Multicomponent synthesis of hydrazino benzothiazole and its substituted derivatives

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ABSTRACT:

A Literature survey indicates that benzothiazole derivatives possess anti-inflammatory and anti-bacterial activity. 6-chloro-2-mercapto benzothiazole on reflux with different hydrazines in the presence of DMF and anhydrous K_2CO_3 gives 2-substituted hydrazino-6-chloro benzothiazole. The synthesized compounds were characterized by elemental analysis and spectral data.

KEY WORDS: *6-chloro-2-mercaptobenzothiazole, K_2CO_3, 2-substituted hydrazino-6-chloro benzothiazole*

1. INTRODUCTION:

Benzothiazole derivatives are an important class of heterocyclic compounds that exhibit a wide range of biological properties in medicinal and agricultural chemistry [1-5]. Further industrial applications as antioxidants [6,7], vulcanization accelerators [8,9], and a do pant in a light emitting organic electroluminescent devices [10] have also been reported. Many reports have appeared in the literature describing the formation of benzothiazoles via one of the two major routes. However, these methodologies suffer from one or more disadvantages, such as tedious workup, high temperature, prolonged reaction time, and toxic organic solvents such as DMF and DMSO.

Carrying out organic reactions in water has become highly desirable in recent years to meet environmental considerations. The use of water as a sole medium of organic reactions would greatly contribute to the development of environmentally friendly processes. It would be even more desirable to carry out catalytic organic reactions in water, which normally require delicate reaction conditions in order for the catalyst to be stable and yet reactive. In this context, in recent years much attention has been focused on Lewis acid-catalyzed organic reactions in water, and several reactions of this type have been already identified. Substituted benzothiazole is an important class of heterocyclic compounds that exhibits a wide range of biological properties such as inhibitors of stearoyl-coenzyme desaturase, antitumor, antimicrobial, LTD_4 receptor antagonist and the Gram-positive selective antibacterials [11-17].

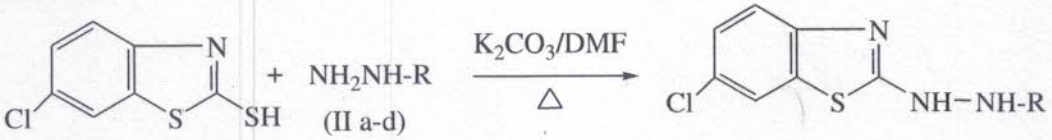
2. LITERATURE REVIEW:

Inspite of tremendous advance made in modern medicine, there are still a large number of aliments for which suitable drugs are yet to be found. Today, there is an need to develop safer drug for the treatment of pain. Hydrazino benzothiazole and isatin derivatives are an important class of organic heterocycles because of their potential activities are reported to be effective in CNS disorders such as convulsion [18] and depressions [19]. Indole and benzothiazoles its analogs constitute the active class of the compounds possessing wide spectrum of antimicrobial [20], anthelmintic [21], analgesic [22] , anti-inflammatory [23] and tuberculosis [24] activities. In view of our program to develop novel analgesic agents it was decided to synthesize substituted derivatives of hydrazino benzothiazole.

3. MATERIALS:

All melting points were determined in open capillary tube and were uncorrected. IR spectra were recorded with potassium bromide pellets technique, ^1H NMR spectra were recorded on AVANCE 300 MHz Spectrometer in DMSO using TMS as internal standard. Mass spectra were recorded on a FT VG-7070 H Mass Spectrometer using EI technique at 70 eV. All the reactions were monitored by Thin layer chromatography.

4. METHOD:



6-chloro-2-mercapto benzothiazole

(I)

2-substituted hydrazino-6-chloro benzothiazole

(III a-d)

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5. DISCUSSION:

Preparation of 2-substituted hydrazino-6-chloro benzothiazole (III a.d):

6-chloro-2-mercapto benzothiazole on reflux independently with hydrazine hydrate, phenyl hydrazine/ 4-nitro phenyl hydrazine /2,4-dinitro phenyl hydrazine in the presence of DMF and anhydrous K_2CO_3 gives 2-substituted hydrazino-6-chloro benzothiazole. The synthesized compounds were characterized by elemental analysis and spectral data.

6. ANALYSIS:

The objectives of the present work are to synthesize certain hydrazino benzothiazole derivatives and study their antibacterial and anti-inflammatory activity in particular. Thus an attempt has been made in this direction. As expected substituted benzothiazoles exhibited antimicrobial activity some are equipotent to that of standard employed for comparison. Therefore a detailed study of toxicity is necessary. There is no such a thing as completely safe drug. Drugs are powerful tools which alter physiological processes for the better or for the worse.

7. FINDINGS: A novel compound synthesize to evaluate antibacterial and anti-inflammatory activity.

8. RESULT:

A society which wishes to benefit from them will not achieve all the benefits are for the biological testing do not always turn out as potential new drugs, but may be intended to serve as models for evaluation of hypothesis.

10. CONCLUSION:

In conclusion, a facile one pot synthesis has been developed for the title compounds using readily available starting materials. Thus, there is a network of reaction equilibria which all finally flow into an irreversible step yielding the product. 2-subtituted hydrazino-6-chloro benzothiazoles are responsible for antibacterial activity, but it is interesting to note that benzothiazole moieties when fused with other moieties showed a broad spectrum antibacterial activity. Hence in search of new generation of antibiotics it may be worthwhile to explore the possibility in this area by fusing different moieties and increase potency.

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