

Adsorption of the reactive gray BF-2R dye on orange peel: kinetics and equilibrium studies

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ABSTRACT

Adsorption of the reactive gray BF-2R dye from an aqueous solution using orange peel as the adsorbent was investigated by the batch method. Experiments characterizing the chemical and physical properties of the adsorbent found that orange peel is a microporous material with a pH_{zpc} 3.9 and containing carboxylic and sulfonic groups. The greatest adsorption capacity was obtained using a 2^3 factorial design for 0.25 g of adsorbent, particle size < 0.419 mm and at 300 rpm. The pseudo-second-order model provided the best fit of the experimental data. The Weber–Morris model indicated that two or more mechanisms control the process. Statistical analysis of the equilibrium studies indicated that there was not a significant difference between the Langmuir and the Fritz–Schlunder models according to an *F*-test. The results showed that orange peel can remove the reactive gray BF-2R dye.

Keywords: Adsorption; Agroindustrial residue; Dye

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