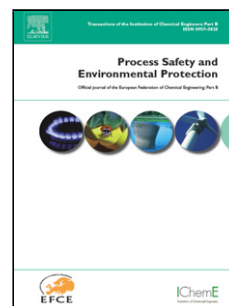


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Enhanced Removal of Tetracycline Using Modified Sawdust: Optimization, Isotherm, Kinetics, and Regeneration Studies

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Abstract

Removal of antibiotics from aqueous environments is of great importance because of their potential adverse effects on living organisms and enhancement of bacterial resistance. The present study deals with tetracycline (TC) removal using sawdust modified with different agents (CaCl₂, NaHCO₃, HCl, and FeCl₃) as a function of TC concentration (5.0-25.0 mg L⁻¹), solution pH (3.0-12.0), adsorbent dose (1.0-5.0 g L⁻¹), and contact time (15.0-120.0 min). Fourier Transform Infrared Spectroscopy and Scanning Electron Microscopy were employed to determine the characteristics of the adsorbent. The results showed that modification with FeCl₃ was the most efficient way to increase adsorptive properties of sawdust. Optimization showed the highest removal efficiency is obtained as 98.40% at initial TC concentration 12.5 mg L⁻¹, pH 7.9, adsorbent dose= 4.8 g L⁻¹, and contact time 118.3 min. The Fe-modified adsorbent could reduce TC in real hospital wastewater from 0.25 mg L⁻¹ to levels not detectable by HPLC. The equilibrium data for TC adsorption were better fitted to the

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