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Kinetic and Mechanistic Study of Chloramine-T Assisted Color Removal of Triphenyl Methylene Dyes Containing Waste Water: A Spectrophotometric Approach

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ABSTRACT

The removal of color in water which contains Tiphenylmethylene dyes by Chloramine-T (oxidizing agent) was studied in acid medium at 301 K. The mechanism of color removal was investigated. The experimental results show that the efficiency of color removal by CAT depends upon the concentration of CAT and pH of the medium. It was observed that the oxidation of AG50 and PB5 followed similar order with both the dyes. The experimental rate law is found to be $-d[CAT]/dt = k[AG50][CAT]^2[H^+]^{-X}[PTS]^{-Y}$, $-d[CAT]/dt = k[PB5][CAT]^2[H^+]^{-X}[PTS]^{-Y}$. *Other factors like ionic strength of the medium, dielectric effect, the addition of halide ions and reduction product (PTS) were also studied. The Stoichiometry was same in each case. The reaction was studied at different temperatures and the activation parameters were computed. Finally the observed results have been explained by plausible mechanism and the rate laws have also been deduced. Finally, CAT assisted color removal is found to be a very good alternative to some of the more conventional forms of chemical treatment, especially for treating actual textile waste with low natural pH.*

Keywords: Food dyes, Chloramine-T, kinetics, Reaction mechanism, Oxidative decolorization.