International Journal of ChemTech Research
CODEN(USA): IJCRGG ISSN : 0974-4290
Vol. 3, No.3, pp 1362-1372, July-Sept 2011

Review article on 1, 3, 4-Oxadiazole derivaties and it's Pharmacological activities.

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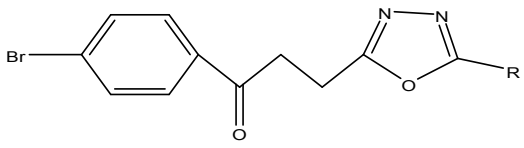
Abstract: A series of five member heterocyclic compounds and its activities as like anti-inflammatory anti HIV, Antitubucular, anticancer activity, all the synthesize compounds check by the instrumental study just like IR, NMR, MASS spectra and pharmacological activity: A series of 1,3,4-oxadiazole and 1,2,4-triazole derivatives of mostly compounds were synthesized in order to obtain new compounds with potential anti-inflammatory activity, analgesic activity and lower ulcerogenic potential. All compounds were evaluated for their anti-inflammatory activity by the carrageenan induced rat paw edema test method. The compounds possessing potent anti-inflammatory activity were further tested for their analgesic, ulcerogenic and antioxidant activities.
Keywords: 1, 3, 4- oxadiazole, pharmacological activity.

INTRODUCTION:

Five member heterocyclic compounds show various type of biological activities among than 2,5-disubstituted 1,3,4-oxadiazole are associated with diverse biological activities.[1]Various biological activities like antimicrobial, anti-tubercular, anti-inflammatory, Anticonvulsant[2], Hypnotic , Anesthetic activity[3].1,3,4-oxadiazoles showed antibacterial properties similar to those of well known sulfonamide drugs. The oxadiazole nucleus with N=C-S linkage exhibits a large number of pharmacological activities.[4]Sulfone derivatives containing heterocyclic moiety are known for their interesting antifungal bioactivities and have attracted considerable attention in pesticide and medicinal formulation. A large number of report on their synthesis and biological activities have appeared during the last three years[5].

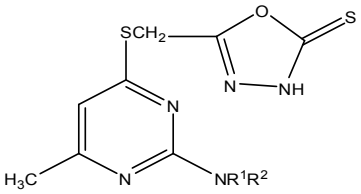
1-ANTI-INFLAMATORY ACTIVITY:

1.1:A novel series of 2-[3-(4-bromophenyl)propan-3-one]-5-(substituted phenyl)-1,3,4-oxadiazoles have been synthesized from 3-(4-bromobenzoyl) propionic acid (**3**)with the aim to get better anti-inflammatory and analgesic agents with minimum or without side effects (ulcerogenicity). Two compounds, 2-[3-(4-bromophenyl)- propan-3-one]-5-(4-chlorophenyl)-1,3,4-oxadiazole and 2-[3-(4-bromophenyl)propan-3-one]-5-(3,4-dimethoxy phenyl)-1,3,4-oxadiazole with anti-inflammatory activity of 59.5 and 61.9 %, respectively, were found to have comparable activity with that of indomethacin which showed 64.3 % activity at the same dose of 20 mg kg–1. (1)

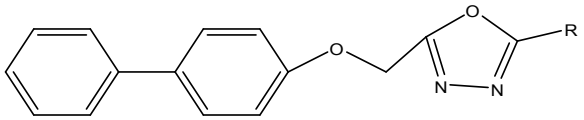


1.2: Synthesis and results of anti-inflammatory activity in vivo of 5-[(2-disubstitutedamino-6-methyl-pyrimidin-4-yl)-sulfanylmethyl]-3H-1,3,4-oxadiazole-2-thiones and their *S*-alkyl-, *N*3-acyl- and *N*3-aminomethyl derivatives are described. All the tested compounds possess anti-inflammatory activity comparable to that of acetylsalicylic acid and some derivatives of 5-[(6-methyl-2-piperidin-1-yl-

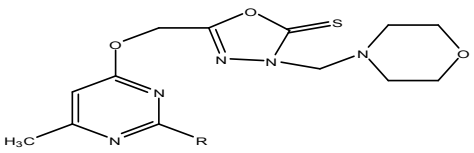
pyrimidin-4-yl)-sulfanylmethyl]-3H-1, 3, 4-oxadiazole-2-thione were found to be much more active than ibuprofen.[2]



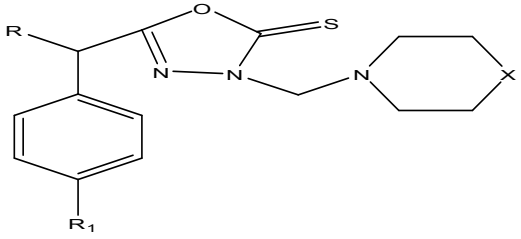
1.3:A series of 1,3,4-oxadiazole and 1,2,4-triazole derivatives of biphenyl-4-yloxy acetic acid were synthesized compounds activity,anti-inflammatory activity, analgesic activity and lower ulcerogenic potential. All compounds were evaluated for their anti-inflammatory activity by the carrageenan induced rat paw edema test method. The Compound was evaluated as the lead compound having inflammatory activity (81.81%) than the reference drug (79.54%), low ulcerogenic more anti- potential and protective effect on lipid peroxidation.[3]



