

## **Kinetics, Equilibrium and Thermodynamic Studies on Adsorption of Reactive Blue 29 from Aqueous Solution Using Activated Tamarind Kernel Powder**

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**Abstract :** Activated tamarind kernel powder (ATKP) was prepared from tamarind fruit (*Tamarindus indica*), and utilized for the removal of Reactive Blue 29 (RB29) from its aqueous solution. The powder was activated using 4N nitric acid ( $\text{HNO}_3$ ). The adsorbent was characterised using infrared spectroscopy, bulk density, ash content, pH, moisture content and dry matter content measurements. The effect of various parameters which include; temperature, pH, adsorbent dosage, ion concentration, and contact time were studied. Four different equilibrium isotherm models were tested on the experimental data, but the Temkin isotherm model was best-fitted into the experimental data. The pseudo-first order and pseudo-second-order kinetic models were also fitted into the graphs, but pseudo-second order was best fitted to the experimental data. The thermodynamic parameters showed that the adsorption of Reactive Blue 29 onto activated tamarind kernel powder is a physical process, feasible and spontaneous, exothermic in nature and there is decreased randomness at the solid/solution interphase during the adsorption process. Therefore, activated tamarind kernel powder has proven to be a very good adsorbent for the removal of Reactive Blue 29 dyes from industrial waste water.

**Keywords :** tamarind kernel powder, reactive blue 29, isotherms, kinetics

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