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Adsorption of dyes from aqueous solutions onto tur dal husk: Characterisation, Equilibrium and Kinetic studies

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Abstract

In the present study, agricultural waste tur dal husk was used for the adsorption of the dyes amaranth and methylene blue. The operating variables studied were initial concentration, initial solution pH, adsorbent dosage and contact time. Experimental equilibrium data were fitted to Freundlich and Langmuir isotherms. The kinetics of adsorption of methylene blue and amaranth onto tur dal husk was found to follow a pseudo first order kinetics. The maximum adsorption of amaranth and methylene blue was 45.09 and 216.68 mg/g of the adsorbent respectively. The Fourier transformed infrared spectroscopy reveals that –OH, C=O and C-O groups present in the tur dal husk is involved in the adsorption process. The optimum pH for the adsorption of methylene blue and amaranth was 6 and 2 respectively. Characterization of the tur dal husk showed that the relative percentage of protein is very less making it an excellent adsorbent for the removal of dyes from wastewater effluents.

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