



Adsorptive Removal of Crystal Violet (aq) Using Untreated and Acid Treated Eucalyptus Leaves

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Abstract

In the present batch study, eucalyptus leaves (EUL) and H_3PO_4 treated eucalyptus leaves (PEUL) were used as adsorbents for the removal of Crystal Violet (CV). The bio-adsorption are executed to inspect the result of variation of different experimental variables like pH (2–10), adsorbent dose (1–10 g/L), contact time (5–360 min), initial CV concentrations (10–300 mg/L) and temperature (298–318K) on the adsorption of CV. The removal of CV from aqueous solution influentially relies on the pH of the solution. The optimal pH has been found to be 8. Between two bio-adsorbents, the maximum capacity of adsorption has been achieved at 151.44 mg/g for H_3PO_4 treated eucalyptus leaves. The experimental data has been found to be best fitted with the pseudo-second-order model. Langmuir isotherm of adsorption has been found to be more suitable over Freundlich or Temkin model, which denotes monolayer adsorption. Thermodynamic variables have revealed the spontaneity, randomness and endothermic nature of the adsorption process. Safe disposal investigation has emphasized the eco-friendliness of the adsorbents. The cost estimation of the adsorption process has shown that the process is economically viable and suitable for small and medium-sized industries in 3rd world countries.

Keywords: Adsorption, Crystal Violet, Untreated and Acid Treated Eucalyptus Leaves, Safe Disposal, Cost Estimation