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A brief review on Triazole and its Pharmacological Application

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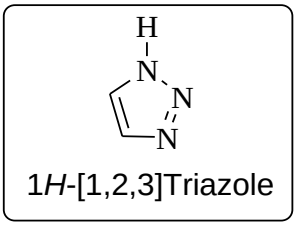
ABSTRACT: The triazole core is one of the most imperative and well known heterocycles which is composed of nitrogen atom which forms natural products with medicinal claims. Triazole moiety is present as a principal structural component in the drug categories such as antimicrobial, anti-inflammatory, analgesic, antineoplastic, antimalarial, antiviral, antihypertensive, local anaesthetic, antianxiety, anti-Parkinson′s, antidepressant, antioxidant, antihistaminic, antitubercular, antidiabetic etc. The broad and potent activity of triazole and their derivatives has established them as pharmacologically significant platforms. The elementary heterocyclic rings present in the numerous medicinal mediators are 1,2,3-triazole and 1,2,4-triazole. A huge capacity of investigations has been approved on triazole and their results, which has proved the pharmacological status of this heterocyclic core. The current paper is an try to review the pharmacological activities reported for triazole derivatives in the current literature with an apprise of current research discoveries on this nuclei.

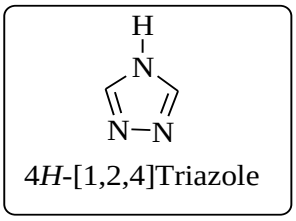
KEYWORDS: 1,2,3-Triazole, 1,2,4-Triazole, Antitubercular, Antimalarial, Antimicrobial, Antiviral Such Activity.

INTRODUCTION

Triazole is acknowledged as pyrrodiazole is single class of organic heterocyclic complexes containing a five-membered Di unsaturated ring assembly composed of three N atoms and two C atoms at non-adjacent positions. The modest form of the triazole domestic is triazole itself. Triazole is a white to pale yellow crystalline solid with a weak, distinctive odour, it is resolvable in water and alcohols. It melts at 120°C and boils at 260°C. It occurs as a pair of isomeric chemical composites as 1,2,3- triazole and 1,2,4-triazole with molecular formula $C_2 H_3 N_3$, and a molecular weight of 69.06[1]. There are two isomers are,



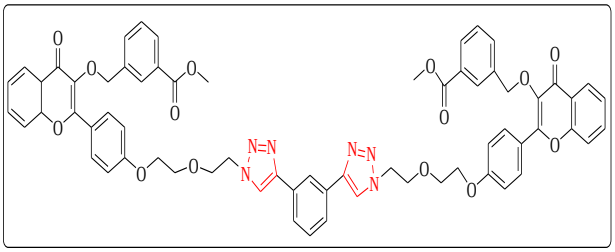
1*H*-[1,2,3]Triazole



4*H*-[1,2,4]Triazole

Kesavan Karthikeyan *et al* [2] reported the synthesized compound shows potent anti-fungal activity against the Candida albicans and Aspergillus niger pathogen.

Xuezhen Zhu *et al* [3] the group of scientist work describes the syntheses of diverse triazole bridged flavonoid dimers and identifies potent, nontoxic, and highly selective Breast Cancer Resistance Protein (BCRP) inhibitors.



Jian-Wei Zhao *et al* [4] current work describes anti-gastric cancer activity evaluation of novel triazole nucleobase analogues containing steroidal/coumarin/quinoline moieties

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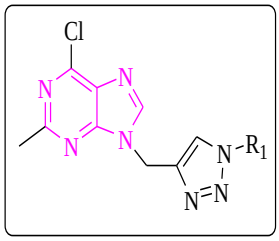
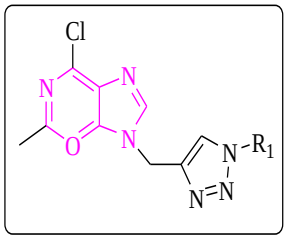
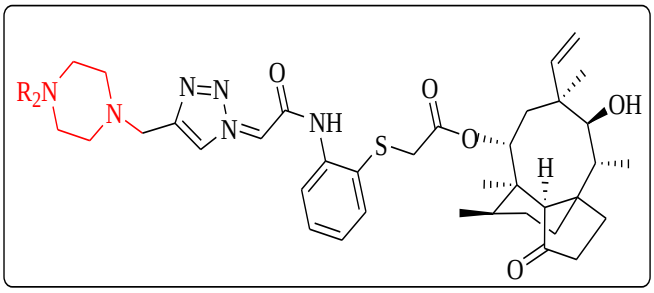
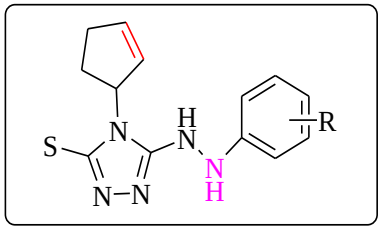



