

Efficient removal of malachite green dye from aqueous solution using *Curcuma caesia* based activated carbon

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ABSTRACT

Ash of *Curcuma caesia* has been explored as potential adsorbent for removal of hazardous dye malachite green from aqueous solution. Surface morphology of ash was studied using scanning electron microscopy. The adsorption mechanism and kinetics of the process have been investigated. Adsorption process is pH-dependent and favored at basic pH. Dubinin–Radushkevich (D–R) adsorption model has been found to be most appropriate for the adsorption. Physic-sorption has been found to control the adsorption mechanism. Intraparticle diffusion is best followed. Batch and column adsorption studies of malachite green onto *C. caesia* ash were carried out. Adsorption capacity for the column process is found to be 38.16 mg/g which is less than that of the batch process. Value for change in Gibbs free energy is negative over the entire temperature range, indicating the process to be spontaneous. The adsorption process is endothermic.

Keywords: Malachite green; Adsorption isotherms; Adsorption kinetics; Dye removal; *Curcuma caesia*

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