

ARSENIC ADSORPTION ONTO IRON-CHITOSAN COMPOSITE FROM DRINKING WATER

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ABSTRACT

To develop an inexpensive adsorbent, suitable for arsenic removal from drinking water, iron-chitosan based sorbents were selected. Chitosan is a biopolymer derived from chitin, a polysaccharide and is available commercially in the form of flakes. To be used in an adsorption system, chitosan should be made in the form of a bead. In this process, two types of beads were prepared 1) Iron-chitosan (CFeN), and 2) Iron-chitosan coated perlite (CFeN+Perlite). These beads were characterized using Scanning Electron Microscopy (SEM), Energy Dispersive x-ray Spectrometry (EDS) and X-ray Photoelectron Spectroscopy (XPS).

The adsorption isotherm studies of arsenic on CFeN and CFeN+Perlite beads were determined using Langmuir model. The effect of pH and competing ions on arsenic removal for CFeN was determined. For CFeN adsorbent, high removals of arsenate were obtained at pH range 5.8-7.8, with maximum removal occurring around pH 5.8. Arsenite removal is also efficient with the maximum removal occurring around pH 8. From the isotherm studies, it was found that the maximum adsorption of arsenate and arsenite onto iron-chitosan coated perlite was almost half that of iron-chitosan.