Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry

2018, 7 (5): 1450-1460

(International Peer Reviewed Journal)

Kinetics of Ir(III) Catalyzed Oxidative Decarboxylation and Deamination of L-phenylalanine by Chloramine-T: A Mechanistic Approach

Abhishek Verma[1], Arvind Kumar Pandey[2], Jyoti Pandey[1] and Sheila Srivastava[3]*

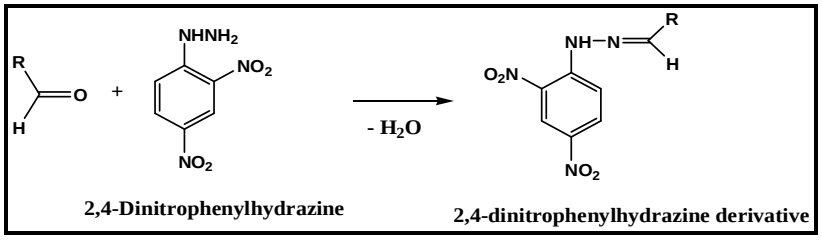
1. Department of Applied Chemistry, BBAU, Lucknow-226025, U.P., **INDIA**
2. Department of Chemistry University of Allahabad, 211002 U.P., **INDIA**
3 Chemical laboratories, Feroze Gandhi College, Raebareli-229001, U.P., **INDIA**
Email: sheila72@yahoo.com

Accepted 26th August, 2018

ABSTRACT

The kinetics and mechanism of homogeneously Ir(III) chloride catalyzed oxidation of L-Phenylalanine by chloramine-T [CAT] has been investigated in perchloric acidic medium in presence of mercuric acetate as a scavenger in the temperature range 30ºC-45ºC. The experimental results show first order kinetics with respect to the oxidant [CAT] and catalyst [Ir(III)] while positive effect with respect to substrate i.e. L-Phenylalanine was observed. The reaction shows negligible effect of [$Hg(OAc)_2$], [H^+] and ionic strength(μ)of the medium. Chloride ion positively influenced the rate of reaction. The reaction between chloramine-T and substrate (L-Phenylalanine) in acid medium shows 1:1 stoichiometry. To calculate activation parameters, the reactions have been studied at four different temperatures between 30 to 45ºC. A mechanism involving the complex formation between catalyst, substrate and oxidant has been proposed. Phenyl acetaldehyde has been identified chromatographically and spectroscopically as the final product of oxidation of L-Phenylalanine. Based on the kinetic data, reaction stoichiometry and product analysis, a reaction mechanism has been proposed and rate law has been derived.

Graphical Abstract



Preparation of 2, 4-dinitrophenyl hydrazine derivative

Keywords: Kinetics, Mechanism, Ir(III) catalysis, Amino acids, Chloramine-T, Acidic medium.