friendly, economic, efficient and time saving procedures. Bioactive food components are non-essential biomolecules that posses health promoting effects. Among many food processing techniques, extraction simply is a process of separating specific components embedded within the complex food matrix and its history goes back to the encient times in which most common examples being maceration, infusion, percolation and distillation used in the production of perfume, medicine, oil, coffee and tea whereas the well-known industrial application is sugar beet or sugar cane extraction. Considering the latest developments and trends in food industry, extraction processes have been demanded to provide lower energy consumption and waste, shorter processing time, higher extraction yield and efficiency, flexibility in the usage of alternative and non-toxic solvents and food by-products as well as safety and quality. All of these properties, in return, were builded up in a general concept and named as green extraction. Green extraction of bioactive food components usually involves in microwave, enzyme, pulsed electric field, ohmic heating or ultrasound assisted extraction, supercritical and subcritical fluid extraction, accelerated solvent extraction or pressurized high temperature extraction. Meanwhile, green solvents namely natural deep eutectic solvents (DES) consist of two to three different components that interact with each other and play a role as hydrogen-bond donor or acceptor and have the advantages of naturally exist in cells, offer biodegradability, low toxicity and cost, high extraction power and direct use of extracted compound in food processing.

There is vast number of studies on green extraction of different food components in recent years.The aim of the study is to present brief summary on techniques and processing parameters of green extraction of bioactive food components along with the latest studies from literature.

Keywords: Green Extraction, Bioactive Component, Microwave, Ultrasound, Ohmic Heating, Green Solvent.

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RECENT ADVANCES IN MEMBRANE FOULING CONTROL IN WASTEWATER TREATMENT PROCESSES

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Abstract:

Membrane bioreactors (MBRs) are systems performing biological wastewater treatment with membranes utilized for solids separation. These systems have a wide range of applications since they offer some important advantages over conventional processes (e.g. high solids removal, low sludge production etc.). One of their main drawbacks, however, is the occurrence of membrane fouling – the occlusion of membrane pores by the various components found in the mixed liquor. Factors contributing to this phenomenon are various and stem from all the aspects of the treatment process, including membrane-, biomass- and wastewater characteristics as well as operating conditions. Efficient fouling control requires a thorough insight into reactor operation and the mechanisms leading to membrane fouling in the first place. While there are some universal remedies, proper tackling of this problem requires an individual approach tailored to the system of concern, since best results originate from the utilization of several methods together. This review outlines novel and emerging methods having a potential to contribute to sustainable and economical membrane fouling mitigation in the future.

Keywords: Biological Processes, Wastewater Treatment, Membrane Bioreactors, Membrane Fouling

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ADSORPTION OF METHYLENE BLUE BY USING ACTIVATED CARBON PREPARED BY OLIVE SEED

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Abstract:

In this study, the adsorption of methylene blue (MB) from aqueous solution onto activated carbon which is prepared by olive seeds was examined. Morphology, surface properties, bond structures and elemental ratios of activated carbon were carried out by using SEM, BET, FTIR and XPS analysis, respectively. The adsorption characteristics of activated carbon were investigated as a function of initial dye concentration and adsorption dosage. Activated carbon was prepared from olive seed by chemical activation. The activation process was performed by using %30 Na2CO3 and %5 H3BO3 with olive seed. In order to obtain activated carbon, 750°C activation temperature and 60 minute carbonization time were selected. The optimum conditions for the adsorption of MB were found as follows: adsorbent dosage of 0.5 g/L, initial MB concentration of 10 mg/L. As a result of adsorption, 97.27 % removal of MB was achieved. According to experiments, the best fit isotherm was determined as Langmuir isotherm with R2 = 0.9533.

Keywords: Adsorption, Methylene Blue, Olive Seeds, Activated Carbon

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EFFECTS OF CATALYSTS ON BIO-OIL OF FAST PYROLYSIS OF GREENHOUSE VEGETABLE WASTES

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Abstract:

Biomass or bioenergy is an alternative to fossil energy sources due to its renewability and cleanness for environment. Biomass such as greenhouse vegetable wastes (GVWs) can mostly be converted to bio-oil by fast pyrolysis technology. Catalysts are commonly used in this conversion process because it affects the yield and composition of bio-oil based on the feedstock type and particle size, pyrolysis temperature, and catlyst type and characteristics. In this study, GVWs were pyrolyzed in a laboratory-scale fast pyrolysis experimental system by using natural catalysts (calcite, dolomite, zeolite) under different process conditions to mainly produce bio-oil. Catalyst samples which maximize the bio-oil yields were selected and the average elemental (O, C, Ca, Mg) distribution on the surface of the selected catalysts were examined by using the scanning electron microscope (SEM) coupled with energy dispersive X-ray spectroscopy (EDX) technique. And also, gas chromatography-mass spectroscopy (GC-MS) analyses of bio-oil samples were made to determine the chemical compounds in bio-oil samples. SEM/EDX analyses were performed for the catalysts before (control) and after the experiments to investigate the effects of catalysts on the yield and quality of bio-oil samples. The study results showed that the % distribution of these elements on the catalysts surfaces was different from catalyst to catalyst compared to the control. Specifically, while O and Ca% on the catalysts surfaces decreased, C and Mg% increased (except Mg% on dolomite) after the experiments. The amount of some chemicals in bio-oil samples increased while the others decreased after using catalysts in the experiments.

Keywords: Fast Pyrolysis, Bio-Oil, Catalyst, SEM/Edx

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INVESTIGATION OF CATALYSTS AND BIO-OIL IN CO-PYROLYSIS OF GREENHOUSE VEGETABLE WASTES AND COAL

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Abstract:

Coal is a low calorific-valued fossil fuel with some problems for environment due to its high sulfur and ash contents. When it is utilized together with biomass in thermocehimacl conversion processes such as fast pyrolysis, some synergic effects can be observed in the products. The liquid product or bio-oil of fast pyrolysis has some problematic features such as high water and oxygen contents, high viscosity and acidity, and low energy potential. Catalysts are commonly used in getting rid of these undesired features of bio-oils by upgrading them. In this study, greenhouse vegetable wastes (GVWs) and lignite coal were co-pyrolyzed in a laboratory-scale fast pyrolysis experimental system by using calcite, dolomite, and zeolite as natural catalysts under different process conditions. Catalyst samples with the highest bio-oil yields were examined by using the scanning electron microscope (SEM) coupled with energy dispersive X-ray spectroscopy (EDX) technique to investigate the average elemental (O, C, Ca, Mg) distribution on the surface of the catalysts. In addition, bio-oil samples were analyzed by gas chromatography-mass spectroscopy (GC-MS) technique to determine the chemical compounds in the samples. The effects of catalysts on the yield and quality of bio-oil samples were investigated by SEM/EDX analyses by characterizing the catalysts before (control) and after the experiments. The study results showed that the catalysts had different amount of accumulation of these elements on the catalysts surface. After the experiments the amounts of O, Ca, and Mg (except Mg% on calcite)% on the catalysts surfaces decreased, but only C% increased. The catalysts had little positive effects on the amount of chemicals in bio-oil samples.

Keywords: Co-Pyrolysis, Coal, Bio-Oil, Catalyst, Characterization

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IMPROVEMENT OF ENGINEERING PROPERTIES OF SANDY SOILS BY BACILLUS SP.

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Abstract:

Site feasibility studies for engineering projects are beneficial before a project can take off. These studies usually take place before the design process begins to understand the characteristics of foundation soil. The following geotechnical design criteria have been adopted during site feasibility studies. These criterias are: bearing capacity and displacement of soil, foundation type etc. If the bearing capacity of soil is poor, some precautions must be taken before construction. One of the operations is soil stabilization methods which aim to improve soil strength and increase resistance.

In this study, serious tests have been applied in the laboratory to investigate the availability of sandy soils with bacillus for increasing the bearing capacity and decreasing consolidation settlement. In the examinations, sand samples which were taken from river bed were used. Experiments were performed at soil mechanics laboratory of Cukurova University on oven-dried sand samples. The sand was classified as uniform clean sand (SP) according to TS 1500. At experiments, Bacillus sp., have been injected into the sandy soil with low bearing capacity. Bacillus sp., is a bacterium that produces calcium carbonate. The Bacillus sp., has been fed for 15 days for adherence to the sandy soil. Then they have been dried in an oven fed at 105 degrees and engineering experiments have been carried out.

As a result of study, it is considered that mechanical and chemical improvements are observed in the blend of sandy soil with Bacillus sp. It has been observed that bearing capacity has increased at a considerable rate.

Keywords: Bacillus Sp., Soil Stabilization, Sandy Soils, Consolidation Settlement,

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TANNASE PRODUCTION AND ENZYME CHARACTERIZATION FROM BACILLUS COAGULANS

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Abstract:

In this study, the tannase from Bacillus sp. strains isolated from soil samples were produced and characterized. Tannase production of these strains were determined by production of clear zones around the colonies on the tannic acid containing medium, after 96 hours incubation at 37°C. The enzymes isolated from Bacillus sp. 2.11 strain used in this study because they show the best activity. Bacillus sp. 2.11 was determined to be Bacillus coagulans with the VITEK-2 Compact System.

Three bands with molecular weights of 17 kDa, 14 kDa and 5 kDa were detected by SDS-PAGE analysis of the tannase produced from Bacillus coagulans strain. Bacillus coagulans extracellular enzyme activity was determined to be 0.313 µmol/mL, enzyme optimum activity at 30°C and pH 4.2. The Bacillus coagulans extracellular enzyme was able to maintain its activity for 64% at 80 °C for 15 minutes. The enzyme activity of Bacillus coagulans was able to maintain its activity with 1mM HgCl2 (74.7%) and was significantly inhibited by 1mM and 5mM MnCl2 and 5mM FeCl2 (0%). According to these results, Bacillus coagulans due to the characteristics of the enzyme, it can be suggested that industrial field use is appropriate.

Keywords: Bacillus Coagulans, Tannase, Tannic Acid, Characterization

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LEGISLATIONS OF MINISTRY OF ENVIRONMENT AND URBANIZATION IN TURKEY FOR SUSTAINABLE CONSTRUCTION

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Abstract:

Today, more than half of the world's population lives in cities. This ratio is expected to increase further in the future. The need for construction for social, cultural and similar activities, particularly the need for shelter, is increasing day by day depending on the increasing urbanization. The construction process, which requires the use of natural resources, energy and raw materials in high quantities, can lead to the emergence of various environmental problems during the supply and use of these resources. The productions, uses, maintenance-repair and demolition of constructions involve a long process. This long process causes the long-term interaction of the structures with the environment. For this reason, it is necessary that the structures must be compliance with environment and sustainable in order to eliminate or minimize the environmental effects caused by the constructs during their long life cycle.

Today, almost every national government has departments or ministries that work within the scope of ensuring environmental sustainability. Ensuring sustainable environmental management in Turkey, planning and coordinating efforts for the establishment of settlements compatible with the environment is carried out by the Ministry of Environment and Urbanization. In this study, the legislations developed for ensuring the harmony of building-environment within the scope of sustainability targets has been researched. In the scope of the study, only the regulations that were carried out by the Ministry of Environment and Urbanization were addressed. The information obtained at the end of the study was assessed and the positive or negative aspects of the examined regulations and legislations were noted.

Keywords: Sustainability, Sustainable Construction, Legislations, Environmental Sustainability.

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ECONOMIC DYNAMIC MODELING OF CLIMATE POLICY IN POLAND

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Abstract:

Poland faces unique challenges in its energy transition due to extreme dependence on coal. The country is responsible for 8% of EU emission, making it the sixth biggest emitter in the block. . The Polish energy sector is dominated by electricity produced from bituminous coal and lignite (around 90%). The main reason is historical, as after WW2 it was decided that Polish energy security will be built on domestically available coal resources. Poland currently uses massive subsidies to boost the coal sector.

Energy is a crucial economic input circulating in the economy, widely utilized as production factor and consumed in different forms by households. For this reason, any changes in energy sector will have a preponderant impact on the entire economy, thus partial equilibrium modeling is not always sufficient. We propose a dynamic intertemporal hybrid general equilibrium modeling that incorporates energy technologies (bottom-up approach) directly into a macroeconomic structure (top-down approach). Using such model we simulate the economic effects of sector regulations and new policy targets within three scenarios, by accounting for complex set of linkages between energy sector and other parts of economy. Those scenarios assume, in different proportions, increasing use of nuclear energy, renewable sources and natural gas in exchange for reduction of carbon. For each scenario, the model provide number of performance measurements such as social welfare and other efficiency indicators like investment to GDP or investment to employment ratio.

Our simulation results suggest that there are no free lunches. No realistic energy mix allows to achieve sustainable positive economic growth when considerable emission reduction is to be achieved. The price on CO2 will exceed EUR 100 for 30% emission reduction with respect to business-as-usual scenario. Gradual phase-out of coal requires focusing on biomass technology (the first best), nuclear and wind power (the second best).

Keywords: Computable General Equilibrium Modeling; Decarbonisation; Energy Technologies

[*]*This study is sponsored by the National Science Center, Poland*

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SEMIANNUAL MONITORING OF IZMIT BAY AFTER OIL SPILL

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Abstract:

Being located in the most industrialized region of Turkey, Izmit Bay faces high pollution loads from hundreds of industrial facilities and dense population. In January 2017, an oil spill has occurred in Izmit Bay, which is a semi enclosed basin in Sea of Marmara. According to official records approximately 100 tons of fuel oil flowed into the bay. The incident caused heavy acute damage to both aquatic and terrestrial life especially in northern shores of the bay. Several aquatic bird deaths were documented by national press. Manual cleaning action by local authorities took place on the coast region of the bay after two days from the incident.

