Adsorption Of Methylene Blue Dye From Aqueous Solution Using Hyperbranched Polyester: Isotherm And Thermodynamic Studies

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In the present study, hyperbranched polyester (HBP), a biodegradable material having a large number of terminal OH groups was used as an adsorbent to study the removal efficiency of Methylene Blue (MB) dye from synthetic aqueous solution. The adsorption process was carried out as a function of varying parameters, such as agitation time (20-180 min), adsorbent dosage (0.05-0.6 g of adsorbent/50 mL dye solution), initial dye concentration (6-50 mg/L), pH (2-12) and solution temperature (303.15-323.15 K). Maximum dye adsorption was observed under 150 min of agitation time, 0.25 g of adsorbent/50 mL dye solution, 6 mg/L of dye solution and at pH 4 for 99% removal of dye, whereas a removal efficiency of 90% was achieved at 30°C solution temperature. Adsorption isotherms were investigated and found that the data fitted well for Freundlich adsorption isotherm. Thermodynamic data reveal that the adsorption process is feasible and spontaneous as indicated from the negative value of $\Delta G^\circ$.

KEYWORDS
Hyperbranched polyester, Methylene Blue dye, Adsorption capacity, Adsorption isotherm, Thermodynamics

REFERENCES


Study Of Water Quality Of River Salandi At Bhadrak, Odisha By Using National Sanitation Foundation Water Quality Index (NSF-WQI) Method

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The river Salandi after its point of origination from Meghasana hill of Similipal reserve forest passes through the mining area, industrial area, urban area, agricultural area and finally merges with the river Baitarani at Tinitaraf ghat before the confluence with the Bay of Bengal at Dhamra. The river during its course of travelling from Similipal to Tinitaraf ghat receives different types of contaminants from different places. In this work, water samples collected from nine different places during summer, rainy, post-rainy and winter seasons in the year 2015 and 2016 have been analyzed to study the physico-chemical as well as bacteriological parameters. The mean and standard deviations (SD) and water quality index (WQI) by using the National Sanitation Foundation (NSF) method have been calculated for the year 2015 and 2016 independently. The study reveals that both the years exhibit bad water quality and belongs to class D. The physico-chemical parameter analysis concludes that the river as a whole is contaminated physically, chemically and bacteriologically with respect to Cr (VI), iron, chloride and bacteria.

KEYWORDS
River water pollution, NSF-WQI, Hexavalent chromium

REFERENCES
Novel Approach For Traffic Directing In Urban Areas Using Ant Colony Optimization Technique To Diminish The Effect Of Air Pollution On The Human Body

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In this paper, the layered architecture to analyze and suggestive route planning based on the critical parameter air pollution is proposed. Various ways have been proposed for minimizing the criticality of air pollution and its impact on health. Usually while selecting a route from one place to another place, one choose the shortest path or the path which is having lesser traffic density but for the person who suffers from diseases like aggravated cardiovascular, respiratory illness, accelerated aging of the lungs, asthma, bronchitis, emphysema, it is more important to know the level of pollution throughout the route which one wants to use while traveling especially for the riders on two-wheeler. Moreover, this awareness about the recent level of pollution will help them to take precautionary actions. The proposed architecture is based on the modified version of the ant colony optimization technique. The novel part of the proposed architecture is to use the dynamic approach to calculate the probability depending on the different parameters like air pollution, traffic density and distance before arriving at each junction of the route on which leads towards the selection of an optimal path. Furthermore, the inclusion of other parameters can experiment in future work.

KEYWORDS
Vehicular ad-hoc network, Ant colony optimization, Air pollution, Health impact, Sensor

REFERENCES


Seasonal And Morphological Analysis Of Airborne PM$_{10}$ And PM$_{2.5}$ In Srinagar Garhwal (Himalaya Region)

