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Synthesis, Characterisation and Application of Activated Carbon from Tree Bark for the Removal of Reactive Red – Isothermal and Thermodynamic Studies

K.S.Thangamani[1], N.Muthulakshmi Andal[2]*, V.Suba[3]

[1,2,3]Department of Chemistry, Dr.N.G.P Institute of Technology, Coimbatore, India
[2]Department of Chemistry, PSGR Krishnammal College for Women, Coimbatore, India

Abstract : Phosphoric acid treated activated carbon derived from ProsopisJuliflora bark (PJBAC) is tested for its adsorption capacity for Reactive Red 152 (RR152). The factors which are taken into consideration are the sorbent characteristics, the dye concentration, agitation time, solution pH and temperature. The prepared activated carbon was characterised by nitrogen adsorption isotherms, scanning electron microscope, elemental analysis, Fourier transform infrared spectroscopy, Thermo-gravimetric and Differential scanning calorimetric. The presence of high percentage of carbon and low percentage of ash resulting from proximate and ultimate analysis is an indication of a good material for production of porous carbon. The sorption capacity of an adsorbent increases with increase in concentration. The maximum uptake is 34.2 mg /g for concentration of 100mg/L of RR152.Adsorption is more predominant in acidic pH.The experimental adsorption data showed good correlation with the Freundlich models among the studied Langmuir, Freundlich and Tempkin isotherm models. The thermodynamic studies reveal that the adsorption process is favourable, exothermic and spontaneous. The present study recommends that the derived activated carbon can be effectively used for the removal of dye molecules from textile effluents.
Key Words: tree bark, adsorption, dye, isotherms, thermodynamics.

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