First sampling were carried out one week after the incident. Mytilus galloprovincialis and Ulva lactuca samples were collected from Hereke, Seka, Derince and Tavsancil sites, which are located in the central and eastern basins of the Izmit Bay. Second and third samplings were carried out on same sampling sites in July 2017 and January 2018 respectively. Polycyclic aromatic hydrocarbon (PAH) analysis was performed on freeze-dried muscle and gill tissues of the mussels. Extractions and other pre-treatments procedure were carried out by modifying EPA 8100 and 8082 methods for GC-FID analysis.

Total PAH concentrations exceeding 400 mg/kg were detected in mussel tissue in the first sampling. Dibenz(a,h)Anthracene, Benzo(g,h,i)Perylene and Indeno(1,2,3-cd)Pyrene were the main constituents of total PAH concentration. Later samplings showed still elevated total PAH concentrations. The incident was the most severe oil spill disaster in the the history of Izmit Bay.

Keywords: Oil Spill, Mytilus Galloprovincialis, Izmit Bay

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EVALUATION OF PAH AND PCB LOADS FROM DIL DERESI TO IZMIT BAY

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Abstract:

The PAH and PCB 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 PAH/PCB concentrations in the sediments carried by Dil Deresi to Izmit Bay during a year. Sediment samples are collected biweekly by two sediment traps placed in the mouth of the stream and analysed for PAH and PCB congeners by GC/FID and GC/ECD respectively. Total PAH concentrations vary 88.5-1587.5 ng/g dry weight, with the dominance of fluoranthene, chrysene and benzo(e)pyrene. On the other hand, total PCB concentrations were in the range of 2.0-53.5 ng/g dry weight, while PCB 18, PCB 52 and PCB 66 were dominant. Results indicate that PAH and PCB loads increase to high levels during some periods of year, possibly due to the industrial discharges to the stream. Results were evaulated with respect to congener distributions and variations during the year were assessed in comparison to those observed for heavy metals and PCDD/Fs to estimate the sources of peak loadings. Total annual loadings from Dil Deresi were calculated also, and the contribution of Dil Deresi to total POP pollution in whole Izmit Bay was disccussed in details.

Keywords: Pahs, Pcbs, Izmit Bay, Sediment, Dil Deresi.

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ENVIRONMENTAL RISKS OF BUMBLEBEE COMMERCIALIZATION AND SUGGESTIONS FOR PREVENTION

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Abstract:

Bumblebees are an important pollinator of wild flora as well as agricultural crops and are increasingly used as an effective commercial pollinator in greenhouses crops mainly in tomatoes all over the world. Eurasian Bombus terrestris L is the most reared subspecies for commercial pollination and has been used outside its natural distribution area. Very early after commercial introduction, it was recognized that this species is invasive and may disturb local ecosystems. There are many invasive characteristics of B. terrestris such as high migration ability, early seasonal emergence, high adaptability under adverse climatic conditions in various habitat, polylectic foraging strategies and regulation of life cycle in a year in newly colonized area. A single commercially produced B. terrestris colony may produce more than a hundred of new queens which may escape from greenhouses and found nest in native flora. The invasion and the increase in population of introduced B. terrestris in the new areas have caused some problems, such as competition with native pollinators for floral resources and nest sites, the introduction of parasites and pathogens, and hybridization with native species. Therefore their potentially effects on the environment are also being observed carefully. The aim of this report is to raise awareness about the environmental risks of bumblebee commercialization and make suggestions for prevention of this possible ecological damage.

Keywords: Bumblebee, Bombus Terrestris, Commercialization, Invasion, Ecology

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AN ENVIRONMENTALLY FRIENDLY PLANT IN TERMS OF OXYGEN SUPPLY: HEMP

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Abstract:

Global warming has been found to be associated with increased concentrations of atmospheric greenhouse gases such as carbon dioxide (CO2). CO2 emitted from the burning of fossil fuels is not absorbed by the vegetation cover, and thus causes the global temperature to rise by continuing to remain in the atmosphere. Industrial hemp uses solar energy to convert atmospheric CO2 to hydrocarbons and water. In addition, O2 procuded. This absorptive CO2 is released back into the atmosphere only when the hemp is composted or burned. According to a report, every ton of hemp produced produces 1.63 tonnes of CO2. Hemp provides the protection of cannabis forests in the production of energy and paper. Hemp stalks release atmospheric carbon dioxide by burning for energy purposes. Cannabis plants used a lotof this carbon dioxide released during the growing season. The high amount of oxygen provided by the atmosphere is due to the rapid growth of the hemp and its abundant leaves. Hemp can be processed into building materials. Thus, even though traditional construction is an expensive carbon footprint, hemp can be used to build "zero carbon" structures, ie building materials absorb CO2 more than the ones produced during construction. In this manuscript, the O2 / CO2 usage cycle of the hemp plant will be discussed.

Keywords: Hemp, Oxygen, Carbon Dioxide, Environment

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THE EFFECTS OF ENVIRONMENTAL POLLUTANTS ON HONEYBEES (APIS MELLIFERA L.)

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Abstract:

Honeybees (Apis mellifera L.) are prevalent in almost all regions on earth, except for polar regions, due to their high adaptability. The honeybees that deliver important products such as primarily honey and beeswax, royal jelly, bee venom and propolis for human consumption, while they improve crop quality and yield in plant propagation due to their contribution to pollination and provide sustenance for the plants through their effects on seed binding. On the other hand, the desire of humans to own and control everything on earthcaused various damages on the world at various degrees since the gathering and hunting period. Especially during the 18th century, the rapid consumption of resources, which started with the industrial revolution,increased the above-mentioned damages significantly. In the present study that aimed to draw attention to several environmental pollutants such as heavy metals, electromagnetic radiation and pesticides, which are the most important causes of serious losses in honeybee colonies throughout the world, it was also aimed to assess the methods to prevent the honeybees that are utilized as bioindicators in determination of environmental pollution and bee products from the above-mentioned effects.

Keywords: Honeybee, Apis Mellifera, Environmental Pollution, Heavy Metals, Electromagnetic Fields, Pesticides.

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DETERMINATION OF ACARICIDAL AND INSECTICIDAL EFFECTS OF LUPIN (LUPINUS ALBUS L.) SEED EXTRACT ON TETRANYCHUS CINNABARINUS (BOISD.), CALLOSOBRUCHUS MACULATUS AND PLODIA INTERPUNCTELLA

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Abstract:

Lupin (Lupinus albus L.) is a species of the genus Lupinus in the family Leguminosae. Lupin is cultivated around the Mediterranean and along the Nile valley where it is used for human consumption, green manuring and as forage. This plant is named Termiye or Acibakla in Turkiye. This study was conducted to determine the acaricidal and insecticidal effect of Lupin seed extract against Tetranychus cinnabarinus, Callosobruchus maculatus and Plodia interpunctella. The adults of the T. cinnabarinus and C. maculatus and the 3-4th instars larvae of the P. interpunctella were used in experiments. Tests for T. cinnabarinus were performed using 3 cm diameter leaf disks of bean dipped in plant extracts. Two µl of the plant extract using a micro-applicator were dropped on C. maculatus adults dorsal surface of thorax. The residual effect tests for Plodia interpunctella larvae were conducted. The experiments were conducted at Entomology laboratory and climate chamber with the temperature of 28±1 °C and 60±5% relative humidity (16:8 L/D time period for T. cinnabarinus) conditions. Plant extracts were used in six different concentrations- 25, 12.5, 6.25, 3.12, 1.56, 0.78 (w/w) for T. cinnabarinus and P. Interpunctella – 10, 5, 2.50, 1.25, 0.625% (w/w) for C. maculatus). Mortality was recorded 24, 48 and 72 hours post-treatment. L. albus extract was found to be quite effective to T. cinnabarinus adults with death rate of 98% mortality in 48 hours and at 12.5% concentrations. The highest death rate (64%) of P. interpunctella larvae were determined at 72 hours and at 25% concentration. At 72 hours, most C. maculatus adults death rates (96 and 100%) from L. albus extract at concentrations of 5 and 10 %, respectively. These results showed that Lupin extract had high toxic effect on T. cinnabarinus and C. maculatus. As we used seed extracts as the tested materials, further research is needed to isolate and purify the most active compounds.

Keywords: Lupinus Albus, Extract, Tetranychus Cinnabarinus, Callosobruchus Maculatus, Plodia Interpunctella

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DETERMINATION OF OPTIMUM OPERATIONAL CONDITIONS FOR THE REMOVAL OF 2-METHYLISOBORNEOL AND GEOSMIN FROM DRINKING WATER BY PEROXONE PROCESS

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Abstract:

2-methylisoborneol (2-MIB) and geosmin are two compounds cause taste and odor problems in surface water bodies. The low odor threshold of detection of these compounds (1.3-4.0 ng/L and 6.3-15 ng/L for geosmin and 2-MIB, respectively) may result in public health concern regarding taste and odor. Since conventional water treatment processes are insufficient for the removal of these substances, advanced oxidation processes have gained importance. Peroxone process is an advanced oxidation process based on the use of ozone (O3) in conjunction with hydrogen peroxide (H2O2) to produce an oxidizing hydroxyl radical (•OH) to remove 2-MIB and geosmin compounds from water. In this study, optimum operational conditions including hydrogen peroxide: ozone ratio (H2O2:O3) and contact time were investigated for the removal of 2-MIB and geosmin from drinking water by peroxone process in laboratory scale reactor. 2-MIB and geosmin compounds were spiked into the water samples obtained from the outlet of an aeration unit in a full-scale drinking water treatment plant. Supplied O3 concentration was 4 mg/L in all experiments. Firstly, the effect of H2O2:O3 ratio on 2-MIB and geosmin removal rates was investigated by applying different ratios of H2O2:O3 (e.g., 0.1, 0.3, 0.5) at a contact time of 10 min. Secondly, different contact times including 5, 7, 10 min were tested with the optimum H2O2:O3 ratio selected at the first stage. Trends in dissolved O3 and residual H2O2 concentrations in the reactor showed that 3 min of contact time was sufficient for the reaction of H2O2 with O3. The overall results indicated that H2O2:O3 ratio of 0.1 and contact time of 5 min were the optimum values for 2-MIB and geosmin removal with removal efficiencies of about 95% and 98%, respectively. According to the results, H2O2:O3 ratio was found to be more effective than contact time on 2-MIB and geosmin removal.

Keywords: 2-Methylisoborneol, Geosmin, Peroxone, Taste And Odor, Water Treatment

**This research was funded by Istanbul Water and Sewerage Administration (ISKI).The authors express their gratitude to Fatih Turan*

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REMOVAL OF INDIGO CARMINE DYE FROM AQUEOUS SOLUTIONS USING CINNAMON SHELL AS AN AGRICULTURAL WASTE

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Abstract:

The wastewater released into the environment by the increased activities of textile, paper, food and leather industries contains dissolved or colloidal dyestuff which lead to serious environmental problems1. They cause toxic effects due to their aromatic structure. Indigo carmine (IC), one of the main industry dyes, has a large share of production and use worldwide. The primary use for IC is mainly in food, textile and cosmetic industries, and in medical diagnostics. Considering the class and texture of the IC, it is highly toxic and causes permanent damage to skin and eye2. Conventional methods such as physical/chemical (flocculation/coagulation, adsorption and chemical oxidation), biological, and advanced treatment (ozone, hydrogen peroxide (H2O2), fenton reactivity) are used for treatment of dyestuff from wastewater. Biological methods may be insufficient for color removal due to the resistance of dyes to biodegradation, as well as other methods has disadvantages, such as operating costs and large quantities of waste sludge production. Adsorption is an important and effective method due to cost effective, feasibility and high efficiency3.

This study investigates the utility and effectiveness of cinnamon shell as an adsorbent to remove IC from aqueous solutions. Adsorption experiments carried out according to central composite design (CCD) and the results were evaluated by response surface methodology (RSM) approach. Thus, experimental factors such as initial concentration, sorbent amount and pH were optimized to determine optimum adsorption conditions for IC removal. The experimental results shown that IC removal efficiency (R(%)±s) can reach to 84.25%±2.11 (N=3) at optimum conditions of 82 mg/L initial IC concentration, 2.00 g sorbent and pH 2. The experimental values were in reasonable agreement with the estimated values 87.18%±0.95 (N=3) from model. As a result, it is observed that cinnamon shell can be used as a low cost adsorbent to remove anionic dyes as IC from aqueous solutions.

Keywords: Adsorption, Cinnamon Shell, Indigo Carmine, RSM

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MULTIPLE CRITERIA ANALYSIS OF WASTE-TO-ENERGY (WTE) TECHNOLOGIES FOR THE TREATMENT OF MUNICIPAL SOLID WASTE : PROMETHEE/GAIA

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Abstract:

Municipal Solid Waste (MSW) is expected to increase to 2.2 billion tones per year by 2025 worldwide. The treatment of these amount of MSW has become an important task of many countries. The collection, transportation and disposition of MSW is still challenging problem in developing countries. The ordinary ways of MSW disposal have also generated a number of environmental and socioeconomics problems. On the contrary different technologies have been developed for the treatment of MSW in developed countries. These technologies are known as Waste-to-Energy (WtE) technologies. A related review show that WtE technologies such as incineration, pyrolysis, gasification, anaerobic digestion, ethanol fermentation, landfill and future trends like microbial fuel cell (MFC) and microbial electrolysis cell (MEC) are the main ways. The suitability of these technologies may vary based on the different criteria, such as economic, environmental, regional, social, technical, etc. The selection of suitable WtE technology requires multi criteria analysis. The objective of this study is to present PROMETHEE/GAIA method, that is one of the pairwise comparison Multiple Criteria Decision Making (MCDM) method. The Analytical Hierarchy Process (AHP) was employed to determine the importance weight of criteria. The PROMETHEE (Preference Ranking Organization Method for Enrichment Evaluation) method was used to rank the WtE technologies according to given criteria. GAIA (Geometrical Analysis for Interactive Aid) method was used to analyze and show the relations between WtE Technologies and criteria. The Visual PROMETHEE software has been used for the data given in literature. The results show that the method is very useful and valuable for the decision makers about MSW management to analyze and compare the alternative WtE technologies for the related criteria.

