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ULTRASOUND-ASSISTED ADSORPTION OF ERIOCHROME BLACK T ONTO A GREEN ADSORBENT, HAZELNUT SHELL

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Abstract

This study investigates the use of an ultrasound-assisted adsorption process to remove Eriochrome Black T (EBT) dye, employing hazelnut shells (HSs) as a green adsorbent. The adsorption of EBT dye onto (HSs) was conducted in a batch system, examining the effects of pH, EBT concentration, and adsorbent amount at room temperature (24°C ± 2.0), both with and without ultrasound (US) assistance. The highest adsorption was achieved at a pH of 2.0, and the dye uptake by HSs was enhanced with EBT concentration up to 100 mg L^{-1}. The EBT uptake capacity of HSs was determined to be 6.07 mg g^{-1} using an orbital shaker system (OSS), 3.57 mg g^{-1} with US at 35 kHz, and 3.71 mg g^{-1} with US at 53 kHz. The applicability of adsorption isotherms and kinetic models was assessed using experimental equilibrium data. The study successfully demonstrated the use of HSs as a green adsorbent for removing of EBT dye.

Key words: adsorption; Eriochrome black T, hazelnut shell, ultrasound

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