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Review Article

A REVIEW: THIAZINES DERIVATIVES TREATED AS POTENTIAL ANTIMICROBIAL AGENTS

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ABSTRACT

In recent days, heterocycles and their derivatives have become strong reflection in medicinal research and pharmaceutical fields because of their practical pharmacological and biological activities. Organic compounds; mainly heterocyclic compounds are wealthy in natural world and contain extra value because their structural subunits are established in many natural products such as enzymes, vitamins, antibiotics, acids, and hormones. Thiazine nucleuses found in compounds have variety of pharmacological activities such as antitumor, antimicrobial, antibacterial, antifungal, antiviral, and anti-inflammatory. This review spotlight on the substituted thiazines with possible antimicrobial activities that are at the present in development.

Keywords: Antibacterial, Substituted thiazines, Antimicrobial agents.

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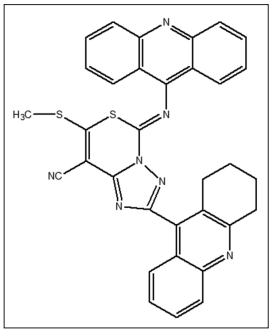
INTRODUCTION

Heterocycles participate in a remarkably important section in the present civilization and group of different applications in diverse fields. Thus, continuously research work has been carried out for the synthesis of new heterocyclic compounds counting synthesis of derivatives of naturally finding ones - proteins, nucleic acids, alkaloids, vitamins, etc. Heterocycles mainly containing heteroatom nitrogen and sulfur have immense possible effect primarily as agrochemicals, medicinal drugs, etc. Thiazine based heterocyclic compound in which N and S atom present in different position (Fig. 1) having N-C-S, N-C, and C-S relationship have been used as antitubercular, antibacterial, antimicrobial, antitumor, antifungal, herbicidal agents, tranquilizers and different dyes, etc. Thus, substituted thiazines are employed in a diversity of organic reactions as reactant, intermediates, and products [1-11]. Thus, the article is dedicated to the place of different thiazine ring systems in heterocycles for their nature as antimicrobial agents. The objective of this review is gather data on antimicrobial activities of thiazines derivatives. This review has clearly confirmed that substituted thiazines treated as potential antimicrobial agents. Thus, we have decided to review on different form of substituted thiazines.

BIOLOGICAL ACTIVITY OF 1,4-BENZOTHIAZINE

Ali and El-Kazak (2015): Thiazine derivatives (1) were evaluated *in vitro* for their antimicrobial activity and showed fair results as antimicrobial agents [12].



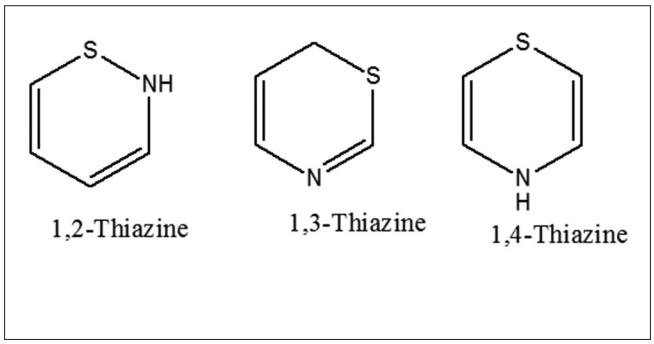
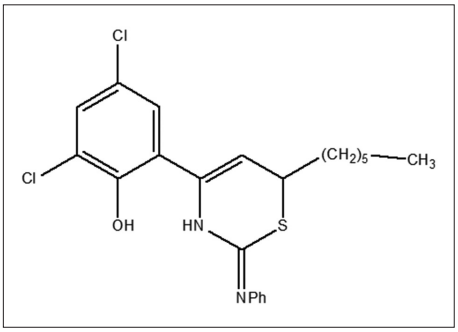
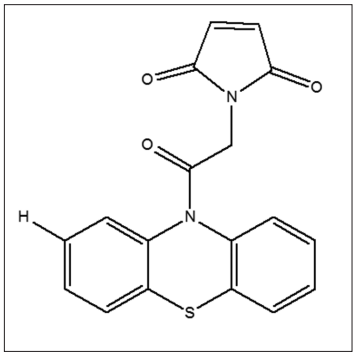


