



Methylene blue removal from aqueous solution by adsorption using *Jatropha* seed husks-activated carbon activated with KOH

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ABSTRACT

The application of activated carbon (AC) from *Jatropha* seed husks for methylene blue (MB) adsorption from aqueous solution at room temperature was studied through batch experiments. The effects of adsorbent dosage, solution pH and initial concentration were studied. Adsorption increased as the adsorbent dosage, initial concentration and contact time increased with the highest adsorption obtained in basic conditions. The average pore diameter of the AC was 10.58 nm with surface area of 1262 m²/g, and total pore volume of 0.4992 cm³/g. Adsorption isotherm data fitted well with the Langmuir model, with a monolayer adsorption capacity of 250 mg/g. The adsorption kinetics obeyed a pseudo-second-order kinetic model. The negative values of free energy change (ΔG°) indicated that the adsorption of MB on AC16 is spontaneous. Also, the positive values of both entropy change (ΔS°) and enthalpy change (ΔH°) mean that the adsorbate has a random organization at the interface of the solid/solution and that the adsorption process was endothermic.

Keywords: Thermodynamics; Kinetics; Isotherm; *Jatropha* seed husks; Activated carbon; Methylene blue

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