

## Kinetic and equilibrium studies of the activated carbon prepared from jackfruit leaves for the adsorption of methyl orange

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### ABSTRACT

In the present study, activated carbon (AC) was prepared from jackfruit leaves (JFL) using phosphoric acid as activating agent. The prepared AC was characterized by Fourier-transform infrared spectroscopy, nitrogen adsorption–desorption analyses and scanning electron microscopy. The adsorptive performance of the prepared activated was investigated by the adsorption of anionic dye methyl orange (MO) from aqueous solutions. The batch adsorption experiments were carried by varying operation parameters such as pH, adsorbent dosage, initial concentration of dye and contact time. The adsorption capacity was increased with increasing concentration of dye. The equilibrium adsorption data were well fitted to Langmuir isotherm model and maximum adsorption capacity was obtained to be 833 mg/g. The adsorption followed the pseudo-second-order kinetic model. Thermodynamic study suggested the endothermic nature of MO adsorption onto prepared activated carbon. Considering high dye adsorption capacity, AC prepared from jackfruit leaves can be used as a promising low-cost adsorbent for the removal of organic dyes from aqueous solution.

*Keywords:* Jackfruit leaves; Activated carbon; Adsorption; Isotherm; Kinetics

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