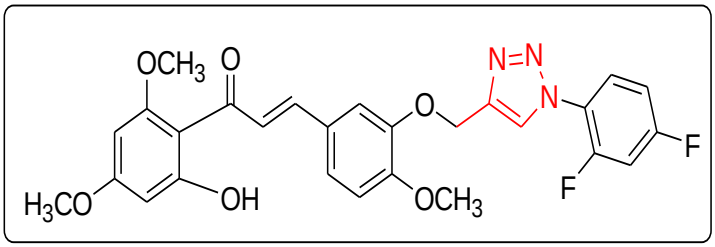
Zhe Zhang *et al* [5] present work describes synthesis and biological activities of novel pleuromutilin derivatives with a substituted triazole moiety as potent antibacterial agents. A series of novel pleuromutilin derivatives possessing 1,2,3-triazole moieties were synthesized via click reactions under mild conditions. The in vitro antibacterial activities of these derivatives against 4 strains of S. aureus (MRSA ATCC 43300, ATCC 29213, AD 3, and 144) and 1 strain of E. coli (ATCC 25922) were tested by the broth dilution method.



Nashwa Hafez Zaher *et al* [6] existing work describes synthesis and molecular docking of novel triazole derivatives as potential CoV helicase inhibitors. Current investigation of anti-MERS-CoV activity of newly synthesized sixteen halogenated triazole compounds through the inhibition of helicase activity using the FRET assay. All new compounds underwent justification for their target structures via microanalytical and spectral data. SAR studies were performed and molecular docking done to check the activity.



Satish K. Awasthi *et al* [7] present work describes Insights into the interaction of potent antimicrobial chalcone triazole analogues with human serum albumin.



Nguyen D. Thanh *et al* [8] present work describes Efficient click chemistry towards novel 1H-1,2,3-triazole-tethered 4-H chromene D-glucose conjugates: Design, synthesis and evaluation of in vitro antibacterial, MRSA and antifungal activitie

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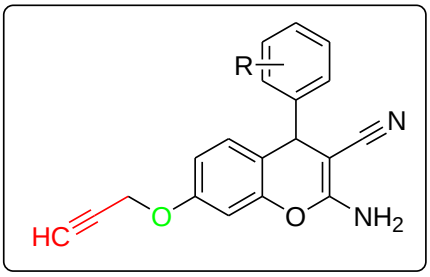
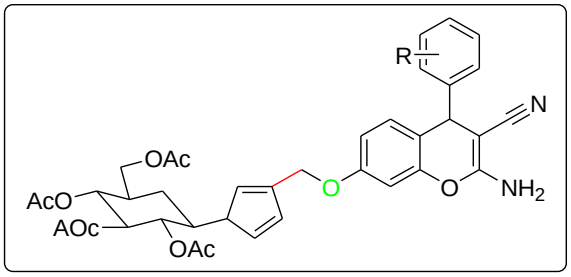
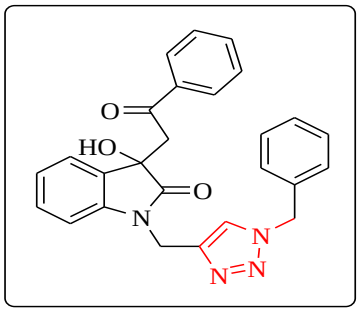
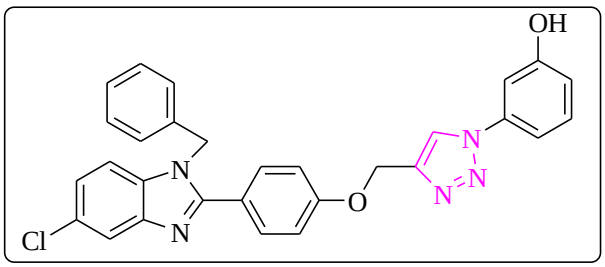




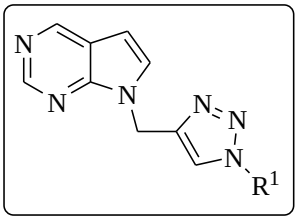
Kesavan Karthikeyan *et al* [9] the group of co-workers Synthesize the1,2,3-triazole tethered 3-hydroxy-2-oxindoles: which is used as corrosion inhibitors for steel in acidic medium and their compound shows potent anti-microbial activity.