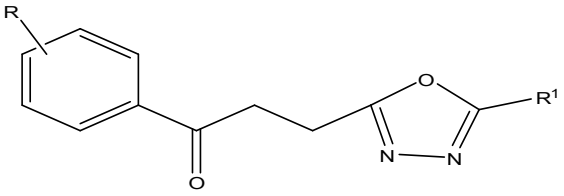
1.4:The synthesis of 5-(6-methyl-2-substituted 4-pyrimidinyloxymethyl)-2,3-dihydro-1,3,4-oxadiazole-2-thiones and their 3-morpholinomethyl derivatives and the results of anti-inflammatory activity in vivo are described. Most of the tested compounds exhibited anti-inflammatory activity and some of them were more active than acetylsalicylic acid.[4]



1.5: It was observed that compounds having 4-chlorophenylpiperazin-4-ylmethyl (5h) and 4-fluorophenylpiperazin-4-ylmethyl also showed good activity, viz. 71.09% and 68.71%,respectively. [5]

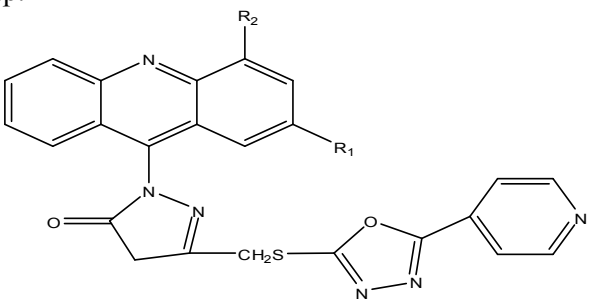


1.6:Various derivatives of aroylpropanoic acid containing oxadiazole nucleus were successfully synthesized and screened for anti-inflammatory, analgesic, ulcerogenic activities and lipid peroxidation studies. Some of the synthesized compounds were very safe with anti-inflammatory and analgesic activities comparable to ibuprofen. The results obtained support the statement that the synthesized compoundsmay be used as safer anti-inflammatory agents.[6]

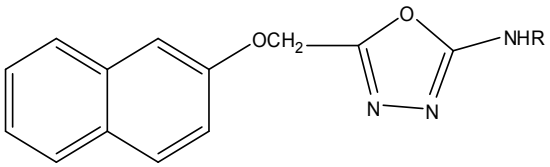


1.7: All the compounds were tested for anti-inflammatory activity in carrageen-induced edema assay in rats at a dosage of 100 mg/kg. Four compounds showed significant activity. Among these compounds, the two dichlorophenyl derivatives, revealed more than 50% activity. However at all of the doses they were less active than ibuprofen. Further, all of these compounds were tested for analgesic activity at 100 mg/kg in acetic acid-induced assay in mice.[7]

1.8: All the newly synthesized compounds are screened for their anti-inflammatory and analgesic activities. All the compounds have shown anti-inflammatory activity ranging from 10.8 to 40.8% at the dose of 50 mg/kg, p.o. In addition of anti-inflammatory activity these compounds have also exhibited analgesic activity in the ranging from 8.6 to 33.5% at the dose of 50 mg/kg, i.p.[8]

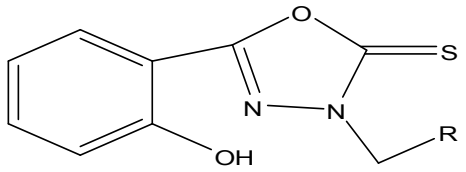


1.9:Sixteen 1-(2-naphthyloxyacetyl)-4-substituted-3-thiosemicarbazide, 2-(2-aphthyloxymethyl)-5-substitutedamino-1,3,4-oxadiazole,2-(2-naphthyloxy methyl)-5-substitutedamino-1,3,4 thiadiazole and 5-(2-naphthyloxymethyl)-4-substituted-1,2,4-triazole-3-thione derivatives have been prepared and evaluated as orally active anti-inflammatory agents with reduced side-effects.[9]

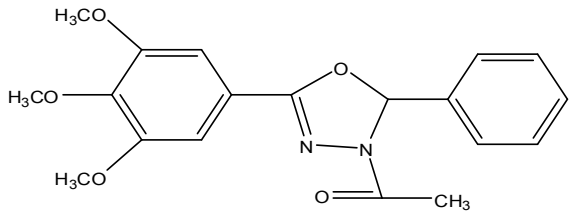


2: ANTICANCER-ACTIVITY:

