



सत्यमेव जयते

Government of West Bengal
Office of the Principal
GOVERNMENT GENERAL DEGREE COLLEGE, MANGALKOTE
PANCHANANTALA, KHUDRUN DIGHI, MANGALKOTE
P.O. - MAJHIGRAM; BLOCK - MANGALKOTE; SUB DIVISION - KATWA
DISTRICT - PURBA BARDHAMAN; WEST BENGAL; PIN CODE - 713132; INDIA
Email: ggdcmangalkote@gmail.com; Website: <http://mangalkotegovtcollege.org>

MEMO NO. 98/ MGC,

DATE 28/02/2022

To Whom It May Concern

This is to certify that Dr. Debasish Kundu, Assistant professor in Chemistry of Government General Degree College, Mangalkote is doing Collaborative Research with Dr. Rathin Jana, Assistant Professor of Chemistry, Shahid Matangini Hazra Govt. General Degree College for Women from 2022. This Collaboration has furnished significant scientific address, developing a productive relationship between the two Institutions.

Their Collaborative effort has created several opportunities of publications in the field of "Natural Transition Metal Catalysis" for the 3 year period. I hope that their collaborations remain as dynamic with several successful publications in the prestigious Science Journals.



Officer-In-Charge
Government General Degree College, Mangalkote

OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132

Dr. Pradipta Kumar Basu
OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132



GOVERNMENT OF WEST BENGAL

Office of the Principal

SHAHID MATANGINI HAZRA GOVT. GENERAL DEGREE COLLEGE FOR WOMEN

Chaksrikrishnapur-Kulberia :: Kulberia :: Purba Medinipur 721643

matanginicollege@gmail.com/ principal@matanginicollege.ac.in 03228-262261/262262 www.matanginicollege.ac.in

Memo No : Chem/11(a)

Date: 28/02/2022

To Whom It May Concern


This is to certify that Dr. Rathin Jana, Assistant professor in Chemistry of Shahid Matangini Hazra Govt. General Degree College for Women is doing Collaborative Research with Dr. Debasish Kundu, Assistant Professor of Chemistry, Government General Degree College, Mangalkote, from 2022. This Collaboration has furnished significant scientific address, festering a productive relationship between the two Institutions.

Their Collaborative effort has created several opportunities of publications in the field of "Natural Transition Metal Catalysis" for the 3 year period. I hope that their collaborations remain as dynamic with several successful publications in the prestigious Science Journals.


Principal

Shahid Matangini Hazra Government
General Degree College for Women,
Chaksrikrishnapur-Kulberia, Kulberia, Tamuk, Purba Medinipur

Principal
Shahid Matangini Hazra Government
General Degree College for Women
Chaksrikrishnapur, Kulberia, Nimgouri
Tamuk, Purba Medinipur


Dr. Pradipta Kumar Basu
OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132

MINI-REVIEW ARTICLE

Bromoaldehyde as a Useful Starting Materials for the Synthesis of Various Hetero Cyclic and Carbocyclic Molecules by Pd-catalyzed Reaction

Mitali Dewan¹, Debasish Kundu² and Rathin Jana^{1,*}

¹Department of Chemistry, Prabhat Kumar College, Shahid Matangini Hazra Govt. General Degree College for Women, Nimtouri, West Bengal, India; ²Department of Chemistry, Government General Degree College at Mangalkote, Khudrun, Purba Bardhaman, 713132, India

ARTICLE HISTORY

Received: December 04, 2022

Revised: March 27, 2023

Accepted: March 30, 2023

DOI:

10.2174/2213346110666230508154324

Keywords: Pyran, intermolecular heck, C-H bond functionalization, palladium, complex, 9 10 dihydrophenanthrene, halovinylaldehydes.

Abstract: This short review presents an overview of the effectiveness of β -bromoaldehyde as synthetic tool in organic chemistry. Few groups have reported significant contributions on β -bromoaldehyde. The aim of our short review was to give an overview of the latest advances in the chemistry of β -bromoaldehyde from their preparation to their transformations and applications in organic synthesis of some heterocyclic and carbocyclic molecules by using palladium-catalyzed reaction.

1. INTRODUCTION

This short review presents an overview of the synthesis and applications of both aromatic and vinylbromovinylaldehydes as a starting compound in synthetic organic chemistry. Different groups have reported significant contributions on halovinylaldehydes [1-7]. and our review aims to give an overview of the latest advances in the chemistry of bromoavinyaldehydes, from their synthesis to their applications in carbocyclic and heterocyclic synthesis by using palladium-catalyzed reaction.

Palladium (II) complexes are very important in organo-palladium chemistry. They are normally electrophilic, and they are soluble in most of organic solvents, and stable in air. Thus, they are easily stockpiled and handled. The best common organic palladium (II) reactants are electron-dense classes, such as alkynes and arenes. Cyclization by Pd (II)-catalyzed oxidative addition and reductive elimination is a dominant process for building heterocyclic. This method usually comprises the addition of a covalent molecule to a Palladium (0) complex, with the cleavage of the covalent bond and oxidation of Pd (0) to Pd (II) to give an organo-palladium (II) halide or triflate complex. The σ -bonded type, once formed, commonly undergoes speedy insertion of an unsaturated species. Successive reductive elimination to afford the preferred heterocyclic and Palladium (0), which reenters the catalytic cycle directly, in contrast to Palladium (II)-catalyzed reactions, which commonly need an additional reoxidation step. The mechanistic pathway of this

reaction has been reviewed [8-15]. The Pd-catalyzed cyclization of aryl, vinyl halides or triflates comprising adjacent alkenes, alkynes/dienes, and arenes through oxidative addition and reductive elimination reactions provides a very valuable approach to a wide range of oxygen and another heterocyclic [16-27]. Here we have discussed the synthesis of various heterocyclic and carbocyclic molecules by palladium-catalyzed reaction starting from β -bromoaldehyde.

2. SYNTHESIS OF 2-BROMO-CYCLOHEXENECARBALDEHYDES

The first reported bromoaldehyde was synthesized by Arnold and Holy starting from cyclohexanone following a formerly developed method by Arnold and Zemlicka for the preparation of chlorovinyl aldehydes [28] using Vilsmeier-Haack type reagent PBr_3 in DMF in place of $POCl_3$ (Scheme 1). This method is high yielding method for the synthesis of β -bromovinyl aldehydes to date.

3. METHODS OF SYNTHESIS OF CARBOCYCLIC AND HETEROCYCLIC COMPOUND STARTING FROM β -BROMOALDEHYDE

We have developed a universal synthetic route for constructing a fused pyran ring system and tetracyclic pyran moiety by Pd-catalyzed β -hydride elimination and by C-H activation [29, 30]. First, vinylbromoaldehyde **1** was reduced to vinyl bromoalcohols **2** by reacting with $NaBH_4$ in CH_3CN (Scheme 2). Then, the precursors O-allylated (**3**)/methallylated (**4**) products were synthesized by the reaction of alcohol **2** with allyl bromide/methallyl bromide in the presence of NaH in THF at 0°C.

*Address correspondence to this author at the Department of Chemistry, Prabhat Kumar College, Shahid Matangini Hazra Govt. General Degree College for Women, Nimtouri, West Bengal, India; E-mail: rathinj83@gmail.com



2213-3461/XX \$65.00+.00

© XXXX Bentham Science Publishers