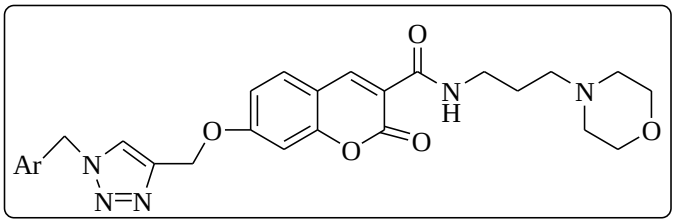
Nerella Sridhar Goud *et al* [10] reported the Novel benzimidazole-triazole hybrids as apoptosis inducing agents in lung cancer. They design and synthesis, 18F-radiolabeling & galectin-1 inhibition studies.



Gowravaram Sabitha *et al* [11] reported the Synthesis of 1H-pyrrolo[2,3-d] pyrimidine-1,2,3-triazole derivatives. Which studies the potent anti-tubercular agents.



Arezoo Rastegari *et al* [12] have reported to design and synthesis of novel 1,2,3 triazole chromenone carboxamide derivatives which shows potent anti-Alzheimer's activity.



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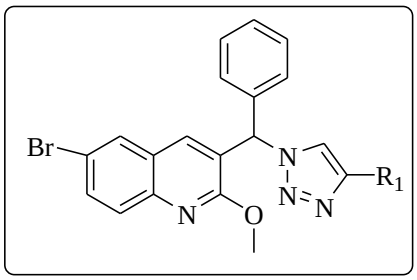
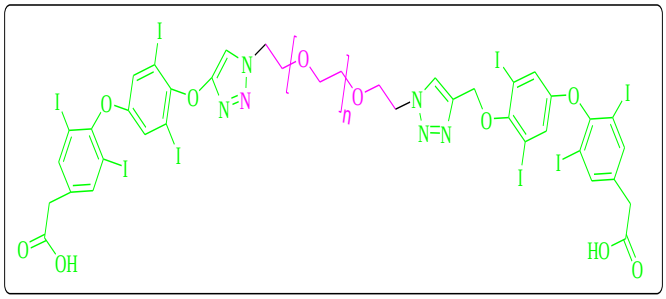
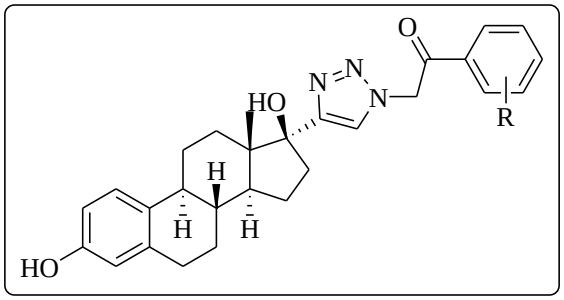
Jurupula Ramprasad *et al* [13] have developed the novel Synthesis of quinoline-triazole analogs for antitubercular properties via molecular hybridization approach.



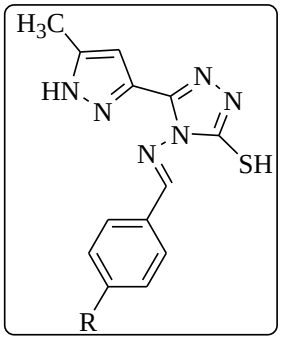
Shaker A. Mousa *et al* [14] a group of scientists developed Triazole modified tetraiodothyro acetic acid conjugated to Polyethylene Glycol. Which shows high affinity thyrointegrin αv β3 Antagonist with Potent Anticancer Activities in Glioblastoma Multiforme.



Thayane M. Queiroz *et al* [15] have study the Semi-synthesis of β-keto-1,2,3-triazole derivatives from ethinylestradiol and the synthesized compound shows cytotoxic activity.