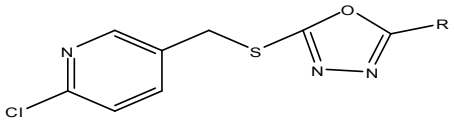
2.1:A series of 5-(2-hydroxyphenyl)-3-substituted-2,3-dihydro-1,3,4-oxadiazole-2-thione derivatives was synthesized and evaluated for their in vitro anticancer activity. Seven of the investigated compounds, 3i, 3j, 3k, 3o, 3p, 3q, and 3r, displayed high anticancer activity in the primary assay. These compounds have been selected for a full anticancer screening against a 60-cell panel assay where they showed non-selective broad spectrum and promising activity against all cancer cell lines. Compounds 3j and 3k proved to be the active members in this study compared to 5-fluorouracil and cyclophosphamide as reference drugs, respectively. Compounds 3j and 3k were identified as promising lead compounds.[10]



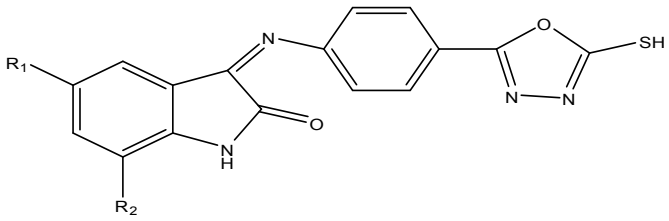
2.2:Some,3-acetyl-2-substituted-phenyl-5-(3,4,5-trimethoxyphenyl)-2,3-dihydro-1,3,4-oxadiazole derivatives were synthesized by cyclization reaction of N0-substituted benzylidene-3,4,5-trimethoxybenzo hydrazide in acetic anhydride.their ant proliferative activities against some cancer cells in vitro by MTT method. Among them, 2a, 2b, 2c, 2f, 3l, and 3m were highly effective against PC3 cells and 2a, 2c, and 2f showed moderate activities against Bcap37 and BGC823 cells. The IC50 values of high active compounds 2a, 2b, 2c, 2f, 3l, and 3m against PC3 cells were 0.2, 1.8, 0.2, 1.2, 1.7, and 0.3 lM,respectively.[11]



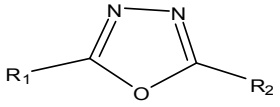
2.3:A series of new 2-chloropyridine derivatives possessing 1,3,4-oxadiazole moiety were synthesized. Antiproliferative assay results indicated that compounds 6o and 6u exhibited the most potent activity against gastric cancer cell SGC-7901, which was more potent than the positive control. Especially, compound 6o exhibited significant telomerase inhibitory activity (IC50 = 2.3 ± 0.07 lM), which was comparable to the positive control ethidium bromide. Docking simulation was performed to position compound 6o intothe active site of telomerase (3DU6) to determine the probable binding model.[12]



2.4:A series of 5-or 7-substituted 3-{4-(5-mercapto-1,3,4-oxadiazol-2-yl)phenylimino}-indolin–2–one derivatives were synthesized by treating 5-(4-aminophenyl)-1,3,4-oxadiazole-2-thiol with different isatin derivatives.. All the synthesized derivatives were screened for anticancer activity against HeLa cancer cell lines using MTT assay. All the synthetic compounds produced a dose dependant inhibition of growth of the cells. The IC50 values of all the synthetic test compounds were found between 10.64 and 33.62_M. The potency (IC50 values) of anticancer activity of compounds VI b-d was comparable with that of known anticancer agent, Cisplatin .Among the synthesized 2-indolinones, compounds VI b-d with halogen atom (electron withdrawing groups) at C5 position showed most potent activity. [13]

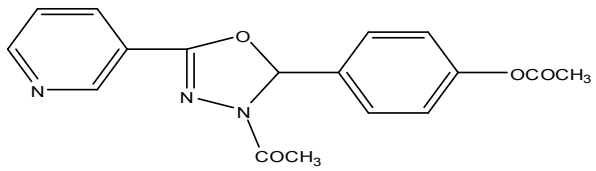


2.5:A series of novel 1,3,4-oxadiazole derivatives based on structural and electronic overlap with combretastatin A-2 have been designed, synthesized and tested in vivo using the sea urchin embryo development assay. We monitored the effects of these agents on two specific developmental stages of the embryo, namely i) fertilized egg to assess anti-mitotic activity; ii) freeswimming blastulae to detect behavioral changes in the embryo swimming pattern.[14]



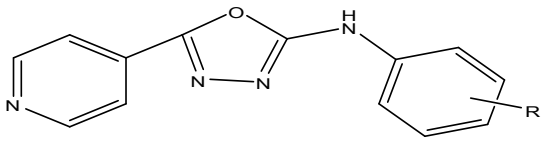
3: CALSIUM-CHANNEL BLOCKER:

In the present study, we investigated whether the correction of endothelial dysfunction is dependent on the normalization of high blood pressure levels by 1,3,4-oxadiazole derivative
(NOX-1) in deoxycorticosterone acetate (DOCA-salt) and NG-nitro-l-arginine (L-NNA) hypertensive rats. In DOCA-salt and L-NNA hypertensive rats, the mean systolic blood pressure (MSBB) was 185.3±4.7 and 170.2±4.1mmHg, whereas after administration of NOX-1 to hypertensive rats, MSBB was 127.8±4.5 and 120.2±5.1mmHg, respectively.[15]

