



## Removal of hexavalent chromium from aqueous solution using biomass derived fly ash from Waste-to-Energy power plant

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### ABSTRACT

Fly ash from the agricultural waste-based Energy Power Plant has been studied for the adsorption of hexavalent chromium [Cr(VI)]. In order to maximize the Cr(VI) removal from simulated aqueous solutions, effects of various parameters i.e. adsorbent dose (10–40 g/L), contact time (5–90 min), variation in pH (1–5), and initial metal ion concentration (10–80 mg/L) on Cr(VI) adsorption were investigated by batch adsorption experiments. It was observed that adsorption of Cr(VI) on the selected adsorbent was dependent on pH. Before optimization of experimental conditions, the percent removal of Cr(VI) from the aqueous solution (10 mg Cr/L) was approximately 4%, which increased to approximately 99% after optimization of experimental conditions. Maximum adsorption was observed upon adding 10 g/L of adsorbent to a 60 mg Cr/L aqueous solution at pH 1.0 and contact time of 90 min at 200 rpm. Equilibrium adsorption data were well fitted in Langmuir isotherm model which substantiate monolayer adsorption of Cr(VI) on fly ash. Kinetics of Cr(VI) adsorption on fly ash follows pseudo-second-order reaction.

*Keywords:* Adsorption; Hexavalent chromium removal; Fly ash; Isotherms; Kinetics

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