



ADSORPTION EQUILIBRIUM STUDIES ON COPPER (II) IONS REMOVAL BY NATURAL WASTE USING NON-LINEAR APPROACH

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Abstract

Cashew nut shell (CNS) is a low cost adsorbent that has been used for the removal of copper (II) from an aqueous solution. The effect of various parameters such as solution pH, CNS dose, contact time and initial copper (II) ion concentration on adsorption efficiency were examined. The copper (II) adsorption was favored with maximum adsorption at pH 5.0, CNS dose 3 g/L, contact time 30 min and initial copper (II) ion concentration 20 mg/L, respectively. The experimental data were analysed by Langmuir, Freundlich, Redlich-Peterson, Dubinin-Radushkevich, Koble-Corrigan, Sips, Toth and Temkin adsorption isotherms. The characteristic parameters for each isotherms and related correlation coefficients were determined using MATLAB 7.1. The experimental data yielded excellent fits in an increasing isotherms order based on their correlation coefficients (R^2) values: Koble-Corrigan>Sips>Redlich-Peterson >Freundlich>Toth>Langmuir>Temkin>Dubinin-Radushkevich. Thus showing that CNS could be employed as low-cost alternative adsorbent for the removal of copper (II) ions from aqueous solutions.

Key words: cashew nut shell, copper (II) ions, FTIR, isotherms, SEM

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