

## Adsorption of basic dyes by dried waste sludge: Kinetic, equilibrium and desorption studies

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### ABSTRACT

Dried waste sludge was used as adsorbent to remove methylene blue, crystal violet and basic fuchsine using batch systems. Rate experiments were performed at various initial adsorbate concentrations, adsorbent concentration and reaction temperature. The experimental data were analyzed using several kinetic equations to determine the best-fit equation and related parameters were calculated. It was shown that the adsorption of respective dye could be best described by Ho's pseudo second order equation. The intraparticle diffusion played an important role in adsorption process. Effect of various initial adsorbent concentration and ionic strength on equilibrium was also investigated. Langmuir and Freundlich isotherms were applicable to the adsorption process and their constants were evaluated. Langmuir isotherm was found to be more suitable than Freundlich isotherm for correlation of equilibrium data. An increase in ionic strength exhibited an adverse effect on respective dye uptake. Desorption experiments showed that the loaded material could be regenerated unsatisfactorily.

*Keywords:* Adsorption; Desorption; Kinetics; Modeling; Waste sludge

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