Fig. 1: Different type of thiazines based on position of N and S atoms

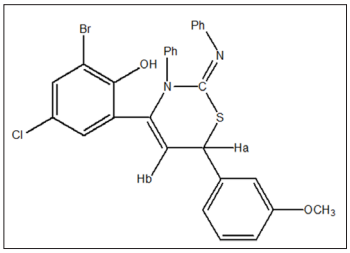
Rathod and Rajput (2010): Synthesized thiazine derivatives were examined for their antimicrobial activities against *Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa,* and *Escherichia coli* species. The presence of –OH group and N, S, hetero atoms add to the antimicrobial activity of this compound [13].



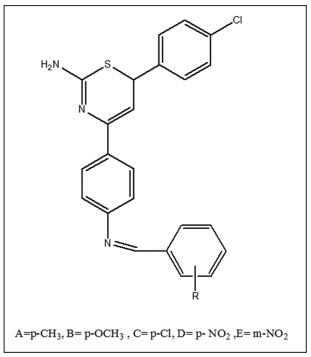
Shweta and Deepika (2011): Synthesized compound was evaluated for antibacterial and antif ungal activities against *B. subtilis, E. coli*, etc., and showed antibacterial activity [14].



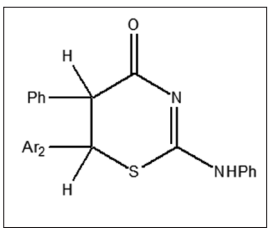
Deshmukh (2015): 1,3-thiazines when monitor *in vitro* against some general bacteria, *viz*., *E. coli, S. aureaus, B. subtilis*, and *P. argenosa.* It was found that compounds have shown a range of biological activities [15].



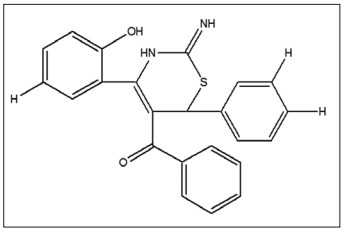
Babu and Pitchai (2015): The synthesized thiazine derivatives were elucidated using spectral data and antimicrobial activity studied using disc diffusion method *E. coli, S. aureus, Aspergillus niger,* and consider as good antimicrobial agents [16].



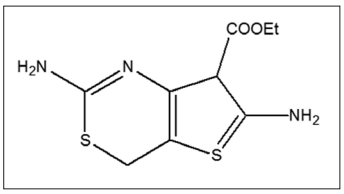
Ghoneim *et al*. (2015): Antimicrobial activity of the synthesized 1,3-thiazine compound was investigated against pathogenic materials *B. subtilis* (Gram-positive), *E. coli* (Gram-negative), and two fungus using the disk diffusion method [17].



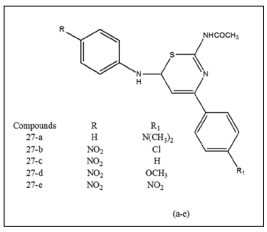
Haider (2012): The compounds (25) were monitored for their antimicrobial activity against bacterial strains *S. aureus* (Gram-positive) and *P. aeruginosa* (Gram-negative) [18].



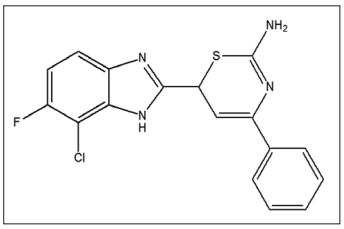
Ghoneim and Bdelaziz (2014): Thiazines mentioned below were tested for biological activities against bacteria *S. aureus* (Gram-positive) and *E. coli* (Gram-negative) in addition to pathogenic fungi and exhibit good results [19].



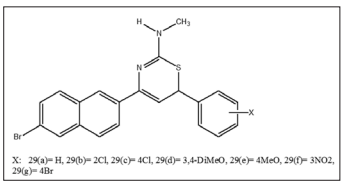
Beena (2013): Thiazine derivatives 27a-e showed antimicrobial activity against all the bacterial microorganisms used for the study [20].