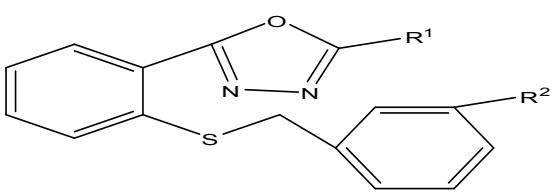


4: ANTICONVULSANT ACTIVITY:

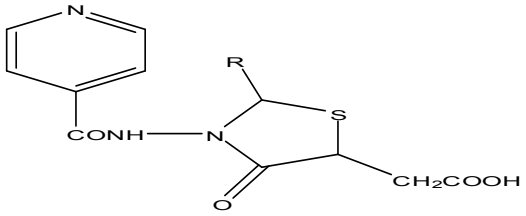
4.1:A series of 2-(substituted phenyl)amino-5-(4-pyridyl)-4H-1,3,4-thiadiazole and 2-(substituted phenyl)amino-5-(4-pyridyl)-4H-1,3,4-oxadiazole was prepared from ionized and substituted phenyl isothiocyanates derived thiosemicarbazides (Scheme 1) All the compounds showed activity in the range of 33-100 % in comparison to phenytoin which completely inhibited the convulsions produced by electroconvulsometer in albino mice. Compounds and showed maximal activity whereas compounds and showed good activity.[16]



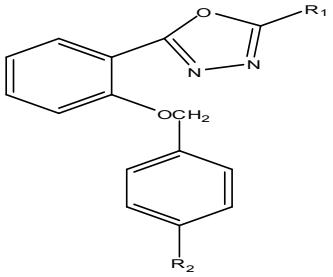
4.2:A new series of 2-substituted-5-{2-[(2-halobenzyl)thio)phenyl}-1,3,4-oxadiazoles was designed, synthesized and investigated for anticonvulsant activities. Electroshock and pentylenetetrazole-induced lethal convulsion tests showed that some of the synthesized compounds had significant anticonvulsant activity.[17]



4.3:A series of Isoninicotinic acid hydrazide (INH) incorporated derivatives of thiazolidin-4-one azetidin-2-one and 1,3,4-oxadiazole has been synthesized. The anticonvulsant activity of all the synthesized compounds was evaluated against maximal electroshock induced seizures (MES) and subcutaneous pentylenetetrazole (scPTZ) induced seizure models in mice. All the compounds were active in MES and a majority of compounds were active in scPTZ test. All compounds were less neurotoxin than the standard drug phenytoin.[18]

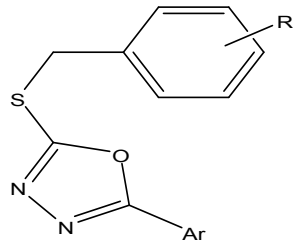


4.4:A series of new 2-substituted-5-(2-benzyl -oxyphenyl)-1,3,4-oxadiazoles have been synthesized and evaluated as anticonvulsant agents. Compound 4b shows considerable anticonvulsant activity both in PTZ and MES models. It seems this effect is mediated through benzodiazepine receptors mechanism.[19]

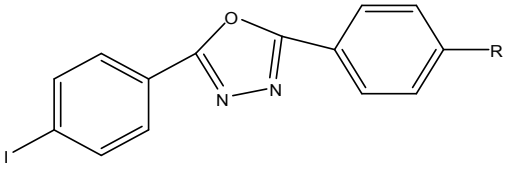


5: ANTI ALZIMER ACTIVITY:

5.1: Glycogen syntheses kinase-3b (GSK-3b) is implicated in abnormal hyperphosphorylation of tau protein and its inhibitors are expected to be promising therapeutic agents for the treatment of Alzheimer's disease. Here we report design, synthesis and structure–activity relationships of a novel series of oxadiazole derivatives as GSK-3b inhibitors. Among these inhibitors, compound 20x showed highly selective and potent GSK-3b inhibitory activity in vitro and its binding mode was determined by obtaining the X-ray co-crystal structure of 20x and GSK-3b. [20]

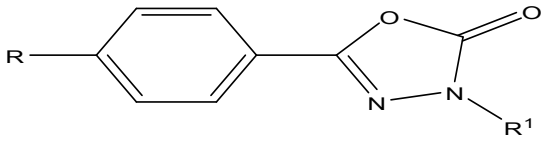


5.2: A series of 2,5-diphenyl-1,3,4-oxadiazole derivatives for detecting b-amyloid plaques in Alzheimer's brains. The affinity for amyloidal plaques was assessed by an in vitro binding assay using pre-formed synthetic Ab42 aggregates. The new series of 1,3,4-DPOD derivatives showed affinity for Ab42 aggregates with Ki values ranging from 20 to 349 nM. The 1,3,4-DPOD derivatives clearly stained b-amyloid plaques in an animal model of Alzheimer's disease, reflecting the affinity for Ab42 aggregates in vitro. Compared to 3,5-diphenyl-1,2,4-oxadiazole (1,2,4-DPOD) derivatives, they displayed good penetration of and fast washout from the brain in biodistribution experiments using normal mice. The novel radio iodinated 1,3,4-DPOD derivatives may be useful probes for detecting b-amyloid plaques in the Alzheimer's brain.[21]

