

Removal of azo dye from aqueous solution by adsorption onto activated clay. Part I: Kinetic study and adsorption isotherm.

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Abstract. The present study deals with the adsorption of Erichrome black T (EBT) – anionic dye – onto activated clay. Batch studies were performed to evaluate the influence of various experimental parameters such as: initial dye concentration and equilibrium time, pH and adsorbent dose. The experimental data were analysed using Langmuir, Freundlich, Temkin and Dubinin-Radushkevich isotherm models. The equilibrium data fitted well with the Langmuir isotherm model with a better correlation coefficient ($R^2 = 0.964$), and the maximum adsorbed amount was found to be 250 mg/g at room temperature ($25 \pm 2^\circ\text{C}$). The kinetic data were evaluated by pseudo-first order, pseudo-second order and intra-particle diffusion kinetic models. The results of the latter indicated the adsorption kinetic of EBT obeys the pseudo-second-order kinetic model. The results of this study show that this activated clay can be used as a cost-effective adsorbent for EBT the removal from wastewater.

Keywords: adsorption, clay, eriochrome black-T, isotherm, kinetic.