



Adsorption of Fe ions by modified carrageenan beads with tricarboxy cellulose: kinetics study and four isotherm models

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ABSTRACT

In this work, we have studied the kinetics of Fe ions adsorption from aqueous solutions by modified carrageenan beads with tricarboxy cellulose. The steps employed in this study involved the extraction of cellulose from bagasse and subsequently, 2,2,6,6-tetramethylpiperidine-1-oxyl (TEMPO) oxidation followed by periodate-chlorite oxidation. Different adsorption conditions were investigated such as; time intervals (5–120 min), Fe ions concentrations (25, 50, 80, 120 and 160 ppm), adsorbent weight (0.1, 0.2, 0.3, 0.4 and 0.5 g), and pH (3–9). Two kinetic models including; pseudo second-order and intra-particle diffusion model have been applied. The conclusion is that, the adsorption kinetics of Fe ions removal using modified carrageenan beads followed pseudo second-order model. Also, four isotherm models namely; Freundlich, Langmuir, Temkin, and Dubinin–Radushkevich were fitted with this study.

Keywords: Beads; Carrageenan; Tricarboxy cellulose; Dubinin–Radushkevich; Freundlich; Kinetic models; Langmuir; Temkin

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