Chemically oxidized pineapple fruit peel for the biosorption of heavy metals from aqueous solutions

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\textbf{ABSTRACT}

Chemically oxidized pineapple fruit peel biomass has been used as a biosorbent for Cd(II) and Pb(II) removal from aqueous solutions. Fourier transform infrared spectroscopy and scanning electron microscopy techniques were used to characterize the treated pineapple fruit peel. The biosorption efficiency of pineapple fruit peel for Cd(II) and Pb(II) was greatly enhanced after chemical oxidation probably due to introduction of carboxylic and hydroxyl groups onto the biosorbent surface. Biosorption kinetics for both metals was well described by pseudo-second-order kinetic equation and intraparticle film diffusion. Langmuir, Freundlich, and Temkin isotherm models were applied to the biosorption equilibrium data and best results were obtained with Langmuir isotherm model. Maximum monolayer biosorption capacity was found to be 42.10 and 28.55 mg g\textsuperscript{-1} for Cd(II) and Pb(II), respectively. Thermodynamic study indicates that the biosorption was exothermic and the spontaneity of the process decreases with the increase in solution temperature.

\textit{Keywords}: Biosorption; Chemical modification; Isotherm; Kinetics; Thermodynamics

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