Keywords: Waste-To-Energy, MCDM, PROMETHEE, Msw

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USE OF ALGINATE – CLINOPTILOLITE BEADS FOR THE REMOVAL OF MIXED HEAVY METALS: EFFECT OF CLINOPTILOLITE SIZE AND ALGINATE – CLINOPTILOLITE RATIO

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Abstract:

Heavy metals are widely used in different industries. Effluents containing these metals should be treated due to their toxic properties even at low concentrations to protect water resources. Adsorption is one of the effective methods and alginate, a natural polymer adsorbent, has ability to capture metals. However, the removal efficiency of the metals by alginates is not high enough to use in real applications. Therefore, studies continue to seek better adsorbent combinations. For this purpose, clinoptilolite, which has abundant source in Turkey, is selected to increase heavy metal uptake capacity of alginate in this study. Similar to the alginate, clinoptilolite can be used for the removal heavy metals by ion exchange. For these reasons, alginate – clinoptilolite (A – C) beads are formed for the removal of heavy metals (Cu2+, Cd2+, Pb2+) from a synthetic mixture using batch reactors. The results related with the effect of using different clinoptilolite sizes and A/C ratios are presented here. The results showed that the highest removal rates were obtained for Pb2+ ion. Pb2+ concentration could be reduced to 4.3±2.5 mg/L, which corresponds to over 95 % of removal, by using 300 µm - 500 µm clinoptilolite size in beads. On the other hand, there were no drastic changes on heavy metal reduction efficiencies at various A/C ratios (1/2, 1/1 and 2/1). Also, shape deterioration in A – C beads was observed at A/C ratio of 2/1 due to high viscosities of alginates.

Keywords: Adsorption, Biopolymer, Cadmium, Copper, Lead

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USE OF ALGINATE – CLINOPTILOLITE BEADS IN AN ADSORPTION COLUMN FOR COPPER REMOVAL: EFFECT OF METAL CONCENTRATION

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Abstract:

With the uncontrolled increase in human population and rapid industrialization, use of heavy metals is increased leading environmental pollution. Heavy metals are toxic substances and treatment before discharges is crucial for all livings. There are lots of heavy metal removal methods, however, adsorption would be a better alternative if the adsorbent is easy to find and cheaper. Recent studies focused on natural adsorbents and alginates, biopolymers from brown algae, are getting attention. Alginates are generally used in bead forms and mostly combined with other materials to improve efficiency in heavy metal studies. In this study, a natural zeolite, clinoptilolite is combined to form composite alginate beads and then they are applied for the removal of copper by using an adsorption column. The results obtained from bead characterization and the effect of variation in copper concentrations are presented here. Scanning electron microscopy for surface images and Brunauer-Emmett-Teller analysis for surface area were used to elucidate the properties of the proposed beads. Also, Image J program was utilized to determine size distribution of the beads. After that, adsorption capacities for copper ion were investigated at constant flow rate of 5 mL/min at different initial concentrations between 10 and 100 mg/L of Cu2+. It was observed that adsorption breakthrough was achieved earlier than 1 hour at 100 mg/L of Cu2+ while the effluent copper concentration was considerably low at 10 mg/L of Cu2+ up to 48 hours leading very efficient copper removal.

Keywords: Biopolymer, Continuous Reactors, Heavy Metal, Zeolite

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IMPROVING WATER QUALITY PARAMETERS BY USING HYDRAULIC STRUCTURES

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Abstract:

Water has great importance in terms of survival of living things. Due to reasons such as the rapid growth of the population, the increase in water consumption because of urbanization and industrialization, lack of infrastructure and excessive irrigation of farmland, we have insufficient fresh water resources. Thus, it is vital to improve the properties of polluted freshwater to reuse. The parameters such as turbidity, PH, temperature, suspended solids, dissolved oxygen concentration are the most important parameters that determine water quality. Many systems are used to improve water quality. Hydraulic structures have been used as an alternative to existing systems in recent years. Hydraulic structures provide water aeration in a short time and effectively compared to the natural process. Generally, this process provides a great economic advantage because it does not require extra energy. As a result of the investigations, it has been determined that water quality is improved by using hydraulic structures.

Keywords: Water Quality, Aeration, Hydraulic Structures

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SOCIAL AND ECONOMIC EFFECTS OF HYDROELECTRIC POWER PLANTS: KEBAN HEPP SAMPLE

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Abstract:

Energy is one of the most fundamental requirements for the economic and social development of countries. Energy consumption is rapidly increasing due to factors such as population growth, industrial developments, urbanization and technological progress. As a result of the investigations, it has been determined that the world's energy consumption has increased by 57% more than expected in the last two decades. For this reason, efficient use of energy resources has gained great importance. Today's energy sources are classified as renewable and non-renewable energy. Renewable energy is also referred to as inexhaustible energy because it is continuously renewed in nature. Solar energy, wind energy, geothermal energy, hydroelectric energy, bioenergy, wave energy are defined as renewable energy sources. In this study, the social and economic impacts of hydroelectric energy from renewable energy sources are mentioned. It also mentioned the social and economic impact of the Keban HEPP of great importance for Turkey's economy.

Keywords: Hydroelectric Power Plant, Renewable Energy, Social Effect, Economic Effect

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A MATHEMATICAL PROGRAMMING APPLICATION FOR MANAGING MUNICIPAL SOLID WASTE

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Abstract:

The prominence of managing municipal solid waste (MSW) in an efficient and effective manner gains more importance every day. Mathematical programming (MP) models are broadly used in the design of optimal integrated systems in several sectors, and also present effective solutions in managing MSW. However, most of the studies only consider the problem from an economical perspective and aim to minimize the total cost of the system. Municipal Solid Waste Management (MSWM) system, on the other hand, is a highly complex problem with several environmental, social and technical dimensions which also need to be taken into consideration. In this work, the integrated MSWM problem is formulated from an optimization perspective and how the economical as well as environmental objectives can be reached simultaneously is represented. The solution of the problem is exemplified for a generalized European case, by solving the problem with MS Excel Solver. The results are inspiring and emphasize the importance of recycling.

Keywords: Municipal Solid Waste Management, Mathematical Programming

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THE IMPORTANCE OF INDOOR AIR POLLUTION FOR SCHOOL CHILDREN

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Abstract:

Indoor air quality (IAQ) in schools have grater importance because of children and staff spent more time in those places and children are more vulnerable to indoor air pollution compared to elders. A school must not affect negatively the health and safety, comfort and productivity of children and teachers. In this study, indoor air pollution and its effects on children have been discussed, and the results of surveys conducted in Samsun, Turkey about respiration problems of school children have been revealed. The results showed that students had respiratory problems generally in primary school, and its ratio to all students attended to survey is 11%. Those students who have respiratory problems have asthma problems too. Indoor air quality problems in schools must be solved by a special programme conducted by government to grow up a healthy generation and to reduce health spendings in time.

Keywords: Indoor Air Pollution, Schools, Children

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THE IMPORANCE OF VENTILATION FOR INDOOR AIR QUALITY

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Abstract:

Indoor air quality (IAQ) has a pretty high importance for healthy indoor environment in which most people spend more than 90% of their daily time. We believe that the indoor air is more cleaner than outside because the building shelter us from harmful effects of substances exist in outside air. But, Environmental Protection Agency (EPA) indicated that concentrations of some pollutants may be 2-5 times, and occasionally more than 100 times higher than outside levels. Therefore, EPA ranked indoor air pollution (IAP) among the top five environmental risks to public health. The most common technique to reduce pollutant concentrations to acceptable levels in buildings is to feed fresh air into indoor environment either by natural or mechanical ventilation. In order to provide a healthy and comfortable indoor environment a suitable and effective ventilation system must be designed and operated. In this paper major principles of effective ventilation systems for schools primarily have been discussed and made clear.

Keywords: Indoor Air Quality, Ventilation, School

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INVESTIGATION OF THE USE OF ADSORBENTS DERIVED FROM WASTE SHELLS WITH ADDITION OF PAN/K2S2O8 IN LAUNDRY WASTEWATER TREATMENT BY ADSORPTION METHODS

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Abstract:

In this study, the treatment of industrial laundry wastewater was investigated by adsorption methods. The adsorbents used in this study were obtained from waste shells by using aniline and K2S2O8, which were walnut shell (WS/PAn+ K2S2O8), hazelnut shell (HS/PAn+K2S2O8), seed hull (SH/PAn+K2S2O8) and rice husk (RH/PAn+K2S2O8). The experiments were conducted with 100 mL wastewater and 1 g adsorbent at 150 rpm of stirring rate for 2 h. In the experimental study, the performance of adsorption process was evaluated through color, turbidity, COD and detergent removal under two different pH values (original wastewater pH 12 and neutral pH 7). In the experiments conducted with original pH; the highest color and detergent removals were obtained as 76% and 98% for SH/PAn+K2S2O8, respectively. Meanwhile, the highest turbidity and COD removals were 70% for HS/PAn+K2S2O8 and 46% for RH/PAn+K2S2O8, respectively. When the initial pH was 7, the highest color, COD and detergent removals were achieved by SH/ PAn+ K2S2O8 as 89%, 69% and 99%, respectively. However, the highest turbidity removal was 77% for HS/ PAn+ K2S2O8. According to these results, adsorbents of seed hull aniline (SH/PAn+ K2S2O8) and hazelnut shell aniline (HS/PAn+ K2S2O8) were determined to be used as an adsorbent in the treatment of wastewaters with high organic pollution load by adsorption methods.

Keywords: Adsorption, Laundry Wastewater, Pan/K2S2O8, Waste Shells Adsorbents.

**This study is supported by TUBITAK Research and Development Program with Priority Fields (1003) to the sub-Project 115Y820.*

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INVESTIGATION OF BISPHENOL A SOLUTIONS TREATABILITY BY USING OZONE BASED OXIDATION PROCESSES

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Abstract:

In this study, treatability of bisphenol A (BPA), which is an endocrine disrupting chemical and widely used in many industries, was evaluated by examining the chemical oxygen demand (COD) and total organic carbon (TOC) parameters using by methods of O3, O3/UV, O3/UV/ZnO and O3/UV/Fe2O3 advanced oxidation processes. The experimental studies were made of at 20 mg/L BPA concentration, at its own pH, at different reaction times (15-120 min), in the presence of 0.1 g of different catalysts (ZnO ve Fe2O3), at 5 ppm ozone dose and under the light source of 16 W UV lamp. The highest COD removal efficiencies were found as 55% over the 90 min reaction time in the O3 process and as 67% at during the 60 min reaction time in the O3/UV/ZnO process. The highest TOC removal efficiencies were determined as 98% and as 96%, respectively as a result of O3/UV/ZnO and O3/UV processes during the 120 min reaction times.

Keywords: Bisphenol A, COD Removal, Ozone, TOC Removal

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ACTIVATED CARBON PRODUCTION FROM LOCAL AGRICULTURAL RESIDUE

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Abstract:

Activated carbons (AC) are amorphous carbon-based materials which have high porosity and surface area in its broadest sense. Preparation steps include different types of carbonization and activation phases. Agricultural residues are regarded as feasible feedstocks for AC production due to their availability and low cost. Bagasse, fruit shells and peels, pine sawdust, olive stone, fruit or vegetable husks etc. are being used in AC production. The products are mostly employed in several environmental applications, such as, color removal, water and wastewater treatment, and air purifying. In this study, AC production conducted using bitter orange peels (BOPs) which are collected from Akdeniz University Campus. The BOPs were washed with tap water and distilled water, cut in small pieces and dried at 70°C for 24 h. After drying step, BOPs were grinded into several sizes (R1: <100 µm, R2: 100-300 µm, R3: >300 µm). The pyrolysis method was used to produce AC from BOPs. The BOPs were mixed with ZnCl2 with 1:1 (30 gr:30 gr) ratio. Pyrolysis was implemented in an electrical tube furnace (Protherm) with nitrogen flow which has 0.4 L/min flow rate at 450°C for 1 hour with a 10°C/min heating rate. After pyrolysis, AC's temperature cooled down to room temperature and was washed with deionized water in order to remove ZnCl2 from AC. Afterwards, material was dried at 110°C for 24 hour and stored accordingly for analysis. Scanning electron microscopy (SEM) and Brunauer-Emmet-Teller (BET) was used to determine morphology and surface area respectively. AC proved to have microporous structure with a 1257 m2/g of BET surface area. Our findings indicate BOPs are feasible candidate for AC production.