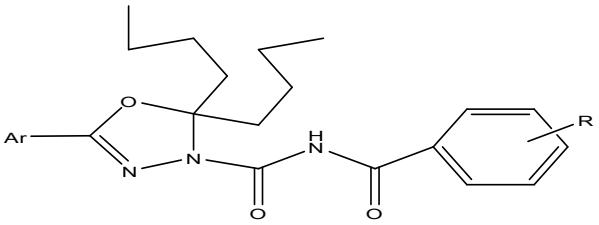


5: MAO INHIBITOR:

5.1: Eighteen new 5-aryl-1,3,4-oxadiazol-2(3H)-one derivatives and sulfur analogues were prepared and evaluated in vitro for their inhibitory properties on monoamine oxidase (MAO) types A and B. The most active compounds in these series acted preferentially against MAO B with I&a values in the range of 1.8-0.056 PM. The 5-(4-biphenylyl)-3-(2-cyanoethyl)-1,3,4-oxadiazol-2(3H)-one 23 and its oxadiazole thione analogue 33 were found to act as potent, selective and competitive MAO B inhibitors with a slight slow-binding character.[22]

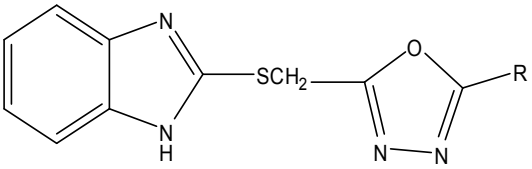


5.2:A new series of 1,3,4-oxadiazole-3(2H)-carboxamide derivatives have been synthesized by direct heterocyclization reaction of substituted benzoylisocyanate with various roylhydrazones as novel monoamine oxidize inhibitors (MAOIs). This work may provide a novel class of lead compounds with potential MAO inhibitions for further optimization.[23]



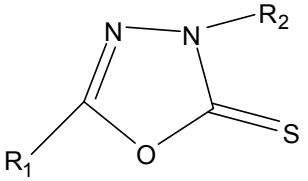
6: ANTIDIABETIC:

6.1:In seeking broad spectrum pharmacological activities of benzimidazole derivatives, a group of 4-thiazolidinones 5(a–j) and 1,3,4-oxadiazoles 6(a–j) containing 2-mercapto benzimidazole moiety were synthesized and screened for in vivo anticonvulsant activity by Maximal Electroshock (MES) model and antidiabetic activity using Oral Glucose Tolerance Test (OGTT).[24]



7: ACTIVITY AGAINST SNAKE VENOM:

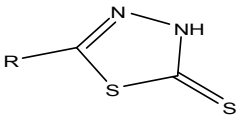
7.1:A series of 1,3,4-oxadiazole-2 (3H)-thiones and 1,3,4-thiadiazole-2 (3H)-thiones were synthesized and evaluated for their inhibitory activities against the two nucleotide pyrophosphates phosphodiesterase 1 enzymes. Dixon, as well as Lineweaver–Burk plots, and their secondary repots have indicated that the inhibition was of pure non-competitive type, against both snake venom and pure human recombinant enzymes as the Vmax values decreases without affecting the Km values. 5-[4-(t-Butyldimethylsilyloxy)- phenyl]-1,3,4-thiadiazole-2 (3H)-thione (17) and [4-(t-butyldimethylsilyloxy)-phenyl]-1,3,4- oxadiazole-2 (3H)-thione (1) were found to be the most active compounds with IC50 values 66.47 and 368 lM, respectively.[25]

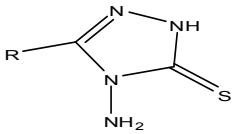


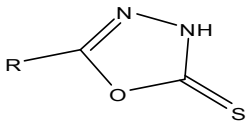
1O:ACTIVITY ON SKIN:

10.1: The tyrosinase inhibition studies of library of 2,5-disubstituted-1,3,4-oxadiazoles have been reported and their structure–activity relationship (SAR) also have been discussed. This molecule can be the best candidate as a lead compound for further development of drug for the treatments of several skin disorders.[26]

10.2:A series of 1,3,4-thiadiazole-2(3H)-thiones, 1,3,4-oxadiazole-2(3H)-thiones, 4-amino-1,2,4-triazole-5(4H)-thiones, and substituted hydrazides were tailored and synthesized as new potent inhibitors of tyrosinase.[27]

