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Review Article

# A REVIEW ON THE ANTIMICROBIAL ACTIVITY OF 1, 2, 4-TRIAZOLE DERIVATIVES

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The 1, 2, 4-triazole ring is an ubiquitous structural feature of many synthetic compounds with diversified therapeutic efficacy. A large volume of published literature over the last few decades preludes a comprehensive review. The major activities exhibited by triazole derivatives are insecticidal, antibacterial, antiviral, sedative, hypnotic, anticonvulsant and anti-inflammatory action. This article present a comprehensive review on the antimicrobial activities of some novel derivatives of the 1, 2, 4-triazole moiety.

**Keywords:** 1,2,4-triazoles, Antibacterial activity

## INTRODUCTION

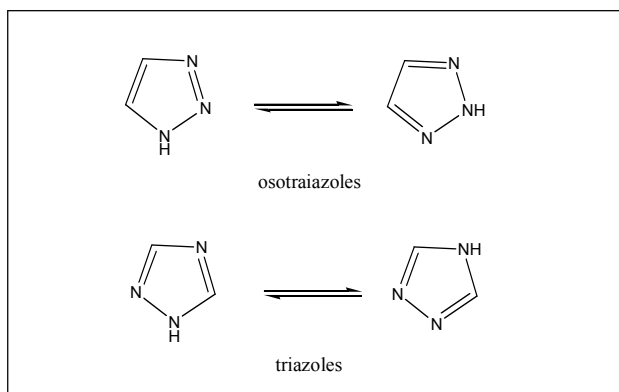
Nowadays research is concentrated towards the introduction of new and safe therapeutic agents of clinical importance. The heterocycles are enjoying their importance as being the centre of activity. The nitrogen containing heterocycles are found in abundance in most of the medicinal compounds. The success of the imidazole as an important moiety of number of medicinal agents led to the introduction of the triazoles. The triazoles are said to be the isosters of imidazoles in which the carbon atom of imidazole is isosterically replaced by nitrogen. Triazoles are 5 membered rings, which contain two carbon and three nitrogen atoms. According to the position of nitrogen atoms, the triazoles exist in isomeric forms.

Two structural isomeric triazoles are known , the 1, 2, 3-(1, 2, 5) and the 1, 2, 4-(1, 3, 4), the former being known as osotriazole, and the latter as triazole. Each exists in two disimilar tautomeric forms. The different isomers are characterized by the position of the nascent hydrogen. Thus, 1, 2, 4-triazoles exist in two isomeric forms, i.e., 1H and 4H.

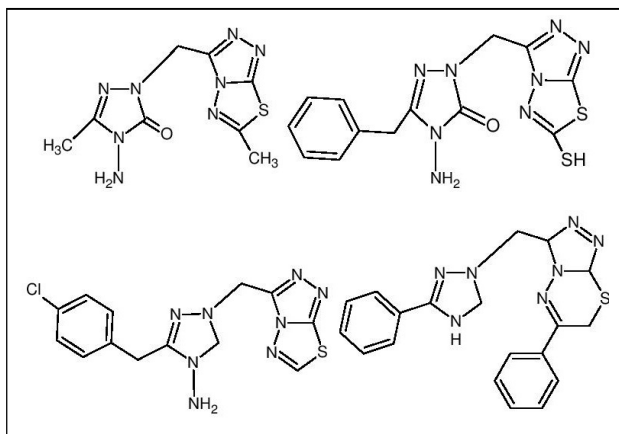
1, 2, 4-Triazoles shows various biological activities such as antifungal, antibacterial, antitubercular, anticonvulsant, analgesic, anti-inflammatory, antiviral activities. This review article highlights the recent work that has been carried out on 1, 2, 4-triazoles reporting the antimicrobial properties of the triazole moiety.

