

Use Of Tannin Mimosa Based Natural Coagulants For Wastewater Treatment: Optimization and modeling using RSM Methodology

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Abstract-Industrial waters are discharges classified as hazardous because of their quantity, concentration or the physical and chemical properties of their constituents (turbidity, heavy metals, organic or phosphorus compounds) that threaten human health and the environment. Among the hazardous industrial waters, we distinguish industrial wastewater. These industrial discharges contain various products in insoluble or soluble form of mineral and/or organic origin, more or less biodegradable and sometimes toxic even in very low concentrations.

In this work, the coagulation-flocculation process was used as a new technology approach for the treatment of this type of rejection. In this study, the jar test was used to determine the optimal conditions of the coagulation-flocculation process using mimosa tannins as natural coagulant by applying a response surface methodology (RSM) based on the bencken box design (BBD) of three levels with three factors (PH, coagulant dosage and setting time) . The BBD is successfully demonstrated to effectively determine the optimized parameters, where 97% of the water turbidity was removed with an initial value of 201 NTU for the optimal conditions of pH (5), coagulant dosage (10 mL/L), settling time (60 min). To evaluate the performance of optimization and modeling of coagulation flocculation process, the coefficients of determinations R^2 and R^2 adjusted were used, the results obtained clearly show that the R^2 (97.20%) and R^2 adjusted (92.16%) obtained confirm the validity of this mathematical model.

Keywords- Tannin Mimosa, Coagulant, Wastewater Waters. Turbidity, Experimental Design.