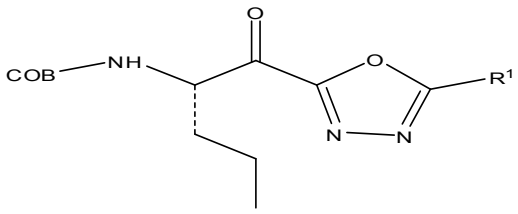






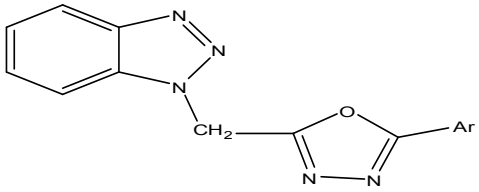
11:ANTIOSTEOPOROTIC ACTIVITY:

We have prepared a series of cathepsin K inhibitors bearing the keto-1,3,4-oxadiazole warhead capable of forming a hemithioketal complex with the target enzyme. By modifying binding moieties at the P1, P2, and prime side positions of the inhibitors, we have achieved selectivity over cathepsins B, L, and S, and have achieved sub-nanomolar potency against cathepsin K. This series thus represents a promising chemotype that could be used in diseases implicated by imbalances in cathepsin K activity such as osteoporosis.[28]

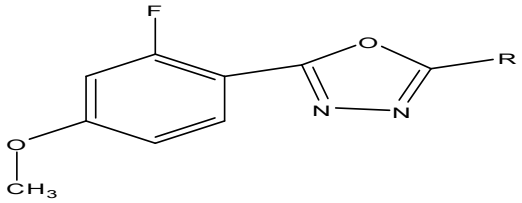


12: ANTIMICROBIAL ACTIVITY:

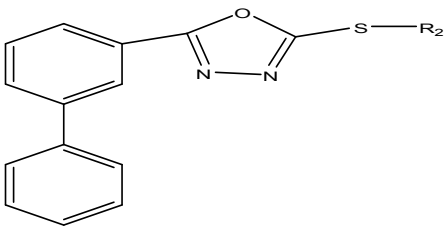
12.1: Synthesis of (ethyl 2- (1H Benzo [d] [1, 2, 3] triazole –1- yl] acetate) and (2H – benzo [d] [1, 2, 3] triazole – 1 – yl ace to hydrazine) along with their derivatives has been done. The Antimicrobial activity of the synthesized compounds was evaluated, on Streptococcus aurous and Esteria coli. The present investigation deals with the synthesized compounds possessing good antimicrobial activity.[29]



12.2:A series of new 1,3,4-oxadiazole derivatives containing 2-fluoro-4-methoxy moiety were synthesized. All the newly synthesized compounds were screened for their antibacterial and antifungal studies. Antimicrobial studies revealed that compounds 4a and 4b showed significant antibacterial activity against Escherichia coli and Pseudomonas aeruginosa Compound 4i showed significant antifungal activity against C. Albicans.[30]

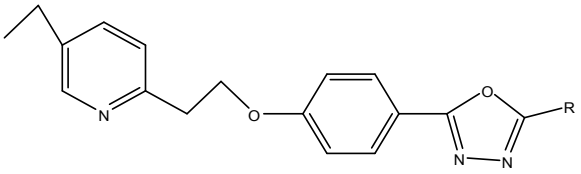


12.3:A series of biphenyl-1,3,4-oxadiazoles namely 5-[substituted-(1,10-biphenyl)-3-yl]-1,3,4-oxadiazole-2(3H)-thiones and its S-alkyl derivatives have been synthesized by multi step organic synthesis involving Suzuki-Miyaura coupling using palladium catalyst. The synthesized compounds were characterized by 1H NMR, 13C NMR, 19F NMR, IR and LCMS spectroscopic properties. They were tested for their antimicrobial and analgesic activities. Some of them showed significant activity.[31]

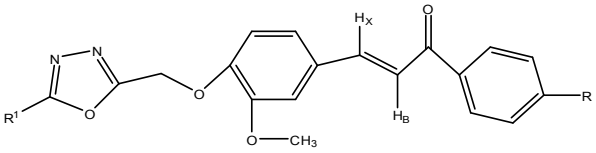


12.4:A series of novel 2-{4-[2-(5-ethylpyridin-2-yl)ethoxy]phenyl}-5-substituted-1,3,4-oxadiazoles were synthesized by the oxidative cyclisation of hydrazones derived from 4-[2-(5-ethylpyridin-2-yl)ethoxy]benzaldehyde and aroylhydrazines using chloramine-T as oxidant. IR, NMR and elemental analysis characterized the newly synthesized

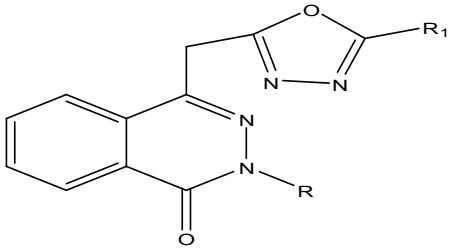
compounds. The synthesized compounds were evaluated for their antimicrobial activity and were compared with standard drugs. The compounds demonstrated potent to weak antimicrobial activity.[32]



