

Adsorption of Lead and Zinc Ions Onto Chemical Activated Millet Husk: Equilibrium and Kinetics Studies

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Abstract : In this study, the adsorption of lead and zinc ions from aqueous solutions by modified millet husk has been investigated. The effects of different parameters, such as pH, adsorbent dosage, concentration, temperature, and contact time, have been investigated. The results of the experiments showed that the adsorption of both metal ions increased by increasing pH values up to 11. Adsorption process was initially fast. The adsorption rate decreased then until it reached to equilibrium time of 120 min for both lead and zinc ions. The Langmuir, Freundlich, Dubinin-Radushkevich (D-R), and thermodynamic models (Gibbs free energy) were used to determine the isotherm parameters associated with the adsorption process. The positive values of Gibbs free energy change indicated that reaction is not spontaneous. Experimental data were also evaluated in terms of kinetic characteristics of adsorption, and it was found that adsorption process for both metal ions followed pseudo-first order for zinc and pseudo-second-order for lead.

Keywords : zinc, lead, adsorption, millet husks

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