



A Comparative Study on Adsorptive Removal of Auramine O and Tartrazine dyes from Aqueous Solution using Activated Carbons

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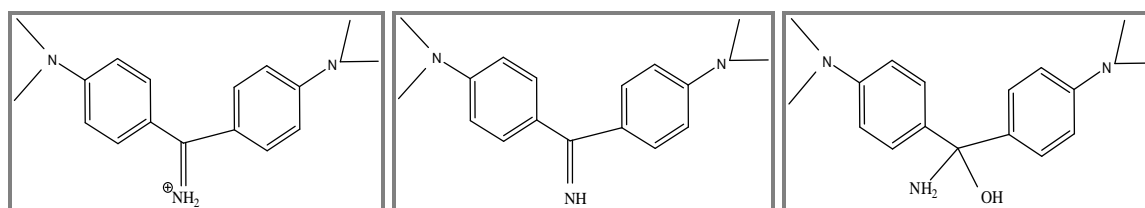
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ABSTRACT

Activated carbon was modified by oxidation with nitric acid to improve its adsorption capacity for the removal of cationic and anionic dyes from aqueous solution. The operational parameters investigated included initial concentrations, pH, temperature and contact time. The experimental data were analyzed by using Langmuir and Freundlich models of adsorption. The adsorption isotherm data for Tartrazine was best fitted to the Freundlich isotherm. While for Auramine O both isotherms fits with experimental data. The adsorption kinetics was modeled by the Lagergren first order and pseudo-second order model. The experimental data obeys pseudo-first order model for both dyes. Using a single batch adsorber design it has been revealed that as-received carbon sample act as good adsorbent for removal anionic dye and modified carbon is a better adsorbent for cationic dye removal.

Graphical Abstract



(a) AR[4,4' bis NMe₂Ph₂C⁺NH₂(λ_{max}=430nm)] (b) AR_{imine}[4,4' bis NMe₂Ph₂C = NH(λ_{max}=315nm)]
(c) AR_{carbinol}[4,4' bis NMe₂Ph₂C (NH₂)OH(λ_{max}=370nm)]

Auramine-O and its conversion forms.

Keywords: Surface acidity, Tartrazine, Auramine O, Batch design.