Renjith Raveendran Pillai *et al* [16] have Synthesize schiff bases tethered 1,2,4-triazole and pyrazole rings and spectroscopic characterization, to study DFT calculations, molecular dynamics simulations and biological evaluation compound.



Zahra Najafi *et al* [17] they developed the novel tacrine-coumarin hybrids linked 1,2,3-triazole compounds which shows as anti-Alzheimer's activity. In vitro and in vivo biological evaluation of compound and also study docking.

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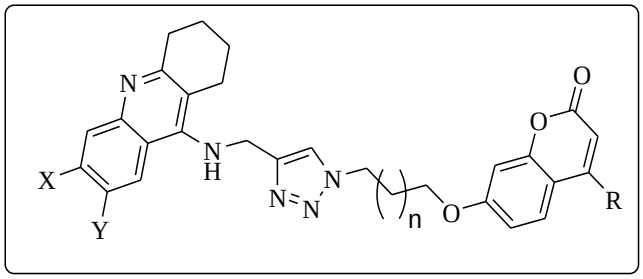
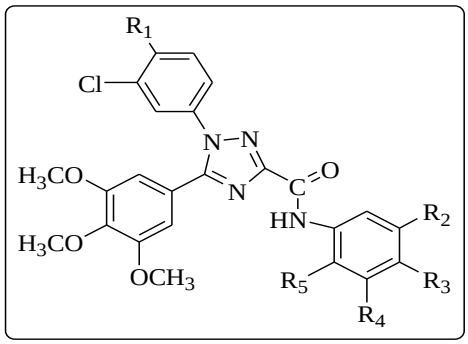
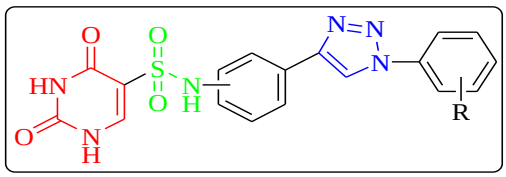


Muhamad Mustafa *et al* [18] have synthesized a potent combretastatin A-4 analogs containing 1,2,4-triazole which carried out antiproliferative, anti-tubulin activity, and docking study.

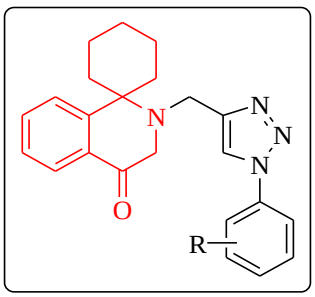


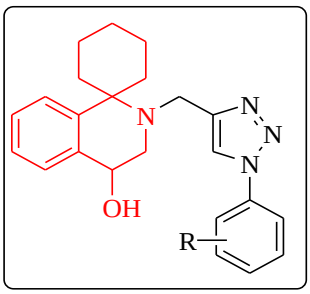
Ana I Matesanz *et al* [19] New Pt (II) have developed the triazole thiosemicarbazone' complexes. And analyse their reactivity and potential antitumoral activity.

Guo-qing Lu *et al* [20]] reported the Design, synthesis and biological evaluation of novel uracil derivative bearing 1, 2, 3-triazole moiety as thymidylate synthase (TS) inhibitors and as potential antitumor drugs.

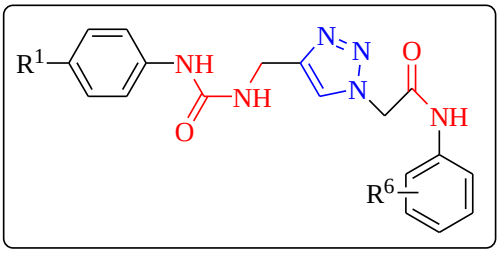


Shuai Li *et al* [21]] reported the Design, synthesis and biological evaluation of erythrina derivatives bearing a 1,2,3-triazole moiety as PARP1 inhibitors.





