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ADSORPTIVE REMOVAL OF HAZARDOUS METHYLENE BLUE BY FRUIT SHELL OF *Cocos nucifera*

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Abstract

In this work, fruit shell of *Cocos nucifera* (FSCN) treated with H₃PO₄ has been tested as a low cost adsorbent for the removal of methylene blue (MB) from aqueous solution in batch and column process. The adsorption of MB onto FSCN was affected by the initial solution pH, dye concentration, temperature, column internal diameter and adsorbent dose. The adsorption equilibrium data was fitted well to the Langmuir model and the maximum adsorption capacity was found to be 20.74 mg/g at 40°C. Kinetic studies showed that the dynamical data fitted well to the pseudo-second order kinetic model. The values of thermodynamic parameters such as the Gibbs free energy (ΔG°), the enthalpy (ΔH°) and the entropy (ΔS°) indicated that the adsorption process was spontaneous and endothermic in nature. The dye was desorbed efficiently through the 1M CH₃COOH solutions and 76.2 % (10 mg/L) dye was recovered.

Key words: adsorption, kinetics, methylene blue, thermodynamics

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