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Antibacterial and Antifungal activity of Piperazinylbenzothiazine

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ABSTRACT

Antimicrobial activity of Piperazinylbenzothiazines were tested for antimicrobial activity against bacteria, Bacillus alkalophilus (MTCC NO=7913), Bacillus subtilis (MTCC NO=411), Bacillus flexus (MTCC NO=7024), Bacillus subtilis (MTCC NO=121), Bacillus subtilis (MTCC NO=1305) and their antifungal activity against Aspergillus Nigrum, Aspergillus Flexus. Thus on the basis of results, it has been found that Piperazinyl -4H-1,4-benzothiazine consider as biological dynamic compounds.

Keywords: Antioxidants, Antibacterial activity, Antifungal activity, Antimicrobial activity, Piperazinyl -4H-1,4-benzothiazines, 4H-1,4-benzothiazine, Piperazine.

INTRODUCTION

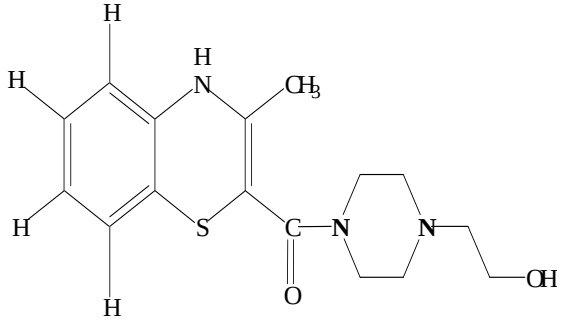
In current years, there has been a growing interest in the synthesis of heterocyclic compounds because most of the compounds with bioactive nature are derived from heterocyclic structures. Heterocyclic compounds are rich in nature and implicated in the synthesis of pharmaceutical and biological important molecules. The piperazine and their derivatives are played significant role in heterocyclic chemistry. Large number of piperazine derivatives also exhibited various biological activities such as antimicrobial, antiinflammatory, painkiller, local anesthetic, antimalarial, antidepressant, hypocholestrolemic and antileukemic etc .4H-1,4-benzothiazene make an important class of heterocyclic compounds, include both Nitrogen and Sulphur heteroatoms. 1,4 benzothiazene derivatives are significant because of their remarkable biological properties such as antibacterial, anti-viral, anti-hyperpedimic, anti HIV,antitumour, anti-fungal[1-7].

Piperazine and 4H-1,4-benzothiazine heterosystems have been examine as important pharmacophores for integration of design, and synthesize biologically dynamic molecules. The heterocycles incorporating the biodynamic heterosystem; 1,4-benzothiazine-piperazine.The presence of piperazine heterosystem in above combination will make them to interact more effectively with biological receptors to make the synthesized compounds therapeutically attractive. In current years benzothiazoles, benzothiazines and its derivatives fused or attached with other biodynamic heterosystems, especially morpholine, piperazine etc have gained unique importance due to wide range of biological/pharmacological activities which are reflected by their uses as anti-covulsant, anesthetic, anticancer, anti-tuberculosis, anti-hypertensive, anti-malarial, hypoglycemic, anti-biotic, etc [8-10].

MATERIALS AND METHODS

Piperazinyl- 4H-1,4-benzothiazines (I)
Piperazinylbenzothiazine were synthesized by manner present in literature [11]. Data required for conformation of structure of the synthesized compound was match with literature [12-22].

Synthesized Piperazinylcarbonyl-4H-1,4-benzothiazines (II) is given as :
(I) 7-chloro-3-methyl-2-[4-(2-hydroxyethyl)-1-piperazinylcarbonyl]-4H-1,4-benzothiazine



I

(Scheme-1)

Antimicrobial Activities
Synthesized compound were monitor for their antimicrobial activity against bacteria, *Bacillus alkalophilus* (MTCC NO=7913), *Bacillus subtilis* (MTCC NO=411), *Bacillus flexus* (MTCC NO=7024), *Bacillus subtilis* (MTCC NO=121), *Bacillus subtilis* (MTCC NO=1305*)* and their antifungal activity against *Aspergillus Nigrum, Aspergillus Flexus* by Agar disc diffusion method. The results obtained were given in **Table:1-2**

Methodology
In this method, the bacterial inoculums fix to certain concentration was inoculated on to the entire surface of a plate with a sterile cotton-tipped swab to form an even lawn. The above components were dissolved and sterilized in an autoclave at 15 lbs and 121^{o}C for 15 minutes. The sterilized medium was discharge into different sterilized Petra-plates in laminar, and was allowed to solidify. The paper disks (6 mm in diameter) permeated with diluted compound II solution was placed on the surface of each NA plate using a sterile pair of forceps.

Then the plates were incubated aerobically and the diameter of zone inhibition was observed by a calliper. Based on the diameter of the inhibition zone and the results were then assigned to three categories, susceptible, intermediate, or resistant. The bigger the diameter of the inhibition zone, the more susceptible is the microorganism to the antimicrobial compound**.**

Table1:- Antibacterial activities of the compound (I) at different concentration in ethanol as control

Name of Bacteria	Zone of inhibition in different concentration in (mm)			
	250ppm	200ppm	150ppm	100ppm
Bacillus Alkalophillus (MTCC NO. 7913)	7mm	7.5mm	6.5mm	7mm
Bacillus Subtilus (MTCC NO. 411)	20mm	8mm	18mm	9mm
Bacillus Flexus (MTCC NO. 7024)	6.9mm	22mm	10mm	9mm
Bacillus Subtilis (MTCC NO. 121).	6mm	5.7mm	5.9mm	6mm
Bacillus Subtilis (MTCC NO. 1305).	6mm	6.5mm	6mm	6mm

Table-2 Antifungal activity of the compounds (I) at different concentrations in ethanol as control

Name of Fungal	Zone of inhibition in different concentration(in mm)			
	250ppm	200ppm	150ppm	100ppm
Aspergillus nigrum	22mm	13mm	19mm	10mm
Aspergillus flexus	20mm	13mm	16mm	17mm

CONCLUSION

It has been observed that the synthesized compound (I) show antimicrobial activity against microbes. Thus from the results, it has been found that piperazinyll-4H-1,4-benzothiazine shows generous variety of antifungal and antibacterial activities in comparison to piperazine or 4H-1,4-benzothizines independently thus believe as bioactive compounds.

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