



Sorption Model for the Removal of 1 – Naphthyl Amine Dye from Aqueous Solution Using Orange Peel as Biomass

A.K. Asiagwu*

Department Of Chemistry, Delta State University, Abraka, Nigeria

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Abstract: This work presents the sorption model for the removal of 1– naphthyl amine dye from waste water using orange peels as the biomass. The effects of various experimental parameters such as adsorbent dosage, contact time, concentration and temperature were investigated. Results revealed that as the adsorbent dosage was increased from 2g to 6g the amount of dye adsorbed increased from 0.098mg/g to 0.219mg/g. Also increase in time interval from 20 to 100min reveals an increase in the amount of dye adsorbed from 0.110mg/g to 0.215mg/g. The effect of dye ion concentration shows a maximum adsorption of 1.093mg/g at 50mg/l. For temperature effects an increase from 30⁰C to 70⁰C shows the amount of dye adsorbed increased from 0.13mg/g to 0.144mg/g. The equilibrium data were fitted into Langmuir and Freundlich adsorption isotherm equation. A separation factor of 0.478 was obtained from the Langmuir equation indicating a favourable isotherm, the coefficient of determination for both isotherm (R^2) were 0.788 and 0.970 respectively. Pseudo first order and Pseudo second order kinetics were used to analyze the experimental data in which the rate constants K_1 and K_2 were observed as 0.029 and 0.119. Thermodynamic parameters like free energy (ΔG), enthalpy (ΔH) and entropy (ΔS) were also accessed, which shows that the process is a slow steady one.

Keywords: *Dye removal, Sorption isotherm, and Sorption kinetics.*

* Corresponding: E-Mail: drasiagwu@yahoo.com;