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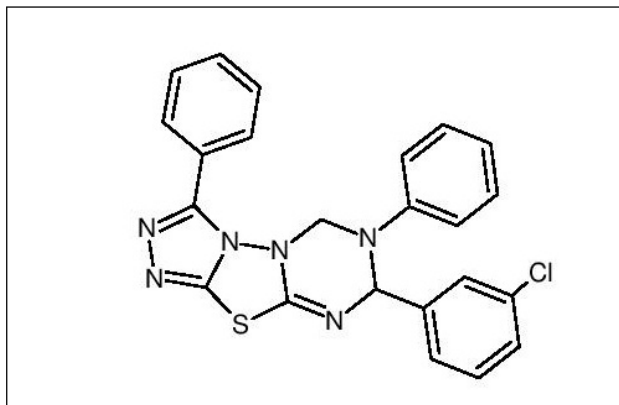
<sup>2</sup> Department of Pharmaceutical Chemistry, Acharya and B M Reddy College of Pharmacy, Bangalore, India.



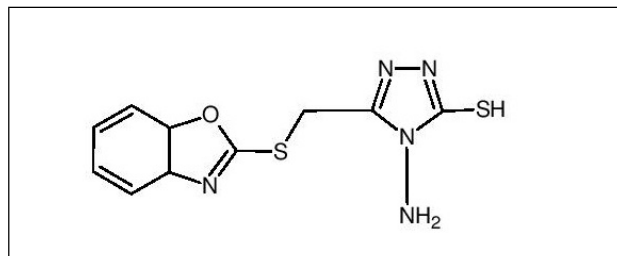
Neslihan Demirbas *et al.* (2008) synthesized some new [1, 2, 4]-triazolo-[3, 4-b], [1, 3, 4]-thiadiazoles and [1, 2, 4]-triazolo-[3, 4-b], [1, 3, 4]-thiadiazines] and screened them for antimicrobial activity.



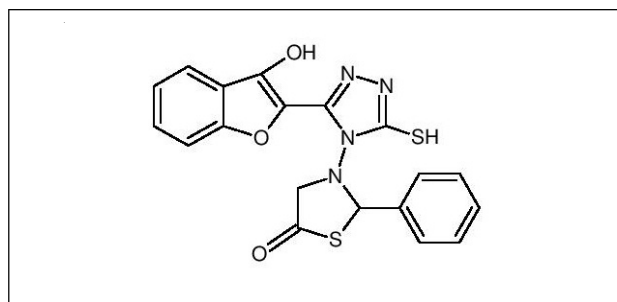
Amit Kumar Rai *et al.* (2006) synthesized certain Triaryl-s-Triazolo- [3, 4-b] -1, 3, 4-thidiazolo [3, 2-b] -s Triazine -5-thiones and screened them for anti fungal activity.



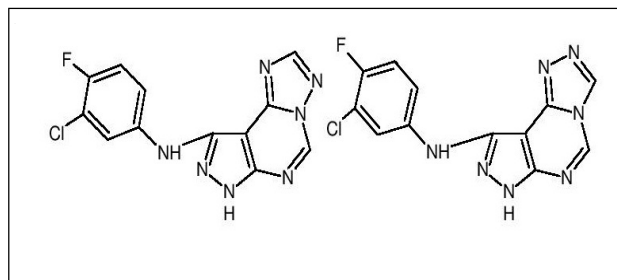
Sarangapani *et al.* (2007) synthesized some new 4- substituted -5- [(2-benzoxazolyl thio) methyl] -3-mercapto -4H-1, 2, 4-triazoles and screened them for antibacterial activity.



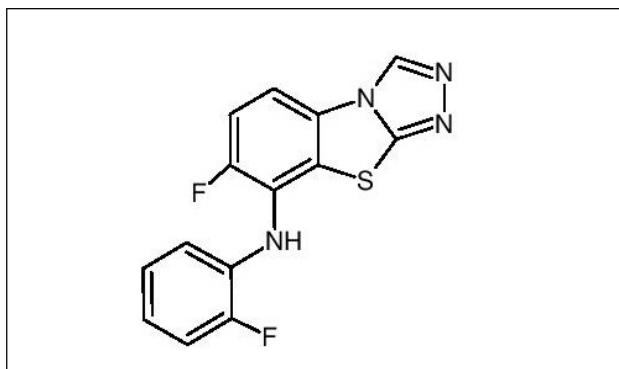
Rajendra Prasad *et al.* (2006) synthesized some new thiazolidin -4-one substituted 1, 2, 4-Triazoles and screened them for antimicrobial activity.



