

Review Article

Different Pharmacological Activities of 2,5-Disubstituted 1,3,4-Oxadiazoles

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Abstract: 1,3,4-Oxadiazole is a versatile heterocyclic nucleus is a novel molecule which attract the medicinal chemist to search a new therapeutic molecule, out of the various derivatives 2,5 disubstituted 1,3,4-oxadiazole is widely exploited for various biological activities, such as antimicrobial, anticonvulsant, antiviral, anticancer, antitubercular and antioxidant etc. This review is mainly focused on oxadiazoles derivatives which are already developed and also which are currently under various stages of development.

Keywords: 1,3,4-oxadiazoles, antimicrobial, anticancer, antitubercular, anti-inflammatory activities.

INTRODUCTION

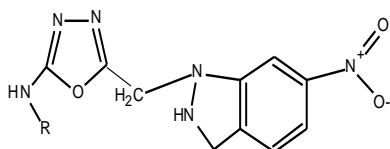
Heterocyclic compounds have attracted the attention of medicinal chemists because of having broad spectrum of pharmacological activities and hence It continues to yield new medicinal agents one such heterocyclic nucleus of medicinal importance is oxadiazole nucleus. 1,3,4-oxadiazole nucleus are known to exhibit Unique anti-inflammatory activity [1-4], differently substituted oxadiazole moiety has been found to have other interesting activities such as analgesic [3-4], antitubercular [5], anticonvulsant [6], antimicrobial [7-8], antitumor [9-10].

Given below is a brief account of various biological and pharmacological activities of 2,5 disubstituted 1,3,4-oxadiazoles.

PHARMACOLOGICAL ACTIVITIES OF 1,3,4-OXADIAZOLE AND THEIR DERIVATIVES

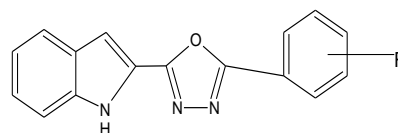
Antipyretic activity

C. Chepteat [11] synthesized new 2,5- substituted 1,3,4-Oxadiazoles for antipyretic activity.

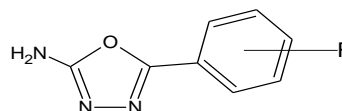


Antimicrobial activity

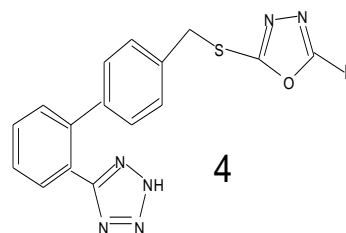
N. Bhardwaj and K. Saraf [13] synthesized, evaluated some 1,3,4-oxadiazoles for antimicrobial activity.



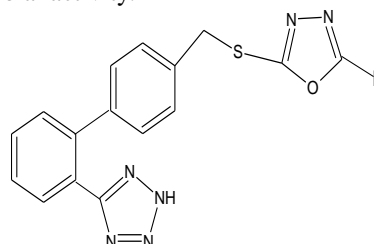
N. B. Patel. And J. C. Patel [14] synthesized 3-(1,3,4-Oxadiazol-2-yl)quinazolin-4(3H)-ones for antimicrobial activity.



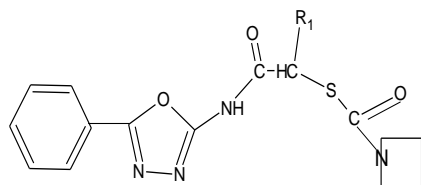
Chao Jun-Shu, Huia Ping-Xin and Liashuo [15] synthesized 1,3,4-oxadiazoles for antimicrobial activity.



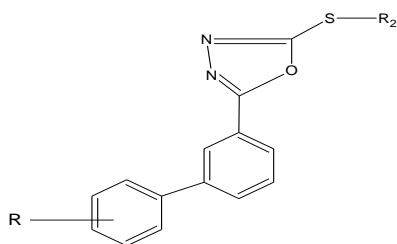
R. B. Mudasir, H. R. Matto and A. Rauf [16] synthesized 5-(alkenyl)-2-amino- and 2-(alkenyl)-5- for antimicrobial activity.



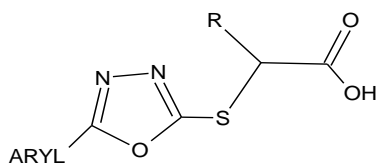
R. Saini, K. A. Rai and A. N. Keshri [17] synthesized 2,5-di-substituted 1,3,4-oxadiazoles for antimicrobial activity.



