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Adsorption of reactive dye from aqueous solutions by compost

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ABSTRACT

The adsorption of a reactive dye, Ariazol Scarlet 2G (AS2G) (C.I.: Reactive Red 234), onto compost, from aqueous solutions, was studied in a batch system. The effects of initial dye concentration, initial pH and sorbent mass have been studied. Four two-parameter isotherm models–Langmuir, Freundlich, Temkin and Harkins Jura – were used to fit the experimental data using a nonlinear trial-and-error method. The best fit of the adsorption isotherm data was obtained using the Langmuir model (X^2 = 1.97E–03). A comparison of kinetic models applied to the adsorption of AS2G on compost was evaluated using the pseudo-second order, Elovich and Lagergren first-order kinetic models. Results showed that the pseudo-second order kinetic model was found to agree well with the experimental data. An intra-particle diffusion model analysis showed multi-linearity with two steps and a non-zero intercept which indicated the intra-particle diffusion model is not a dominant rate controlling mechanism in the sorption of AS2G by compost.

Keywords: Adsorption; Adsorption isotherms; Reactive dye; Kinetic models; Compost

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