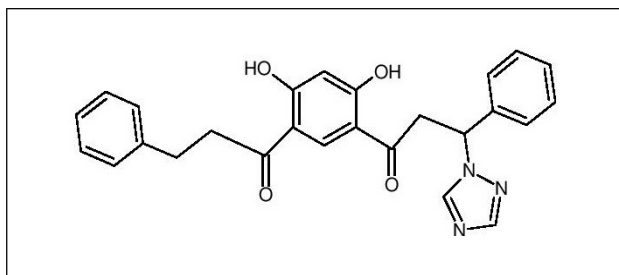
Udupi *et al.* (2006) synthesized certain substituted fluoropyrazolo (3, 4-d) pyrimidines and Triazoles and screened them for antimicrobial and anti fungal activity.



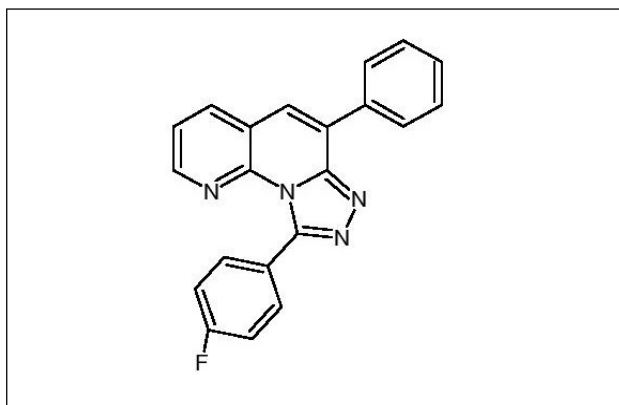
Hipparagi *et al.* (2007) synthesized some 8- substituted-7- fluoro-Benzo [4, 5] Thiazolo [2, 3-c] [1, 2, 4] Triazoles and screened them for antimicrobial activity.



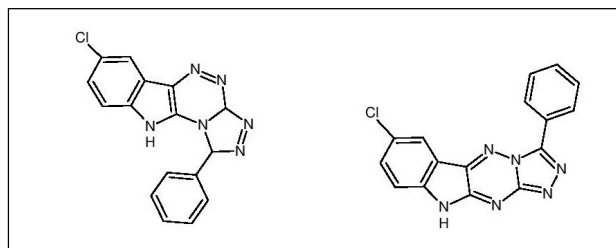
Ashok *et al* (2008) synthesized some new (E)-1-[2', 4'-dihydroxy -5'-(3"-aryl-3"-1H-1, 2, 4-Triazol-1-yl) propanoyl] phenyl]-3-aryl prop-2-en-1-ones and screened them for antifungal activity.



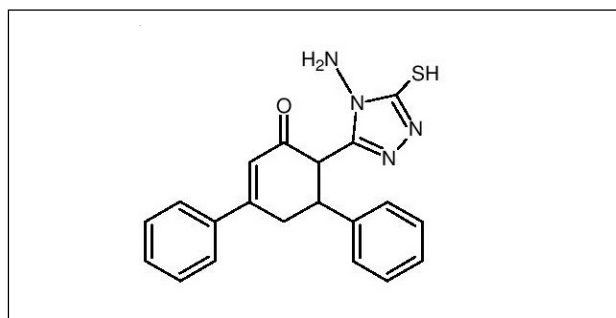
Mogilaiah *et al.* (2009) synthesized some 6-aryl-9-(p-fluorophenyl)-1, 2, 4-Triazolo[4, 3-a] [ 1, 8 ] Naphthyridines and screened them for antibacterial activity.