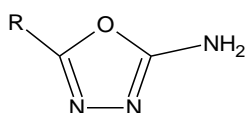
Aates OĖznur and Kocabalkanli [18] synthesized some aryl 2-(N,N disubstituted thiocarbamoyl thioacylamino)-1,3,4 oxadiazoles for antimicrobial activity.



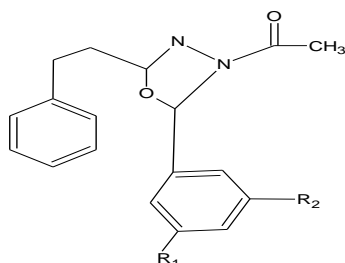
G.C.Ramaprasad, B.Kalluraya and S. B.Kumar [19] synthesized some novel 1,3,4-oxadiazoles for antimicrobial activity.



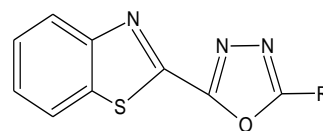
N. Jain, D. P. Pathak, P. Mishra and S. J. Jain [20]; synthesized some 2[5(Aryl)[1,3,4]oxadiazole-2-ylsulfanyl] alkanic acids for antimicrobial activity.



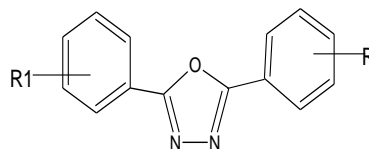
S.Kumar [21] synthesized 5-substituted-2-amino-1,3,4-oxadiazole derivatives for antimicrobial activity.



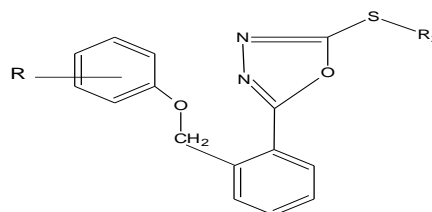
N. K. Fuloria, V. and M. Ali [22]; synthesized some new oxadiazoles derived from Phenylpropionoylhydrazides for antimicrobial activity



K. K. Jha, S. Abdul and K. Yatendra [23]; Designed, synthesized 1,3,4-oxadiazole derivatives for antimicrobial activity.

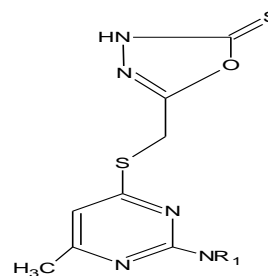


S. N. Channamata, B. Poojary and S. K. Nalilu [24]; synthesized, some disubstituted 1,3,4-oxadiazoles carrying 2(aryloxymethyl)phenyl moiety for antimicrobial activity.

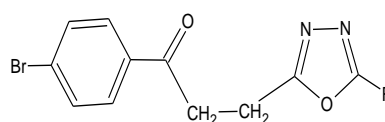


Anti-inflammatory activity

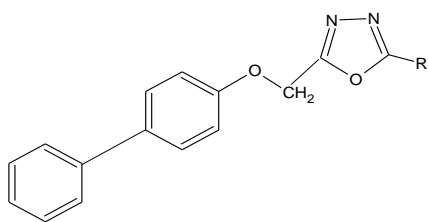
M. M.Burbuliene, J. Virginija and Mekuskiene [27] synthesized 5-[(2-disubstitutedamino-6methylpyrimidin-4-yl)-sulfanyl methyl]-3H-1,3,4-oxadiazole-2-thiones for anti-inflammatory activity.



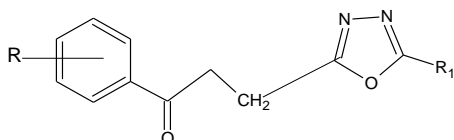
A.Husain and A.Mohammed [28] synthesized of novel 1,3,4-oxadiazole derivatives for their anti-inflammatory properties.



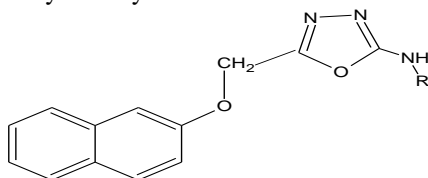
H. Kumar, J. A. Sadique Khan and A. Suroor [29] synthesized 1,3,4-oxadiazole/thiadiazole and 1,2,4-triazole derivatives of biphenyl-4-yloxy acetic acid for anti-inflammatory activity.



