Litchi pericarps used as adsorbents for methylene blue removal from solution

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ABSTRACT

The adsorption capacity of methylene blue (MB) on raw or chemically modified litchi pericarp (LP or MLP, respectively) was investigated as a function of contact time, pH, and adsorbent dose. The adsorption isotherms, kinetics, and thermodynamic characteristics were also studied using batch assays. The optimum MB adsorption efficiency on LP and MLP occurred at a contact time of 180 min, pH of 6.0–9.0, and adsorbent dosage of 2 g/L. Langmuir, Freundlich and Dubinin–Radushkevich isotherms and a pseudo second-order kinetic model satisfactorily fit the equilibrium adsorption with high correlation coefficients ($R^2 > 0.97$). Based on the Langmuir model, the maximum adsorption capacities of MB on LP and MLP were 100 and 139 mg/g, respectively. The results of thermodynamics studies indicated that MB adsorption on both LP and MLP was a spontaneous and exothermic process. The physical characteristics of LP and MLP were also studied using FTIR.

Keywords: Litchi pericarp; Methylene blue; Adsorption; Isotherms; Kinetics; Thermodynamics

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