Removal of inorganic arsenic oxyanions using Ca–Fe(III) alginate beads

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\textbf{ABSTRACT}

Arsenic is a highly soluble oxyanion that is toxic to humans and the environment. Ca–Fe(III) alginate beads were used as a green adsorbent for the removal of inorganic arsenic oxyanions from aqueous solutions. The carboxyl groups present in the Ca-alginate structure are responsible for the binding of divalent cations. The insertion of iron as a dispersed colloidal ferric hydroxide enhances the adsorption efficiency toward arsenic. The adsorption was fitted by the Langmuir and the Freundlich models, the first being more suitable. The Langmuir parameter $q$, which indicates the maximum uptake capacity of the sorbent, was 0.364 (mg/g) for As(V) and 0.117 (mg/g) for As(III). Our results suggest that the removal mechanism for arsenic species is the adsorption onto the iron in the alginate bead surface. The results demonstrate that the Ca–Fe(III) alginate beads could be used as a green alternative to remove trace levels of arsenic oxyanions.

\textit{Keywords:} Arsenic; Oxyanions; Ca-Fe(III) alginate beads; Adsorption

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