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Research

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Faculty of Engineering



REMOVAL OF METHYL ORANGE DYE USING ACTIVATED CARBON DERIVED FROM PINE AGRICULTURE WASTES

A graduation project is submitted to the Chemical Engineering Department in
partial fulfillment of the requirements for the degree of Bachelor of Science in

Chemical Engineering

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ABSTRACT

Textile effluents are considered as potential sources of water pollution because they contain toxic dyes. The discharge of azo dye in to environment is of great alarmed due to color, toxicity, mutagenicity, and carcinogenicity of the dye. This work to study the possibility of using activated carbon derived from Pine branches in the removal of MO dye from aqueous solution by batch operation and Adsorption Technique. Various operating parameters such as solution pH, equilibrium contact time, initial dye concentration, adsorbent dosage, particle diameter and temperature have been studied. The results indicated that the adsorption of MO decreased with increasing pH, and the optimum solution pH for the adsorption of MO was found to be 7. The adsorption process increases with increasing dosage of AC, also the amount of MO removed changes with MO initial concentration and contact time. Adsorption was rapid and occurred within 140 min. for MO concentration range from 10 to 30 ppm (mg/l). About 0.8 g of AC was found to be enough remove 83.106% of 10 mg/l initial MO dye concentration from 20 mL of dye solution. The optimum agitation rate is 200 rpm. The optimum particle diameter and temperature are 0.315 mm. and 25 C° respectively. The equilibrium adsorption data for MO were fitted well with the Langmuir and Freundlich adsorption isotherm models. Satisfactory agreement between experimental data and the model-predicted values was expressed by the correlation coefficient (r^2). The maximum adsorption capacity of AC was found to be 0.7312 mg/g. So, the results indicated the suitability use of the activated carbon derived from Pine branches as low cost and natural material for reliable removal of MO from water and wastewater effluents.