

Removal of catechol from aqueous solutions by adsorption using low cost activated carbon prepared from *Eichhornia crassipes*

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ABSTRACT

The adsorptive removal of catechol employing *Eichhornia crassipes* (water hyacinth) for preparation of activated carbon was executed. Response surface methodology (RSM) was used for the optimization of the process variables for preparation of adsorbent and removal of catechol. Weight ratio of activating agent to water hyacinth (1.0–1.5 ml/g), temperature (400°C–500°C) and time of carbonization (50–100 min) were selected as the dependent parameters during optimization of carbonizing condition and percentage removal of prepared sample was the response. The optimized parameters for the carbonization was found at 400°C for 53 min having a weight ratio of activating agent to water hyacinth taken at 1.04:1. Furthermore, the conditions for removal of catechol using charred water hyacinth (CWH) were optimized. For this, the initial concentration of catechol (25–100 mg/L), weight of CWH (0.5–1.5 g/L), pH (4–10) and temperature (30–40°C) were considered as independent parameters and percentage removal of catechol as the response. The maximum removal of 82% catechol was attained at an initial concentration of 100 mg/L under the optimized parameters of pH 4 at 35°C at the weight of CWH 1.5 g which can be harnessed for adsorption mediated wastewater treatment. The adsorption follows pseudo second order kinetics and it was seen that this technique could be used effectively for large scale adsorption processes.

Keywords: Adsorption; Catechol; Response surface methodology; Kinetics, Langmuir isotherm, Freundlich isotherm

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