

Removal of Cu and Pb by tartaric acid modified rice husk from aqueous solutions

ABSTRACT

A study on the modification of rice husk by various carboxylic acids showed that tartaric acid modified rice husk (TARH) had the highest binding capacities for Cu and Pb. The carboxyl groups on the surface of the modified rice husk were primarily responsible for the sorption of metal ions. A series of batch experiments using TARH as the sorbent for the removal of Cu and Pb showed that the sorption process was pH dependent, rapid and exothermic. The sorption process conformed to the Langmuir isotherm with maximum sorption capacities of 29 and 108 mg/g at 27 ± 2 °C for Cu and Pb, respectively. The uptake increased with agitation rate. Decrease in sorbent particle size led to an increase in the sorption of metal ions and this could be explained by an increase in surface area and hence binding sites. Metal uptake was reduced in the presence of competitive cations and chelators. The affinity of TARH for Pb is greater than Cu.

Keyword: Heavy metal removal; Rice husk; Tartaric acid; Modification; Sorption