



Removal of Water Hardness by Adsorption on Peanut Hull

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Abstract: Studies on a batch sorption process using peanut hull as a low cost sorbent was investigated to remove calcium and magnesium ions from aqueous solutions. The influence of operational conditions such as contact time, metal ion initial concentration, sorbent mass, solution initial pH, agitation speed, ionic strength and temperature, on the sorption kinetics of calcium and magnesium were studied. Experimental results showed that the maximum adsorption capacity was observed at pH 4.0 for the two metal ions and adsorption was increased with increasing adsorbent concentration and contact time. The suitability of the adsorbent was tested by fitting the adsorption data with Langmuir and Freundlich isotherms to obtain the characteristic parameters of each model. Both models were found to well represent the measured sorption data. According to the data obtained from the Langmuir equation, the maximum sorption capacities of metal ions onto peanut hull were 17.48 mg g⁻¹ for Ca(II) and 16.36 mg g⁻¹ for Mg(II). The results showed that peanut hull is an alternative low-cost biosorbent for the removal of Ca(II) and Mg(II) ions from aqueous media.

Keywords: *calcium; magnesium; water hardness; peanut hull; adsorption.*

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