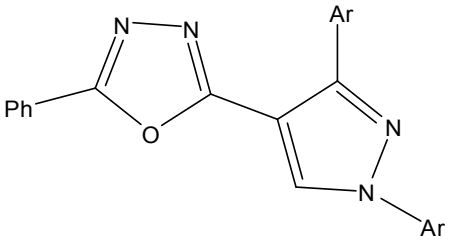
12.5:A series of 28 oxadiazole analogues (AB1eAB28) were subjected to molecular properties prediction, drug-likeness by Molinspiration (Molinspiration, 2008) & MolSoft (MolSoft, 2007) softwares, lipophilicity and solubility parameters using ALOGPS 2.1 program. Out of 28 analogues only 16 were chosen on the basis of Lipinski "Rule of Five" (Ro5) for the synthesis and antimicrobial screening as oral bioavailable drugs/leads. Maximum drug-likeness model score (1.22) was found to be of compound AB13. Selected compounds (AB1eAB2), (AB5eAB9), (AB12eAB16), (AB18eAB21) were synthesized and characterized by IR, NMR and mass spectral analysis followed by antibacterial and antifungal screening. It was observed that compounds showed moderate to good antibacterial activity, but their antifungal activity was somewhat moderate..[33]



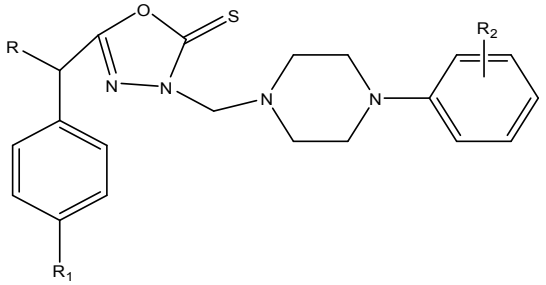
12.6:A series of new 2-substituted [4-(1,3,4-oxadiazol-2-yl)methyl]phthalazin-1(2H)-one derivatives 7aeh to 9aeh were designed and synthesized from methyl (4-oxo-3,4-dihydrophthalazin-1-yl)acetate (4), which in was turn prepared from phthalic anhydride. The structure of synthesized new compounds were characterized by spectral data and screened for their antimicrobial activities against various bacteria and fungi strains. Several of these compounds showed antimicrobial activity.[34]



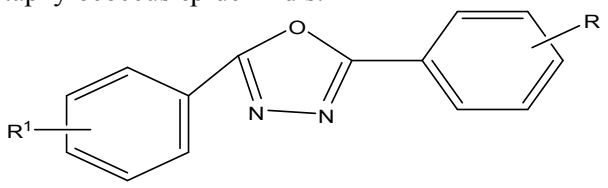
12.7:A series of novel 2,5-disubstituted 1,3,4-oxadiazoles 4 have been conveniently synthesized by oxidative cyclization of pyrazolylaldehyde N-acylhydrazones 3 promoted by iodobenzene diacetate under mild conditions (11 examples, up to 92% isolated yields). All the eleven compounds were tested in vitro for their antibacterial activity against Gram-positive bacteria namely, Staphylococcus aureus, Bacillus subtilis and two Gram-negative bacteria namely, Escherichia coli and Pseudomonas aeruginosa. All the synthesized compounds were also tested for their inhibitory action against two strains of fungus.[35]



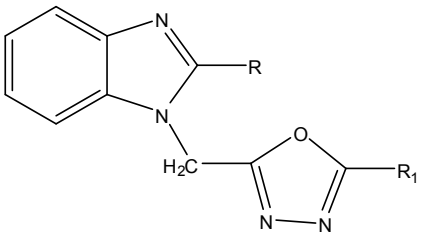
12.8: The acid hydrazides (2) derived from ibuprofen and 4-methylthiophenyl acetic acids have been subjected to cyclization with carbon disulphide under basic conditions to yield 1,3,4-oxadiazol-2-thiones (3) which on aminomethylation with formaldehyde and secondary amines afforded a series of Mannich bases (4 and 5). Purity of the compounds has been confirmed by TLC. Structures of these compounds were established on the basis of elemental analyses and spectral studies. The newly synthesized compounds were evaluated for their anti-inflammatory, analgesic, ulcerogenic and antimicrobial activities.[36]



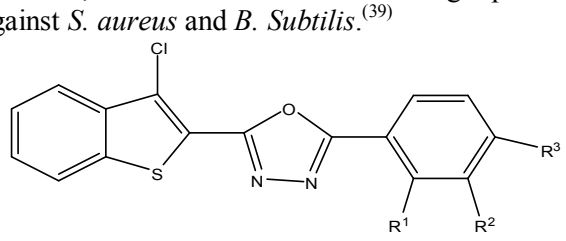
12.9: Title compounds of 1,3,4-oxadiazole derivatives were synthesized by the ring closure reactions of various acylhydrazides with carbon disulphide (4aee) and with aromatic acids in POCl3 (5aee). After structural elucidation, all the synthesized compounds were evaluated for their antimicrobial activity against Escherichia coli, Staphylococcus aureus and Staphylococcus epidermidis.[37]