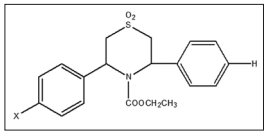
Gayathri and Jacob (2012): Substituted thiazines were screened for their antibacterial activity. Compounds containing electron withdrawing groups in the substituted benzimidazole thiazine were established to show strong antibacterial activities [21].



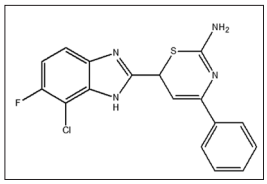
Prakash and Ingarsal (2015): Thiazine derivatives were tested their antimicrobial activities against representative bacterial strains *E. coli*, *B. subtilis*, *P. aeruginosa*, *S. aureus,* etc., and fungal strains *A. niger* and *Aspergillus flavus* [22].



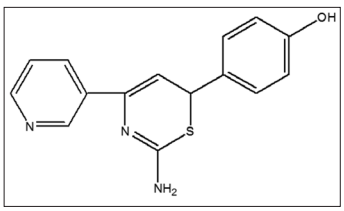
Valliappan (2013): Synthesized compounds were examined *in vitro* for antimicrobial activity against *E. coli* (Gram-negative), *S. aureus* (Gram-positive), *Aspergillus fumigatus*, and *A. niger* and shown antimicrobial activities [23].



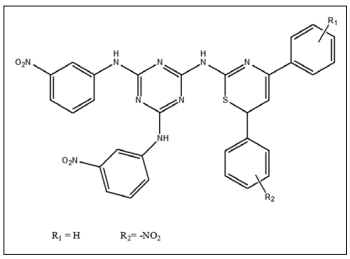
Banda *et al*. (2012): The compound has been screened for their analgesic and antimicrobial activities. Benzimidazole thiazine was found to show potent analgesic and antibacterial activities [24].



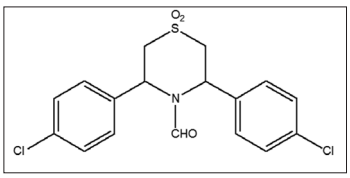
Kadhim (2010): Azachalcone compounds show biological activities against different strains of bacterial and fungi [25].



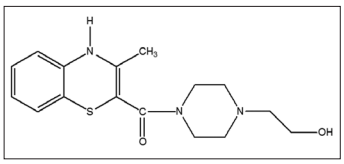
Gahtori and Ghosh (2012): Thiazine derivatives (15) showed moderate to significant susceptibilities toward deferent strains of bacteria [26].



Govindan (2013): Substituted 1, 4-thiazine-1, 1-dioxides were examined for their *in vitro* antimicrobial activity against Gram-positive and Gram-negative bacterial strains exhibit the strong antimicrobial activities [27].

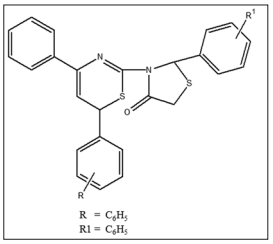


Sharma *et al*. (2012): Substituted morpholinyl and piperazinyl benzothiazines were examined for antimicrobial activity against and consider as antimicrobial agents [28].

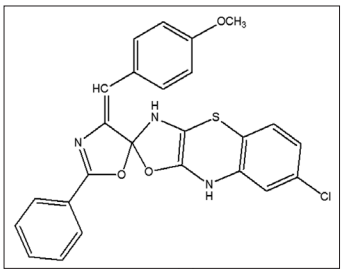


Rathod (2013): Benzothiazines were tested for antimicrobial activities against different bacterial and fungal strains such as *E. coli, S. aureus, P. aeruginosa, B. subtilis, Candida albicans,* and *A. niger* [29].

Didwagh *et al*. (2013): Substituted thiazine derivatives were tested for their antimicrobial activity using ciprofloxacin and fluconazole as standard drugs and shows antimicrobial activities [30].



Dabholkar *et al*. (2013): Substituted benzothiazines were examined for antimicrobial activities against various strains of bacteria such as *S. typhi, E. coli*, *B. substilus,* and *S. aureus* and exhibit antimicrobial activity [31].



CONCLUSION

Literature [32-39] revels that thiazines based heterocycles are treated as major group of heterocycles. On the basis of above data, it has been confirmed that a variety of thiazine based heterocycles are believed as probable antimicrobial agents.

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