Keywords: Activated Carbon, Bitter Orange Peels, Agricultural Residue, Recycle, Material Production

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KINETIC STUDY OF DYE ADSORPTION ON ACTIVATED CARBON PRODUCED FROM BITTER ORANGE PEELS

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Abstract:

In recent years, water scarcity has become a serious global issue due to increasing population, rapid urbanization and industrialization. This situation compels communities towards environmentally friendly and sustainable solutions, and responsible usage of resources. However, consumerism and dependence on industrial products still have pressure on the environment. Many industries like textile use dyes in their processes hence discharge wastewater is containing color pigment pollutants. It is predicted that approximately 10.000 dyes are used in textile industry and 700.000 tons of dyes are manufactured worldwide every year. Therefore, decolorization of dyes is an essential treatment step before discharge of the colored wastewater into the receiving environment.

In this study, kinetic study of methylene blue (MB) adsorption on activated carbon (AC) produced from bitter orange (Citrus aurantium) is evaluated. AC is produced, analyzed and batch adsorption studies were carried out in order to determine adsorption isotherms (i.e. Langmuir and Freundlich). MB stock solution was prepared with deionized water and diluted accordingly. Batch adsorption was performed in 50 mL beakers with 100 ppm MB and 1000 ppm AC. Beakers containing solutions were mixed on a mechanical shaker with speed of 500 rpm at room temperature (25°C). Solutions reached equilibrium and filtered after 8 hours and MB concentrations were determined at λmax= 664 nm using a Perkin Elmer Lambda 365 UV-VIS spectrophotometer. Kinetic and isotherm studies revealed that activated carbon from bitter orange peels has potential to become a commercial product comparing with the literature.

Keywords: Activated Carbon, Adsorption, Bitter Orange Peels, Methylene Blue, Color Removal

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PREVALENCE AND ANTIMICROBIAL RESISTANCE OF AEROMONAS SPP. ISOLATED FROM DRINKING WATERS FROM EASTERN TURKEY

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Abstract:

The prevalence and antibiotic resistance of Aeromonas spp. was investigated in spring, well and city waters in Van and its province. For this purpose samples (n = 120) were collected from 19 natural springs, 10 wells and 91 public drinking water supply distribution systems. The membrane filter method was used for detection and counting of the bacteria. Several strains of Aeromonas spp. were isolated and identified. The antibiotic resistance of each strain was determined. Contamination was found in about 30% of the total number of samples studied. Three isolates of Aeromonas hydrophila (2.5%), two of Aeromonas sobria (1.6%), and thirty-one from Aeromonas caviae (25.8%) were found in all samples. The A. hydrophila isolates showed resistance to ceftazidime (66.6 %), cefotaxime, ampicilin and amoxicillin clavulanic acid (33.3 %). A. caviae was resistant to ampicilin (58.1 %), amoxicillin clavulanic acid (80.6 %), and ceftazidime (32.2 %) and A. sobria was resistant to amoxicillin clavulanic acid and ceftazidime (100 %), cefotaxime, ofloxacin, piperacillin and tetracycline(50 %).

Our results show that caution must be taken because of the high rate of contamination by Aeromonas spp., which poses a potential public health hazard from use of such waters.

* This study is a part of Master Thesis

Keywords: Aeromonas Spp., Water Contamination, Antibiotic Resistance

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DEVELOPING A METHODOLOGY FOR SOIL STABILIZATION USING PALM MAT BIO-GEOTEXTILES FOR PREVENTING SOIL LOSS AND SLOPE FAILURE AT EROSION PRONE SITES IN EBONYI STATE, SOUTH EAST NIGERIA

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Abstract:

Soil erosion is reported to be the single most important environmental problem in most developing countries. In particular, The World Bank estimates that soil degradation affects over 50 million people in Nigeria and accounts for the loss of resources amounting to USD 3000 million per year. This project evaluates the effectiveness of palm mat (Elaeis guineensis) as a locally produced bio-geotextile for sustainable soil stabilization in order to prevent erosion and preserve other agricultural properties of soils. The research adopts a multi methods approach incorporating desktop study and field trials at case studies locations. A phase II site investigation study was also carried out from which the morphological characteristics of the case study site and gully slopes were determined. Soil samples were collected from slope sections to determine geotechnical properties such as soil type, gradation, Atterberg limit - plasticity index, maximum dry density, optimum moisture content, bearing capacity, shear strength and soil hydraulic conductivity. Soil samples were tested in the laboratory using standard American Standards for Testing and Materials (ASTM) methodology. Soil and gully slopes stabilization field trials were carried out over the two main tropical seasons, using locally fabricated bio-geotextile matting to enhance sustainability. Data on runoff discharge and soil loss were generated from plots stabilized with geotextiles and compared with data generated from unstabilized/control plots to evaluate the effectiveness of the stabilization procedure. Preliminary results indicate that the morphological characteristics of soils and unsustainable anthropogenic practices are the main predisposing factors to gully erosion. Based on research findings, a set of suatainable and integrated control measures have been recommended for dealing with the problem of soil degradation in the the case study area.

Keywords: Soil Stabilization; Bio Geotextiles, Gully Erosion, Nigeria

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TOXIC EFFECTS OF SEWAGE ON CAENORHABDITIS ELEGANS

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Abstract:

Daily, tens of millions liters of sewage go down from homes, schools, factories and other business activities that is then flowed through the sewer lines to sewage water plant. Sewage undergoes quickly five processes: preliminary treatment, primary treatment, secondary treatment, disinfection and finally sludge treatment. These processes can be done naturally (a couple of weeks) but cannot handle huge volume of sewage. Therefore, sewage must be fully treated before is being returned into the environment. The full explanation of this topic is beyond the scope of this study.

Dumping untreated sewage into the environment can be harmful as well as serious health risks. This includes other contamination potentials such as contamination of drinking water sources. Sewage can also directly and indirectly affect human health. The potential toxicity of dumped sewage to free-living organism Caenorhabditis eleganswas studied at four different locations within dumping area. The findings showed that all worms are completely paralyzed especially at 100%, 50% and 25% of all the tested locations, after 24 hours of incubation. After 48 hours of incubation, sewage showed higher toxicity in C.elegans, as it produces ~90% mortality in C.elegans with observed paralysis on mobility. There is no significant difference among locations B, C and D on the mortality of C.elegans. Finally, this study gave initial and serious warning to avoid dumping untreated or poorly treated sewage into the environment.

Keywords: Sewage,C.Elegans, Environmental, Ecosystem, Pesticides, Nematode.

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EXPERIENCES ON SUSTAINABLE TOURISM DEVELOPMENT IN TURKEY

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Abstract:

Turkey achieved the most significant accomplishments in the top ten most visited countries in 2015 rose to sixth place. Developments in the Middle East and especially terrorism have affected this ranking in 2016 and have fallen to the tenth rank, but recovery has begun since 2017. Today, the vast majority of tourists come to the Mediterranean region with tour packages as part of mass tourism and almost spend all of the holidays at the hotel. In other words, these tourists mostly return to their countries without knowing Turkish culture and natural values of Turkey. In fact, Turkey has 18 asset in the UNESCO World Heritage list, 16 asset in the UNESCO Intangible Heritage list, 459 blue flag beaches and protected areas with different characteristics. Therefore, Turkey is a tourist destination with a lot of competitive advantage in terms of many types of tourism such as ecotourism, nature tourism, community-based tourism, cultural tourism, gastronomy tourism, health tourism, religious tourism etc.

At this point; diversification of tourism, spread of it over a year, creation of different tourism destinations and alternatives, awareness raising on nature and culture conservation will be important. The United Nations has declared the year 2017 "International Year for Sustainable Tourism for Development" in order to emphasize the importance of sustainable tourism for the whole world. In particular, sustainable tourism approach will have a vital importance for all types of tourism development in Turkey.

In recent years, there are different successful sustainable tourism practices in Turkey in the context of nationally/internationally funded projects, social responsibility studies, governmental and non-governmental enterprises. In this paper, current tourism statement of Turkey will be evaluated; important natural and cultural resources will be outlined; experiences on sustainable tourism will be examined; and suggestions for ensuring sustainable tourism development will be established.

Keywords: Turkey, Natural And Cultural Resources, Sustainable Tourism, Development, Awareness Raising

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TEMPORAL COASTAL CHANGE ANALYSIS IN KIZILIRMAK DELTA AND YESILIRMAK DELTA

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Abstract:

Kizilirmak and Yesilirmak rivers rises in Eastern part of Anatolia. These two rivers are two of the most important rivers in Turkey they pass through a lot of cities and emptying into the Black Sea. These two rivers formed two important deltas in the Blacksea coast. Kizilirmak and Yesilirmak Delta have been occurred from the sediments carried by Kizilirmak and Yesilirmak Rivers for thousands of years. Kizilirmak Delta is an important wetland and 321 species of bird and a lot of plants lives in the delta area. The Kizilirmak River has 78.646 km2 drainage area and 185 m3/s average flow value. Yesilirmak River has 37.823 km2 drainage area and Yesilirmak Delta is an important wetland and also agricultural area for Turkey. Last fifty years more than 30 regulators and dams were built on Kizilirmak River and the proportion of the alluvium flowing in the river significantly decreased. Therefore enlargement of Kizilirmak delta stopped and it began to shrink. Four dams and some power plant were built on Yesilirmak River and change of shoreline in Yesilirmak Delta is expected. The aim of this study is to investigate temporal changes in the Kizilirmak delta and Yesilirmak Delta coast for fifty years, using temporal aerial photo and satellite image in GIS.

Keywords: Coastal Change, Gis, Kizilirmak, Yesilirmak

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AMMONIA REMOVAL FROM LANDFILL LEACHATE USING MAP PRECIPITATION METHOD

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Abstract:

Landfill leachates are complex wastewaters containing high amounts of organic and inorganic contaminants. Nitrogen, which is present in very high concentrations in the leachate, affects the quality of this wastewater and prevents its purification. It is obligatory to discharge the NH4-N ions, which have a considerably detrimental effect on the ecosystem before the catching and discharging of leachate. Magnesium ammonium phosphate precipitation (MAP) appears to be an alternative method for ammonia removal, with the advantages of high yields at high ammonium concentrations and the potential for use of the formed precipitate as fertilizer.

In this study; the preliminary treatment of the leachate of the Samsun Metropolitan Municipal Solid Waste Landfill with MAP settlement has been investigated. For this purpose, optimization of the parameters affecting the MAP settlement has been tried and the conditions for optimum recovery efficiency have been investigated. As a result of preliminary experiments, MAP formation was achieved at pH 9.5, 2 minutes of rapid mixing and 30 minutes of resting time. To measure the efficiency of the process in the experimental run, the starting and ending Ammonia and COD values were measured. As a result of MAP precipitation, different stoichiometric (Mg:NH4:PO4) ratios were tried to provide the best ammonia removal efficiency. When the Mg ratios are tested in 7 different ratios between 1 and 4, the best NH3-N and COD removal efficiencies are achieved (4:1:0.55), yields of 63.79% and 37.56%, respectively. When the PO4 ratios are tested in 7 different ratios between 1 and 2,2 the best NH3-N and COD removal efficiencies are obtained (1:1:2,2), with yields of 82.69% and 35.83% respectively. When the Mg and PO4 ratios were both increased, the best NH3-N removal efficiency was achieved (4:1:2,2) and reached 90,63%.

Experimental data were also evaluated with statistical programs.

Keywords: MAP Precipitation, Leachate, Ammonia Removal

[*]*This study is supported by Scientific Activities Support Program of Ondokuz Mayis University*

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ASSESSMENT OF SOME PHYSICAL AND CHEMICAL CHARACTERISTICS OF SOIL IN SAMSUN TEKKEKOY REGION WITH CBS

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Abstract:

Soil refers to the surface layer the atmosphere and the lithosphere are in contact with. In addition to hosting organic and inorganic matter inside, this layer is also the area in which complicated physico-chemical and biological events take place. Although the definition and meaning of soil is different for many disciplines, this material includes solid elements such as sand, silt, clay and organic matter and several types of salt. Its main physical and chemical characteristics such as pH, organic matter, cation change capacity, lime and texture are fundamental parameters used in questioning and associating the results of a great number of studies in different disciplines. In soil pollution researches, the values of the aforementioned parameters are taken into consideration in examining and interpreting the behaviour of pollutants in the soil. Geographical information systems have become one of the primary tools in environmental management, as in many applications. Geographical information system applications are used especially in studies of natural resource management, resource inventory, assessment of wild life, environmental protection, risk assessment, air emission tracking, land assessment and selection, environmental effect studies, ecological and geological studies, soil analyses, infrastructure management with erosion assessment, waste management, planning, housing, etc. Information systems in which data about the soil are assessed are a significant source of information for all disciplines related with soil.

In this study, basic physical and chemical characteristics of soil samples taken from 0-20 cm deep from Tekkekoy town of Samsun province were assessed and thematic maps were produced for the data obtained through Geographical Information Systems applications. The purpose was to make the results of the study set up a substructure in the interpretation and assessment of other studies to be conducted on the region.

Keywords: Soil, Geographical Information Systems, Environmental Management, KDK, Organic Matter.

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EFFECT OF COMMON-RAIL DIESEL ENGINE BIOETHANOL-BIODIESEL-EURODIESEL MIXTURES ON ENGINE PERFORMANCE AND EMISSIONS

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Abstract:

In recent years, many different studies have been conducted regarding the use of ethanol in both gasoline and diesel engines. As is known, ethanol is a clean fuel in terms of environmental pollution and is suitable for use by mixing gasoline because the number of ethanol octane is high. Ethanol, however, is very low in the number of Setan, it is not used by mixing directly into the diesel fuel. The biggest problem of the use of ethanol in the engines is the difficulty of working in the cold as a result of slow evaporation at low temperatures.

