ISSN: 2455-7064

Contents lists available at http://www.albertscience.com

ASIO Journal of Chemistry, Physics, Mathematics & Applied Sciences (ASIO-JCPMAS)

Volume 1, Issue 1, 2016, 01-03

SYNTHESIS OF 1-ARYL-[MERCAPTO-(P-CHLORO BENZOYL)-METHYL]-4 [PHNYL/P-CHLORO PHENYL]-IMIDAZOLES AND THEIR ACETYL CHOLINE ESTERASE INHIBITORY ACTIVITY

Uma Singh[1†], Padam Kant[2], J Singh Gaur[2]

[1] Epidemiology Division, Indian Institute of Toxicology Research, M.G. Marg, Lucknow, U.P., India
[2] Departments of Chemistry, Lucknow University, Lucknow, U.P., India

ARTICLE INFO

Research Article History

Received: 22 July, 2015
Accepted: 25 October, 2015
Corresponding Author:
†Uma Singh

Department of Chemistry, Lucknow University, Lucknow, U.P., India.

Email: lucknow.uma.singh816@gmail.com

ABSTRACT

Twelve 1-aryl -2-[mercapto (p –chlorobenzoyl)-methyl1]-4-[phenyl/p-chlorophenyl]-imdidazoles (iii a-1) were synthesized by the condensation of various 1-aryl -2-mercapto-4[phenyl/p-chlorophenyl]-imidazole (Ia-1) with 4-chlorophenyl bromide (II). All the synthesized compounds were evaluated for their inhibitory properties towards choline esterase activity. Bactericidal activity of these compounds was also studied *in vitro* method. None of the compounds possessed significant choline esterase inhibitory activity. The compound (IIIa, c, h) were found to be moderately good antibacterial agents against *bacillus pumilus, baccilus cereus*.

Keywords: Imdidazoles, chlorophenyl bromide, antibacterial agents.

INTRODUCTION

A careful survey of literature has revealed some new imidazoles derivatives which have significant pharmacological values viz., anthi-hypertensive [1], monoamine oxidase [2], antidepressant [3], vasodialator [4], sedatives [4], anti-convulsant [5], and bactericidal [6]. Imidazoles-2-yl-thioalknoic acid and their derivatives possess hypolipidemic, anti-atherosclerotic, anti-thrombic and anti-inflammatory activity as has been reported by some researchers and Nyberg et al. have found some imidazoles derivatives to inhibit dopamine–beta-hydroxylase *in vitro* [8]. Some of the imidazoles derivatives are useful as antiparkinson agent, diuretics and cardiotonics [8].

2-(bromo methyl)-dihydro benzofuran derivatives of imidazoles has been reported useful for the treatment of myocardial infection, angina pectoris and thrombosis etc [9]. Some researchers have reported imidazoles derivative to be useful as inflammation inhibitors, virusides and sun screens [10]. 2-Mercapto -5-imidazoles carboxylates exhibits anti –inflammatory activity against carrageenan induced rat jaw edema [11]. Recently, few researchers have reported imidazole derivative to be useful as bactericides and protozoacides.

In addition to above properties, imidazoles also possess acetyl choline esterase inhibitory activity as reported by some researchers [12]. Keeping in view of the usefulness of 2-mercaptoimidazoles, we thought that it would be worthwhile to introduced p- chlorophenyl group, pharmacological activities of which are well known at 2 –position in imidazoles ring, since such compound could incorporate in their chemical makeup, the essential pharmacodynamic requirement, as may be needed in the biologically active acetyl choline esterase inhibitory and anti–bacterial compound.

MATERIALS & METHODS

1-aryl -2-mercapto-4 [phenyl/p-chlorophenyl]-imidazole, 4-chlorophenyl bromide and other chemicals were purchased from Sigma Aldrich, Mumbai, India. Preparation of 1-Aryl -2-mercapto-4-(phenyl/p-chloro –phenyl) –imidazoles (ia-1): These compounds were prepared by the earlier reported methods [11-12].
Prepration of 1-(o-Hydroxyphenyl)-2 [mercato-(p-chlorobenzoyl) methyl]-4- (phenyl/ p-chloro–phenyl)-imidazoles (Ia-1): These compounds were prepared by the earlier reported method [11-12].

dids no.: 03.2016-26169319, dids Link: http://dids.info/didslink/03.2016-82544922/

Preparation of 1-(0-Hydroxyphenyl)-2 [mercapto –(p-chlorobenzoyl) methyl]-4-(p-chlorophenyl)-imidazole (IIIa) 1-(2- Hydroxyphenyl)-2 –mercapto-4 – (p-chlorophenyl)-imidazoles(0.01M) (Ia) and sodium hydroxide (0.01M) were taken in di methyl formamide in a round bottom flask and heated for half an hour. p –chlorophenacyl bromide (0.01M) (II) was added to it (figure 1). The contents of the flask were refluxed for 4 hours. Finally, the reaction mixture was cooled and poured over crushed ice. The solid thus separated was washed with ice cold water. It was crystallized from DMF/water.