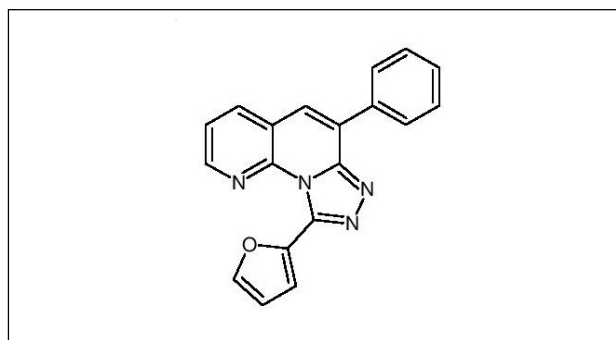
Shivarama Holla *et al.* (2009) synthesized some Halogen containing Triazolotriazinoindoles moiety and screened them for antibacterial activity.



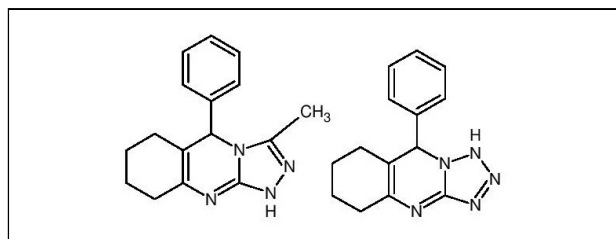
Vijaya Kumar Tirlapur *et al.* (2008) synthesized some new Triazoles and screened them for antimicrobial and anti fungal activity.



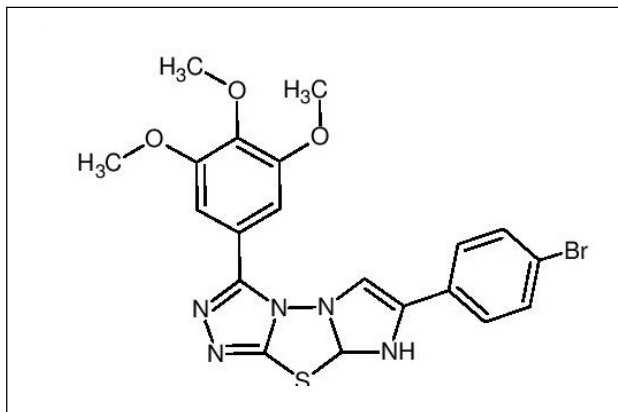
Mogilaiah *et al.* (2007) synthesized certain 4-aryl-1-(2-furyl/2-Thienyl)-1, 2, 4-Triazolo [4, 3-a] [1, 8] Naphthyridines and screened them for antibacterial activity.



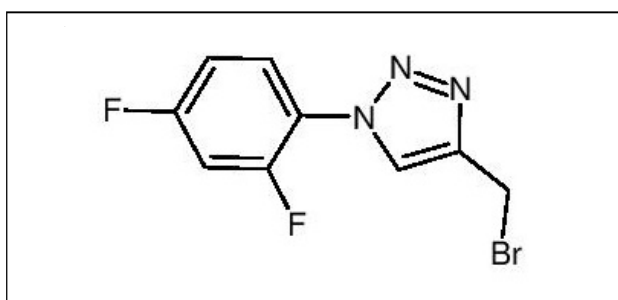
Sharma *et al*<sup>12</sup> synthesized certain 1, 2, 4-Triazolo-Tetrazolo-and 2-pyrazolyl Quinoxalines and screened them for antibacterial activity.



