

Succinylated rice bran starch as adsorbent of heavy metals in aqueous solution

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ABSTRACT:

In this study, starch was prepared and modified from rice bran as abundant and cheap raw material. Its adsorption efficiency against heavy metals in aqueous solutions was determined. Desorption, recovery of heavy metals and recyclability of the adsorbent were also calculated based on desorption efficiency and degradability of the adsorbent determined through repeated process of adsorption-desorption. Based on the results of the study, 39.3% of starch was extracted and modified from rice bran. Copper ions were adsorbed with 97.7%, cadmium ions with 95.9% and lead ions with 80.5% efficiency at 25°C. and pH 7.0. The adsorbent best fitted the Langmuir isotherm with maximum adsorption capacity of 195.44 mg/g. Repeated cycles of adsorption and desorption posed minimal decrease in the adsorption efficiency offering the advantage of recovering both the adsorbent and heavy metals, thus reducing its presence and adverse health effects promoting green chemistry.

Keywords:

Rice starch, Succinylation, Heavy metal, Adsorption isotherm, Rice bran.