



## Fast adsorptive removal of methylene blue dye from aqueous solution onto a wild carrot flower activated carbon: isotherms and kinetics studies

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### ABSTRACT

In the present study, adsorption of methylene blue (MB) dye from aqueous solution on to a wild carrot flower activated carbon (WCFAC) as a potential adsorbent was investigated. No attempt has been made in the past on WCFAC and it also finds application in reducing the population of this poisonous weed. WCFAC was prepared using simple chemical activation method and MB dye adsorption was studied by batch adsorption experiments. The effects of various parameters like dosage effect, effect of pH, initial concentration of the dye and contact time on the adsorption capacity of MB dye on WCFAC are reported. It was found that, maximum adsorption (~88%) was observed at pH 6 with a good sorption capacity (~21 mg/g) of dye. The adsorption isotherms are analyzed by Langmuir and Freundlich models. The sorption data were better fitted by the Freundlich isotherm model as evident from the  $R^2$  value 0.940. Adsorption kinetics was performed and obeys pseudo-second-order kinetic model ( $R^2$  at 0.9325). The zero point charge for the WCFAC was found to be 4.9 pH. pH optimization studies show that the favorable adsorption range ~4–6 pH. Experimental and kinetic results reveal that WCFAC is a potential adsorbent for the adsorption of MB dye from aqueous solution.

*Keywords:* Wild carrot; Methylene blue; Langmuir; Freundlich; Adsorption

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