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Auramine 'O' dye adsorption onto de-oiled cotton seed cake biochar: process optimization using Response Surface Methodology for maximizing adsorbate removal

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Abstract : Biochar, produced from de-oiled cottonseed cake was used as an adsorbent for Auramine 'O' dye removal from the aqueous solution. The effects of adsorbent dose, pH, temperature, initial dye concentration and contact time were investigated and were optimized using Response surface methodology based on Box-Behnken design to identify the conditions that maximize the adsorbate removal. Results indicate that basic pH favours the adsorption. The dye removal increased with increase in process parameters. Freundlich isotherm best fits the experimental data and the adsorption follows pseudo second order kinetics. The optimum conditions identified are pH of 10, initial dye concentration of 20 mg/L and adsorbent dose of 6 mg/L and temperature of 50^0C for 98.98% removal.
Keywords : Pyrolysis, Auramine 'O', Adsorption, Isotherm, RSM, De-oiled cotton seed cake.

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