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To understand the morphology and chemical constituent of ambient air in Srinagar, Garhwal valley, an experiment was carried out in the Department of Physics, Chauras campus, Hemvati Nandan Bahuguna Garhwal Garhwal University. The particulate matter (PMs) were collected by using fine particulate dust sampler (APM 550 and APM 460 NL, Envirotech, New Delhi) and analysed by using SEM and EDAX technique (CARL ZEISS, MA15/EVO18). The average mass concentration of PM$_{10}$ is recorded as 107.4±16.3 µg/m$^3$, whereas the average mass concentration of PM$_{2.5}$ is recorded as 88.48±14.74 µg/m$^3$ which are much higher than the standard value prescribed by WHO and NAAQS. The reason behind such a huge concentration is identified as massive construction of building, stone crusher factory and exponential growth in vehicles, forest fire and other anthropogenic activities in the surrounding area. The SEM analysis suggest that silicon (Si), oxygen (O), sodium (Na), aluminium (Al) are dominantly present in form of silica (SiO$_2$), aluminosilicate (Si-Al rich), sea spray, mineral dust and gold (Au), zinc (Zn) and barium (Ba) may be present due to natural ores in surrounding hills in all seasons. But in the case of the post-monsoon season, nearly 25% of PM$_{2.5}$ consists of carbon particles, which is more likely to be coming from soot particle emission from biomass burning.

KEYWORDS

SEM, EDAX, Forest fire, Anthropogenic activities, Particulate matter (PM$_{2.5}$ and PM$_{10}$)

REFERENCES

Polymer Coated Magnetic Banana Peel Cellulose Nanocomposites For Oil Removal

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Oil spills, particularly of the sea and navigable waters, have serious impacts on the environment. Current oil spill remediation techniques are inefficient and may have deleterious environmental consequences. However, nanotechnology offers a new direction to oil spill removal. In this study, a cheap facile method was developed to synthesize maleic anhydride grafted polypropylene anchored magnetic banana peel cellulose nanocomposites (MAPP-a-MBPCNFs/PP) to separate heavy crude oil from oil-water mixture. Carboxylated cellulose nanofibers (CCNFs) were synthesized from banana peel. The MAPP-a-MBPCNFs/PP nanocomposite was characterized with FTIR, TGA and SEM. Oil absorption capacity studies showed 100% removal of heavy crude oil from the oil-water mixture under optimum condition. Results show that MAPP-a-MBPCNFs/PP nanocomposites can be utilized to remove oil over a short time with high removal efficiency under environmentally relevant conditions.

KEYWORDS

MAPP-a-MBPCNFs/PP nanocomposites, FTIR, TGA, SEM, Oil absorption capacity

REFERENCES

An Overview Of Marine Pollution: Impact And Remedies

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Our oceans are polluted with various deleterious materials due to air, water and land contamination. These pollutants can make the oceans a garbage dump thus removing the life in seas and ultimately harming the existence of man on the earth. Several technologies are slowly being adopted for cleanup but the efforts are low compared to the rise in pollution. Concerted efforts are required to curtail the damage already caused. This paper discusses the major causes, impacts and efforts for combating marine pollution at national and international levels.

KEYWORDS
Marine pollution, Oil spill, Plastic pollution, India, Clean-up technologies

REFERENCES
Design Of Intelligent Controller For Hybrid Renewable Power Generation For Sustained Environment

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The great demand for clean, renewable and sustainable energy resources has been created by the rapid growth of energy consumption, fossil fuel restriction, global warming and all the damages to the ecosystem and environment. Amongst all renewable energy sources, wind energy has the capability to deliver electric power with low or zero-emission of toxin gases. This paper delivers the concept of hybrid renewable power system generation which is a valuable solution to organize our energy demands and to reduce the emission of greenhouse gases. To promote the power quality of the wind energy system a Wind-EB (electricity board) source-diesel engine based hybrid power system is proposed in this paper. A dynamic electric power control strategy has been introduced since the wind system alone is not proficient to convene the energy demand. Based on the availability of wind energy, wind turbines contribute a maximum of power in order to decrease fuel consumption and the emissions caused by diesel generators. The performance and the analysis were achieved through modelling a proposed hybrid system with the help of the Simulink library in the Matlab platform which is simulation software.

KEYWORDS
Hybrid, Renewable, Wind energy, Diesel engine, EB source, Zero emission, Energy demand, Control strategy, Modelling, Performance

REFERENCES
Evaluating Environmental Threads And Possible Remedies Of Buriganga River, Bangladesh: A Contextual Study

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Bangladesh is a land of rivers. The Buriganga river is located in the southern part of the north-central region of Bangladesh which is getting highly contaminated for many years. Around 7000 industries and municipal waste make the river contaminated continuously. The physico-chemical parameters, like pH, DO, BOD, TDS, EC, temperature and transparency indicate that the quality of the Buriganga river water is very low. High quantity of metal concentration, like Pb, Cr, Cu, Zn and Ni are found in this water which proves that water of the Buriganga is highly polluted. The deteriorating health of the river is now manifested in the health of the Dhaka city itself. The paper is an attempt to briefly identify the main causes of water pollution, assessment of the impact of pollution and finally discuss some remedies to improve the water quality of the Buriganga.

