Avocado seed powder: characterization and its application for crystal violet dye removal from aqueous solutions

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Received 9 January 2015; Accepted 14 July 2015

\textbf{ABSTRACT}

This study presents removal of crystal violet (CV) dye from aqueous solutions using solid food waste, avocado kernel seed powder (ASP). ASP was used in the native form for biosorption study. The effects of different experimental conditions such as pH of the solution, initial dye concentration, contact time, and temperature were investigated using batch study. Maximum removal of CV (95.9 mg g\textsuperscript{-1}) by ASP (100 mg) was observed at pH 7 and 55\textdegree C. The kinetics data were evaluated using pseudo-first-order, pseudo-second-order, and general-order kinetic adsorption models. The general-order kinetic adsorption model gave the best description of the biosorption kinetic of CV onto ASP biosorbent. Similarly, the intraparticle diffusion plots showed three linear portions during biosorption process. Freundlich, Langmuir, and Liu models were used to analyze the isothermal data; Liu equilibrium model gave the best fit of the isothermal data of CV biosorption onto ASP. The calculations from thermodynamic studies showed that CV biosorption onto ASP was an exothermic process and a feasible process. The combined data showed that avocado seed powder could be efficiently utilized for the treatment of dyes-rich wastewaters.

\textit{Keywords:} Avocado seed; Adsorption; Equilibrium; Kinetic; Crystal violet