In this study, bioethanol produced from sugar beet was used. Biodiesel is manufactured by transesterification method from safflower oil. In all of the mixtures, biodiesel fuel and bioethanol rates of 20% were used as 20%, 30% and 50%. Fuel comparison fuel is accepted as Eurodiesel. The experiments used a diesel engine with a Common-rail fuel system. The results of the experiments were evaluated by comparing the motor performance and emissions values.

Keywords: Biodiesel, Bioethanol, Eurodiesel, Engine Performance, Emissions

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THE MICROWAVE OVEN CURING OF FLY ASH-BASED GEOPOLYMER MORTARS

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Abstract:

Industrial wastes such as fly ash or blast furnace slag, in which dissolved silica and alumina species are present, are commonly used alumina silicate materials. Activation of aluminosilicates with alkaline solution, particularly when the activating solution does not contain soluble silica, requires the external energy to be supplied as heat for produced the alkaline aluminosilicates. This energy transfer, which takes place over a wide temperature range of 40 to 90 °C and a curing time of 2 to 48 hours, is generally carried out with conventional techniques and with the help of an oven. This can cause irregular heat build-ups that can affect the mechanical properties of the material that gives thermal energy to the material surface by radiant or convection heating.

As an alternative, microwave curing in which microwave energy is transmitted directly to the material through interactions at the molecular level with the electromagnetic field is proposed in this work. This curing method has been tried in the production of geopolymer mortar. Fly ash was used as a binder and NaOH solution was used as alkali activator. The mortar samples were produced with different factors such as two different NaOH molarities (3M and 9M), three power levels (200, 300, 400 W) and two different curing times (25 and 50 min).

According obtained results from samples, the physical and mechanical test results indicate that the microwave oven curing method produces satisfactory results. However the molarity, the energy and the curing temperature are affected the obtained results from samples. As a result, the highest compressive strength (23,1 MPa) was obtained from the samples that is activated with 9M NaOH and it was curing throughout 25 minutes with 200 W.

Keywords: Geopolymer Mortar, Fly Ash, Microwave Cure

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EFFECT OF NANO-SILICA ADDITION ON KAOLIN-BASED BRICK PROPERTIES

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Abstract:

In this study, brick samples were produced by adding nano-silica to 0.1% - 0.3% of kaolin clay by weight. In the study, 500 µm fine kaolin clay obtained from Canakkale-Can/Turkey region was used as raw material and HDK-N20 pyrogenic nano silica was used.

The samples were formed in 25 mm cylinder molds using a hydraulic hand press at 70 bar pressure and using 50 g of wet materials. The shaped samples were dried until the laboratory samples reached constant weight, then the samples were fired at 700, 800 and 900 oC (with firing speed for 2.5 oC/min.) in laboratory-type electric ovens at one hour in the final temperatures. Following the firing process, the samples were placed in a water tank to determine their physical properties. According to the arshimed principle, water absorption, porosity, unit volume weight and apparent density values of the samples were determined. Then, the compressive strengths of the relevant samples were determined in an automatic computer controlled cement press.

According to findings; the apparent porosity, water absorption and apparent density values of the samples increased with increasing firing temperatures. However, it was observed that the increasing firing temperatures did not increase linearly in the sample compressive strengths. As a result, the compressive strength of the samples increased with the increase of nano-silica addition in the brick samples fired at 700 oC. However, in the samples fired at other temperatures, the effect of nano-silica addition was observed to be variable.

Keywords: Nano-Silica, Kaolin, Brick, Firing.

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METHANE PRODUCTION ENHANCED THROUGH OZONE PRETREATMENT IN ANAEROBIC DIGESTION

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Abstract:

Anaerobic digestion is a common method used for sludge treatment since it has an advantage of producing biogas containing methane and carbon dioxide by microorganisms breaking down organic material. Anaerobic digestion process is accomplished in four stages in turn as hydrolysis, acidogenesis, acetogenesis and methanogenesis. Methane production in anaerobic digestion mainly depends on the biodegradability of organics in the first step: hydrolysis. Ozone pretreatment accelerates this rate limiting step by improving sludge biodegradability and also methane production. However, optimum ozone dose for the highest methane production is a challenge due to lack of studies. Therefore, the impact of varied ozone doses applied before anaerobic digestion on methane production was investigated in this study. Three varying ozone doses 0.03, 0.06 and 0.09 g O3/g TSS and a control without ozone were applied to the feed sludges of anaerobic digesters. For each reactors, biogas production was measured by water displacement method and methane content of biogas was measured with gas chromatography on a daily basis. After the operation, the reactor pretreated with 0.06 g O3/g TSS ozone dose gave the highest methane production.

Keywords: Ozone Pretreatment, Anaerobic Digestion, Methane Production, Biogas

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AMINOGLYCOSIDE RESISTANCE GENES TREATED BY SEQUENCING BATCH REACTOR TYPE WASTEWATER TREATMENT PLANTS

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Abstract:

Antibiotics have been used in treatment of diseases for over a century. However, excessive and misuse of the antibiotics have led to dissemination of antibiotic resistance genes (ARGs) in environment. Aminoglycosides are one of the most common used antibiotic group. The aminoglycoside resistance gene, aadA, inhibit the effectiveness of the aminoglycoside antibiotics by enzymatic inactivation. Thus, aminoglycoside resistance genes emerge as a great risk for the public health. Although antibiotics persist in both aquatic and soil environments, the ARGs can persist even after the removal of antibiotics. These ARGs can spread with horizontal gene transfer through drinking waters, rivers, seas and wastewater treatment plants (WWTPs). WWTPs, therefore, are considered as one of the main hotspots for the spread of ARGs. Sequencing batch reactor (SBR) type WWTPs have been widely applied worldwide because of their high operational flexibility and ability of treating wastewaters in a single tank. Although, SBR systems successfully treat municipal wastewaters, their impact on the removal of antibiotic resistance genes has not been defined yet. In this study, therefore, removal of the aadA gene was investigated in a SBR type WWTP. For that reason, seasonal water samples from influents and effluents were collected from a SBR type WWTP. Quantification of the aadA gene was done by quantitative polymerase chain reactions. Our results showed that SBR type WWTP removed the aadA gene with the efficiencies of 98–100%. As a conclusion, SBR type WWTP removed the aadA gene with high efficiency without being affected from seasonal changes.

Keywords: Aminoglycoside Resistance Gene, Aada, Sequencing Batch Reactor

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ANTIMICROBIAL ACTIVITY OF TRGONOSCIADIUM LASIOCARPUM (BOISS) ALAVA, AN ENDEMIC PLANT FROM TURKEY

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Abstract:

Trigonosciadium lasiocarpum (Boiss) Alava is an endemic plant from Turkey. This study was conducted to find out whether this plant had and antimicrobial activity or not. For this purpose, fruits of this plant were collected from field and dried in the laboratory conditions. After that, they were crashed into a fine powder using a blender and extracted in different types of solvents (water, ethanol, methanol, acetone, petroleum ether and chloroform). After extraction process, solvents were blown avay in an evaporator , samples were lyophilized and dissolved in DMSO. Fruit extracts were tested on different kinds of organisms like Aeromonas sp., Pseudomonas aeruginosa, Escherichia coli, Candida albicans, Staphylococcus aureus and E.nterobacter aerogenes. Methanol extract was found having antimicrobial activity on Aeromonas sp. and C. albicans. While aceton extract had antimicrobial effect on C. albicans, petroleum ether extract was found effective for elimination of Aeromonas sp. We can conclude that fruits of Trigonosciadium lasiocarpum (Boiss) Alava had an antimicrobial activity on Aeromonas sp. and Candida albicans.

Keywords: Trigonosciadium, Endemic, Fruit, Antimicrobial Activitiy,

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REMOVAL OF DICLOFENAC FROM AQUEOUS SOLUTION BY MICROWAVE ENCHANCED PERSULFATE OXIDATION: OPTIMIZATION USING TAGUCHI DESIGN

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Abstract:

Diclofenac (DCF), an important non-steroidal anti-inflammatory drug, is widely used in human health care and veterinary industry. The main difficulty for the removal of DC from water is their high polarity and solubilty in water. In this work, the performance of diclofenac (DCF), an anti-inflammatory analgesic, oxidation with activated persulfate (PS) by microwave was investigated. A optimization method was used Taguchi's robust design approach. Taguchi's L9 ortogonal array was planned for experimental design. The parameters for the L9 orthogonal array were determined as power (W), contact time (min), persulfate anion concentration (g/L) and pH. Removal process is optimized with the response characteristics of the DCF removal efficiency. The signal noise (SN) ratio was calculated for the response variable and the optimal combination level of the factors was obtained using Taguchi's ortogonal design. Analysis of variance (ANOVA) was used to describe the significance level of factors on the multiple performance characteristics considered. Ph has been found as the most effective factor and its contribution is 84.51% on multiple quality characteristics. The optimum conditions for DCF removal were determined as 0.5 g/L of PS, 1 min. of time, microwave pover at 126 watt and pH at 3. As a result of the verification experiment, 94.74 % removal efficiency was obtained which was higher than the L9 Taguchi set.

Keywords: Microwave-Persulfate, Diclofenac, Multi-Response S/N Ratio, Optimisation, Taguchi Methods, Anova

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MICROWAVE ASSISTED SLUDGE DISINTEGRATION: OPTIMIZATION OF OPERATING PARAMETERS

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Abstract:

The high volume of sludge generated in wastewater treatment plants poses a problem for sludge processing and disposal. Sludge disposal is the reason for the 50% additional cost of total finance. The disintegration process provides reduction of the sludge at the source, increased anaerobic digestion efficiency, increased biogas production and less harmful, odorless, stable sludge formation. Microwave (MW) disintegration has become an interesting subject in recent years as an innovative method applied on waste sludge. Using microwave energy can result in substantial waste volume reduction, process time reduction and energy savings. In this study, the efficiency of microwave disintegration on the sludge from a recycle line of a treatment plant was investigated. COD (chemical oxygen demand) in supernatant was determined as the response parameter and the independent variables affecting the response were selected as microwave irradiation time, microwave power (watt), pH and organic acid addition (citric acid). For each selected parameter, 3 levels (low, medium, high) were determined and L9 orthogonal Taguchi experiment design was created with MINITAB 17. The optimum levels of control factors for maximum cell disruption were found as, microwave irradiation time at 5 min, microwave power at 700 watt, pH at 9 and citric acid addition at 0.5 ml for 50 ml sludge. According to ANOVA analysis most effective control factors were found as microwave irradiation time and pH with contributions of 35.43% and 34.43% respectively. A confirmation experiment was performed to verify the effectiveness of the optimal combination. As a result of the optimization experiment, higher cell disruption resulted in a higher COD value than results in the L9 Taguchi set. It was concluded that the microwave disintegration could be an efficient option to break down the intracellular organic material and make the sludge more stable.

Keywords: Sludge Disintegration, Microwave, Taguchi Experimental Method

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ASSESSMENT KNOWLEDGE OF PRODUCTION COMPANIES ABOUT REVERSE LOGISTIC AND WASTE MANAGEMENT: EXAMPLE OF BOLU PROVINCE

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Abstract:

Reverse logistic is a complement of activities which include re-evaluated processes. The input of these processes consists of environmentally harmful waste or product, semi-product and raw material that are discarded. Although it is thought that only some properties of these inputs are renewed in reverse logistic processes, reverse logistic is also an important research field because of environmental perspective. In many countries, legal regulations and supports about reverse logistic application have been increased because it covers both removing and reusing all environmental waste. So, we have aimed to investigate what production companies know about reverse logistic and waste management. Our study focus on production companies around Bolu province. In Bolu Province, 206 enterprises are in service. But, we eliminated chicken producers and small-scale enterprises. A questionnaire composed of 32 questions was created to measure knowledge of them and data were gathered by face to face interview method. They were analysed by t-test, chi-square analysis and variance analysis.

Keywords: Reverse Logistic, Waste Management, Statistical Analysis

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MULTI-RESPONSE OPTIMIZATION OF NANOFILTRATION PROCESS FOR CARBAMAZEPINE REMOVAL

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Abstract:

In recent years, the presence of micropollutants in aqueous environments is an increasing concern due to their potentially harmful effects on aquatic life. Conventional wastewater treatment technologies are ineffective in the treatment of pharmaceutical compounds such as carbamazepine at levels of ng/L and mg/L in surface and ground waters. Carbamazepine, which is an anti-epileptic drug, is commonly present in municipal wastewater and it is not significantly removed during conventional biological treatment because of its resistance to biodegradation and low Log Kow. For this reason, advanced treatment technologies should be considered which allow removal of carbamazepine from wastewater or destruction of its biological activity. In this study, the removal of carbamazepine from synthetic wastewater by nanofiltration process has been extensively investigated. Taguchi's robust design approach was used to optimize the system with the multi-response optimization method. Design factor and levels were selected as transmembrane pressure (TMP: 10, 15, 20 bar), membrane type (NF270, DS5DK, NP010), volume reduction factor (VRF: 1.5, 2.0, 3.0), and pH (6.12, 7, 10). L9 (34) orthogonal array was used for experimental design and the-larger-the-better response category was applied to maximize carbamazepine removal and flux value. The optimum conditions were determined as the first level of membrane type (NF270), third level of TMP (20 bar), third level of VRF (3) and second level of pH (7). The most effective factor was found to be membrane type with 65.89%. Under these conditions, 91% carbamazepine removal and 134 L/m2.h flux value were obtained. These results showed significant improvement in performances of carbamazepine removal and flux by means of used the multi-response optimization, compared to initial value of carbamazepine removal (71.4%) and flux (95 L/m2.h).