Kashmiri Lal *et al* [22] study the Design, synthesis, antimicrobial evaluation and docking studies of urea-triazole-amide hybrids



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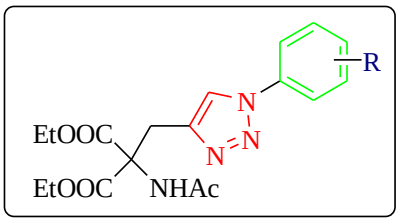
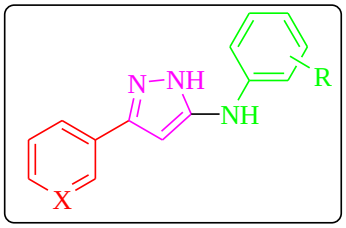
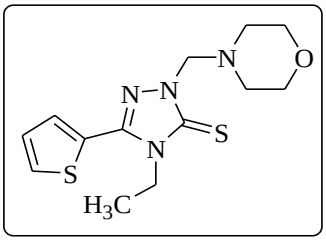
Amandeep Kaur *et al* [23] Multifunctional Mono-Triazole Derivatives Inhibit Aβ42 Aggregation and Cu2+-Mediated Aβ42 Aggregation and Protect Against Aβ42-Induced Cytotoxicity.



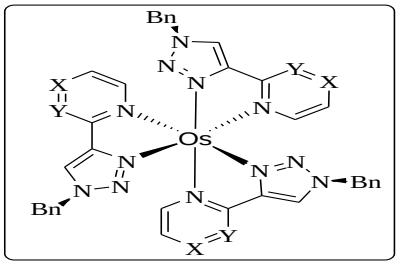
Oleksandr Grytsai *et al* [24] Synthesis and biological evaluation of 3-amino-1,2,4-triazole derivatives as potential anticancer compounds.



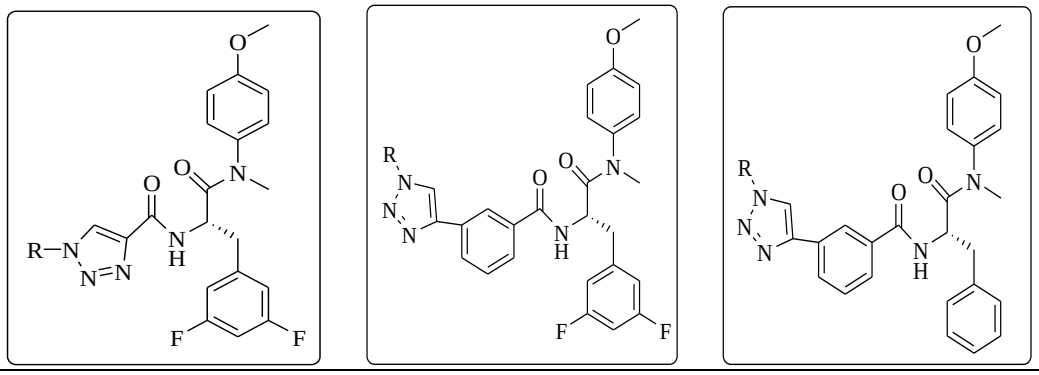
Mehmet Çiftçi *et al* [25] In vitro cytotoxic and in vivo antitumoral activities of some aminomethyl derivatives of 2,4-dihydro-3H-1,2, 4-triazole-3-thiones—Evaluation of their acetylcholinesterase and carbonic anhydrase enzymes inhibition profiles.



Kirsty L. Smitten *et al* [26] synthesized the Triazole-based Osmium (II) complexes displaying red/near-IR luminescence: antimicrobial activity and super-resolution imaging.



Xiangyi Jiang *et al* [27]have made Discovery of novel 1,4-disubstituted 1,2,3-triazole phenylalanine derivatives as HIV-1 capsid inhibitors.



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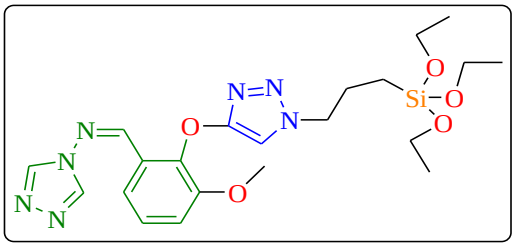
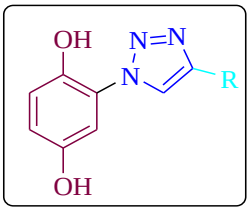
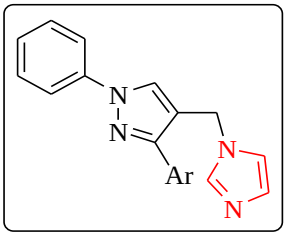
Gur Jaspreet Singh *et al* [28] Synthesis and characterization of microwave-assisted biologically active triazole silanes

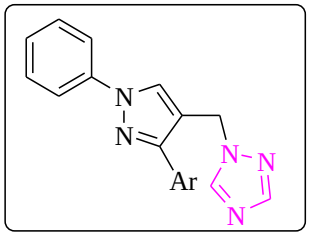


David D. N'Da *et al* [29] Synthesis and in vitro antimycobacterial and antileishmanial activities of hydroquinone-triazole hybrids.

