

## *Research Article*

# **Novel Method for Breakthrough Removal of Azo Dye from Aqueous Environment Using Integrated Coagulation and Fenton Process**

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Fenton process has proven to be efficient in the removal of color and chemical oxygen demand (COD) from the aqueous environment. However, the environment, health, and economic constraints on the dosage of hydrogen peroxide represent a limitation towards a wide practical use of this approach. In this study, a novel approach is proposed; this includes the treatment with ferrous oxide through coagulation followed by integrated Fenton process. However, the excess ferrous and ferric ions from the coagulation step were utilized in the advanced oxidation step using hydrogen peroxide. The advantage here is the usage of the minimum number of hydrogen peroxide to comply with all the international environmental, safety, and health regulations. The aim of this study is to evaluate the capabilities of the unique integrated process of coagulation and Fenton process for color and COD removal of azo dye in an aqueous environment. The optimum operating parameters such as coagulant dose, temperature, and the dose of hydrogen peroxide were determined. This was done with the objective to optimize the percentage removal of color and COD. The main properties of the treated wastewater such as pH and COD content were measured after treatment against the Malaysian standard part B. The results show that the proposed method was successful for the removal of the color and COD from the aqueous environment to reach more than 99% with the new method.