Keywords: Carbamazepine Removal, Nanofiltration Process, Multi-Response Optimization, Micropollutions

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A NEW USER BASED APPROACH AND INTERDISCIPLINARY PLANNING PROCESS ON SPATIAL DESIGN

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Abstract:

It is a common approach to design the conceptual and physical framework of a project primarily in both urban planning and architecture disciplines. Functionality, capacity analysis, orientation, user profiles, user needs, normal time operation and emergency evacuation scenarios have secondary importance in many projects. However, it is a significant factor to follow a theory, research and application chain to create satisfying spaces for people in terms of functionality and efficiency. User based design approach proposes firstly determining all kind of user profiles and their spatial requirements. The planner or the designer must integrate this information to interior and exterior physical design process to evaluate the building in the meaning of capacity. By the latest 3D pedestrian simulation software, it is possible to test any building before construction about the design defects that will negatively affect the circulation, comfort and safety of people. All spaces must be designed in accordance with the user number and user needs by evaluating the capacity of horizontal and vertical circulation elements. Of course all design process must have an interdisciplinary interaction among urban planners, architects, engineers etc. for more efficient and sustainable environments. This study aims to explain this user based approach via a case study, a metro station. A BIM integrated process will be performed through a 3D pedestrian simulation software, Massmotion. The capacity analysis results, design defects, solutions and architectural revisions have been detected and given throughout this study.

Keywords: User Centered Planning, Spatial Design, Functionality, Pedestrian Simulation, Massmotion

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OPERATIONAL EFFICIENCY OF COAGULATION UNITS IN VARIED FULL-SCALE PLANTS BY FLUORESCENT SIGNAL

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Abstract:

In this paper, three water plants including Cheng-Ching Lake (CCL), Kaotan (KT), and Mudan (MT) in southern Taiwan were compared in the efficiency of removing particles and organic matter by the treatment units which are pre-oxidized by adding different oxidant following to coagulation. Regarding to the parameters related with the property of organic matter, Excitation Emission Fluorescence Matrix (EEFM) obtained by fluorometer, molecular weight (MW) cut-offs measured by High performance size exclusion chromatography (HPSEC) combined with DAD detector, and non-purgable dissolved organic carbon (NPDOC) measured by total organic carbon meter (TOC) were used to indicate the variation of the property of organic matter in oxidation/coagulation units. The results indicated that removing of turbidity for pre-ozonation/coagulation units of CCL is superior to that for pre-chlorination/coagulation units of MT and KT. Average particle size of colloid in units of CCL was reduced, but that in units of MT and KT was enhanced. CCL has better ability to remove NPDOC than MT and KT. The fluorescent spectrum variation related with humus including fulvc-like and humic-like in three water plants all appeared that the target peak might vanish or its intensity became weak or the shift of emission wavelength or excitation wavelength in spectrum, which might be attributed to the dose of oxidant and coagulant. Molecular weight cut-offs of organic matter detected in three water plants were distributed in 43~76 kDa, 47~110 kDa, 69~110 kDa and after oxidation/coagulation units, the peak intensity and area were greatly decreased.

Keywords: Excitation Emission Fluorescence Matrix (EEFM) ; High Performance Size Exclusion Chromatography (HPSEC) ; Humic-Like Substances ; Ful

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USE OF 3D CITY MODELING TECHNIQUES IN URBAN PLANNING: A CASE STUDY OF SELAHIYE

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Abstract:

The Earth has been changed and altered from past to present by human activities. Agriculture, transport, industry, mining and settlements are human activities that are effective in the transformation of natural landscape into cultural landscapes. The settlement areas have caused and have caused significant changes in the Earth since the human being's settled passion. Natural unsettled areas are opened to settlement construction activities with each passing day. However, this situation is much more unplanned and painful today with increasing population pressure. As long as unplanned settlement and use of the natural environment contrary to the physical space organization continues, mankind will continue to lose natural resources that can not be recovered. At this point, a sustainable urban planning approach gains importance. In the recent past, planning studies with classical methods have gained a different dimension with developing technology. Urban models obtained by 3D modeling also change the planning process. We have significantly improved the way we visualize urban objects, visualize and plan our sustainable future environments. In this study, planning studies conducted in rural settlements located close to the city's area of influence, were analyzed in 3D city models. The obtained numerical data was prepared with geographic information systems software and modeled in Esri CityEngine software. Thus, what kind of cultural landscaping will be revealed as a result of planning is revealed visually. The 3D urban information system infrastructure has been created along with the attribute information added to the created 3D model.

Keywords: 3d City Modeling, Urban Planning, Gis, Sakarya

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BALANCE ANALYSIS FOR LAND-ENERGY-ECONOMY-ENVIRONMENT CORRELATION IN TAIWAN

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Abstract:

Land is the foundation of human development. People get the resources and energies from land to support the higher economic achievement, but also caused the environmental impacts at the same time. For pursuing the eternal of earth and human, the concept of sustainable development therefore be created and raised the discussions between land exploitation, energy consumption, economic development and environment protection. However, due to the complex relevance in various aspects, the balanced development strategies for country or city are difficult to be established. This research therefore would like to realize the current development situation for various aspects in Taiwan. The thematic-based indicator system with three hierarchy and twenty items was built base on country scale for evaluating the current situation of country development and environmental quality. A coupling model of coordinated was built for assessing the coordinated development degree between land use, energy consumption, economy development and environment protection. The results indicate that coupling degree of Taiwan had transfer from moderately unbalanced development to superiorly balanced development between 2002 and 2015. In which, environmental quality level is the best one in the four aspects now. We also find that it can go further by improving land and economy aspects for achieving the goal of balance growth in Taiwan.

Keywords: Coupling Coordination Degree, Information Entropy Weight, Balanced Growth Strategy, Sustainable Development

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THE IMPACT OF FINE PARTICULATE FROM MOBILE SOURCE TO AIR QUALITY IN URBAN AREA

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Abstract:

Taichung metropolis is one of cities which densely of populated, industrial and commercial development. In order to make people or products can be convenient or clipper transport, people and vendors all use vehicles as their means of transport. However, these vehicles emit air pollutants such as volatile organic compounds, heavy metals, PM2.5, etc. Especially PM2.5 has been reported to be very harmful to humans in many medical reports. Therefore, how to assess the impact of mobile PM2.5 emissions on the local environment is very important. Since the Taichung metropolis is a basin topography, PM2.5 is disturbed by natural factors and lead to retention phenomenon. Therefore, Taichung City was used a case study in this study, using The Air Pollution Model (TAPM) and local traffic data to evaluate the impacts of PM2.5 on the local environment. The results show when the wind is weaker, trucks have a bigger impact on the local environment than vehicle. And High concentrations of PM2.5 concentrated in Taichung metropolis. Finally, this result provides the local government with pollution reduction measures reference.

Keywords: PM2.5, TAPM, Terrace, Air Pollution

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OCCURRENCE OF MICROPOLLUTANTS IN WASTEWATER TREATMENT PLANTS: ANTALYA, TURKEY CASE STUDY

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Abstract:

Industrial chemicals, pesticides, drugs and drug residuals, personal care products, steroid hormones, and many other emerging pollutants are being considered under the term "micropollutants". Micropollutants are environmental contaminants and have become a major threat to the health of human and receiving environment. Due to their different physicochemical properties, they could be persistent and bioactive, and they tend to bioaccumulate. Because of those properties, they are not completely treated with traditional wastewater treatment processes. Polychlorinated Biphenyls (PCBs) are a group of organic chemicals, and the number of chlorine atoms and their location in a PCB molecule determine many of their physical and chemical properties. PCBs have no known taste, smell and color. They are non-flammable, very stable and generally were used in electrical equipment, transformers, capacitors and cable insulation. PCBs were legally manufactured between 1929 and 1979. Although their manufacturing was banned in 1979 due to their toxic/ecotoxic effects on human (such as cancer, endocrine disorders etc.) and receiving environments with bioaccumulation and persistent properties, PCBs congeners can still be found in receiving environments.

Aim of this study is to monitor two wastewater treatment plants (WWTPs) located in Antalya, Turkey to analyze seven PCB congeners and to determine their treatment efficiencies. Influent and effluent samples (24 h composite) were collected from industrial and urban WWTPs. Samples were concentrated and separated by Horizon SPE-DEX 4790 automatic extraction system, and extracted analytes were analyzed with a Shimadzu QP2010 GC-MS.

In industrial WWTP, the ∑PCB7 concentration was ranged from 9.078 to 16.6 ng/L in influent and from 2 to 10.6 ng/L in effluent. In urban WWTP, lower ∑PCB7 concentrations were obtained that in influent the results were between <MDL (below method detection limit) and 13.3 ng/L, in effluent ∑PCB7 values from <MDL to 7.1 ng/L. The highest PCB congener concentration of 8.562 ng/L (PCB 101) and 7.145 ng/L (PCB 52) were obtained from industrial and urban WWTPs, respectively.

Keywords: Micropollutant Monitoring, PCB Congener, Wastewater Treatment Plant, Antalya

*This study was financially supported by TUBITAK (The Scientific and Technical Research Council of Turkey, Project no. 115Y309).

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EVALUATION OF USABILITY OF BIOSENSORS AS ENVIRONMENTAL MONITORING TECHNIQUES

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Abstract:

In recent years, increasing population and increasing environmental problems have necessitated more comprehensive studies in environmental engineering. Biosensors have become widespread as alternative analytical methods in the world and in our country have increased the performance of traditional analytical devices also they have enabled the development of low cost analytical devices instead of using harmful and expensive solutions.

Biosensors can determine the type and amount of microorganisms present in the environment while allowing quantitative evaluations on the types and quantities of various toxic substances such as pesticides.Biosensors are being developed to make such measurements more practical and cheap.

In this study, studies conducted in the literature on the use of biosensor technologies, one of the environmental monitoring techniques, will be examined and the results of DNA biosensors prepared using three methods will be evaluated.

When all the experimental results obtained in this study are examined, it is seen that the experiments are not repeatable, in other words, the same stability results can not be obtained in the repeated experiments under the same conditions. This could be caused by the following reasons: Uncontrollable environmental conditions, Used the enzyme concentration, Probe concentration, Surface modification, this uncertainity may be due to one of the operating parameters that has not yet been determined.

Keywords: Biosensor, Enzyme Marking , Sandwich Method, Fish Method.

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EXAMINATION OF THE EFFECT OF FILAMENTOUS MICROORGANISMS ON MBR AND ACTIVATED SLUDGE SYSTEM

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Abstract:

Activated sludge systems are one of the biological treatment systems that are widely used in wastewater treatment. Wastewater such as fruit juice wastewater can be easily treated in activated sludge and membrane bioreactors. The quality of the biological slurry in these treatment systems also directly affects the efficiency of the treatment. In an effective activated sludge system there are bacteria, algae, rotifers, fungi and especially protozoa in different species in the environment. Especially when the oxygen is reduced and the pH changes in the environment, the number of filamentous microorganisms in the system increases and this changes the quality of the activated sludge. With the increase of the filamentous microorganisms, the nutrients are adsorbed onto these microorganisms and cause the bulking problem by the denitrification.

In this study, the MBR system was fed with fruit juice wastewater and the treatment yield was investigated. the activated sludge in the system was examined by SVI, MLSS and MLVSS experiments and microscopic analyzes. Wastewater treatment yield was measured by COD, TKN and TP experiments.

In the experiments, it was observed that filamentous microorganisms increased in the environment due to increase of sludge age and decrease of oxygen. MLSS and MLVSS values increased as sludge age increased, while SVI decreased. When SVI was low, it was observed that the mud did not collapse well and there were many filamentous microorganisms in the activated sludge system. When the treatment yield is examined, the COD removal is also slightly reduced when the SVI is low.

The increase of filamentous microorganisms and some fungi in the system has altered the quality of activated sludge and negatively affected the efficiency of the treatment. Bulking and foaming problem in treatment system with increasing of filamentous microorganisms. pH, oxygen and nutrient content in activated sludge systems are important for microorganisms and affect the quality of sludge and the efficiency of treatment.

Keywords: Membrane Bioreactor, Activated Sludge, Filamentous Microorganisms

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PETALOID MONOCOTYLEDONOUS FLORA OF BINGOL PROVINCE (TURKEY)

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Abstract:

This study was carried out to determine petaloid monocotyledonous flora of Bingol (Turkey) and around within the scope of the Determination Project of Biodiversity in Bingol Province. Bingol is located in East Anatolia region of Turkey. This area belongs to Irano–Turanian phytogeographic region and situates at B8 frame within the grid system of Davis Bingol Province is versatile for its plant biodiversity in terms of phytogeographic region and location.

During the flowering period of 2016 and 2018, numerous plant specimens were collected, photographed and determined from Bingol and around.

As scope of work, a total of 90 monocotyl petaloid taxons belonging to 10 families were identified at Bingol province and it was found that 12 of them were endemic to Turkey. 5 of these taxa are new records for Bingol. Threat categories of rare and endemic plant species are as follows; 1 Critical (CR), 1 Endangered (EN), 3 Vulnerable (VU), 3 Near Threatened (NT), and 5 Least Concern (LC).

Keywords: Bingol, Endemic, Petaloid Monocotyledonous, Turkey.

