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## ADSORPTION OF DYES ON ACTIVATED CARBON FROM AGRICULTURAL WASTES

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Adsorption of dyes as a remediation technique for dye-loaded waste water remains an area of interest. On the one hand, adsorption using bio-derived, renewable sorbent materials can be seen as environmentally friendly, on the other hand adsorption can provide us with a trouble-free, commercially cheap operation. The main objective of my work is adsorption of the dyes [Crystal Violet (CV) and Nile Blue (NB)] on activated carbon which derived from date palm leaf wastes. For this purpose, activated carbon was prepared via chemical treatment of palm leaf wastes with sulfuric acid ( $H_2SO_4$ ), phosphoric acid ( $H_3PO_4$ ), and nitric acid ( $HNO_3$ ), respectively, with subsequent carbonization through thermal treatment. Dye adsorption studies with this activated carbon were carried out under different conditions, and the influence of different parameters such as temperature, time, pH, dye concentration, dose and mesh size of activated carbon (AC) was investigated in batch experiments. Furthermore, dynamic sorption experiments were performed successively. The present study found AC from date palm leaves to be a promising low cost adsorbent to remove CV and NB from aqueous solutions.

EN-OP-32

## REDUCTION OF HEXAVALENT CHROMIUM (VI) BY CHROMIUM RESISTANT BACTERIA ISOLATED FROM TANNERY EFFLUENTS.

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Cr(VI) is highly toxic, carcinogenic and mutagenic in nature and it is exclusively released through anthropogenic activities. The study was performed to isolate indigenous chromium resistant and reducing bacteria. Chromium (VI) reducing bacteria (CRBs) were isolated from tannery waste water and tannery drain mud collected from three different tanneries of Hazaribag, Dhaka, Bangladesh. Five chromium resistant (500 ppm) bacterial strains S1, S2, S3, S4 and S5 were isolated from tannery effluent. Their reduction ability of Hexavalent Chromium [Cr (VI)] as  $K_2Cr_2O_7$  at different concentrations was determined by DPC method. Here selected isolates



## 16<sup>th</sup> Asian Chemical Congress 2016

were able to tolerate at least 500 ppm of Cr<sup>6+</sup>. Besides S3 and S4 were able to tolerate up to 1000 ppm Cr<sup>6+</sup>. All the strains reduce 50 ppm Cr<sup>6+</sup> completely (100%) within 48 hours at pH 7 and Temperature is 37°C. The reduction rate decreased with the increment of initial chromium concentration. As the isolates have turned out to successfully reduce Cr<sup>6+</sup> in this study, these can be used for the development of bioremediation process.

EN-OP-33

### **Application of activated Coir dust for efficient removal of Remazol Blue from aqueous solution of dye**

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The effluents from the dyestuff manufacturing and textile industries, in particular, are highly colored with a large amount of dyes and considered as important sources of water pollution. Numerous physiochemical and biological methods have been used to decolorize dye bearing effluents, often in combinations as one single treatment may not be sufficient to remove certain classes of synthetic dyes. Adsorption has been found to be an efficient and economic method for dyes removal. One of the advantages is the possibility to use a large variety of solid materials: synthetic to natural low-cost materials (natural as well as waste materials from different industries and agriculture) as suitable adsorbents for removal of dye from industrial effluents. The objective of the work is to study the feasibility of activated charcoal prepared from coir dust as alternate adsorbents to commercial charcoal for the removal of Remazol Blue (RB). The adsorption of RB dye on activated charcoal prepared from coir dust was investigated in a batch process. Coconut coir is a fibrous material found between the leathery covering and the shell of a coconut. In this study activated charcoal prepared from coir dust by sulfuric acid and zinc chloride. Remazol Blue (RB), is a reactive dye which is extensively used in textile industry.

The effects of adsorbent dosages, contact time, pH and solution temperature were evaluated. The adsorption equilibrium and kinetic were found to follow Freundlich isotherm models and pseudo-second-order kinetic model, respectively. Results from thermodynamic adsorption show that interaction for RB dye was found to be feasible, nonspontaneous, and endothermic. Furthermore, it was found that a maximum uptake of Remazol blue was ~95% by activated charcoal prepared from Coir dust. But removal efficiency of commercial activated carbon for the removal RB is ~86%. This result indicates that activated carbon (Coir dust) could be employed as low-cost alternatives to commercial activated carbon for the removal of reactive dyes (RB) from wastewater.