KEYWORDS
Pollution, Industrial waste, River dredging, Public awareness

REFERENCES


Photodegradation Of Acid Red 88 And Direct Green 6 Dyes Using Prepared Nickel Oxide Nanoparticles

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The photodegradation of coloured aqueous medium of two targeted synthetic textile dyes is tested by using efficient photocatalyst, prepared by simple, fast and cost-effective solution combustion method using glycine as a fuel. The prepared nickel oxide nanoparticles were characterized by XRD, SEM, FTIR and UV absorption spectroscopy. The optical band gap was found to be 3.03 eV and the average size was found to be 26 nm. The experimental results showed that the synthesized nickel oxide has the efficient ability to degrade Acid Red 88 (95.10%) and Direct Green 6 (96.23%) dyes. The nanoparticle has the advantage of easy and clean removal of dyes from the polluted water medium.

KEYWORDS
Acid Red 88, Direct Green 6, Photocatalyst, Nanoparticles, Photodegradation

REFERENCES


Assessment Of Deterioration Of Jaipur’s Monument

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Jaipur shows the rich culture and history. It has numerous cultural heritages which has significant value. Cultural heritage has a valuable approach to history, culture and many other aspects. While studying cultural heritage or monuments, which are made up of different types of stone materials, we identify the deterioration also. This can be caused by physical, chemical and biological means. Here we focus on microbial aspects of biological cultural deterioration. Before studying deterioration, we did an assessment of the surface of monuments with the visual inspection method for better understanding. This method is very simple and non-destructive one. With the help of this method, we can identify the pattern of stone loss, basic deterioration mechanism and basic characteristics of the surface area of selected sites which will help for restoration and protection. These properties give an indication of the bio-receptivity of the surface.

KEYWORDS

Bioreceptivity, Cultural heritage, Deterioration, Jaipur

REFERENCES

Estimations Of Air Pollutants With Respect To Meteorological Parameters

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The present study was carried out in Gwalior in order to know the level of gaseous pollutants (SO\textsubscript{2} and NO\textsubscript{2}) and particulate matter (SPM and RSPM). In this study, gaseous pollutants SO\textsubscript{2}, NO\textsubscript{2} and particulate matter (SPM and RSPM) was collected during different seasons (2014-17) and estimation was done by chemical method. The method used for the determination of SO\textsubscript{2} and NO\textsubscript{2} in the ambient air of Gwalior was modified West and Geake method and modified Jacob and Hochheisier method. For the determination and investigation of SPM and RSPM in the ambient air Envirotech fine particulate matter sampler (APM-550) was used. GF/A Whatman’s filter paper no. 1 was used to collect suspended particulate matter and respirable suspended particulate matter. Meteorological parameters, like temperature, relative humidity and rainfall data were also recorded during the sampling period. The statistical analysis was carried out between the level of gaseous pollutants (SO\textsubscript{2} and NO\textsubscript{2}) and particulate matter (SPM and RSPM) alongwith meteorological parameters measured during the sampling. The average concentration of pollutants showed distinct seasonal variations with high winter and summer value in the study area than the post-monsoon value. This post-monsoon fall down of air pollutants may be attributed to the monsoonal washout effect of particles, whereas during winter low mixing heights leads to an accumulation of pollutants for long time. The accumulation of such a high level of pollutants in winter may also be attributed to the emission from the vehicles, local rice mills, suspension of dusts from the paved and unpaved road, etc. The main objective of this study was to know the level pollutants of alongwith meteorological parameters in Gwalior.

KEYWORDS

Air pollutants, Air quality, Meteorological parameters, Gwalior, India

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Physico-Chemical Characterization, Mapping And Quality Assessment Of The Berrechid Groundwater, Morocco

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This work is part of the study of the quality assessment and mapping of the Berrechid groundwater. Physico-chemical analyzes of seven wells are carried out. Samples of seven wells were taken in January and April 2018. The results obtained showed that the majority of the analyzed samples have conductivity values which exceed the norms whereas potassium, magnesium, calcium and chlorides meet the standards defined by the World Health Organization (WHO). While the recorded values of sodium, sulphates and especially the nitrates remain high in some wells and go well beyond the Moroccan norms and those defined by the WHO. The application of the principal component analysis on these results shows that we have two groups of wells: the first group of wells in the positive part of the F1 axis, with waters with high concentrations (Na+, Cl-, NO3-, and Ca2+, Mg2+, K+) and high values of electrical conductivity, at the level of the wells (P1, P2 and P3) and the second group of wells in the negative part of the F1 axis, characterized by water at high levels of pH at the wells (P5, P4). The piper diagrams, Schoeller-Berkaloff, Stabler and Stiff confirm the predominance of the sulphated-calcium and sulphated-sodium facies. The obtained Riverside diagram shows that the studied wells’ waters are of poor quality and highly mineralized, while the Wilcox diagram shows that the studied wells are of bad to poor quality.

