

ADSORPTION STUDIES ON CHARCOAL

DERIVED FROM COIR DUST

BY

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ABSTRACT

There are various kinds of activated carbons used for various purposes. These activated carbons can be produced by any carbonaceous material like wood, peat etc. This work focuses on locally available carbonaceous material which could be converted into activated carbon. Since these materials are locally found they are very cheap and readily available. In this work a process was developed to prepare activated carbon which is very hydrophobic and can be used to separate oil like diesel from water. This may find application in environmental cleaning processes. We have selected following locally available materials to study the adsorption properties.

- i. Charcoal granular type
- ii. Paddy hull
- iii. Wood chips
- iv. *Processed coir dust
- v. Coir dust

First the material was dried and its capacity to adsorb diesel, water, and methylene blue was measured. Since the unprocessed material contain both hydrophobic and hydrophilic sites, the total

(* A sample prepared from coir dust in air)

adsorption capacity for diesel was low. Since their efficiency was lower than that of activated carbon, it was tried to optimize the hydrophobic nature of surface by various activation process.

Normal nitrogen processing improved the hydrophobic nature over the air dried sample. This was well established by methylene blue adsorption test. The efficiency was further improved by treating with stearic acid which contains a long chain hydrocarbon and a polar end.

In addition to that selective adsorption studies were done using gas chromatography. The dried coir dust sample showed selective adsorption towards short chain, hydrocarbons of C_{10} to C_{15} .

However, for the short chain hydrocarbons nitrogen treated ($300^{\circ}C$) samples displayed better selective adsorption. Coir dust showed selective adsorption towards longer carbon chains rather than for shorter chains when treated with water vapour. This may be attributed to the increase in the pore size when treated with water. The processed coir dust has lower capacity than the coir dust. This may be due to the destruction of the active centers during activation in air. Different hydrocarbon chains in diesel (C_7 - C_{28}) were identified by comparing mass spectral and retention data with standards using GC/MS.