Removal of Ni(II) from aqueous solution by Lycopersicum esculentum (Tomato) leaf powder as a low-cost biosorbent

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\textbf{ABSTRACT}

The present study investigates the biosorption potentiality of Lycopersicum esculentum leaves powder as a low-cost agricultural waste biomass for the removal of Ni(II) ion from aqueous solution in batch method. The experimental kinetic data were modeled using pseudo-first-order, pseudo-second-order, and intraparticle diffusion model. It was found that the biosorption was better described by pseudo-second-order kinetic model. Langmuir and Freundlich isotherm models were applied to analyze the experimental data and to predict the relevant isotherm parameters. The best interpretation for the experimental data was given by the Langmuir isotherm, and the maximum biosorption capacity for Ni(II) is 58.82 mg/g at 323 K. Thermodynamic parameters such as $\Delta G^\circ$, $\Delta H^\circ$, and $\Delta S^\circ$ were calculated, and it was observed that the adsorption process was feasible, spontaneous, and endothermic.

\textit{Keywords:} Lycopersicum esculentum leaves powder; Biosorption; Nickel; Isotherms; Kinetics

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