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**Investigation of kinetics and mechanistic studies of N-(2-hydroxyethyl) phthalimide by +1 halogen oxidant in acidic medium**

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**Abstract**

The oxidation of N-(2-hydroxyethyl) phthalimide (NHEP) by chloramine T (CAT) in perchloric acid medium has been investigated iodometrically at 298 K. The stoichiometry of the reaction was found to be 1:2. The oxidation products were identified by LC-MS analysis. Kinetic orders with respect to oxidant, substrate and acid concentrations were determined. Enhancement of rate observed with an increase in acid concentration. Effect of solvent polarity and ionic strength was studied. Addition of p-toluene sulfonamide (reductant) to the reaction mixture has no significant influence on the rate. The active species of the oxidant in acidic medium was ascertained. Plausible mechanistic scheme explaining all of the observed kinetic results have been proposed. The effect of temperature on the reaction rates has also been studied. Activation parameters and thermodynamic quantities were evaluated and discussed. The rate constant of the slow step of the reaction along with the equilibrium constants were also calculated.

**Keywords:**

NHEP-CAT redox system, Oxidation-kinetics, Rate law, Mechanism, Activation parameters

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