Use of activated carbon prepared from *Prosopis spicigera* L. wood (PSLW) plant material for the removal of rhodamine 6G from aqueous solution

Mahalingam Murugan\textsuperscript{a,*}, Manickam Jansi Rani\textsuperscript{b}, Perumal Subramaniam\textsuperscript{c}, Esakkiappan Subramanian\textsuperscript{d}

\textsuperscript{a}Department of Chemistry, Sri K.G.S. Arts College, Srivaikuntam, Tuticorin 628 619, Tamil Nadu, India, Fax: 04630255252; email: mahalingam_murugan2004@yahoo.com
\textsuperscript{b}Department of Chemistry, Govindammal Aditanar College for Women, Tiruchendur, Tuticorin 628 215, Tamil Nadu, India
\textsuperscript{c}Department of Chemistry, Aditanar College of Arts and Science, Tiruchendur, Tuticorin 628 216, Tamil Nadu, India
\textsuperscript{d}Department of Chemistry, Manonmaniam Sundaranar University, Tirunelveli 627012, Tamil Nadu, India

Received 25 March 2014; Accepted 28 October 2014

**ABSTRACT**

The removal of rhodamine 6G dye from aqueous solution using carbon prepared from cheaply available agro-product, *Prosopis spicigera* L. wood (PSLW), was investigated. This work involves studies of physical and chemical properties of adsorbent, batch sorption experiments, and continuous run in a packed column at laboratory scale. Optimum condition for rhodamine 6G dye adsorption on PSLW carbon was determined by varying pHs, adsorbate concentrations, contact time, adsorbent dosage, and temperature. Lower solution pH favored the adsorption of Rh 6G dye. Adsorption onto the surface, surface mass transfer, and pore diffusion of dye molecules were the main process involved in the removal of Rh 6G dye. The adsorption followed Langmuir isotherm and the maximum adsorption capacity was found to be 8.86 mg/g for an initial concentration of 30 mg/L at 30°C. Thermodynamic parameters indicated that the adsorption interaction was spontaneous and exothermic in nature. The column study was explained using Thomas model.

**Keywords:** Adsorption; Kinetics; *Prosopis spicigera* L. wood (PSLW) carbon; Rhodamine 6G; Thomas model