

Chromium (VI) uptake from aqueous solution by adsorption onto timber industry waste

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ABSTRACT

In the present study sawdust, a timber industry waste has been investigated as an adsorbent for the removal of Cr(VI) from synthetic wastewater. Batch mode experiments have been conducted by varying various process parameters including pH, Cr(VI) concentration, adsorbent dose and contact time. Cr(VI) removal was maximum at pH 2. Efficiency of sawdust for Cr(VI) removal from dilute wastewater was 80% at 20 g L⁻¹ adsorbent dose. FTIR spectra were recorded to explore number and position of the functional groups available for the binding of Cr(VI) ions onto sawdust. SEMs and EDAX of the adsorbents were recorded to explore the morphology and elemental constitution of the adsorbents. Langmuir, Freundlich and Dubinin–Radushkevich adsorption isotherms were also tested. Pseudo-second order model explains the Cr(VI) kinetic more effectively. Reusability of the adsorbents was examined by desorption in which HCl eluted 79.63% Cr(VI).

Keywords: Sawdust; Chromium; Isotherm; Adsorption; Desorption

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