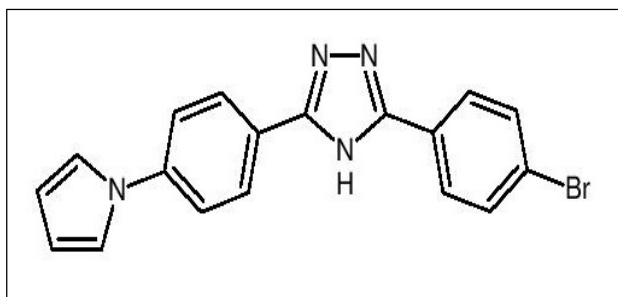
Jag Mohan *et al.* (2005) synthesized some Imidazo-[2, 1-b]-1, 3, 4-Thiadiazolo [2, 3-c] –s-Triazoles and related systems and screened them for antimicrobial activity.



Gill *et al.* (2008) synthesized certain difluorobenzimidazole and 1, 2, 3-triazole incorporated chromones and screened them for antimicrobial activity.

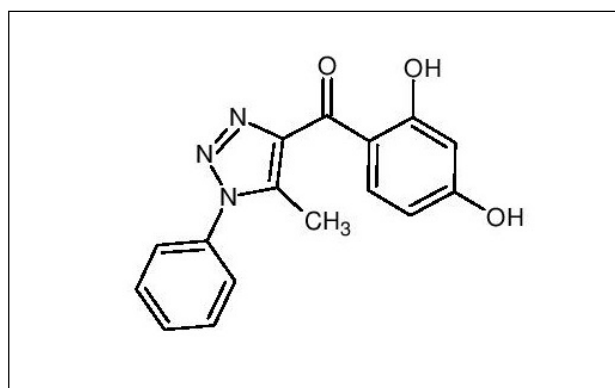


Vagdevi *et al.* (2008) synthesized some 3-substituted phenyl-5-(4-pyrrol-1-ylphenyl)-4H-1, 2,

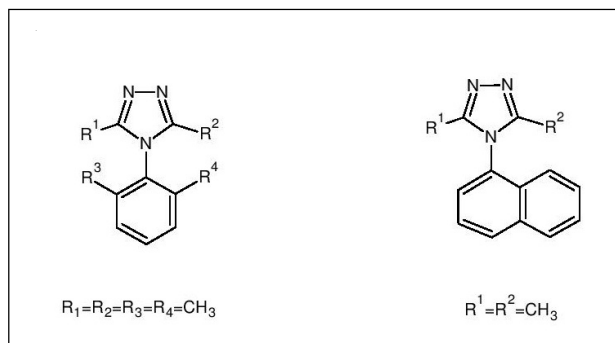


4-triazoles and screened them for antibacterial and antitubercular activities.

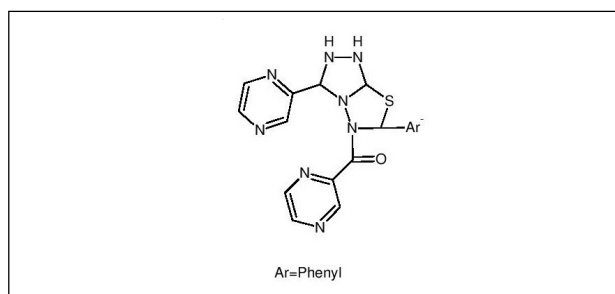
Heng-Shan Dong *et al.* (2008) synthesized some new (1-aryl-5-methyl-1H-1, 2, 3-triazol-4-yl)- (2,4-dihydroxy-phenyl)-methanones and screened them for antifungal, antiviral, and anti-inflammatory activities.



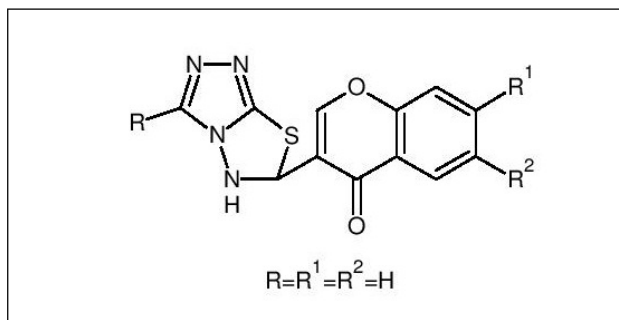
Laxmi Devi *et al.* (2008) synthesized some stereochemistry of N4-Aryl-1, 2, 4-triazoles and screened them for antimicrobial activity.



