

**Exploration of Ruthenium (III) Chloride catalysis on oxidative conversion of aryloximes to arylaldehydes with bromamine-B: A kinetic and mechanistic approach Authors**

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**Abstract**

Conversion of aryloximes to corresponding arylaldehydes is an important oxidative transformation in synthetic chemistry. In the course of this research, optimum conditions for the facile oxidation of benzaldehyde oxime and p-substituted benzaldehyde oximes viz., phydroxybenzaldehyde oxime, p-methoxybenzaldehyde oxime, p-bromobenzaldehyde oxime and p-nitrobenzaldehyde oxime (aryloximes) with bromamine-B (BAB) catalyzed by ruthenium (III) chloride (RuCl<sub>3</sub>) in perchloric acid (HClO<sub>4</sub>) medium have been kinetically investigated at 303 K. All the five aryloximes follow identical kinetics with a first-order dependence of rate on [BAB]<sub>0</sub>, fractional-order each on [aryloximes]<sub>0</sub> and [RuCl<sub>3</sub>], and an inverse fractional-order on [H<sup>+</sup>]. Activation parameters have been evaluated. Oxidation products were characterized by spectral analysis. Under the identical set of experimental conditions, the kinetics of catalyzed reactions has been compared with uncatalyzed reactions and found that the catalyzed reactions are 4–6 folds faster. Isokinetic temperature is found to be 338 K. The catalytic constants (K<sub>c</sub>) have been calculated at different temperatures and the values of activation parameters with respect to the catalyst have been evaluated. Spectroscopic evidence for the formation of 1:1 complex between BAB and RuCl<sub>3</sub> has been obtained. The observed results have been explained by a plausible mechanism and the related rate law has been deduced. The present method offers many advantages including high conversion, short reaction times and the involvement of nontoxic reagents.

**Keywords:**

RuCl<sub>3</sub>-catalysis, Aryloximes, Arylaldehydes, Bromamine-B, Oxidation.

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