



Removal of methylene blue from aqueous solution using acid/base treated rice husk as an adsorbent

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ABSTRACT

An agricultural waste, cheap and easily available rice husk is chemically modified with acid/base and used as an adsorbent for the removal of methylene blue (MB) (one of the industrially important dye) from aqueous media. The adsorption data were evaluated by Freundlich, Langmuir and Dubinin–Radushkevich isotherm models. Langmuir model showed best fit to the data indicating the formation of monolayer. The adsorption capacity (q_m) of the chemically modified rice husk was found to be 93.5 mg/g at a temperature of 298 K which is higher than that reported earlier in the literature which suggests that the treated rice husk can be efficiently used for the removal of MB. The adsorption kinetics was investigated by pseudo-first-, pseudo-second-order kinetic and intra-particle diffusion models. The q_e value calculated from pseudo-second-order kinetic model is in agreement with the experimental value with higher correlation coefficient (0.9988). The non-linearity of intra-particle diffusion model is an indication that more than one mechanism is involved in the adsorption process.

Keywords: Methylene blue; Rice husk; Adsorption kinetics; Langmuir model

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