



Removal of Direct Red 81 dye from aqueous solution using neutral soil containing copper

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ABSTRACT

The adsorption efficiency (%) of Direct Red 81 (DR 81) dye using neutral soil containing copper (NSCC) was studied in a batch reactor with respect to adsorbent dose, initial dye concentration, pH and contact time. Maximum adsorption efficiency (41.84%) was obtained from an adsorbent dose of 2 g/L, pH of 3, an initial dye concentration of 50 mg/L and a contact time of 60 min. An increase in the dye adsorption efficiency (%) was observed when the adsorbent dose increased and the pH decreased. The Langmuir and Freundlich isotherm models were tested, and it was found that the Langmuir model was fitted better than the Freundlich model. In addition, the rates of adsorption were found to conform to pseudo-second-order kinetics with good correlation ($R^2 \geq 0.99$). The highest adsorbent recovery (85%) was found with the use of 0.1 M NaOH. The results show that NSCC may be a suitable adsorbent for removal of DR 81 dye due to its low cost and relatively high efficiency.

Keywords: DR 81 dye; Adsorption; Soil; Copper

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