

The Performance of Anaerobic Baffled Reactor on Treatment of Ketchup Wastewater : The Effect of Activated Sludge Height

Indro Sumantri, B. Budiyo and P. Purwanto

Diponegoro University, Department of Chemical Engineering, Faculty of Engineering, Jalan Prof. H. Soedarto, SH, Kampus Baru, Tembalang, Semarang-50275, Indonesia

The ketchup home industries generate unique wastewater and discharge it to the water body without prior treatments. This situation is mainly caused by the lack of working capital, land area, environmental awareness and skills. The objective of this research is to investigate the effect of the height of the activated sludge on the performance of anaerobic baffled reactor (ABR) and to contribute knowledge on efficient and applicable wastewater treatment to the home. The synthetic wastewater used in this research was the imitation of ketchup wastewater of Superindo brand. The anaerobic baffled reactor has 3-pairs down and up-flow sections with total volume of 60 L. Active sludge of 30, 40 and 50% of the height of the anaerobic baffled reactor were employed in this research. The best result was obtained when activated sludge of 50% height was used in the anaerobic baffled reactor system with chemical oxygen demand (COD) removal was higher than 80%, stable of pH and least suspended solid for three days treatment.

KEYWORD

Activated sludge height, Anaerobic baffled reactor (ABR), Down-upflow, Ketchup, Synthetic wastewater.

AUTHOR

1*. Indro Sumantri, Graduate Student, Department of Chemical Engineering, Faculty of Engineering, Diponegoro University, Jalan Prof. H. Soedarto, SH, Kampus Baru, Tembalang, Semarang-50275, Indonesia.

2. Dr. B. Budiyo, Professor, Department of Chemical Engineering, Faculty of Engineering, Diponegoro University, Jalan Prof. H. Soedarto, SH, Kampus Baru, Tembalang, Semarang-50275, Indonesia.

3. Dr. P. Purwanto, Professor, Department of Chemical Engineering, Faculty of Engineering, Diponegoro University, Jalan Prof. H. Soedarto, SH, Kampus Baru, Tembalang, Semarang-50275, Indonesia.

A Study on Water Quality of Fish Ponds and Contamination of Surrounding Water Resources - A Case Study

M.V.S. Raju

V. R. Siddhartha Engineering College; Department of Civil Engineering, Vijayawada-520 007

In order to provide optimal growth of fishes and prawn with high stocking density in the small area, various artificial inputs in the form of feed, fertilizers and drugs are essential. These are added regularly in aqua ponds as food, to kill predators and control of diseases. The organic load in terms of unutilized feed due to excessive feeding, faecal matter released by fish or prawn, dead algae, etc., which are rich in proteins and carbohydrates settle at the bottom of the pond and contribute to the pollution. During harvesting of the crop, the ponds contaminated water is emptied either into the canal or surrounding water bodies of good quality of water. These activities instigate the pollution in ponds and increase total dissolved solids (TDS), total suspended solids (TSS), chemical oxygen demand (COD) and biochemical oxygen demand (BOD) in aquaculture water in-turn surrounding surface and groundwater. Local people are struggling a lot for drinking water, in spite of plenty of water is available in coastal regions. Keeping the above points in view, an attempt has been made to study the level of contamination in fish and drinking water ponds at Nandivada Mandal, Krishna district, Andhra Pradesh and to warn the local Government and people against intensive aquaculture. During the study period (2016), 17 samples were collected from seven villages of Nandivada Mandal and analyzed for various parameters, such as dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), total suspended solids (TSS), turbidity, pH value, total alkalinity, total acidity, total hardness and chlorides. The analyzed data has been used to find water quality index (WQI). The water quality index calculated in this work is composed of eight measurable parameters. High concentrations of biochemical oxygen demand, chemical oxygen demand and total suspended solids were recorded both at fish and drinking water ponds. The water quality index at all locations were much more than 100. It is evident from the present investigation that the degradation of water quality in this watershed is due to aquaculture activity.

KEYWORD

Water quality index, Sub-index, Quality rating, Relative weight, Standard limit, Contamination.

AUTHOR

1.* Dr. M.V.S. Raju, Professor, Department of Civil Engineering, V.R. Siddhartha Engineering College, Vijayawada - 520 007.

