



## Oxidation of Some Vicinal and Non-Vicinal Diols by Imidazolium Dichromate: A Kinetic and Mechanistic Study

Shobha Puniya<sup>1</sup>, Bhagyalaxmi<sup>1</sup>, Rajesh Kumar<sup>1</sup>, Gifty Sharma<sup>1</sup>,  
PTSRK Prasadrao<sup>2</sup> and Vinita Sharma<sup>1\*</sup>

1. Chemical kinetics laboratories, Department of Chemistry, J.N.V. University, Jodhpur, **INDIA**

2. Department of Chemistry, PB Siddharth College of Arts & Science, Vijayawada, A.P, **INDIA**

Email: [drpkvs27@yahoo.com](mailto:drpkvs27@yahoo.com)

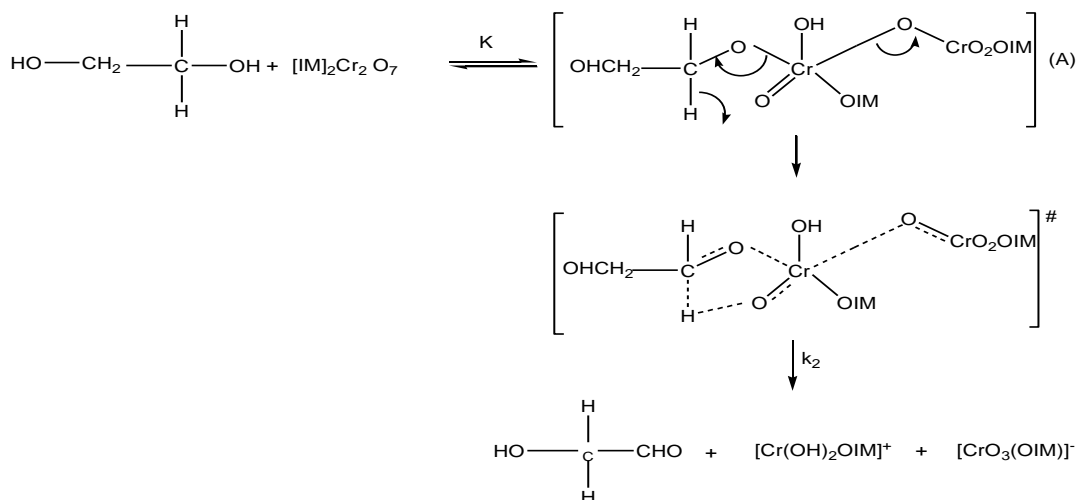
Accepted on 4<sup>th</sup> November 2017, Published online on 27<sup>th</sup> November 2017

### ABSTRACT

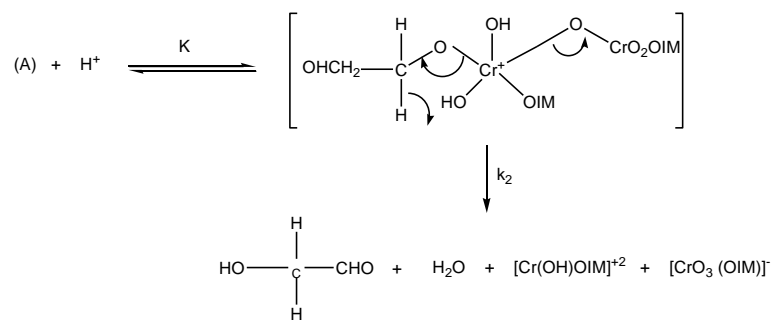
The kinetics of oxidation of four vicinal, four non-vicinal diols by imidazolium dichromate (IDC) have been studied in dimethylsulphoxide (DMSO). The main product of oxidation is the corresponding hydroxycarbonyl compound. The reaction is first order in IDC. Michaelis-Menten type of kinetics is observed with respect to the diols. The reaction is catalysed by hydrogen ions. The hydrogen ion dependence has the form:  $k_{obs} = a + b[H^+]$ . The oxidation of [1,1,2,2-<sup>2</sup>H<sub>4</sub>] ethanediol exhibits a substantial primary kinetic isotope effect ( $k_H/k_D = 5.75$  at 298 K). The reaction has been studied in nineteen different organic solvents and the solvent effect has been analysed using Taft's and Swain's multiparametric equations. The temperature dependence of the kinetic isotope effect indicates the presence of a symmetrical transition state in the rate-determining step. A suitable mechanism has been proposed.

### Graphical Abstract

Acid-independent Path



Acid-dependent Path



**Keywords:** Correlation analysis, dichromate, diols, kinetics, mechanism, oxidation.