

## Removal of Xylenol Orange and Eriochrome Black T Dyes from Aqueous Solution Using Chemically Activated Cocos nucifera and Mango Seed

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**Abstract :** The biosorption of Xylenol Orange (XO) and Eriochrome Black T (EBT) from aqueous solutions by chemically activated Cocos nucifera and mango seed as a low-cost, natural, and eco-friendly biosorbents was investigated. The study for biosorption of XO and EBT was optimized by different experimental parameters, initial pH 2-7, temperature 30-60 °C, biosorbent dosage 0.1 - 0.5 g, and XO: EBT dye proportions 0 - 100 by weight %. Physicochemical characteristic studies were conducted by Fourier Transform Infrared (FTIR). The equilibrium uptake was increased with an increase in the initial dye concentrations in the solution. Biosorption kinetic data were properly fitted with the pseudo-second-order kinetic model. The experimental isotherms data were analyzed using Langmuir, Freundlich, Redlich-Peterson, and Toth isotherm equations. Thermodynamic parameters  $\Delta G_0$ ,  $\Delta H_0$ , and  $\Delta S_0$  were calculated indicating that the biosorption of Xo and EBT dye is a spontaneous and endothermic process. The Langmuir model gave the best fit by higher correlation coefficient ( $R^2 = 0.9971$ ) for both biosorbents at optimum circumstances as pH 3, temperature 30°C, dosage 0.5 g for chemically activated Cocos nucifera and 0.4 g for chemically activated mango seeds it assumes as monolayer adsorption. The maximum dye removal efficiency was determined as 79.75% with chemically activated mango seeds compared to chemically activated Cocos nucifera. In summary, this research work showed that chemically modified activated mango seed can be effectively used as a promising low-cost biosorbent for the removal of different XO and EBT mixed dye combinations from aqueous solutions.

**Keywords :** mixed dye proportions, xylenol orange and eriochrome black t, chemically activated cocos nucifera and mango seed, kinetic, isotherm and thermodynamic studies, FTIR

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