

## REMOVAL OF ORGANIC MATTER FROM TEXTILE INDUSTRY WASTEWATER BY SYNTHESIZED POTASSIUM FERRATE

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### ABSTRACT

This study investigated the use of synthesized potassium ferrate as a treatment option for the removal of organic matter (COD) and color contained in wastewater from a fabric dyeing and washing plant. The industrial organic dyes used in the process are: Reactive blue 19, Allura red and Reactive black 5. As a result of an experimental design at room temperature, an optimal dose of ferrate ion of approximately 90 mg-FeO<sub>4</sub><sup>2-</sup>/l was found at a pH = 7, conditions that generated a removal efficiency of soluble COD of 82%. The color removal efficiency was greater than 80% at pH = 7 and a ferrate ion dose of 120 mg/l. The coagulation-flocculation process takes 21 min; i.e. 1 min of rapid agitation and 20 min of slow and controlled agitation at a shear rate of 33 s<sup>-1</sup>. The critical sedimentation velocity of the formed flocs was 3.5 cm/min under optimal conditions. With this velocity, settlers with a surface load of 50.4 m<sup>3</sup>/m<sup>2</sup>/d can be designed, which is higher than the values commonly used in the design of settlers in water clarification plants intended for human consumption. In conclusion, the study shows that the use of potassium ferrate as a coagulant and oxidant is effective for the removal of organic matter and the discoloration of wastewater from the textile industry.

**Keywords:** Potassium Ferrate, Textile Industry Wastewater Treatment, COD Removal, Discoloration, Settling Velocity.

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