Melting points were taken in melt–Temp apparatus in open capillaries and are uncorrected.

TLC was done on silica gel and the spots were detected by iodine vapors.

FTIR spectra were recorded by using Perkin-Elmer spectrophotometer.

The C, H and N, analyzers were carried out manually using the Authors H & Thomas C, H and N analyzer.

Antibacterial Activities

The antibacterial effects of these compounds against *Bacclilus pumilus*, and *B. Cereus* were investigated earlier by some researchers [8-11].

The list organism included *B. Pumilus, B. subtilis* and *B. cereus* the agar medium was inoculated heavily with the test organism and the filter paper disc (6.35 mm) saturated with two drops (2 g/ml) in aqueous ethanol or water, were placed or agar . After 48 hours of incubation periods, the zones of inhibition around the disk were measured. If the zone size smaller than 6.35 mm were considered as negative activity.

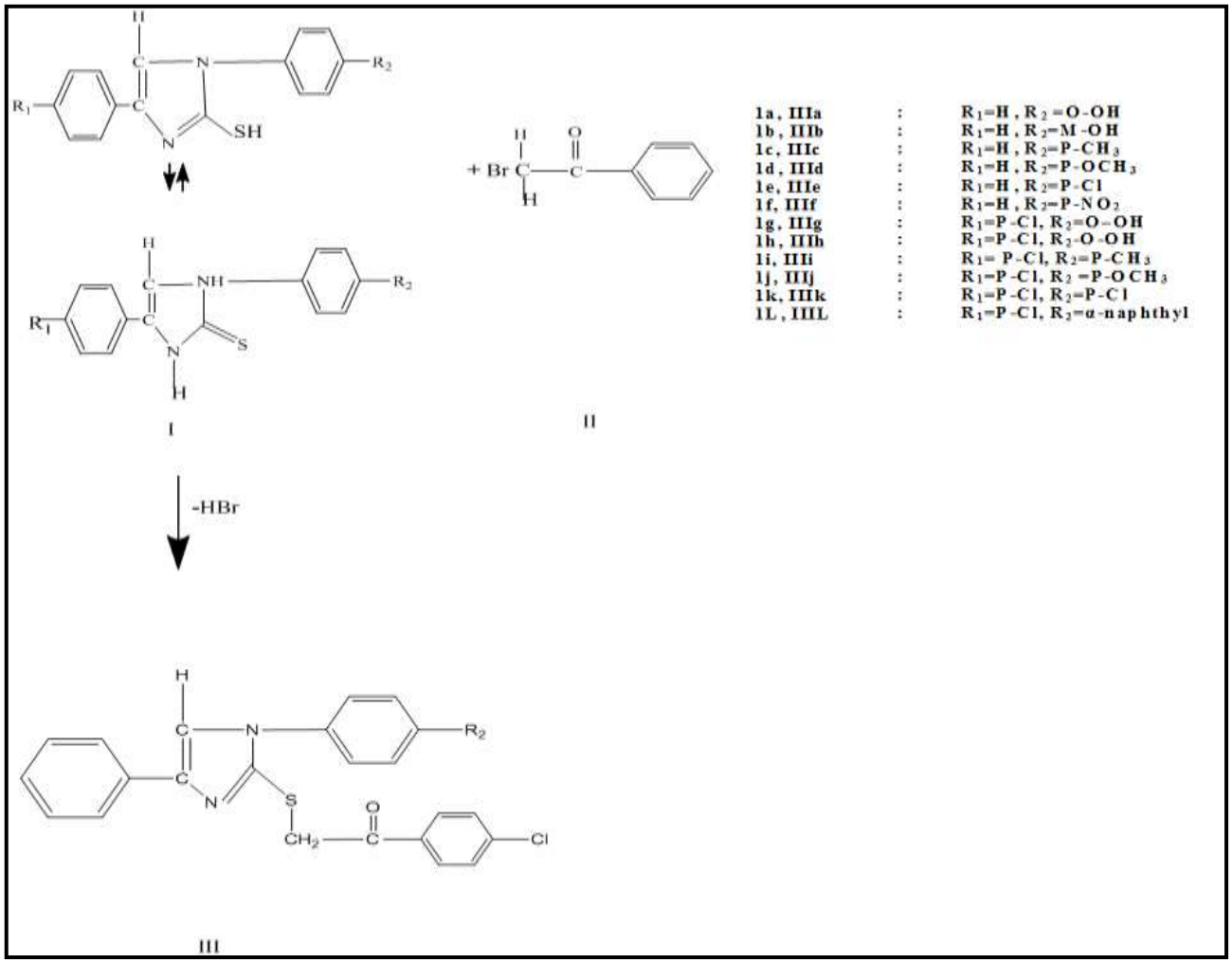

Figure 1: Twelve 1-aryl -2-[mercapto (p –chlorobenzoyl)-methyl1]-4-[phenyl/p-chlorophenyl]-imdidazoles (iii a-1) were synthesized by the condensation of various 1-aryl -2-mercapto-4[phenyl/p-chlorophenyl]-imidazole (Ia-1) with 4-chlorophenyl bromide (II).

dids no.: 03.2016-26169319, dids Link: http://dids.info/didslink/03.2016-82544922/

RESULT AND DISCUSSION

The present work involved the reaction between 1-aryl -2- marcapto-4- (phenyl / p-chlorophenyl)-imdazoles (Ia-1) with p-chlorophenacyl bromide (II) using sodium hydroxide in DMF. The1-aryl-2-[mercapto (p-chlorobenzoyl) methyl]-4- (4- chloro phenyl)- imidazoles (IIIa-1) thus formed were confirmed by elemental and I.R. spectral analysis. The I.R. spectra showed the important bands at 2920 (-CH_2), 1685(C=O), 1600(C=N), 1430(S-CH_2), 1320 cm^{-1} (Penta cyclic ring). The presence of a band at 1430 cm^{-1} (S-CH_2) and absence of peak of –SH group the formation of the compounds.