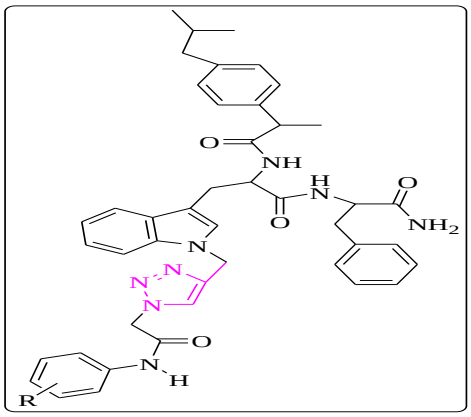


Iwona E. Głowacka *et al* [30] Synthesis and antimicrobial activity of novel 1,2,3-triazole-conjugates of quinazolin-4-ones.
Claire Simons *et al* [31] Design and Synthesis of Imidazole and Triazole Pyrazoles as Mycobacterium Tuberculosis CYP121A1 Inhibitors

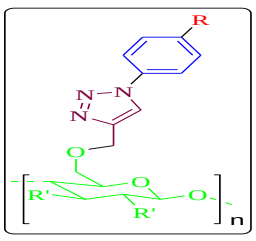




Sarbani Pal *et al* [32] Synthesis, biological evaluation, and docking study of a series of 1,4-disubstituted 1,2,3-triazole derivatives with an indole-triazole-peptide conjugate



Zineb Khaldi *et al* [33] showed the Synthesis, characterization, and antibacterial activities of a new lignocellulosic material carrying aryl triazole moiety.



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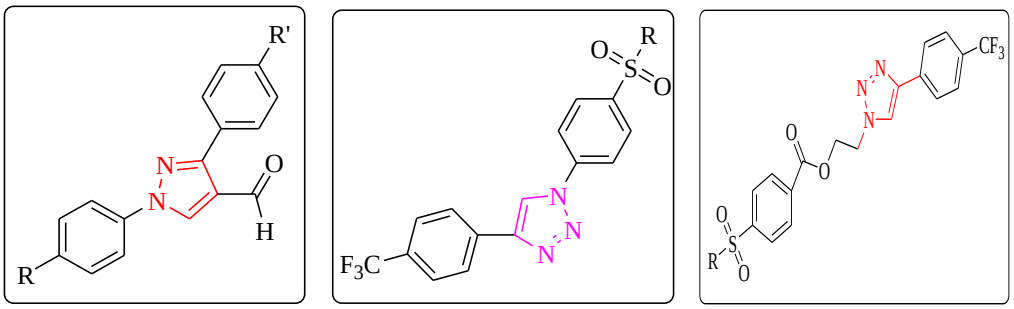
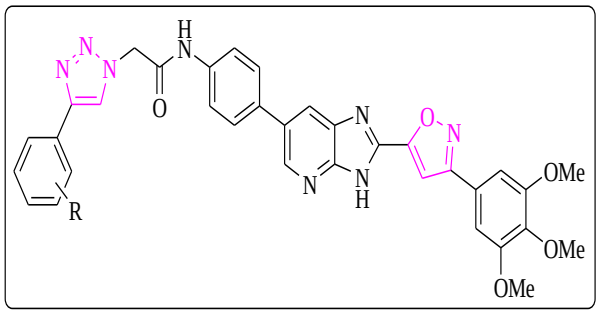
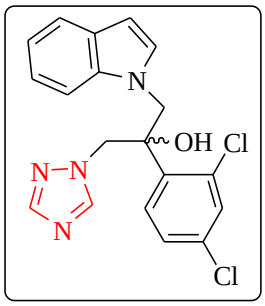
Mohyeddin Assali *et al* [34] study the Synthesis, Biological Activity, and Molecular Modeling Studies of Pyrazole and Triazole Derivatives as Selective COX-2 Inhibitors.