[*]*This study was supported by Turkish Republic, Ministry of Agriculture and Forestry*

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EFFECTS OF CATALYTIC PROPERTIES OF COPPER, IRON AND/OR MANGANESE IMPREGNATED TI-PILLARED BENTONITES ON THE ACTIVITIES FOR ETHANOL OXIDATION

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Abstract:

Ti-pillared bentonite (Ti-PB) using bentonite from the Middle Anatolia region (Hancili) was synthesized. Different combinations of cerium, manganese or copper were impregnated through the Ti-PB under evaporation. Iron or copper impregnation from the solution to Ti-PB and subsequent cerium incorporation by wet impregnation were performed. All of the bands corresponding to the bentonite structure were retained in all of the pillared samples indicating that the structure of the host mineral was unaffected by the pillaring and further metal incorporation. Surface acidities of pillared samples were evaluated by FTIR spectrums. Ti-PB exhibited both the Lewis and Brønsted acidities. The copper impregnation resulted in an increase in the Lewis acidity. The cerium-iron and cerium-copper impregnated samples yielded an increase in the Brønsted acidity. The intensities of the bands corresponding to Lewis bounded pyridine decreased while the bands that correspond to strong interactions of pyridine-functional groups were protected with an increase of pyridine desorption temperature. From thermogravimetric analysis (TGA) results, it was obtained that the total weight losses of manganese incorporated samples were less than the iron or copper impregnated Ti-PBs in the range of 25-300ºC. The X-ray photoelectron spectroscopy (XPS) data showed that the titanium in all of the samples was in the TiO2 form (Ti+4) with 2p3/2 and 2p1/2 orbitals respectively. The 2p3/2 and 2p1 orbitals of copper resulting from CuO (Cu2+) was observed for the copper impregnated sample. The 2p3/2, 2p1/2 and 2s orbitals of iron from bentonite and by impregnation were also observed showing the presence of Fe2O3 (Fe+3). The 2p3 and 2p1 orbitals of manganese resulting from Mn3O4 and the 3d3/2 orbital of cerium corresponding to CeO2 (Ce+4) were observed for cerium manganese containing Ti-PB, while the cerium orbital was not observed for the iron including one. Copper and/or manganese impregnated Ti-pillared catalysts gave conversion values reaching to 0.85 at moderate temperatures in ethanol oxidation reaction and acetaldehyde was major product. Ti-pillared bentonite gave 0.35 at 350ºC, 0.75 conversion values at 400ºC and acetaldehyde selectivity was obtained as 0.6. After copper impregnation conversion value increased to 0.85 at 200ºC and acetaldehyde selectivity also increased to near 0.85. Manganese incorporation resulted in acetaldehyde selectivity reaching near 0.9 after 300ºC. Between 0.7 and 0.8 conversion values were obtained by iron impregnated Ti-pillared bentonites and acetaldehyde selectivity was obtained as near 0.65.

Keywords: Ti-Pillared Bentonite, Surface Acidity, XPS, Ethanol Oxidation

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MICRO- MESOPORE ANALYSIS OF TI-PILLARED BENTONITES

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Abstract:

Iron or copper was impregnated to Ti-pillared bentonite (Ti-PB) and subsequent cerium incorporation was done by wet impregnation. Different combinations of cerium, manganese or copper were impregnated through the Ti-PB under evaporation. The bentonite from the Middle Anatolia region (Hancili) was used in the synthesis. From X-ray diffraction (XRD) patterns, the reflection at 2θ value of 7.3° which gave the basal spacing (d001) value of 1.2 nm, moved to lower value resulting a considerable increase in the basal spacing value (d001 =4.41 nm) with a decrease in its intensity by the pillaring with titanium. The anatase phase of titanium dioxide was found for all of the samples and the phase was not changed with the further metal inserting. The nitrogen adsorption isotherms of all of the samples fitted the type IV isotherm which was characteristic for solids containing both micro and mesopores according to the International Union of Pure and Applied Chemistry (IUPAC) classification. Approximately 30 % of total adsorption occurred at low relative pressures (P/P0 < 0.1) was related to the micropores. The Ti-PB calcined at 500 °C gave a specific Brunauer, Emmett, Teller (BET) surface area of 348 m2 g-1, and a micropore volume of 0.093 cm3g-1. The copper and iron impregnation resulted in a decrease in the micropore properties. The Horvath and Kawazoe (HK) micropore size distribution for the Ti-pillared montmorillonite reflected generally bidispersed structure (centered at approximately 0.44 nm; 0.94-1.64 nm) in the micropore region. One narrow peak at approximately 3.63 nm-3.81 nm was obtained in the mesopore size distribution determined by the Barrett-Joyner-Halenda (BJH) method. The energy dispersive X-ray spectroscopy (EDS) analyses indicated that TiO2 content of all PBs was near 40 mass % and metal incorporation to Ti-PB was succesfully performed by the impregnation method.

Keywords: Ti-Pillared Bentonite, Structural Properties, Chemical Compositon

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APPLICATION OF MICROWAVE ASSISTED REACTION SYSTEM ON CLEAN HYDROGEN PRODUCTION

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Abstract:

Recent years, alternative energy sources have gained great attention due to the decrease in the fossil fuel reserves and the increase in the concentration of CO2, which is one of the major reasons of greenhouse effect. Utilization of hydrogen as an environmentally friendly energy source especially by means of fuel cell application increases steadily, due to its energy content and its clean fuel properties. Well-known conventional routes to synthesize hydrogen generally use hydrocarbons as feedstock and the formation of COx components which cause a decrease the fuel cell performance, is inevitable. Last years, ammonia has been recognized as a raw material for hydrogen production since it has high hydrogen content and COx free hydrogen can be simply produced by decomposition of it.

Nowadays, microwave energy has been considered as an alternative heating method to enhance heterogeneous chemical reactions. Conventional heating methods, such as electrically heated furnaces, are based on heat transfer from the source mainly by means of conduction and convection modes, whereas, in microwave systems heat is generated by direct conversion of electromagnetic energy where it is needed.

In the present study, multiwall carbon nanotube supported molybdenum and iron incorporated monometallic catalysts were used to produce hydrogen from ammonia in microwave heated reactor system with high yield. Activities of these catalysts were found to be very low at temperatures of 550oC or below in conventionally heated reaction system (GHSVNH3: 36,000ml/hgcat). On the contrary, total conversion was achieved even at 450oC in microwave heated reaction system under the same experimental conditions. Direct transfer of energy to the active sites, formation of hot spots as well as formation of carbide species of iron and molybdenum, are main reasons of getting higher activity from the catalysts in microwave assisted ammonia decomposition reaction.

Keywords: Clean Energy, Hydrogen, Ammonia, Microwave System

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ACTIVITIES OF COBALT INCORPORATED MESOPOROUS SILICATE CATALYSTS ON AMMONIA DECOMPOSITION USING MICROVAVE HEATED REACTOR SYSTEM

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Abstract:

Hydrogen production from non-carbonaceous raw material has gained great importance, since conventional routes, such as steam reforming, result in formation of COx components which cause a decrease in fuel cell performance. Ammonia, has been considered as an important raw material and decomposition of it has been worked on number of metals. Transition metals, such as Fe, Ni, Co, have been generally studied due to their good activity and lower prices comparing with the precious ones1-2. Recent years, microwave assisted reactors have become an attractive way to proceed reactions especially for endothermic ones since higher activities could be achieved at lower reaction temperatures under the same feed flow rate. Unlikely, conventional heating method, heat is generated by direct conversion of electromagnetic energy3-4.

In the present work, cobalt incorporated mesoporous silicate structured catalyst were prepared following the direct hydrothermal synthesis procedure using cobalt nitrate and sodium silicate with different metal loading. Co3O4 crystallites were observed with Type IV adsorption-desorption isotherms, indicating mesoporous structure of the catalysts1,2.

Activity measurement of cobalt incorporated silicate structured catalysts in a conventionally heated fixed bed flow reactor indicated 74 % ammonia conversion at 600oC and total conversion at 700oC under the flow of pure ammonia (60 ml/min)1. Same catalysts were also tested in microwave heated reaction system, however, they showed very low activity which could be explained with the low ability to absorb microwave. For this reason, catalysts were mixed with mesoporous carbon with a 50 wt % keeping the total amount at 0.1 g and tested under the same feed flow rate. Results showed total ammonia conversion at 450oC. This higher activity of the catalysts in microwave heated system could be explained with the transfer of energy directly to the catalysts without any loss.

Keywords: Hydrogen, Ammonia, Microwave, Cobalt

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A CASE STUDY FOR WASTE TO ENERGY CONVERSION: MCw PLASMA GASIFIER

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Abstract:

The critical importance of energy for the total economic infrastructure is apparent in reference to our daily life in integrity with transportation systems of goods and people, the site of manufacturers from enormous global industries to small-medium enterprises, and even for the policy-makers from independent social groups, local municipalities, governments to global organizations . The following inter-related-inter-influenced sub-cases are referred concepts :

-The transformation of existing linear economy to a circular one covering our life with the role of waste management and thereby

- Methodology for cleaner production

- Waste to energy conversion

In this respect ; operational characteristics of a research test system " MCw GASIFIER " as a case study for the disposal of a variety of solid wastes is the topic of the presentation. Microwave MCw plasma is generated by the commercial system of MUEGGE at a frequency of 2450 MHz under atmospheric conditions. The characteristics of the system hardware ; plasma gasification process and the treatment of gasification process via measurements are described. The performance treatment of plasma gasification and the operational range of MCw GASIFIER are given. The covered ranges of the major variables are input MCw plasma power range P; 3000 W ≤ P ≤ 6000 W rate of plasma environment gas Q g ; 50 l/min ≤ Q g ≤ 100 l/min.

Keywords: Microwave Plasma Gasification , Waste To Energy Conversion , Gasification Performance

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MICROWAVE PLASMA GASIFICATION PROCESS OF POLYETHYLENE

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Abstract:

A microwave plasma gasification process designed for the determination of energy conversion characteristics of polyethylene through a laboratory-sized test system called as MCw GASIFIER is the concern of the presentation. An open cycle blower type atmospheric test system with a fixed bed updraft reactor using air as the plasma environment gas is used. The utilized microwave plasma input power is between 3000 W to 6000 W with varying rates of air as 50 L/min, 75 L/min and 100 L/min for a fixed amount of polyethylene bed in the reactor.

The gasification process for each case (at different input power and rate of air) is determined by means of the instantaneous measurements of local temperatures along the reactor during the gasification (5 stations) gasification time from the start and end of process which is defined by means of the instantaneous syngas content analysis.

Proximate - ultimate analysis of polyethylene , chemical content - available energy content of the produced syngas and ash of the gasification are given to determine energy conversion characteristics of the process through thermodynamic analysis.

Keywords: Plasma Gasification , Syngas , Gasification Rate , Efficiency Of Process

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COMPARISON OF PERFORMANCE AND COMBUSTION CHARACTERISTICS OF METHYL ESTER AND ETHANOL USED IN A COMMON RAIL DIESEL ENGINE

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Abstract:

The use of oxygen fuels as alternative diesel fuels or in fossil fuels has always been on the agenda in reducing exhaust emissions from internal combustion engine vehicles. In fact, despite the fact that Rudolf Diesel originally used African origin ground oil as a diesel fuel, fossil-based fuels with higher energy content and higher energy content have become more widely used in diesel engines. Biodiesel is based on vegetable or animal fats is defined as the mono alkyl ester of the fatty acid chain. In this study, the effects of the engine power and torque performance of the Camellia biodiesel fuels by transesterification on fuel. Combustion characteristics of these fuels collationed to diesel fuel were identified at B20D80 and B20E15D65 ratios. With diesel fuel and all other fuel mixtures, the maximum engine power is achieved at 2500 rpm. At 2500 rpm, the engine power was reduced by the use of B20D80 fuel and by the use of B20E15D65 fuel compared to petrol diesel. This is due to the low heating value of the fuel. The maximum torque was found at 2000 rpm. At 2000 rpm, the engine torque was found at 181 Nm using petrol diesel fuel. The engine torque was found as 172 Nm with the B20D80 fuel and 161 Nm with the B20E15D65 fuel.

Keywords: Biodiesel, Engine Performance, Combustion Characteristics

[*]This study was supported by Scientific Research Foundation of Selcuk University and The Scientific and Technological Research C

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TREATMENT OF TEXTILE WASTEWATER USING ELECTROCOAGULATION PROCESS WITH FE ELECTRODE: TREATMENT PERFORMANCE, COST ANALYSIS AND SLUDGE CHARACTERIZATION

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Abstract:

The textile industry is considered as one of the largest water consuming industries. Huge amount of effluent is generated from different steps of wet processing operations that contains organic and inorganic pollutants such as salts, dyes, finishing agents, chlorine compounds, surfactants, starch, hydrogen peroxide and inhibitor compounds. Textile wastewaters are harmful for the environment if these hazardous pollutants discharged without efficient treatment. Various treatment methods including physical, chemical, biochemical, hybrid treatment methods are applied for textile wastewater treatment. In recent years, electrocoagulation (EC) process has received considerable attention for industrial effluent treatment due to its simple equipment, environmental compatibility, versatility and low levels of sludge. The coagulants were generated with electrodissolution of sacrificial anodes and hydrogen gas occurred at the cathode due to the application of direct current source in this process. In this study, treatment of real textile wastewater using EC process with Fe electrode was investigated. The effects of operating parameters such as pH, current density and operating time on the pollutant removal efficiency, electrode consumption, energy consumption, total operation cost and produced sludge amount were evaluated in the monopolar series electrode connection mode. The sludge sample that was obtained under the optimum operating conditions was characterized by ESEM-EDS (Scanning Electron Microscopy-Energy Dispersive System), FTIR (Fourier-Transform InfraredSspectroscopy), and size distribution analysis. Optimum operating conditions were determined as pH:8.5, current density:110 A/m2, and operating time 90 min for Fe electrode. 76% chemical oxygen demand (COD), 96-100% color, 51% sulphate and 99% total hardness removal efficiencies were achieved under the optimum operating conditions. As a conclusion, high color removal efficiency was achieved using EC process. However, EC process should be integrated with membrane processes to increase COD and sulphate removal efficiencies.

