Removal of copper (II) from aqueous solution using granular sodium alginate/activated carbon hydrogel in a fixed-bed column

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ABSTRACT

Sodium alginate is a natural polysaccharide-based polymer and due to its anionic nature is effective for the adsorption heavy metals. In this study, the removal of Cu(II) ions from aqueous solutions was investigated using synthetic hydrogel of SA/AC/HA prepared by sol-gel method, and properties of composite were characterized using Fourier transform infrared spectroscopy (FTIR). The effect of various experimental conditions such as column height (3.5–4.5 cm), flow rate (6, 8, 10 ml/min) and inlet copper concentration (300, 400, 500 mg/L) on the column was studied. The experimental data were investigated by the Adam-Boohart and the Thomas and Yoon-Nelsone kinetic models. The experimental and theoretical adsorption capacity of column (q_e) (calculated by Thoms model) were proportional error = ±0.308%. Adsorbent has regeneration ability using 4% HCl, for recovery up to 5 times, with percentage coefficient (D%) between 70–82.75%.

Keywords: Sodium alginate; Copper ion(II); Fixed-bed column; Adsorption; Kinetic model

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