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Review Article

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A Review Article on Triazole Derivatives with Azetidinone Moiety and Biological Activity

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Abstract: Triazole is a heterocyclic compound possesses five member ring, whose structural constituents are three nitrogen atoms and two carbon atoms. Various heterocyclic compounds containing 1,2,4-triazole nucleus are famous to have biological properties such as antimicrobial, antibacterial, anti-inflammatory, anticonvulsant, antifungal activities etc. A number of drugs are common drugs which are used in our daily life such as fluconazol (antifungal), etoperidone (antidepressant), ampicillin (antibacterial), ribavirim (antivirol). Triazole derivatives with azetidinone moiety enhanced biological activity. The aim of this review is to give extra knowledge of methods to syntheses triazole derivatives and beneficial for biological importance for these heterocyclic compounds.

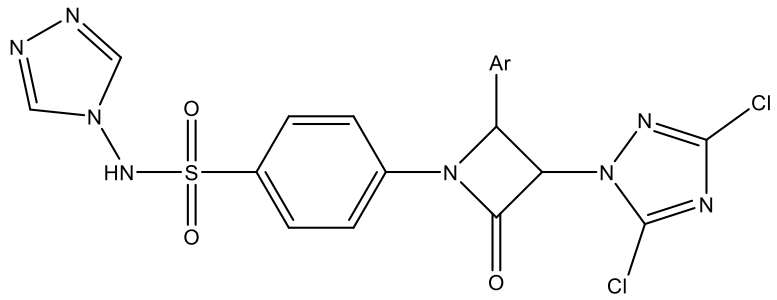
Keywords: Triazole, azetidinone, antimicrobial activity, anti-inflammatory activity, anticancer activity.

INTRODUCTION

Recently, a number of heterocyclic derivatives have been prepared and studies on their pharmacological properties. Heterocyclic compounds containing triazole ring exhibit diverse pharmacological properties. A number of triazoles have been synthesized and published by scientists and researchers in pharmacology and medical field. From the literature survey, it has been founded that triazole derivatives incorporating azetidinone moiety increase the biological activity such as antimicrobial (Ayrim, N.B. *et al*., 2024- Hamdan, I.A.A.H. *et al*., 2024), antibacterial(Vijabaskaran, M. *et al*., 2011- Sayed, R.E., 2006), anticancer(Aziz, D. *et al*., 2023; Matin, M.M. *et al*., 2022), antifungal(Kumar, S. *et al*., 2021) etc. On the bases of above observation, this article focuses on synthesizes of triazole derivatives with azetidinone moiety by new methods and studies of pharmacological activity.

BIOLOGICAL SIGNIFICANCE

Vinay Kumar Patel and Shailesh V. Patel, have synthesized azetidinone derivatives based on 4-amino-N-(4h-1,2,4-triazole-4-yl)benzene sulfonamide and showed antimicrobial activity. They have selected different bacteria such as S. aureus, B. megaterium, E. coli, P. aeruginosa for antibacterial activity and compared with standard drug tetracycline. For antifungal activity they have selected various fungi like R. nigricum, A. niger, F. oxyporium and B. thiobromine by using potato dextrose agar method.



2-azetidinone derivatives of 4-amino-1,2,4-triazole have been synthesized by Rameshbabu, *et al*., 2019. and screened of antimicrobial activity against different bacteria and different fungi by using agar cup plate method.

