



## Optimization of chemical coagulation of real textile wastewater using Taguchi experimental design method

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### ABSTRACT

In the present study, optimal coagulation conditions, such as pH, coagulant dosage, slow mixing rate, rapid mixing rate, and initial concentration, were determined using the Taguchi experimental design method. Color and turbidity were considered as performance statistics. An  $L_{25} (5^5)$  orthogonal array was selected as the experimental plan for the five parameters mentioned above. Performance measure analysis was followed by performing a variance analysis, in order to determine the optimum levels and relative magnitude of the effect of parameters. The obtained results allowed concluding that the optimal conditions in terms of color and turbidity removals were initial pH of the wastewater of 9, coagulant dosage of 200 and 400 mg  $Al^{3+}$ /l, slow mixing rate of 15 and 30 rpm, rapid mixing rate of 150, and initial concentration of wastewater of  $C_o/4$ , respectively. At the end of the experimental studies, obtained color and turbidity removal results for real textile wastewater were 99.43 and 99.22%, respectively, at these optimum conditions.

*Keywords:* Chemical coagulation; Taguchi; Optimization; Color; Turbidity; Textile wastewater

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