Adsorption of toxic Cr(VI) ions from aqueous solution by sulphuric acid modified *Strychnos potatorum* seeds in batch and column studies

K. Anbalagan\textsuperscript{a}, P. Senthil Kumar\textsuperscript{b,\ast}, R. Karthikeyan\textsuperscript{c}

\textsuperscript{a}Department of Chemical Engineering, SRM University, Chennai 600 033, India, Tel. +91 9442088867; email: anbu74_srm@yahoo.co.in
\textsuperscript{b}Department of Chemical Engineering, SSN College of Engineering, Chennai 603 110, India, Tel. +91 9884823425; email: senthilchem8582@gmail.com
\textsuperscript{c}Department of Chemical Engineering, Anjalai Ammal Mahalingam Engineering College, Kovilvenni 614 403, India, Tel. +91 4423767215; email: principal@aamec.edu.in

Received 11 January 2015; Accepted 6 May 2015

**ABSTRACT**

A new low-cost adsorbent such as sulphuric acid modified *Strychnos potatorum* seeds (SMSP) was employed for the removal of toxic Cr(VI) ions from aqueous solution in batch and column modes. Results showed that the removal of Cr(VI) ions could be effectively removed with the SMSP in batch operation. Adsorption of Cr(VI) ions onto SMSP followed the pseudo-first-order and Redlich–Peterson models in batch operation and Thomas model in column operation. Adsorption was more favourable at acidic pH of 2.0 with the maximum monolayer adsorption capacity of 202.7 mg/g. NaOH was a better desorbing agent with the recovery of 93.245% of Cr(VI) ions. Column studies were optimized with various parameters such as bed height (2–10 cm), Cr(VI) ions concentration (50–250 mg/L) and flow rate (5–25 mL/min). According to the fact that SMSP-based adsorption process could be a promising technology for the removal of Cr(VI) ions from wastewaters.

**Keywords:** Cr(VI) ions; Isotherms; Desorption; Kinetics; Thermodynamics; Thomas model

\textsuperscript{\ast}Corresponding author.

1944-3994/1944-3986 © 2015 Balaban Desalination Publications. All rights reserved.