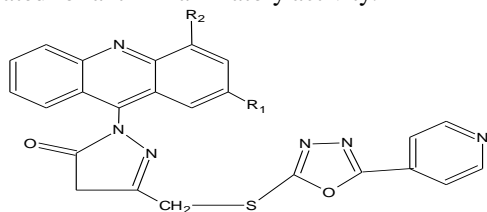
A.Mymoona, A.Husain and B.Azad [30] synthesized Aroylpropionic acid based 2,5-disubstituted-1,3,4-oxadiazoles for anti-inflammatory and analgesic activity.



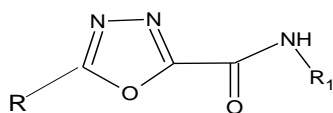
P. Erhan, S. Gulay, K.Pelin [31] synthesized 1-acylthiosemicarbazides, 1,3,4-oxadiazoles, 1,3,4-thiadiazoles and 1,2,4-triazole-3-thiones for anti-inflammatory activity.



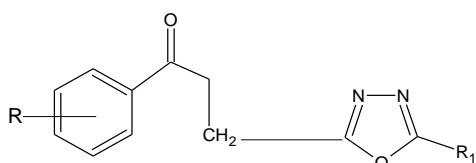
T. Chandra, S. Lata and S. Saxena [32] synthesized substituted acridinyl pyrazoline derivatives and evaluated for anti-inflammatory activity.



A.K. Singh, R. Parthasarthy and M. Lohani [33] synthesized some 1,3,4-oxadiazole derivatives for anti-inflammatory activity.

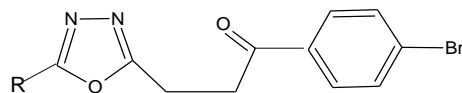


M. Akhter, A. Husain, B. Azad and Mohd. Ajmal [34] synthesized Aroylpropionic acid based 2,5-disubstituted-1,3,4-oxadiazoles and evaluated their anti-inflammatory activity.

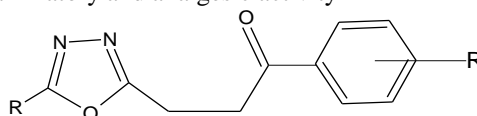


Analgesic activity

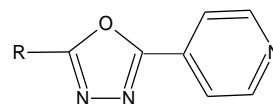
A.Husain and A. Mohammed [35], synthesized novel 1,3,4-oxadiazole derivatives and evaluated their analgesic properties.



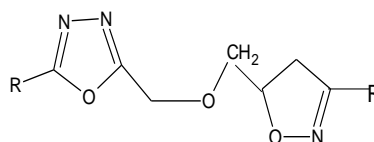
A. Mymoona, H. Asif and A.Bismillah [36]; synthesized Aroylpropionic acid based 2,5-disubstituted-1,3,4-oxadiazoles: Synthesis for anti-inflammatory and analgesic activity



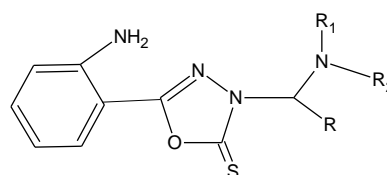
D. Dhansay and A. Pandey [37] synthesized some novel 2,5-Disubstituted 1,3,4-Oxadiazole and evaluated their Analgesic, Anti-Inflammatory, Anti-Bacterial and Anti Tubercular Activity.



B. Jayashankar [38] synthesized 2, 5-Disubstituted 1, 3, 4-Oxadiazole and evaluated their analgesic activity:

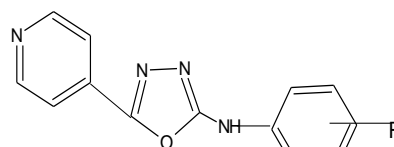


K. Selvakumar [39] synthesized, characterized 1,3,4-oxadiazole derivatives and evaluated their analgesic activity.

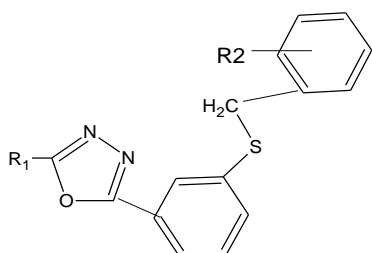


Anticonvulsant activity

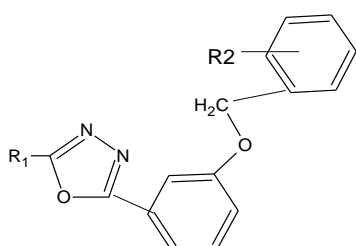
Y. Mohammad and W. MohdAkhter [40] synthesized substituted oxadiazole and thiadiazole derivatives and evaluated for anticonvulsant activity.