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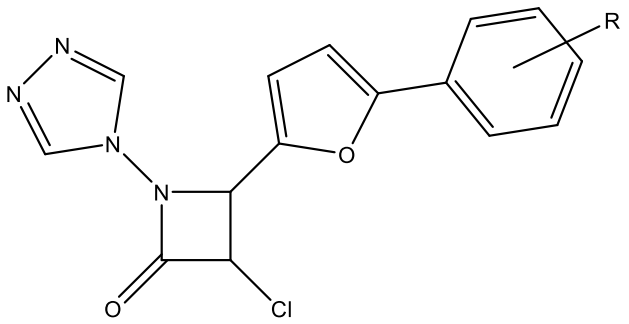
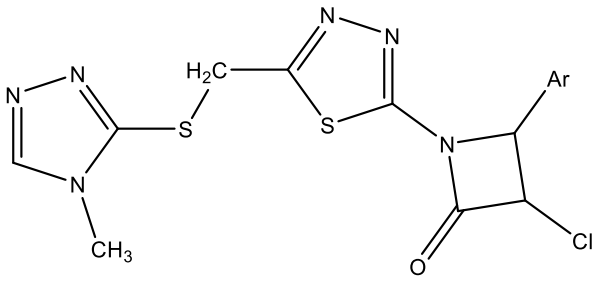
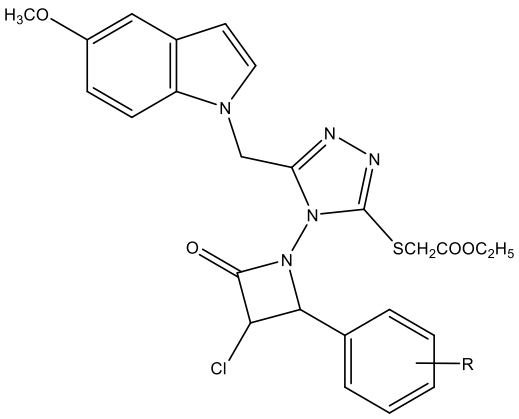


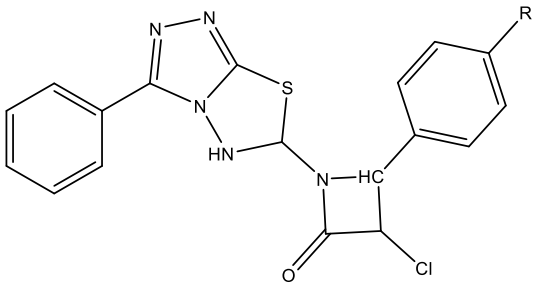
Khan, *et al*., 2017; have synthesized thiadiazole and azetidinone derivatives drived from triazoles and explained antbacterial as well as antifungal activity. For antibacterial activity they have taken bacillus subtilis, staphylococcus aureus and for antifungal activity they have selected aspergellus niger, fusarium oxisporum then compared with standard drugs streptomycin and griseofulvin respectively.



Azetidinone derivatives with triazole moiety have been synthesized by Jawarkar and Game, 2024. They have reported antimicrobial activity with help of disc diffusion technique against different bacteria and fungi and then compared with suitable standard drugs for antibacterial as well as antifungal activity.



Kumar, *et al*., 2024; have synthesized, characterization, in silico studies of substituted azetidinone bearing triazole and thiadiazole ring. They explained antibacterial activity with some bacteria like S. aureus, E. coli by using disc diffusion method and compared with standard drug moxifloxacin.



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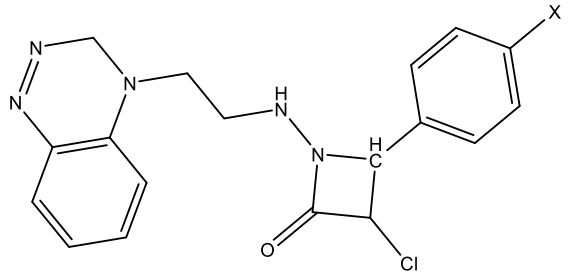
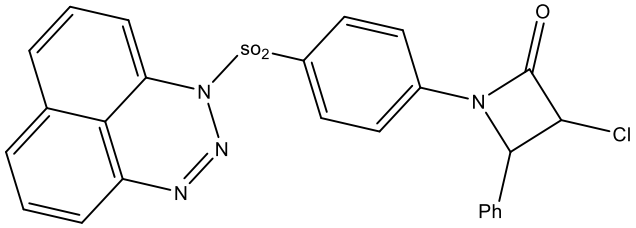
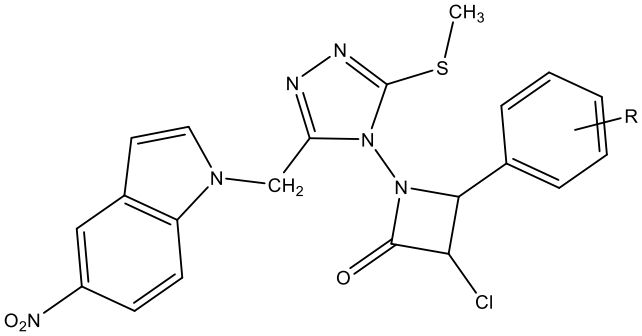
Synthesis and biological significance of some 2-azetidinone derivatives have been reported by Sharma, *et al*., 2012. In the biological significance they have explained antimicrobial activity and antitubercular activity. For antibacterial activity they have taken different bacteria such as b. subtilis, e. coli, s. aureus, for antifungal activity they have taken a. niger, a. flavus, c. albicans and for antitubercular activity they have taken m. tuberculosis.



