BIOMASS CHARACTERISATION AND THE APPLICATION OF BIOMASS CHAR FOR SORPTION OF PHENOL FROM AQUEOUS SOLUTIONS

by

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CERTIFICATE

This is to certify that the thesis entitled **Biomass Characterisation and the Application of Biomass Char for Sorption of Phenol from Aqueous Solution**, presented by PUSHPA JHA is worthy of consideration for the award of the degree of **Doctor of Philosophy** and is a record of the original bonafide research work carried out by her under my guidance and supervision and that the results contained in it have not been submitted in part or in full to any other University or Institute for award of any Degree.

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ABSTRACT

Phenolic type of substances are objectionable in a disposable waste because of their toxicity to animal and plant life. Concentration of phenolic waste in chemical and coke oven effluents varies from 3-10,000 mg/l. Chemical, physical and biological treatment methods are available for their treatment. Sorption of phenol by a suitable solid sorbent is a simple and economical process for the purpose.

Biomass particularly agro-residues like rice-husk, bagasse, raw groundnut shell, sal seed husk, coconut coir, cotton stalks, etc. are available in India abundantly. These are either grossly under utilised or completely unutilized by in-situ burning in the fields as a means of disposal. These biomass being the source of carbon is considered as good material for sorption of phenol from aqueous solutions.

Characterisation of agro-residues is very essential for the proper understanding of their properties and choice of suitable conversion routes. The ones chosen for characterisation are rice-husk, bagasse, lantana, raw groundnut shell, sal seed husk, pine needle, coconut coir (dust), bamboo dust, kikar and cotton stalks. Based on the characterisation, partially pyrolysed rice-husk is chosen as the most suitable for phenol sorption. The sorbent chosen is compared with commercially available carbon for phenol sorption capacity.

On the basis of the comparison, modifications needed to improve the sorption capacity of the partially pyrolysed char by activation is done. Equilibrium and kinetic studies of the activated char for sorption along with their modelling are attempted and presented in the thesis.

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