

Tea Dust as a Potential Low-Cost Adsorbent For The Removal of Crystal Violet From Aqueous Solution

Md. Maksudur Rahman Khan, Md. Wasikur Rahman, Huei Ruey Ong, Ainihayati Binti Ismail & Chin Kui Cheng

Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

ABSTRACT

The present work demonstrates tea dust (TD) as a potential low-cost adsorbent for the removal of crystal violet (CV) from aqueous solution by batch adsorption technique. Reaction kinetics and isotherm studies were carried out under various conditions of initial dye concentration, contact time, adsorbent dosage, and pH. The adsorbent was characterized by scanning electron microscopy, Fourier transform infrared spectroscopy (FTIR) and Brunauer–Emmett–Teller. FTIR results showed complexation and ion exchange appeared to be the principle mechanism for CV adsorption. The adsorption isotherm data were fitted to Langmuir and Freundlich equations; and the maximum adsorption capacity was found to be 175.4 mg/g. The removal of CV by TD followed the unified approach model. Therefore, TD can be employed as an efficient and cost-effective adsorbent in industrial wastewater treatment for the removal of basic dyes.

KEYWORDS: Adsorption, Tea Dust, Crystal Violet, Isotherm, Kinetics, Unified Approach Model

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