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Thesis Topic: Utilization of some Low-cost Adsorbents for the Removal of Dyestuffs from the Effluents of Textile Industries.

ABSTRACT

The increasing pollution level of many water resources due to the release of effluents containing dyestuffs during dying and finishing processes in textile industrieshas been a serious environmental problem for many years. Coloured dyes dischargedinto water streams contribute negatively to the aesthetic value of water and affectorganic productivity as well as the photosynthetic activity in aquatic life due to reducedlight penetration. Dyes also have tendency to sequester metal ions producing macrotoxicity to fish and other organisms. Dyestuffs and pigments are carcinogenic and highlytoxic to living beings. Wool processing release bacteria and many other pathogens.

Considering both the volume and chemical composition of the discharged effluent, the textile paper and printing industries are the major polluters among the industrialsector. Pulp and textile industries consume considerable amount of water intheir manufacturing processes and hence produce large amounts of waste water. The textile industries use dyes or pigments to colour their final product. Such extensive useof colour often poses problem in form of coloured waste water that requirepretreatment prior to disposal into receiving water bodies.

Different processes for the removal of coloured dyes from industrial effluents have been reported in the past. Over the years, the adsorption process has emerged as a viable and effective alternative to most of these conventional methods of treatment, which arerather expensive. A large number of cheap adsorbents have been studied for theremoval studies of coloured

substances. However, the search for more cheaper andmore effective adsorbents still continuesunabated. The adsorption studies of some dyes used in textile industries onto the selected low cost adsorbents were carried out. The potential use of these low-cost adsorbents for removal of the dyes was studied in terms of various processes factors such as initial concentration, temperature, contact time and pH.The adsorption isotherms, thermodynamic and kinetic parameters were studied. The rate and the extent of adsorption at solid solution interface was assessed by measuring the change in concentration of adsorbed solution. Adsorption studies were carried out by shaking desired adsorbent with aqueous solution of adsorbate (dyes) of desired initial concentration for different agitation times at different temperature and pH using temperature controlled water bath. The progress of adsorption was noticed at different time intervals till the saturation was attained. After the predetermined time interval the adsorbate was removed by centrifugation and supernatant liquid was analysed spectrophotometrically to determine the residual dyes concentration at the wavelength corresponding to their maximum absorbances. Adsorbents were characterized using XRD, IR and SEM techniques. Adsorption studies were carried out using Batch method. Thermodynamic and kinetic studies were carried out using different adsorption isotherms. Values of different parameters were evaluated from these isotherms.