Pyrolysis Temperature Effects on Yield, Physico-chemical Characteristics of Pine-Bark Biochars and Cadmium Sorption

Koetlisi A Koetlisi and Pardon Muchaonyerwa

University of KwaZulu-Natal, Soil Science Discipline, School of Agricultural, Earth and Environmental Sciences, Private Bag X01, Scottsville 3209, South Africa

Globally, tonnes of bark wastes are disposed off by timber production industries annually. Pyrolysis of the bark could be viable waste management option where the biochar could be used as sorbents of pollutants in wastewater and in agricultural applications, depending on their properties that are known to depend on carbonization processes. The objective of this study was to determine the effect of pyrolysis temperature on yield and physico-chemical characteristics and cadmium sorption of biochars carbonized from pine-bark. The biochars were produced by slow pyrolysis at 350°C, 550°C and 650°C and were analysed for yield, ash content, fixed carbon, total carbon, nitrogen, and hydrogen content and surface characteristics. Sorption of cadmium was studied using a laboratory batch experiment with the three biochars with solutions of increasing cadmium concentrations. The adsorption data were fitted in best fitting Langmuir isotherms. Biochar from pine-bark showed a more porous structure when pyrolysis temperature was increased. Sorption capacities increased with pyrolysis temperature. The findings imply that pine bark biochar could be a low-cost adsorbent for cadmium from wastewater and the effectiveness could be increased by higher pyrolysis temperatures and furthermore, cadmium sorption efficacy of pine-bark may be improved by incorporation of human faecal waste derived biochars.

KEYWORD

Biochar, Cadmium sorption, Human faecal, Pine-bark, Pyrolysis temperature.

AUTHOR

1*. Koetlisi, A. Koetlisi, Soil Science Discipline, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3209, South Africa.

2. Prof. Pardon Muchaonyerwa, Academic Leader-Environmental Sciences Cluster, Rabie Saunders Building, Room G07, School of Agricultural, Earth and Environmental Sciences, University of KwaZulu-Natal, Private Bag X01, Scottsville 3209, South Africa.

Removal of Organic Pollutants From Coffee Wastewater : A Mini-Review

Sujatha Gurudev and S. Shanthakumar

Vellore Institute of Technology (VIT), Department of Environmental and Water Resources Engineering, School of Civil and Chemical Engineering, Vellore-632 014

The coffee industry utilizes large quantities of water during the various stages of the production process. Consequently, the amount of wastewater generated is high that contains high concentrations of organic matter, nutrients, suspended matter and highly acidic. The effluent discharged unwisely into nearby natural water bodies which flow into rivers and/or infiltrate into groundwater become the main threat to the quality of surface and groundwater. Hence there is a need to curb this problem through innovative and eco-friendly techniques. Understanding the coffee processing and nature of the coffee processing wastewater is fundamental for the design and operation of appropriate and effective treatment technologies. This review present the various treatment techniques adopted and also various research conducted on the removal of organic pollutants from coffee processing wastewater (CPWW). In addition, the scope for biogas production from the wastewater treatment is highlighted.

KEYWORD

Coffee processing wastewater (CPWW), Organic pollutants, Treatment technologies.

AUTHOR

1. Ms. Sujatha Gurudev, Post Graduate Student, Department of Environmental and Water Resources Engineering, School of Civil and Chemical Engineering, Vellore Institute of Technology (VIT), Vellore-623 014.

2*. Dr. S. Shanthakumar, Professor, Department of Environmental and Water Resources Engineering, School of Civil and Chemical Engineering, Vellore Institute of Technology (VIT), Vellore-623 014.

Removal of Heavy Metals From Synthetic Wastewater Using Turmeric Leaves and Stems as Adsorbents

S.M. Karthik Anand¹, Sri Uma¹, K.C. Sunanda¹ and R. Sivaprasad²

1. *CS Academy, Coimbatore*

2. *PSG College of Arts and Science, Department of Biochemistry, Coimbatore-641 014*

The present study evaluates the removal of heavy metals, like lead, cadmium and mercury with varying concentrations of turmeric leaves and stem as adsorbent from the synthetic waste-water. Synthetic wastewater was prepared using lead acetate, cadmium chloride and mercuric chloride at a concentration of 10 mg/L (10 ppm) separately in double distilled water. Varying concentrations of turmeric leaves and stem (50, 75 and 100 mg/L of wastewater) was effective in removing heavy metals, like lead, cadmium and mercury ranging from 35-82% as evidenced from the analysis of treated water by atomic absorption spectrophotometer. The results point out the efficacy of the turmeric leaves and stems as good candidates thereby opening up new vistas in the treatment of wastewater using adsorbents.

KEYWORD

Heavy metals, Wastewater, Adsorbents, Turmeric leaves.

AUTHOR

1. S.M. Karthik Anand, Student, CS Academy, V.L.B. College Road, Kovaipudur, Coimbatore.
2. Mrs. Sri Uma , Mentor and Guide, CS Academy, V.L.B. College Road, Kovaipudur, Coimbatore.
3. Dr.K.C. Sunanda, Principal, CS Academy, V.L.B. College Road, Kovaipudur, Coimbatore.
- 4*. Dr. R. Sivaprasad, Assistant Professor, Department of Biochemistry, PSG College of Arts and Science, Coimbatore - 641 014.

