Application of agricultural waste as a biosorbent to removal of basic blue dye from aqueous solution: Kinetics and Equilibrium study

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Abstract:

In this study, cacao peel was used as adsorbent for the investigation of the adsorption kinetic, isotherm parameters of the basic dye (BB41) from aqueous solution at various concentration (5-25mg/L) and temperatures (298-323K). The equilibrium adsorption data were analyzed by Langmuir, Freundlich and Temkin isotherm models. The kinetic of adsorption of the basic blue (BB41) followed the pseudo second order kinetic and Bangham equation, Langmuir, Freundlich, Temkin models and intraparticule diffusion was not the only rate-controlling step. In order to reveal the adsorption characteristic of adsorbents, SEM, FTIR and DRX analyses were carried out. The maximum adsorption capacity (q_m) of cacao peel 12.65 mg g^{-1}. In addition, the adsorption rate was found to confirm that the pseudo second order have a good correlation (R^2> 0.99). We note also, that the adsorbent used are low-cost alternative to other adsorbent in the removal of basic dye BB41 in aqueous solution

Keywords: Basic dye, Cacao peel, kinetic, Isotherms, Adsorption

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