Removal of acid dyes from aqueous solution using potato peel waste biomass: a kinetic and equilibrium study

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ABSTRACT

The goal of this study was to survey the feasibility of the biosorption of two acid dyes (Acid Blue 113 and Acid Black 1) from aqueous solution using biomass prepared from potato peel waste. Adsorption isotherms were constructed and the kinetics of dye adsorption were studied. Langmuir and Freundlich isotherms, pseudo-first-order, and pseudo-second-order kinetic models were studied. The maximum biosorption was observed at a pH of 2 and 3 for Acid Blue 113 and Acid Black 1, respectively. The biosorption of two dyes increased with increasing contact time and reached equilibrium after two hours, approximately. Acid dye removal efficiency decreased with an increase in the initial dye concentration. The sum of squares due to error and the coefficient of determination (R2) analysis showed that the pseudo-second-order kinetic and the Langmuir isotherm model are better fit for the adsorption of Acid Blue 113 and Acid Black 1 on used potato peel waste.

Keywords: Biomass; Acid dye; Potato; Isotherm; Kinetics; Biosorption

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