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### COMPARATIVE STUDY ON METAL IONS ADSORPTION ON A LOW COST CARBONACEOUS ADSORBENT KINETIC EQUILIBRIUM AND MECHANISTIC STUDIES

S. Arivoli, M. Hema, C. Barathiraja

#### Abstract:

A carbonaceous adsorbent prepared from an indigenous waste and treated by acid was tested for its efficiency in removing metal ions of Fe(II), Co(II) and Ni(II). The process parameters studied included agitation time, initial metal ion concentration, carbon dosage, pH, other ions and temperature. The kinetics of adsorption followed first order reaction equation and the rate was mainly controlled by intraparticle diffusion. Freundlich and Langmuir isotherm models were applied to the equilibrium data. The adsorption capacity obtained from the Langmuir isotherm plots was found around 28mg/g for all selected metal ions at an initial pH of 6. The temperature variation study showed that the metal ions adsorption is endothermic and spontaneous with increased randomness at the solid solution interface. Significant effect on adsorption was observed on varying pH of the metal ion solutions. The type I and II isotherms obtained, positive  $\Delta H_0$  values, pH dependent results and desorption of metal ions in mineral acid suggests that the adsorption of metal ions on this type of adsorbent involves both chemisorption and physical adsorption mechanisms.

#### Keywords:

[adsorption isotherms](#) . [kinetic and thermodynamic parameters](#) . [regeneration pattern](#)

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