CHN Analysis: For $C_{23}H_{10}N_{202}SCl_2$: C, 60.66; H, 3.51; N, 6.15%, Found: C, 60.60; H, 3.48; N, 6.20%

IR: 2990(-CH_2), 1850 (C=O), 1600(C=N), 1430(-S-CH_2-), 1320(penta-cyclic ring) and 660cm-1(C-Cl).

Similarly, other 1-aryl -2-[mercapto (p-chloro benzoyl)-methyl]-4-(phenyl/p-chloro phenyl)-imidazoles (IIIa-1) were synthesized.

All the compounds (IIIa-I) synthesized, are marginally active against all the strains of the bacteria used.
The compounds having 4-chloro substitution at 4-aryl position are more active. It can be confirm by comparing the activities of compound IIIa and IIIg; IIIc and IIIh; IIIi.

Acknowledgement
Authors are thankful to Central Library, Lucknow University, Lucknow, India, for providing necessary facilities.

REFERENCES

1. Simpson J. Chemical education. 1946, 95, 236.
2. Schonberg A. J. Am. Chem. Soc. 1938, 824.
3. Baker W, Ouis WD. quart. Rev. 1957, 15.
4. Davis D, Backer HJ, Rogers EF. Phytopatnology, 1956, 49,821.
5. Putler RW, Wolform G. BRIT. Pat 823. 001, Ger. PAT. 1, 057, 124.
6. Baemiker HC, D ruey J, Helv J. Chem. Act a 1957, 40, 918.
7. Grew CV, Nyberg WH, Cheng CS. J. Med. Pharm. Chem. Soc. 1962, 5, 851.
8. Nyberg WH, Cheng CS. J. Med. Chem. 1965, 8, 531.
9. Kier LB, Fox LE, Dhawan D, Waters IW. J. Am. Chem. Soc. 1962,195, 817.
10. Ochme P, Goves E, Schwarz K, Pelsch K, Faulhaber HD, Lauge P. Acta Biol. Med. 1965, 14, 369.
11. Stewart TJ, Kier LB. J. Pharm. Sci. 1965, 54,731.
12. Dambal DD, Pattanashetty PP, Tikare B, Badami V, Puranik GS. Ind. J. Chem. Sec. B, 1984, 23B (2): 186.

dids no.: 03.2016-26169319, dids Link: http://dids.info/didslink/03.2016-82544922/