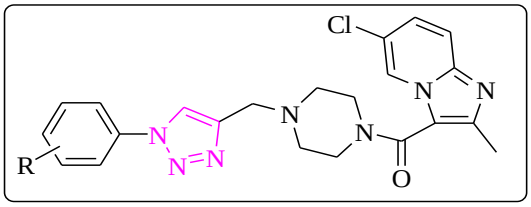
R. Ramesh Raju *et al* [35] have study the Design, Synthesis, and Anticancer Activity of 1,2,3-Triazole Linked 1,2-Isoxazole-imidazo[4,5-b] pyridine Derivatives



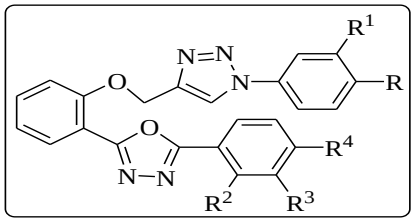
Fabrice Pagniez *et al* [36] Biological exploration of a novel 1,2,4-triazoleindole hybrid molecule as antifungal agent



Adinarayana Nandikolla *et al* [37] reported the Synthesis, study of antileishmanial and antitrypanosomal activity of imidazo pyridine fused triazole analogues.



Raju Atcha *et al* [38] Design and Synthesis of Triazole Conjugated Novel 2,5-Diaryl Substituted1,3,4-Oxadiazoles as Potential Antimicrobial and Anti-fungal Agents.



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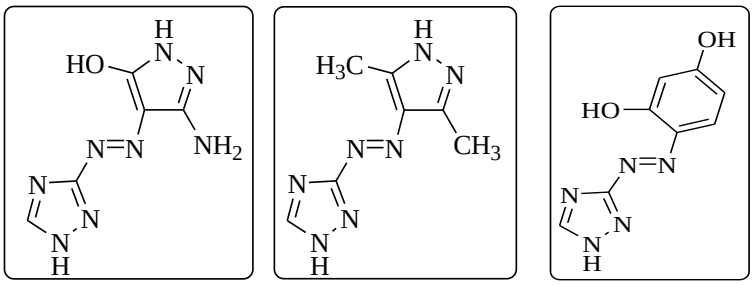
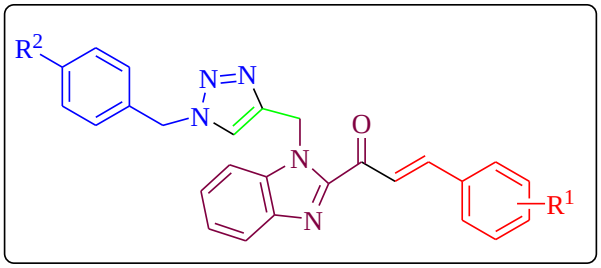
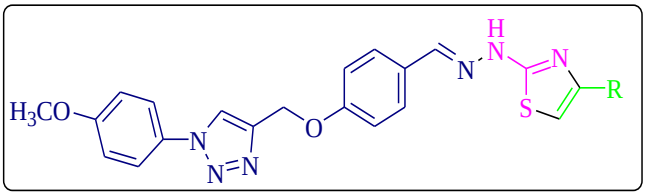
Merve Gokalp *et al* [39]reported the Triazole based azo molecules as potential antibacterial agents: Synthesis, characterization, DFT, ADME and molecular docking studies



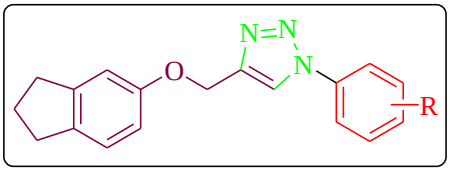
Artur M. S. Silva *et al* [40] have study A step-by-step synthesis of Triazole-Benzimidazole-Chalcone hybrids: Anticancer activity in human cells



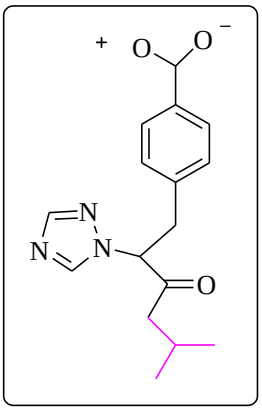
Ramesh Gondru *et al* [41] 1,2,3-triazole-thiazole hybrids: Synthesis, *in* vitro antimicrobial activity and antibiofilm studies.



