Adsorption of iron ions from palm oil mill effluent using novel adsorbent of alginate–mangrove composite beads coated by chitosan

ABSTRACT

This study was about the investigation of the removal of iron ions from Palm Oil Mill Effluent (POME) by using novel adsorbent which is Alginate–Mangrove Composite Beads Coated by Chitosan (AMCBCC). The adsorbent was characterized by Fourier Transform Infrared Spectroscopy (FTIR) and Scanning Electron Microscope (SEM) with Energy Dispersive X-ray Spectroscopy (EDX) to prove the successful coating by Chitosan and also to provide an evidence of iron ions were adsorbed on the surface of the beads. Batch studies were conducted by using different parameters, such as pH, dosage, contact time, and initial concentration. It was found that at pH value of 3, 300 g/L of AMCBCC concentration, and a contact time of 72 hours the maximum removal of iron ions was 92.7%. The isotherm equilibrium data were followed Freundlich isotherm model and the adsorption kinetic data were well fitted by the pseudo second order.

Keyword: Mangrove bark; Alginate; Chitosan; Adsorption; Iron ions; Palm oil mill effluent