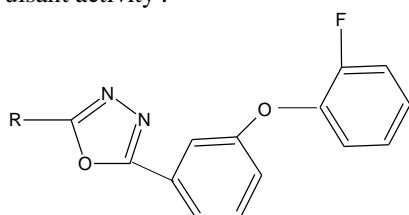
Z. Afshin, H. Samaneh, T. Fatemeh [41] synthesized new 2-substituted-5{2-[(2-halobenzyl)thio]phenyl}-1,3,4-oxadiazoles evaluated as anticonvulsant agents.



A Zarghi, Tabatabai S. A., Faizi Ahadian A. [42] synthesized new 2-substituted benzyloxyphenyl -1,3,4-oxadiazoles and evaluated as anticonvulsant agents.

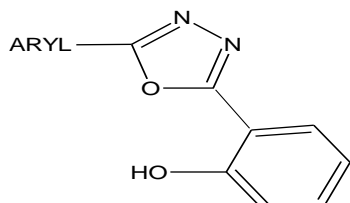


A.Almasirad, T. Sand and Faizi M [43] synthesized new 2-substituted-5-[2-(2fluorophenoxy) phenyl]1,3,4-oxadiazole and 1,2,4-triazoles and evaluate their anticonvulsant activity .

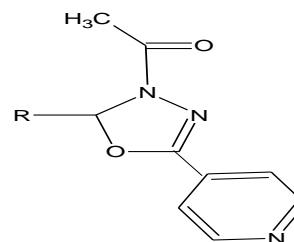


Anti-tubercular activity

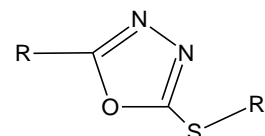
S. R.Pattan, P. A.Rabara, S. Jayashri [44] synthesized and evaluated some novel substituted 1,3,4-oxadiazole and pyrazole derivatives for anti-tubercular activity.



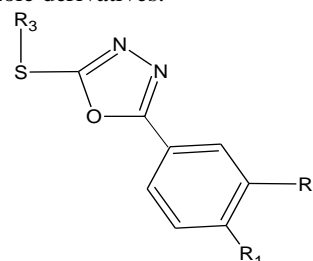
Yarshahar M, Siddiqui Ahmed A and Aliashraf M [45] synthesized and evaluated anti-tuberculostatic activity of novel 1,3,4-oxadiazole derivatives.



R.L. Bakal [46] synthesized some 2,5-disubstituted oxadiazole derivatives as potential candidate for treatment of XDR and MDR tuberculosis.

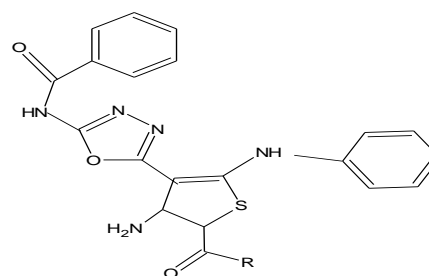


F. Macaev [47] studied the structure- antituberculosis activity relationships study of a series of 5-aryl-2-thio-1,3,4oxadiazole derivatives.



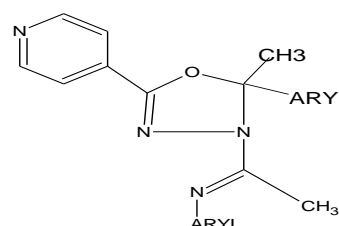
Anti Tumor activity

S. Bondock [48] synthesized some new 1,3,4-oxadiazole and evaluated for antitumor activity.



Pulmonary Vasodilatory activity

P. J. Shirote and M. S. Bhatia [49] synthesized some novel 1,3,4oxadiazoles and evaluated for pulmonary vasodilatory activity .



CONCLUSION

This review highlights the therapeutic properties of the 1,3,4-oxadiazole ring and found to be promising as it is related to diverse range of pharmacological activities. Thus this paper proves to be significant for further research work on the bioactive oxadiazole ring.

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