Kishan P. Haval *et al* [42] report the Design and Synthesis of New Indanol-1,2,3-triazole Derivatives as Potent Antitubercular and Antimicrobial Agents



Fliur Macaev *et al* [43] New vinyl-1,2,4-triazole derivatives as antimicrobial agents: Synthesis, biological evaluation and molecular docking studies.



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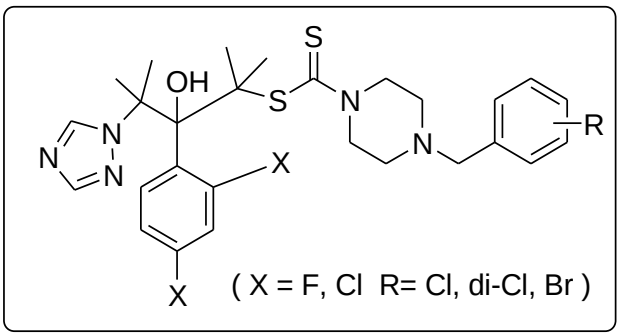
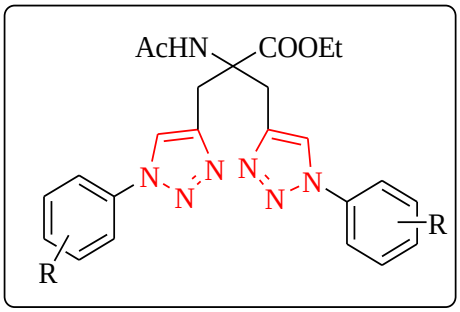
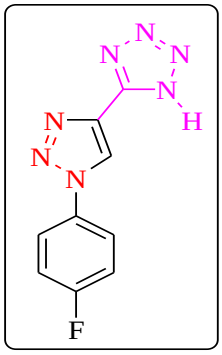
Yaser Mahmoudi *et al* [44] the group of scientists have carried out the synthesis of New potent antifungal triazole alcohols containing N-benzylpiperazine carbodithioate moiety. Which shows in vitro evaluation and in silico study.



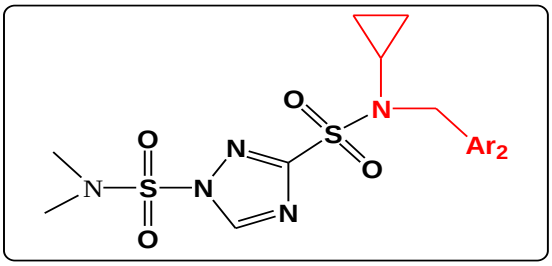
Deepti Goyal *et al* [45] they reported A novel series of triazole-based compounds have been designed, synthesised and evaluated as multi-target directed ligands (MTDLs) against Alzheimer disease.



Elson A. Costa *et al* [46] have reported the study to design, synthesize and evaluate the potential analgesic and anti-inflammatory effects of 5-[1-(4-fluorphenyl)-1H-1,2,3-triazol-4-yl]-1H-tetrazole (LQFM-096: a new triazole compound) as well as to elucidate its possible mechanisms of action study and Mechanisms involved in the antinociceptive and anti-inflammatory effects of a new triazole derivative: 5-[1-(4-fluorophenyl)-1H-1, 2,3-triazol-4-yl]-1H-tetrazole (LQFM-096).



Yitao Li *et al* [47] have synthesized effective fungicide Novel Triazole Sulphonamide derivatives containing a Benzylamine Moiety which is applicable in the plant effective against cucumber downy mildew. They study triazole sulphonamide which played a very important role in the field of research to new agrochemical compounds formulation.



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CONCLUSIONS

From the above information, it can be said that 1, 2, 4-triazole derivatives can be prepared using different methods like ring opening, rearrangement and substitution reaction. The biological profiles of these new derivatives of 1, 2, 4- triazole also reveal the therapeutic importance of it. An attempt of modify of the moiety will increase therapeutically uses of 1, 2, 4-triazole derivatives. These heterocyclic derivatives will result into introduction of therapeutically potent drugs. We must hope that further investigation gets carried on to find out more efficient derivatives of 1, 2, 4- triazole for such a disease whose treatment are challenging in the field of medical science.

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