Controlling Boiler Tube Failures in Thermal Power Plants Towards Enhanced Energy Efficiency

Ashok G. Matani

Government College of Engineering, Department of Mechanical Engineering, Amravati-444 604

According to National Thermal Power Corporation (NTPC) reports, in the NTPC Unchahar Power Plant in Raebareli district started generating power in 1988 with five units of 210 Mw each, an extremely high-pressure explosion occurred because of ash within the boiler furnace caused it to leak, producing a disaster. The blast was reportedly triggered in the duct connected to the boiler which is used for transferring ash of burnt coal. It is believed that the ash pipe got choked, leading to the blast. The boiler pipe burst in the 500 Mw power generating unit that started operating in March at the plant in Unchahar, which is nearly 30 years old. A massive fire broke out and a huge ball of dust rose after the explosion, making rescue difficult. According to NTPC reports, there was sudden abnormal sound at 20 m elevation and there was an opening from which hot flue gases and steam escaped affecting the people working around the area. This paper highlights the importance of boiler tube leakage on the performance of the thermal power plant. This paper also suggests various controlling mechanisms towards enhancing energy efficiency in thermal power plants.

KEYWORD

Stress rupture, Fireside corrosion, Corrosion fatigue failures, Soot blower erosion, Material defect and weld defects.

AUTHOR

1*. Dr. Ashok G. Matani, Associate Professor, Department of Mechanical Engineering, Government College of Engineering, Amravati - 444 604.

Effectiveness of an Automatic Centralized Remote Observing System (ACROS) for Accuracy Forestry

Kalyan Sagar Kadali¹ and L. Rajaji²

1. AMET University, Department of Electrical and Electronics Engineering, Chennai – 603 112

2. ARM College of Engineering, Department of Electrical and Electronics Engineering, Chennai

Forest environments have constantly received overall consideration because of their natural differences and significant parts in the worldwide climatic adjust. The fundamental point of this exploration is to use and to assess a mechanized question-based change recognition strategy for identifying changes in the environment. The procedure of this examination comprises of an instructional outline used to buildup this model and framework design to disclose obviously to the peruser about the directed research. The proposed strategy comprises of independent boxes, with the case contained multi-sensors, like moistness and temperature and hydrogen gas sensors. We looked at the information picked up from the upper piece of the woodland and the lower some portion of the backwoods to check whether there are any events including the lower part on the grounds that from the review and it is expressed that there are illicit logging exercises at the lower some portion of the forest. A model in light of Technology Acceptance Model has been created to be specific First Order Structural Deforestation Modeling for the Effect of Environmental Data to see the connection between's factors at upper and lower parts. This outcome will profit the significant expert in ensuring backwoods biological system.

KEYWORD

Hydrogen gas sensors, Moistness and temperature sensor.

AUTHOR

1*. Kalyan Sagar Kadali, Research Scholar, Department of Electrical and Electronics Engineering, AMET University, Chennai - 603 112.

2. L. Rajaji, Professor, Department of Electrical and Electronics Engineering, ARM College of Engineering and Technology, Chennai.

Characterization and Effective Utilization of Coal Ash With Geosynthetics in Pavement Subgrade

C. Rajakumar¹, S.P. Jeyapriya² and T. Meenambal²

1. Karpagam University, Department of Civil Engineering, Coimbatore-641 021

2. Government College of Technology, Department of Civil Engineering, Coimbatore-641 013

Pavements on black cotton soils fail during adverse weather conditions due to swelling and shrinkage characteristics of such soils. Stabilization of black cotton soils, therefore, becomes mandatory. Geosynthetics are soil stabilization materials used to improve soil conditions in various applications. Coal ash is available at low cost and it is utilized for the stabilization of black cotton soils. The present study aims to utilize coal ash effectively in pavement subgrade. In phase I of the research, index and engineering properties of virgin soil is studied and the soil is classified under CH (clay of high compressibility) category. Coal ash is added to the soil by 10%, 20%, 30%, 40%, 50% replacements to the weight of soil. The shear strength of virgin soil is 90.60 kN/m² at an optimum moisture content of 21% and maximum dry density of 1.6807g/cc. The California bearing ratio (CBR) values of the virgin soil under unsoaked and soaked conditions are 5.33% and 2.84%, respectively. This study shows that the shear strength, optimum moisture content, maximum dry density is maximum at an optimum of 10% addition of coal ash to the soil. Atterbergs limits and plasticity index decreases with the addition of coal ash.

KEYWORD

Black cotton soil, Geosynthetics, Waste coal ash, Optimum moisture content, Maximum dry density, Unconfined compressive strength, California bearing ratio (CBR).

