



Adsorption of Congo red onto modified rice husk from aqueous solution

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Rice husk, an agricultural by-product, was treated using cetyltrimethyl ammonium bromide (CTAB) to enhance its adsorption capacity for the removal of Congo red dye (CR, anionic dye) from aqueous solutions. Batch adsorption experiments were carried out to study the effects of key parameters such as pH, contact time, initial dye concentration and adsorbent dose. The equilibrium adsorption capacity (q_e) increases with increasing the initial concentration of dye and with decreasing pH. Maximum Congo red dye adsorption onto modified rice husk was observed at pH 3 with 0.5 g/50 ml of adsorbent dose. The kinetic data were modeled using pseudo-first-order and pseudo-second-order kinetic equations and the equilibrium data were analyzed by Langmuir and Freundlich isotherm models. The adsorption process fitted the pseudo-second-order model well and the adsorption isotherm was found to fit Langmuir model. Thermodynamics parameters such as Gibbs free energy change (ΔG), enthalpy change (ΔH) and entropy change (ΔS) were also discussed.

Keywords: Adsorption; Kinetics, Congo red, Modified rice husk.