

عنوان مقاله:

Kinetic, Isotherm, and Thermodynamic Modeling of Pb(II) Removal from Aqueous Solutions Using Cellulose Extracted from *Pentaclethra macrophylla* Benth Pod

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خلاصه مقاله:

Biosorption potentials of cellulose from *pentaclethra Macrophylla* pod for the removal of Pb(II) from aqueous solution was investigated. The cellulose adsorbent was successfully isolated and characterized X-ray diffraction (XRD), scanning electron microscopy (SEM), Fourier Transform Infrared Spectrometry (FTIR) and BET. The effects of adsorbent dosage ( $0.1 - 0.5$ g), initial pH of solution ( $2 - 10$ ), initial Pb(II) concentration ( $50 - 250$ mg/l), temperature ( $30^{\circ}\text{C} - 50^{\circ}\text{C}$ ) and contact time ( $5 - 150$  minutes) were studied. The percent Pb(II) uptake was found to increase with increase with increase in adsorbent dosage and contact time and decreased with increase initial Pb(II) concentration and temperature. Optimum adsorption of Pb(II) was observed at pH 8. The biosorption equilibrium data were well represented by both Langmuir and the Freundlich models. Kinetic data obtained fitted the pseudo-second-order model very well with high correlation coefficient. The calculated thermodynamic parameters ( $\Delta G$ ,  $\Delta H$  and  $\Delta S$ ) indicated that adsorption of Pb(II) onto cellulose *Pentaclethra macrophylla* Benth Pod was exothermic, spontaneous and feasible in the temperature range studied. Results of this work showed that cellulose *Pentaclethra macrophylla* Benth Pod could be used as low cost adsorbents for the removal of Pb(II) from aqueous wastewater

کلمات کلیدی:

Adsorption, Adsorption capacity, Langmuir isotherm, Freundlich Isotherm, Temkin isotherm

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