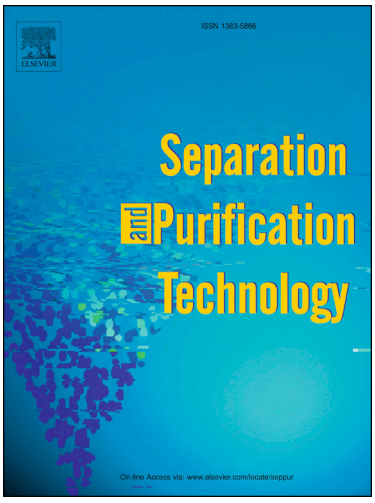

A New Indigenous Green Option for Turbidity Removal from Aqueous System

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A New Indigenous Green Option for Turbidity Removal from Aqueous System

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Abstract

The quest to develop effective, green, eco-friendly and sustainable indigenous solutions to a global challenge necessitated this study. The water extract of the fresh seed of *Margaritarea discoidea* was characterised and used as a primary coagulant in turbidity removal from qua system. The optimum coagulant dosage of the fruit seed extract (FSE) was determined and the time-concentration profiles of the coagulation/flocculation (CF) process was determined. The influence of process variables (i.e. turbid water pH value, anionic and cationic interference) on the CF process and the characteristics of the sludge derived from the process were evaluated. Premised on experimental and instrumental analysis, the active ingredient in the FSE was found to be galactomannans, a water soluble non-ionic hydrocolloidal polysaccharide. The kinetic analysis of the time-concentration profile data showed that the reaction pathway may not be straight forward as expected for a typical homogeneous chemical reaction. The nature of the active coagulating ingredients in the FSE revealed that the turbidity removal occurred via adsorption and bridging mechanism. Variations in the process variable parameters had no visible influence on the coagulation efficiency of the FSE. The values of the sludge volume index (31.1mg/g) and the specific cake resistance (α = 5.27 x 10^9m/kg) and the resistance of the filter medium (R_m = 1.58 x 10^4l/m) obtained for the sludge derived from the CF operations were below the values reported for sludges derived from many other CF processes.

Keywords: Turbidity; *Magarteria discoidea;* bio-coagulant; coagulation-flocculation; sludge; galactomannans