



Investigation of the cationic resin Amberlite®IRC-50 as a potential adsorbent to remove the anionic dye methyl orange

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ABSTRACT

The cationic exchange resin Amberlite®IRC-50 was evaluated as a potential adsorbent for toxic methyl orange (MO) dye. The adsorption study was evaluated as a function of time, temperature, pH value, optimal concentration of the anionic dye MO and adsorbent the cationic resin. The maximum retained content of MO was 68.2 mg g⁻¹ of concentration 200 mg L⁻¹. The various values of the rate constant for adsorption process of the dye MO were determined. Kinetic analysis of the adsorption study of the impact of the concentration was compatible with linear pseudo-second-order (The experimental capacity is very close as the capacity calculates, 68.2 mg g⁻¹ of experimental capacity and 76.9 mg g⁻¹ of capacity calculates). The thermodynamic parameters ΔG° (-1.84 at -4.00 kJ mol⁻¹), ΔH° (19.62 kJ mol⁻¹) and ΔS° (72.00 kJ mol⁻¹) were determined using the Van't Hoff equation. The values of these parameters indicate that the adsorption process is an endothermic and spontaneous. The adsorption process fit well with the Langmuir adsorption isotherm model.

Keywords: Adsorption; Methyl orange; Ion exchange; Cationic resin; Langmuir model; Kinetic modeling

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