عنوان مقاله:

Equilibrium sorption of Lead (II) in aqueous solution onto EDTA-modified Cocoa (Theobroma cacao) Pod husk residue

محل انتشار:

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خلاصه مقاله:

The adsorption of lead (II) ions onto EDTA- modified cocoa pod husk (CPH) in an equilibrium system was investigated. Kinetics, mechanism and thermodynamic parameters were estimated. Adsorption capacity was rapid and time dependent as appreciable level of Pb (II) uptake was achieved at an optimum contact time of 50 minutes. Three kinetic models were used to fit the kinetic data; Pseudo-first order, Pseudo-second order and intraparticle diffusion. Adsorption of the metal ions follows the Pseudo-second order and intraparticle kinetics as these provide a better fit to the experimental data with high R2 values ranging from 0.9776 – 1. Thermodynamic parameters such as change in Gibbs free energy (ΔGo) change in enthalpy (ΔHo), and entropy change (ΔSo) were calculated. The ΔGo (-5.499kJmol-1), ΔHo (60.36 kJmol-1) and ΔSo (212.44 Jmol-1K-1) of the adsorption process of metal ions onto the modified adsorbent was found to be feasible, endothermic, spontaneous and physiosorption in nature. These results indicate that modified CPH is a promising sorbent for the removal of Pb (II) in industrial effluent and wastewaters containing same.

کلمات کلیدی:

Cocoa pod husk, Lead, Kinetics, Physiosorption, Gibbs free energy