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ORIENTAL JOURNAL OF CHEMISTRY
An International Open Free Access, Peer Reviewed Research Journal

www.orientjchem.org

ISSN: 0970-020 X
CODEN: OJCHEG
2012, Vol. 28, No. (3):
Pg. 1531-1532

A Facile Steroselective Synthesis of Z-Aldoximes from Benzaldehyde and Hydroxlaminehydrochloride in Dry Media

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(Received: June 03, 2011; Accepted: July 20, 2011)

ABSTRACT

The synthesis of Z-arylaldoximes has been carried out under microwave conditions using $CdSO_4$ as catalyst. The yields obtained were in the range 84-88%.

Key words: Z-oximes, Aldehydes, CdSO4, M W, Streoselectivity.

INTRODUCTION

Oximes are widely used as protective groups for carbonyl compounds in organic synthesis as they are very stable crystalline substances. Further, they are very important from pharmacological point of view.They can also be converted into useful nitriles As part of our continued interest in the protective group protocols in organic synthesis[1-5], we describe herein our results for the synthesis of oximes under microwave conditions in dry media using $CdSO_4$.

EXPERIMENTAL

In a typical procedure , benzaldehyde(1 mmol), and hydroxylaminehydrochloride (1.2mmol) were mixed together with $CdSO_4$ (0.5 g) in an Erlenmeyer flask and then irradiated at 320 W in a domestic microwave oven(Kenstar OM-9925E,800W, operating at 2450 MHz) and the reaction was monitored by TLC till completion. The flask was taken out,cooled and dichloromethane (5omL) added. The catalyst was filtered off and the resultant solution after drying over anhyd sodium sulfate evaporated to give a residue which was purified by column chromatography to afford the desired Z-oxime

RESULTS AND DISCUSSION

Oximes are commonly synthesized by condensing carbonyl compounds with hydroxylaminehydrochloride in an acidic medium although many other methods exist. However,this method usually yields a mixture of Z- and E-stereoisomeric oximes.

$$RCH=O + H_2NOH \rightarrow RCH=NOH + H_2O$$

We have already reported the stereoselective synthesis of Z-oximes using ZnSO4 as catalyst in this reaction. We have now investigated the use of CdSO4 as catalyst in this reaction. The results are collected in Table 1. A large variety of variously substituted (EWG and EDG) were investigated. These included benzaldehyde,4-nitrobenzaldehyde,4-chlorobenzaldehyde,2,6-dichlorobenzaldehyde,4-hydroxybenzaldehyde, anisaldehyde, tolualdehyde and cinnamaldehyde. The Z-oximes were obtained in 84-88% yield. These were obtained within about five minutes of microwaving the reaction mixture under open vessel conditions. E-oximes were not obtained All the products were identified on the basis of their spectroscopic data and by comparison of their mps with those reported in literature[1-4].

Table 1: Synthesis of Z-oximes under MW using CdSO4

Arylaldehydeoxime	Yield
Benzaldehyde	88%
3-NItrobenzaldehyde	84%
4-chlorobenzaldehyde	86%
2,6-dichlorobenzaldehyde	85%
4-Hydroxybenzaldehyde	84%
Cinnamaldehyde	85%

Cinnamaldehyde was chosen as the representative example of an alpha, beta-unsaturated arylaldehyde and its Z-streoisomeric oxime was obtained in 85% yield.

ACKNOWLEDGEMENTS

We thank CSIR,New Delhi for financial assistance and Mr Yashwant for a gift of the microwave oven used in present work

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