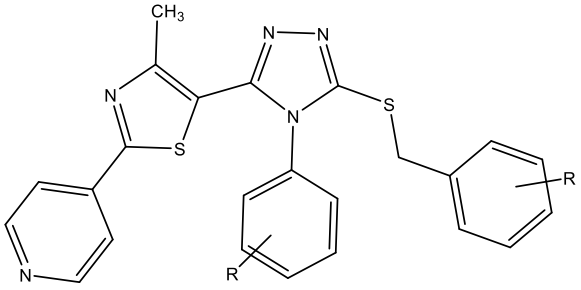
Patel and Patel, 2012; have synthesized azetidinone derivatives with triazole moiety. For antibacterial activity they have selected b. subtilis, s. aureus, k. promioe, e. coli bacteria and compared with standard drug tetracycline. For antifungal activity they have selected a. niger, b. thiobromine, f. oxyporium, nigrospora sp., r. nigricum by using potato dextrose agar medium.



Synthesis of novel potential substituted thiazolidinone, azetidinone derivatives containing substituted triazole, indole moiety have been reported by Bhatt and Singh, 2022. They screened antifungal activity by taken different fungi like c. krusei Go3, c. glabrata Ho5, p. arapsilosis then compared with standard drug griseofulvin.



Tay, *et al*., 2022; have synthesized pyridyl substituted thiazolyl triazole derivatives. They have explained antimicrobial as well as antioxidant activity.



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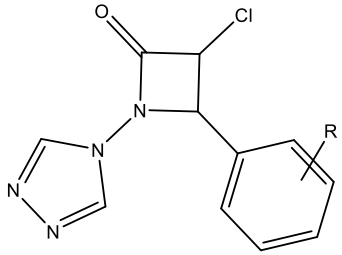
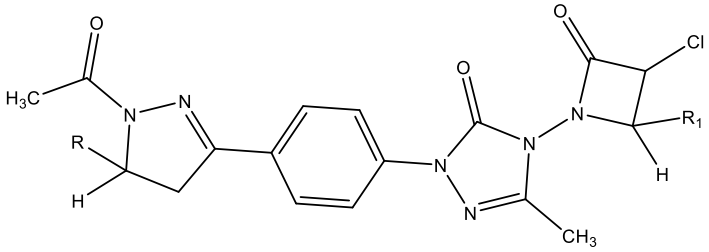
Gao, *et al*., 2019; have prepared 1,2,4-triazole derivatives with azetidinone moiety. They explained antibacterial activity by taken different bacteria and compared with appropriate standard drug.



An expeditious green synthesis of Schiff bases and azetidinones derivatives with 1,2,4-triazole derivatives have been reported by Taj, *et al*., 2011. They have selected different bacteria such as b. subtilis, s. aureus, e, coli, p. aeruginosa, e. faecalis, k. pneumonia and compared with standard drug ampicillin.



CONCLUSION

Heterocyclic compounds containing triazole and azetidinone ring possesses various biological functions such as anti-inflammatory, antifungal, antimicrobial, anticancer, antibacterial activities. Some biological properties of these compounds are explained in this review with their structures of some compounds that have pharmacological properties.

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