AUTHOR

1. C. Rajakumar, Assistant Professor, Department of Civil Engineering, Karpagam University, Coimbatore - 641 021.

2. Dr. S.P. Jeyapriya, Associate Professor, Department of Civil Engineering, Government College of Technology, Coimbatore - 641 013.

3*. Dr. T. Meenambal, Professor, Department of Civil Engineering, Government College of Technology, Coimbatore - 641 013.

A Study on Environmental Awareness Among the People of Dakshin Dimoria Village in Dimoria Block of Assam

Chandra Sharma¹ and Babu Das²

1. Indian Council of Forestry Research and Education (ICFRE), Environment Management Division, Dehradun - 248 006

2. Nexa Showroom, Guwahati

Environmental education is emerging across the globe as a tool for sustainable development. The study was undertaken to know about the environmental awareness among the people of Dakshin Dimoria village in Dhopguri Gaon Panchayat under Dimoria Development Block of Assam. In order to conduct this research, a questionnaire survey was carried out and the interview was undertaken among 33 respondents based on random sampling method in the village. The questionnaire on environmental awareness consisted of 37 questions that covered general environmental problems, pollution, waste, water, energy, global warming, pesticides, health and sanitation, etc. The target population consisted middle-class people with different backgrounds including gender and age groups. The study revealed a significant difference between genders on environmental awareness. The environmental awareness of the people in this study showed that the increase of age and educational level regardless of gender have shown significant differences.

KEYWORD

Environmental education, Environmental awareness, Gender, Dakshin Dimoria.

AUTHOR

1*. Chandra Sharma, Research Officer, Environment Management Division, Directorate of Extension, Indian Council of Forestry Research and Education (ICFRE), Dehradun-248 006.

2. Babu Das, Data Entry Officer, Nexa Showroom, Guwahati.

Efficiency of Sweet Lemon (*Citrus limetta*) Biochar Adsorbent for Removal of Chromium From Tannery Effluent

Poonam and Narendra Kumar

Babasaheb Bhimrao Ambedkar University, Department of Environmental Science, Lucknow- 226 025

The present study investigated the efficiency of biochar prepared from peels of sweet lemon (*C. limetta*) for removing chromium (Cr) from tannery effluent by the process of adsorption. The adsorbent was used in the form of biochar and was characterized by SEM-EDXA and FTIR studies. The study was carried out in batch experiments to investigate the effect of different dosage of adsorbents at different time intervals at constant pH and temperature. The saturation point was found to be 0.5 gm/100 mL of tannery wastewater at 200 min of contact time with maximum removal efficiency of about 98%. The presence of different functional groups and morphological change on biochar enabled the efficient removal of chromium. Further, the adsorption of chromium onto the surface of biochar of the peels of sweet lemon favoured Langmuir adsorption isotherm in comparison to Freundlich adsorption isotherm, which demonstrates that the adsorption process has been monolayer and homogenous.

KEYWORD

Adsorption, Sweet lemon, Chromium, Langmuir adsorption isotherm, Tannery effluent.

AUTHOR

1*. Poonam, Research Scholar, Department of Environmental Science, Babasaheb Bhimrao Ambedkar University, Lucknow - 226 025.

2. Narendra Kumar, Assistant Professor, Department of Environmental Science, Babasaheb Bhimrao Ambedkar University, Lucknow - 226 025.

Toxic Effects of Triazophos Pesticide on Male and Female Field Workers in Guntur District, Andhra Pradesh

K. Suneetha and Mohammed Mustafa Abdulkadhm

Acharya Nagarjuna University, Department of Biochemistry, Guntur - 522 510

India being an agricultural land, pesticides consumption causes a serious environmental and public health problem. Due to the steep competition and a large demand, many farmers are resorting to extensive and rather overuse of organophosphate pesticides to increase their agricultural yields. The workers who are involved in the spraying activity and mixing of pesticides in fields get the direct exposure to pesticides due to unsafe and non-preventive work practices. They do not use the safety masks, gloves and other protective gears during the spraying of pesticides which results into the access of pesticides in the blood stream through inhalation and dermal exposure which can adversely affect their eyes, skin and the respiratory system. Triazophos is a broad spectrum systemic insecticide and acaricide belongs to class organophosphorous pesticides. It is widely used in cotton, chillies and rice crops. The current study documented the serious consequences of pesticide use for the health of farmers, particularly men and women field helpers. Male workers who are involved in spraying pesticides and female tasks, such as mixing concentrated chemicals and refilling spraying tanks were as hazardous as direct pesticide application.

KEYWORD

Pesticides, Triazophos, Field workers.

AUTHOR

1*. Dr. K. Suneetha, Guest Faculty, Department of Biochemistry, Acharya Nagarjuna University, Guntur - 522 510.

2. Mohammed Mustafa Abdulkadhm, Research Scholar, Department of Biochemistry, Acharya Nagarjuna University, Guntur - 522 510.