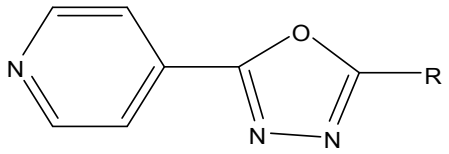
12.10: Some derivatives of benzimidazole were synthesized by nucleophilic substitution of 2-substituted-1Hbenzimidazole. The resulting ethyl (2-substituted-1H-benzimidazol-1-yl) acetate on treatment with hydrazine hydrate yielded 2-(2-substituted-1H-benzimidazol-1-yl) acetohydrazide, which on further reaction with one equivalent of different aliphatic or aromatic carboxylic acids in the presence of phosphoryl chloride afforded the corresponding target compounds, 2-substituted-1-[{(5-substitutedalkyl/aryl)-1,3,4-oxadiazol-2-yl} methyl]-1H-benzimidazole. The structures of the synthesized compounds were evaluated by spectral and elemental methods of analyses. All the synthesized compounds were screened for their antimicrobial activities. All of the derivatives showed good activity towards Gram-positive bacteria and negligible activity towards Gram-negative bacteria. Some of the synthesized compounds showed moderate activity against tested fungi.[38]



12.11:Some new 3-acetyl-5-(3-chloro-1-benzo[*b*]thiophen-2-yl)-2-substituted phenyl-2,3-dihydro-1,3,4-oxadiazoles and 2-(3-chloro-1-benzo[*b*]thiophen-2-yl)-5-substituted phenyl-1,3,4-oxadiazoles have been synthesized and evaluated for antimicrobial activity. All the compounds were screened for their antibacterial activities against *Staphylococcus aureus, Bacillus subtilis, Escherichia coli* and *Pseudomonas aeruginosa* and for antifungal activity against *Candida albicans* and *Asperigillus niger*. The compounds exhibited significant antibacterial and moderate antifungal activities. Compounds and were found to be most potent with activities, even better than standard drug ciprofloxacin against *S. aureus* and *B. Subtilis*.[39]

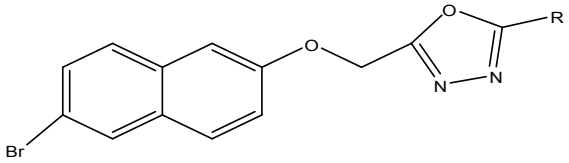


12.12: Novel derivatives of the titled compounds and evaluate the anti-bacterial, analgesic,anti-inflammatory and antitubercular activities.1,3,4-oxadiazole and its derivatives were obtained from the intermediate pyridine-4-carbohydrazide from which schiffs base were obtained on treatment with various aromatic aldehyde ,further on condensation with acetic anhydride produced the title compounds.The remaining derivatives were also obtained from the same intermediate pyridine-4-carbohydrazide by condensation with different cyclizing reagent like phosphoryl chloride. The structures of the compounds were confirmed by IR, 1H NMR, MASS spectral data.All the synthesized compounds shown to significant analgesic, anti-inflammatory,anti-bacterial and anti-tubercular activities.But compound and was found to possess better activity then others.Structure activity relationship and mass fregmentation has also been studied.[40]



we report here the synthesis and *in vitro* antimicrobial activity of various 3-(1,3,4-oxadiazol-2-yl)-quinazolin-4(3*H*)-ones. The antimicrobial activity of title compounds were examined against two gram positive bacteria (*S. aureus*, *S. pyogenes*), two gram negative bacteria (*E. coli*, *P. aeruginosa*) and three fungi (*C. albicans*, *A. niger*, *A. clavatus*) using the broth microdilution method. Some derivatives bearing a bromo or iodo group exhibited very good antimicrobial activity.[41]

12.13: A series of new 1,3,4-oxadiazole derivatives having 6-bromonaphthalene moiety are synthesized. 2-[(6-bromo-2-naphthyl)oxy]acetohydrazide was treated with various substituted aromatic acids in presence of POCl3 to give 2-{[(6-bromo-2-naphthyl)oxy]methyl}-5-aryl-1,3,4-oxadiazole. Also the hydrazide on treating with CS2/KOH gave 5-{[(6-bromo-2-naphthyl) oxy]methyl}-1,3,4-oxadiazole-2(3*H*)-thione, which was subjected to Mannich reaction to get a series of Mannich bases and with alkyl/aryl halide to give 2-{[(6-bromo-2-naphthyl)oxy]methyl}-5-[(alkyl/aryl)thio]-1,3,4-oxadiazole. The newly synthesized compounds were characterized by analytical and spectral data. Antimicrobial activities of these compounds were carried out and some of them have exhibited good activity. [50]



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