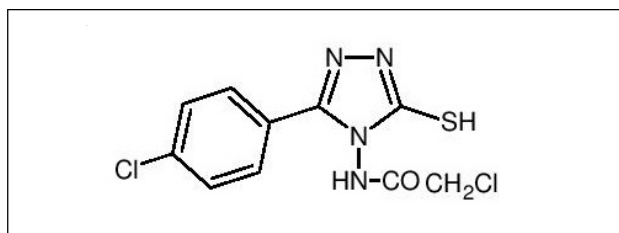
Udupi *et al.* (2005) synthesized some new 3-(pyrazine-2-yl)-6- aryl-5-pyrazinoyl-(6H)-1, 2, 4-triazole of (3, 4-b) (1, 3, 4)-thiadiazolidines and screened them for antibacterial, antifungal, anti-inflammatory and analgesic activities.



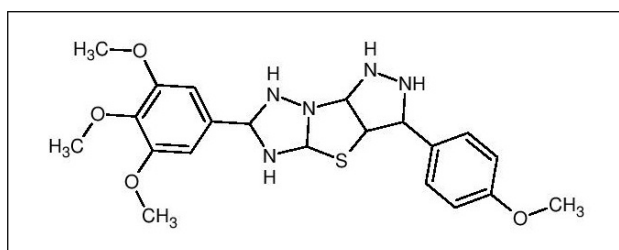
Makrandi *et al.* (2008) synthesized some new 6-(3-chromonyl)-5, 6-dihydro-3- alkyl/aryl-s-triazolo[3, 4-b] [1, 3, 4] thiadiazoles and screened them for antibacterial and antifungal activities.



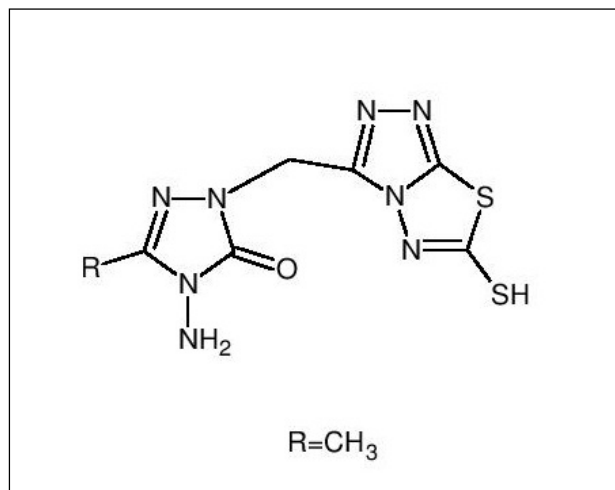
Harshita Rastogi *et al.* (2008) synthesized some new 5-(4'-chlorophenyl)-3-mercapto-4-[N-(2'-chloroacetyl)] amino-1, 2, 4-triazoles and screened them for antifungal activity.



Jag mohan *et al.* (2005) synthesized some pyrazolo [3', 4':4, 5-]thiazolo-[3, 2-b]-s-triazoles and screened them for antibacterial and antifungal activities.



Neslihan Demirbas *et al.* (2005) synthesized some new [1, 2, 4]-triazolo [3, 4-b] [1,3,4]-thiadiazoles new [1, 2, 4]-triazolo [3, 4-b] [1, 3, 4] thiadiazines and screened them for antimicrobial activity.



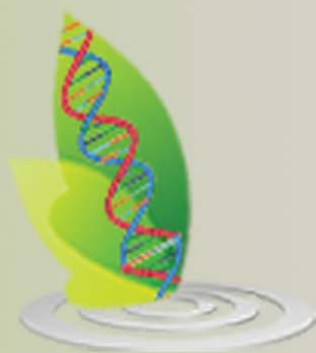
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