KEYWORDS
Groundwater, PCA, Piper, Stiff, Stabler, Berrechid plain

REFERENCES
Rivers have always been the most important freshwater resource and many developmental activities are dependent upon them. Rivers are our lifeline. Mahi is one of the major interstate flowing river of India. Correlation and their significance level will be helpful in the understanding of water quality and also in its maintenance. For this purpose in the present investigation, samples were collected from 6 different locations which are situated at the bank of the river. Pearson’s correlation coefficient (r) between 19 physico-chemical and biological parameters have been studied. It was determined by using IBM SPSS software version 1.0.0-3906 in all three sessions (2015-16, 2016-17 and 2017-18). Median values are considered for statistical correlation studies. From the experimental observation, it’s found that studied physico-chemical parameters were within the set guidelines of BIS, WHO for domestic and agricultural use. The high level of indicator organism suggests that the water should be properly disinfected before use.

KEYWORDS
Physico-chemical parameter, Water, Mahi river, WHO, Pearson’s correlation coefficient

REFERENCES


Effect Of Aggregate Gradation On The Design Parameters Of Flexible Pavement With The Addition Of Polyurethane Foam

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Road transport is one of the most widely used means of mobility for people and goods. Hot bituminous mixtures require a large quantity of aggregates and asphalt binders for road surfacing and for other sorts of bituminous surface courses. Hence, an investigation into the use of recycled materials for the manufacture of bituminous surface courses is of great interest from an environmental point of view. This project work has considered two different mixes of dense graded aggregate and has analyzed the behaviour of bitumen-polyurethane mixtures but based on the use of the material as a pre-prepared waste product rather than the manufacture of polymer in-situ. In this work, bituminous mixtures were prepared with the partial addition of polyurethane foam waste and their physical and mechanical properties were studied. Here two dense graded bituminous mixes, Mix I and Mix II was considered. One comprising of more percentage of fine aggregate than the coarse aggregate and the other with more percentage of coarse aggregate as compared to fine aggregate by weight. A certain percentage of polyurethane foam was added to the Marshall mix and Marshall stability test was conducted. It was found that the mix with more percentage of coarse aggregate gives higher stability value and a lower flow value and also it can conclude that the percentage of polyurethane foam must be limited to 10% as the stability value decreases with an addition of 15% of polyurethane foam.

KEYWORDS
Dense grade aggregate, Bitumen, Polyurethane foam, Marshall stability test

REFERENCES

Crude oil is called rock oil, is gifted by the earth. But in return, the same factor is adversely affecting her own rich and useful environment. In this connection, the oil spill in the sea and oceans has caused a great environmental impact on the entire marine eco-system. In the present study a modern technique, Fourier transform infrared (FTIR) spectroscopy is used for oil spill identification. Identification of the oil spill is carried out by matching the fingerprint bands of the known and unknown hydrocarbon samples.

**KEYWORDS**

Oil spill, FTIR, Crude oil, Hydrocarbon, Marine ecosystem

**REFERENCES**

Heavy Metals Found Due To Traffic Density In Soil From Dhule Along National Highway

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The toxic metal level of the roadside topsoil collected along National Highway-17, North Maharashtra, India, such as lead, cadmium, copper, nickel, zinc, chromium, As, Hg, Co, Fe, Mn and others was determined. The impact of vehicular traffic can thus be undisputedly documented on heavy metal contamination of roadside soil. Road traffic and maintenance pollutes the roadside soil by chronic heavy metals. Some of these pollutants can be scattered into the air or stored on the roadside. The collection of samples from a higher pollutant site near highway-17 also determined soil metals collected by atomic adsorption spectroscopy after acid digestion with a control sample that were considerably distant from the road. The heavy metal concentration in the former sites was compared between polluted control sites.

KEYWORDS
Heavy metal, NH-17, Soil, Traffic, North Maharashtra

REFERENCES