Keywords: Textile Wastewater, Electrocoagulation, Cost Analysis, Sludge Characterization

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TREATMENT AND REUSE OF GREY WATER USING MEMBRANE PROCESSES

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Abstract:

Grey water is defined as the urban wastewater including water from baths, showers, washing machines and dishwashers. Grey water constitutes 50-80% of the total household wastewater. Water scarcity is one of the biggest challenges to be faced in this century. Grey water can be reused after treatment for irrigation and for toilet reservoir water. Technologies applied for grey water treatments include physical, chemical and biological systems. In this study, use membrane processes for treatment and reuse of grey water of medium strength belonging to a public building located in Istanbul was investigated. In the first part of study, membrane selection using microfiltration (FM MV02 and FM MP005), ultrafiltration (FM UP020 and FM UP005) and nanofiltration (Desal 5DL, FM NP010 and FM NP030) for treatment of grey water was performed. Performances and fouling of membranes for the selection of membranes were evaluated. The membrane fouling was also clarified with the resistances-in-series model. The best permeate quality was obtained from Desal 5DL membrane. The lowest flux decline caused by fouling was occured for FM MP005 membrane (19.5%). Desal 5DL and FM MP005 were selected as suitable membranes. A RO membrane (BW 30) was used for improving the permeate quality of selected membranes. The flux decline was found as 44.3% and 19.8% for BW 30 membranes used after the Desal 5DL and FM MP005 membranes, respectively. The quality of permeate which obtained from used RO membranes after MF and NF membranes were found very close. The wastewater treated by hybrid membrane process (FM MP005+BW 30 and Desal 5DL+BW 30) was found suitable for using in toilet reservoir. In addition, Class A irrigation water was obtained in these hybrid processes according to national agricultural irrigation water standard. The chemical quality of treated wastewater was also classified as III. class irrigation water.

Keywords: Grey Water, Reuse, Membrane Processes

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ADSORPTION OF ORGANIC MATTER FROM CONFECTIONERY INDUSTRY WASTEWATER BY ACTIVATED CARBON: EQUILIBRIUM AND KINETIC STUDIES

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Abstract:

Confectionery industry that processes a large number of materials (chocolates, sugars, flours, almonds, etc.) produces high amounts of wastewater containing readily biodegradable organics. Due to high chemical oxygen (COD) concentrations (2840-19900 mg/L) usually a two-stage biological treatment (anaerobic + aerobic) is applied in this industry. Also, the use of anaerobic membrane bioreactor (AnMBR) systems are noteworthy. Activated carbons are used to control the fouling and improve the performance of the MBR systems. In this study, preliminary studies were carried out in order to control the fouling in an AnMBR system with the aim of effective activated carbon selection. Two different granular activated carbons were used in batch adsorption studies. Preliminary batch experiments were carried out in a thermostated orbital shaker at an agitation speed of 150 rpm, pH of 7 and temperature of 35˚C with 100 mL of wastewater. Firstly, optimum contact time and granular activated carbon dosage for the adsorption of confectionery wastewater (COD: 7650 mg/L) were determined. For the wood based granular activated carbon (FILTRACARB CC40 8X30), optimum contact time and dosage was found as 6 hours and 30 g/L, respectively. 8 hours contact time and 20 g/L dosage were determined as optimum conditions for coconut based activated carbon (FILTRACARB RT5 8X30). Adsorption capacities of coconut based granular activated carbon and wood based granular activated carbon at optimum conditions were calculated as 232.5 mg/g and 159.8 mg/g, respectively. COD removal efficiencies of granular activated carbons were too close (61 and 63%). Secondly, adsorption mechanism was investigated using isotherm (Langmuir and Freundlich), kinetic (Lagergren and pseudo second order), and thermodynamic models. Thermodynamic studies were carried out at 288 – 318 K. The higher regression coefficients R2 showed that the data fitted well with pseudo second order model among the kinetic models.

Keywords: Confectionery Wastewater, Activated Carbon, Kinetic, Isotherm

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LANDSCAPE DESIGN PROJECT OF THE SEYHAMAMI GEOSITE OF KIZILCAHAMAM-CAMLIDERE GEOPARK

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Abstract:

Increased sensitivity to the environment in recent years has allowed the development of new areas of activity and science. Natural places are important places for this purpose for today's people who want to spend their free time in a different and full with information, culture and entertainment. The geological heritage, which is evidence of the formation of sphere, attracts people with its interesting appearance, temporal richness and scientific and recreational reasons. It is important to visit these natural areas but it is possible to achieve a balance between the satisfaction of the visitors and protection. For this reason, landscape design projects undertake vehicle maintenance in order to achieve this balance. In this study, Seyhamami Geosite, a stop of the Kizilcahamam-Camlidere Geopark, which is important due to its geological and geomorphological aspects, has been examined. It is aimed to improve the usage and appearance of the physical place by making the landscape design of the area. Coreldraw, Auto Cad 2014, Photoshop CS5, Sketch Up and Lumion programs were used for drawing. The proposed projects were presented with three-dimensional visuals in the form of a landscape design project. It is believed that the project prepared for the applicable will contribute to the development of the area.

Keywords: Geopark, Geosite, Landscape Design, Seyhamami, Kizilcahamam-Camlidere.

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DETERMINATION OF THE MICROBIAL COMPOSITION OF 1-YEAR SHELF-LIFE LYOPHILIZED BACTERIA WITH DGGE METHOD

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Abstract:

Lyophilization has been used for long-term storage of bacteria. Cryoprotectants should be used to obtain high viability of the bacteria and provide the cryoprotection to the cells during the freezing process. In this lyophilization study, the bacterial consortium was used which are biodegraded p-toluic acid (p-Tol), 4-carboxybenzaldehyde (4-CBA) and terephthalic acid (TA). The effects of different cryoprotectants on the viability of bacterial consortium were investigated. Furthermore, the microbial composition of these products were determined by Denaturing Gradient Gel Electrophoresis (DGGE) method after 1 year.

The initial cell concentration before lyophilization was 6.2x108. Several protectants were tested to improve the survival of bacterial consortium after freeze-drying. After freeze drying, the samples were rehydrated Phosphate Buffer Solution (20 mL). After 15 min on the bench, the serial dilution technique was employed the determine the colony forming units on Plate Count Agar plate and added (1,25 mL) Nutrient Broth in (25 mL) Erlenmeyer flask. After the incubation time, DNA was extracted from samples taken from the Nutrient Broth. DNA samples were prepared by two-step PCR. For the nested PCR, the bacterial forward primer 11F and universal reverse primer 1492R were used for the first-step. 338F(GC clamp) and 805R primer were used in second-step. PCR products were separated by DGGE, which was conducted using the DCode™ Universal Mutation Detection System. The major DGGE bands were excised and purified to determine sequences. According to the results of colony counts of bacteria, the survival rates showed that skim milk + sodium glutamate could still reach 107 cfu/mL after 12 months. sequence analysis results of bands of DGGE were Raoultella planticola and Pseudomonas alkyophenolica dominated.

Keywords: Keywords: Dgge,Pcr, Pta, Wastewater, Lyophilization, Cryoprotectant

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QUANTIFICATION OF MICROORGANISM COMPOSITION OF BIOHYDROGEN PRODUCTION FROM THE DRY FERMENTATION SYSTEM BY REAL-TIME Q-PCR

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Abstract:

The composition of microorganisms is an effective and fundamental factor in the production of biohydrogen. Clostridium species are frequently encountered in the production of biohydrogen. Four specific real-time PCR primers of Clostridium butyricum, Clostridium pasteuranium, Clostridium tyrobutyricum and Clostridium 16S rRNA genes responsible for hydrogen production were synthesized and quantitative and qualitative results were determined by Real-time PCR. It has also been found that Clostridium species are responsible for the hydrogenase gene in the production of hydrogen. For this reason, the primers of the hydrogenase gene were also synthesized and evaluated quantitatively in Real-time PCR. In this study, where hydrogen production is carried out from fruits and vegetables wastes; the effect of particle size has been investigated. Samples were taken from the dry fermentor reactor system depending on the varying amounts of biohydrogen produced in three different parameters (autoclaved - small particles, non-autoclaved - small particles and autoclaved - large particles). In these samples taken from the dry fermentor reactor system, the number of Clostridium species present was discussed by evaluating the particle sizes. In order to provide quantitative results in real-time Q-PCR applications; cloning of species which are dominant in hydrogen production and hydrogenase gene have been performed. Maximum hydrogen production is obtained by autoclaving - in the case of small particles; 44%. C. pasteuranium was not found in this sample. The gene for the hydrogenase enzyme responsible for the production of hydrogen is 106 copies of the gene. In addition, C. butyricum and C. tyrobuyricum counts were 105 gene copies / mL.

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Keywords: Quantitative Real-Time PCR, Biohydrogen Production, Dry Fermentation, Clostridium Sp., Microbial Community Structure

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A STUDY ON THE DETERMINATION OF THE EFFECTS OF CARBON STRUCTURES OF FAME FUELS ON FUEL PROPERTIES

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Abstract:

The world-wide development of biofuels today is a challenging and complex endeavor that gives rise to a number of questions that originate from the multitude of stakeholders and complex trade-offs that the production, distribution, and utilization of biofuels involves. The current interest in biofuels development stems from a major global reevaluation of traditional energy sources. Biodiesel is a clean-burning, high octane renewable fuel derived from long chain fatty acids found in plant oils and animal fats. Potential feedstocks include safflower, rapeseed, canola, jatropha, and palm oil. Biodiesel is used to substitute for diesel. It focuses on ethanol, the most commonly used biofuel to substitute for gasoline, and biodiesel, a substitute for diesel.

In the present study, two different types of safflower (Dincer and Remzibey-05), palm, mustard, cottonseed and rapeseed ME produced through transesterification were selected as the research material. FAME fuels produced by the transesterification method, the measured density, kinematic viscosity, heating value and cetane number, determined by gas chromatography

according to the chemical structure and the carbon bonds, these equations are calculated, and the availability of statistical reexamined with empirical equations. Safflower measured fuel density, kinematic viscosity, HHV and CN 880 kg/m3, respectively, 3.98 mm2 / s, 40 MJ / kg, 49.3, 885.31 kg/m3, while the calculated values, 4.00 mm2 / s, 38.86 MJ / kg and found to 49.339.

Keywords: Biodiesel, Cetane Number, Density, Fuel Properties, Kinematic Viscosity, Hhv

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MODELING OF NEAR FIELD DILUTION OF WASTEWATER DISCHARGES IN OLUDENIZ

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Abstract:

The main cause of wastewater discharges is the use of sea outfalls with the increasing industrialization and urbanization, which are chosen through the assimilation capacity of seas as an economical alternative to refinery systems. Uncontrolled discharges into the ambient sea water have an adverse effect on the ecosystem and incorrect selection of the location of the sea outfall causes that the wastewater comes back to the coastal zone and deposit in the ecosystem.In this study, the near field dilution of wastewater discharges was modeled and the behaviors of pollutant clouds were analyzed using VISUAL PLUMES, CORMIX, HYDROTAM 3D for Oludeniz. Following effects of different parameters (total effluent discharge, velocity and direction of current) on the near field dilution of wastewater discharges were examined with different scenarios in summer and winter conditions. Wind climate, wave climate and current pattern of Oludeniz were determined by HYDROTAM-3D and were used as input for near field dilution calculation.

Keywords: Wastewater Discharges, Near Field Dilution, Visual Plumes, Cormix, Hydrotam 3d, Oludeni

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PRODUCTION OF FUNCTIONAL CATECHIN EXTRACTS FROM WASTE GREEN TEA

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Abstract:

Tea is obtained by processing the top buds and leaves of the plant called Camellia sinensis. Tea is consumed mostly in western countries including our country, Turkey. The tea contains more than 4000 chemicals. It is believed that polyphenols such as theaflavins, thearubigins, and especially catechins are responsible for antioxidant effects. Studies have shown that tea has various pharmacological effects such as antioxidative, antiinflammatory, antimutagenic, anticarcinogenic, antidiabetic, antibacterial and antiviral. Recently, intensive researches have been carried out on the use of phenolic substances extracted from plants to increase the shelf life of foods and gain functional properties. In particular, the use of catechin extracts made of tea has become widespread. Most of these products are imported to our country at high cost from abroad. Since only fresh leaves on top of the tea plant are used in the production of teas that are offered for consumption, other parts of the plant can not be evaluated. The evaluation of these wastes in the production of catechin extract constitutes an important potential both in preventing environmental pollution and contributing to the economy of the country. Solvent extraction is generally used when phenolic materials are isolated from plants and wastes. Organic solvents have disadvantages such as threatening human health, damage to the environment and high cost. Now, it is possible to use porous materials with large surface area in purification processes. The production of catechin extract from tea wastes using an inexpensive and reusable selective column column chromatography results in an attractive production method. The production of catechins with valuable functional properties in a healthy, environmentally and economically way is likely to provide consumers with low cost of this product and contribute to the country's economy. In this study, production of catechin extract from green tea wastes was investigated using macroporous resins.

Keywords: Green tea, tea wastes, catechin, antioxidant, column chromatography, resin

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