American Journal of Drug Delivery and Therapeutics
ISSN 2349-7211
2020
Vol.7 No.4

Solvent-free synthesis and characterization of 6-chloro-3-alkyl/aryl/heteroaryl-1,2,4-triazolo[4,3-b]pyridazines

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Abstract

The 1,2,4-triazole nucleus is an important five-membered heterocyclic scaffold, which is found large number of marketed drugs. Pyridazine ring has been known to be present in several natural products and drugs. A number of synthetic methods have been developed for the synthesis of 1,2,4-triazolo[4,3-b]pyridazine derivatives which involve the oxidation of hydrazones with various reagents such as lead tetraacetate, bromine, nitrobenzene, copper dichloride, mixture of Me4NBr and oxon etc. Unfortunately, most of these methods suffer from various disadvantages such as hazardous materials, poor yield and longer reaction time at higher reaction temperature. Utility of iodobenzene diacetate (IBD) in oxidative transformation is a valuable strategy for greener synthesis because of its easy availability, mild reaction condition and ease of handling. In view of these observations, solvent-free protocol synthesis was developed in the present study for the synthesis of 6-chloro-1,2,4-triazolo[4,3-b]pyridazines using iodobenzene diacetate (IBD) as an eco-friendly agent. Initially, a mixture of 3,6-dichloropyridazine 1 was refluxed with 1 equivalents of hydrazine hydrate in tert-butylalcohol which furnished 6-chloro-3-hydrazinopyridazine 2 after four hour. Further, 1 moles of benzaldehyde was homogenized with 1 equivalent of 2 the reaction mixture was grinded in pestle mortar at room temperature. The reaction was regularly monitored at short intervals by thin layer chromatography (tlc) which indicated the completion of reaction in 20 minutes and a new spot appeared. Then 1.1 equivalents of IBD was added in situ and the reaction mixture was grinded for another 1 hr. Formation of 3 was confirmed on the basis of tlc and spectral data. 1H NMR spectra of compounds 3 displayed pair of doublets for H-4 and H-5 of pyridazine ring at 7.1-8.4 ppm and 7.0-8.1 ppm, respectively with coupling constant 3J= ~ 9.2 Hz.

Biography:

My name is Mamta. I am research scholar at Kurukshetra University, Kurukshetra, India, and pursuing research under the kind supervision of Prof. Ranjana aggarwal. My research interest is to synthesize nitrogen containing heterocyclic compounds of biological significance. Compounds which I have synthesized during my Ph.D. evaluated for cytotoxicity and some of the compounds give promising activity.

Speaker Publications:

1.Synthesis and cytotoxic evaluation of some new 1-(6-chlopyridazin-3-yl)-3-H/alkyl-4-phenyl-1H-pyrazol-5-amines and their derivatives. Mamta, Ranjana Aggarwal, Jessie Smith, Rachna Sadana, Indian J. Het. Chem., 2016, 26, 1/2, 59-68.

2. Synthesis and characterization of 1-(6-chlopyridazin-3-yl)-3-H/alkyl-4-phenyl-1H-pyrazol-5-amines and their derivatives. Mamta, Poster presentation in Proceedings of the 51st Annual Convention of Chemists, Kurukshetra University (Kurukshetra), Dec. 2014, Abstract No. ORG(PP)-43.

3. A facile and efficient synthesis of 6-chloro-3-alkyl/aryl-1,2,4-triazolo[4,3-b]pyridazines as potential photonuclease. Mamta, Ranjana Aggarwal. Poster presentation in International Conference on Nasecent Developments in Chemical Sciences (BITS), Pilani, Oct. 2015, Abstract No. PP-106.

4. A facile synthesis and characterization of new 1-(6-chloropyridazin-3-yl)-3-alkyl-4-phenyl-1H-pyrazolo-5-amines and their derivatives of biological interest. Mamta, National Conference on Modern Trend in Chemical Sciences, (M. L. Sukhadia University, Udaipur), Jan. 2016, Abstract No. PP-4, pg-24.

12th International Conference & Expo on Chromatography Techniques; Berlin, Germany - April 20-21, 2020.

Abstract Citation:

Mamta, Solvent-free synthesis and characterization of 6-chloro-3-alkyl/aryl/heteroaryl-1,2,4-triazolo[4,3-b]pyridazines, Advanced Chromatography 2020, 12th International Conference & Expo on Chromatography Techniques; Berlin, Germany.
(https://chromatography.pharmaceuticalconferences.com/abstract/2020/solvent-free-synthesis-and-characterization-of-6-chloro-3-alkyl-aryl-heteroaryl-1-2-4-triazolo-4-3-b-pyridazines)