

Manufacture, Properties and use of Activated Carbon from Cashew Nut Shells in Waste Water Treatment

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Activated carbon is produced from carbonaceous materials like coconut shells, wood and coal. In the present work cashew nut shell cake (CNSC), i.e. the residue obtained after removing cashew nut shell liquid, has been used for the preparation of activated carbon. The shell is mainly composed of cellulosic materials, but it is rich with phenolic compounds such as anacardic acids, cardols, cardanols, methylcardols and polymeric materials ultimately making it a suitable raw material for the production of activated carbon.

In the present work, activated carbon is produced from CNSC using a two stage chemical activation process. Sodium hydroxide was used as the activating agent. The correct NaOH concentration and impregnation ratio was determined by trial and error. In the present work, the chemically activated CNSC was pyrolyzed under normal atmospheric condition at a temperature around 300°C. The optimized process was triplicated. Carbon produced in this

manner was evaluated for its physical properties (hardness, bulk density, burn-off/ yield), chemical properties (ash, pH), adsorption properties (dye, oil and metal ion removal) and surface properties (SEM images). The physical, chemical, adsorption and surface properties were studied in triplicates. These properties except for burn-off/ yield were compared with a commercial reference carbon. The effect of activating agent was studied for CNSC by running a control. The control consisted of carbon produced from CNSC which was not treated with NaOH.

The present study indicates that metal adsorption capacity of carbon from base treated CNSC was higher than the other two carbons. Among the three selected metal ions (Cd^{2+} , Pb^{2+} , Cu^{2+}), Carbon from base treated CNSC had a very high adsorption capacity for copper ions. It may be due to the functional groups present in CNSC. However Remazol brilliant blue and Methylene blue dye uptake was highest in commercial carbon compared to the two