

Equilibrium isotherm studies for the uptake of Pb(II) and Cd(II) onto Lignocellulosic Biosorbent from waste water.

ABSTRACT

The removal of Pb(II) and Cd(II), by treated rubber wood fibre, a low-cost material, has been found to be concentration, pH and contact time dependent. The adsorption parameters were determined using both Langmuir and Freundlich isotherm models and the Langmuir model was found to be in better correlation with the experimental data with a maximum adsorption capacity, Pb(II) (52.38 mg/g) and Cd(II) (5.64 mg/g) respectively. Surface complexation is the major removal mechanisms involved. The adsorption isotherm studies clearly indicated that the adsorptive behaviour of metal ions on treated rubber wood fibre satisfies not only the Langmuir assumptions but also the Freundlich assumptions. Results of kinetic experiments demonstrated that the adsorption was effective and rapid. Two different kinds of kinetic models (Lagergren-first-order and second-order equations) were used to investigate the adsorption mechanisms. The kinetic adsorption data can be described by the second-order equation and the adsorption might be a rate-limiting control. The results indicate the potential application of this method for effluent treatment in industries and also provide strong evidence to support the adsorption mechanism proposed.

Keyword: Rubber wood fibre; Heavy metals; Adsorption.