



## Adsorption of congo red onto activated carbons having different surface properties: studies of kinetics and adsorption equilibrium

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### ABSTRACT

To enhance congo red (CR) removal from aqueous solution, activated carbons prepared from date pits and modified by oxidation with nitric acid followed by heat treatment in a nitrogen atmosphere were tested. Kinetic and equilibrium adsorptions data of CR from aqueous solution were carried out, showing that the elimination of oxygen surface groups from activated carbon by heat treatment enhanced the adsorption capacity. The adsorption followed pseudo-second order kinetics. The experimental isotherms were analysed with two and three parameters equations (Freundlich, Langmuir, and Redlich–Peterson) using non-linear regression. The results showed that the Langmuir and Redlich–Peterson isotherms best-fit the equilibrium data, with maximum adsorption capacity of 105 mg/g calculated from Langmuir equation. The mechanism adsorption of this anionic dye on activated carbons involved electrostatic and dispersive interactions.

*Keywords:* Activated carbon; Surface properties; Dye; Adsorption; Kinetics; Isotherms

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