**Abstract**

*Prosopis juliflora* Bark Activated Carbon-Cobalt Ferrite Magnetic Composite (PJBAC-CFC) was synthesized by auto-combustion method and employed for the removal of Reactive red 152 (RR152) from aqueous solutions. Thre prepared composite was characterized by powder XRD, SEM and EDAX. Operating factors influencing the rate of adsorption viz., initial dye concentrations, doses of sorbent materials, preset time intervals and variable pH environments are substantiated by batch equilibration method. Conditions have been optimized for the maximum removal of DB2 (96%) from 100 mg/L initial concentration, 100 mg adsorbent dose, 60 min contact time and pH2. The maximum sorption capacity of PJBAC-CFC as calculated from equilibrium concentration data is 125mg/g. Magnetized composite material exhibited sorption characteristics. The isothermal adsorption data fits well with Freundlich isotherm. The outcome of the present work indicates that PJBAC-CFC can be effectively used as a cost effective potential adsorbent for trapping the dye molecules.