

## Nitric acid-treated bamboo waste as low-cost adsorbent for removal of cationic dye from aqueous solution

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### ABSTRACT

The feasibility of nitric acid-treated bamboo waste (NBW) for the removal of methylene blue (MB) from aqueous solutions was investigated. Batch adsorption studies were conducted to study the effects of contact time (0–180 min), initial concentration (45–375 mg/L) and solution pH (2–10) on the removal of dye at 30°C. The experimental data were analyzed by using four different types of linearized Langmuir and the Freundlich isotherms. Equilibrium data fitted well with the type 1 Langmuir model, yielding maximum monolayer MB adsorption capacity of 87.719 mg/g. The kinetic data were found to conform to pseudo-second-order kinetic model with good correlation. Intraparticle diffusion model was further tested to identify the diffusion mechanism. The scanning electron micrographs showed that MB was adsorbed on the rough surface of NBW. The NBW prepared in this study was shown to be a promising low-cost material for adsorption of MB from aqueous solutions.

*Keywords:* Adsorption; Bamboo waste; Isotherm; Kinetics; Methylene blue

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