Cactus opuntia (ficus-indica): an eco-friendly alternative coagulant in the treatment of paint effluent

S. Vishali\textsuperscript{a,b}, R. Karthikeyan\textsuperscript{b}
\textsuperscript{a}Department of Chemical Engineering, SRM University, Chennai 603 203, India, Tel. +91 94438 83562; email: meet.vishali@gmail.com
\textsuperscript{b}AAMEC, Kovilvenni, Thanjavur 614 403, India, Tel. +91 9940561915; email: drrkarthi@yahoo.com

Received 19 December 2013; Accepted 11 July 2014

\textbf{ABSTRACT}

In this study, the potentiality of \textit{Cactus opuntia} (ficus-indica), as a coagulant for the treatment of simulated industrial water-based paint wastewater in terms of colour, chemical oxygen demand (COD) and turbidity was investigated. The coagulation ability was assessed for 1 L of effluent using the standard jar test apparatus by varying the operational variables like eluent type (water, NaCl and BaCl\textsubscript{2}), eluent concentration (1–5 N), coagulant dosage (1–6 g), coagulant volume (20–100 mL), initial pH (5–11) and initial effluent concentration (3100, 4224, 5650, 6258 and 7693 mg/L named as sample number 1–5, respectively). The results were maximum when 100 mL of 3 g of \textit{C. opuntia}, eluted using 3 N NaCl was used as a coagulant to treat a litre of effluent. The favourable pH to run the treatment was confirmed as the actual pH of the sample (7.2–7.8). It was found that the removal efficiency increased as the pollution load swelled. The FTIR study revealed the presence of various functional groups, which are responsible for the coagulation process. The obtained results were compared with conventional coagulant ferric chloride. The results acknowledged that \textit{Cactus opuntia} (ficus-indica) a natural, eco-friendly coagulant, could be a strong alternative to the conventional coagulant in the treatment of water-based paint wastewater.

\textit{Keywords:} Cactus opuntia (ficus-indica) coagulation; Eluate; FeCl\textsubscript{3}; Paint effluent

\textsuperscript{*}Corresponding author.