

## Sorption of Congo Red from Aqueous Solution by Surfactant-Modified Bentonite: Kinetic and Factorial Design Study

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**Abstract :** An organoclay (HDTMA-B) was prepared from sodium bentonite (Na-B). The starting material was modified using the hexadecyltrimethylammonium ion (HDTMA<sup>+</sup>) in the amounts corresponding to 100 % of the CEC value. Batch experiments were carried out in order to model and optimize the sorption of Congo red dye from aqueous solution. The pseudo-first order and pseudo-second order kinetic models have been developed to predict the rate constant and the sorption capacity at equilibrium with the effect of temperature, the solid/solution ratio and the initial dye concentration. The equilibrium time was reached within 60 min. At room temperature (20 °C), optimum dye sorption of 49.4 mg/g (98.9%) was achieved at pH 6.6, sorbent dosage of 1g/L and initial dye concentration of 50 mg/L, using surfactant modified bentonite. The optimization of adsorption parameters mentioned above on dye removal was carried out using Box-Behnken design. The sorption parameters were analyzed statistically by means of variance analysis by using the Statgraphics Centurion XVI software.

**Keywords :** adsorption, dye, factorial design, kinetic, organo-bentonite

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