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"Synthesis and evaluation of some novel **[5-(4-substituted)-2, 3-dihydro-1,3,4-oxadiazol-2-yl]** aryl oxadiazole derivatives and different biological activities in vitro."

Rajesh Meshram[1*], Satish Sahu[2], **Bhagyashree** Agrawal[3], **Pankaj** Masih[4], Reneesh Jaiswal[5]

[*1]Department of Pharmaceutical Chemistry, School of Pharmacy, Chouksey Engineering College,Bilaspur, Chattisgarh, India
[2]Department of Pharmaceutical Chemistry, School of Pharmacy, Chouksey Engineering College,Bilaspur, Chattisgarh, India
[3]Department of Pharmaceutical Chemistry, School of Pharmacy, Chouksey Engineering College,Bilaspur, Chattisgarh, India
[4]Department of Pharmaceutical Chemistry, School of Pharmacy, Chouksey Engineering College,Bilaspur, Chattisgarh, India
[5]Department of Pharmaceutical Chemistry, School of Pharmacy, Chouksey Engineering College,Bilaspur, Chattisgarh, India

ABSTRACT
A number of substituted aryl oxadiazoles are known for their biological importance like antibacterial, antifungal, anticancer, antioxidants and antiinflamatory activities. The present investigation is carried for the synthesis of certain substituted aryl oxadiazoles and carried out their biological activities. Nine new derivatives of aryl oxadiazoles (Scheme I) were synthesized during the course of research work. The title compound were synthesized from pyarazinoic acid hydrazide react with substituted aryl aldehyde to give Schiff base.A Schiffs base on treatment with aromatic acids in presence of phosphorus oxychloride gives aryl oxadiazoles. The newly synthesized compounds were characterized by, IR, ^{1}H-NMR, and CHN analysis selected compounds screened for antimicrobial, antitubercular, anti-inflammatory and antioxidant activities in vitro. Few of them have exhibited promising activities.

Keywords: Schiffs bases, aryl oxadiazoles, antimicrobial screening. IR, ^{1}H-NMR, CHN analysis.

INTRODUCTION

a) Tuberculosis:

Tuberculosis or **TB** (short for tubercles bacillus) is a common and often deadly infectious disease caused by various strains of mycobacterium, usually *Mycobacterium tuberculosis* in humans.[1] Tuberculosis usually attacks the lungs but can also affect other parts of the body. It is spread through the air, when people who have the disease cough, sneeze, or spit.

The classic symptoms are a chronic cough with blood-tinged sputum, fever, night sweats, and weight loss. Infection of other organs causes a wide range of symptoms. Diagnosis relies on radiology (commonly chest X-rays), a tuberculin skin test, blood tests, as well as microscopic examination and microbiological culture of bodily fluids. Treatment is difficult and requires long courses of multiple antibiotics. [2]

b) Inflammation:

Inflammation (Latin, *inflammare*, to set on fire) is the complex biological response of vascular tissues to harmful stimuli, such as pathogens, damaged cells, or irritants.[26] Inflammation is a protective attempt by the organism to remove the injurious stimuli as well as initiate the healing process for the tissue. Inflammation is not a synonym for infection. Inflammation can be classified as either *acute* or *chronic*.

Acute inflammation is the initial response of the body to harmful stimuli and is achieved by the increased movement of plasma and leukocytes from the blood into the injured tissues. Prolonged inflammation, known as **chronic inflammation**, leads to a progressive shift in the type of cells which are present at the site of inflammation and is characterized by simultaneous destruction and healing of the tissue from the inflammatory process. [27]

c) Antimicrobial agents:

Initially the term 'chemotherapeutic agent' was restricted to synthetic compounds, but now since many antibiotics and their analogues have been synthesized, this criterion has become irrelevant; both synthetically and microbiologically produced drugs need to be include together. However it would be more meaningful to use the term Antimicrobial agent (AMA) to designate synthetic as well as naturally obtained drugs that attenuate microorganisms [4].

d) Antioxidants:

An **antioxidant** is a molecule capable of inhibiting the oxidation of other molecules. Oxidation is a chemical reaction that transfers electrons from a substance to an oxidizing agent. Oxidation reactions can produce free radicals. In turn, these radicals can start chain reactions. When the chain reaction occurs in a cell, it can cause damage or death. When the chain reaction occurs in a purified monomer, it produces a polymer resin, such as a plastic, a synthetic fiber, or an oil paint film. Antioxidants terminate these chain reactions by removing free radical intermediates, and inhibit other oxidation reactions. They do this by being oxidized themselves, so antioxidants are often reducing agents such as thiols, ascorbic acid or polyphenols. [5]

Antioxidants are widely used as ingredients in dietary supplements and have been investigated for the prevention of diseases such as cancer, coronary heart disease and even altitude sickness. Although initial studies suggested that antioxidant supplements might promote health, later large clinical trials did not detect any benefit and suggested instead that excess supplementation is harmful. [6,7]

MATERIALS AND METHODS

Experimental:

The Chemical characterization of the prepared compounds were carried out by the following procedure to ascertain that all prepared compounds were of different chemical nature than the respective parent compound.

- Physical Constant.
- Thin Layer Chromatography (TLC)
- FT-Infrared Spectroscopy (FT-IR)
- ^{1}H-NMR
- Elemental Analysis (C,H,N)
-

Melting Point Determination:

The melting points of the organic compounds were determined by open capillary in a heavy liquid paraffin bath. Melting point is a valuable criterion of purity for an organic compound, as a pure crystal is having definite and sharp melting point. The purity should not be assumed but must be established by observation of any changes in the melting point when the compound is subjected to purification by recrystallisation.

Thin Layer Chromatography:

Chromatography is an important technique to identify the formulation of new compounds and also to determine the purity of the compounds. The R_f value is the characteristic for each of the compound.

FT-Infrared Spectroscopy (FT-IR):

FTIR can be routinely used to identify the functional groups and identification/quality control of raw material/finished products. Thermo Nicolet IR 200 spectrophotometer offers fast throughput and rapid access to reliable and dependable IR results. It has resolution of 1 cm^{-1} and scan range of 4000 cm^{-1} to 600 cm^{-1}. IR spectra were recorded on spectrophotometer using KBr disc method.

Nuclear Magnetic Resonance Spectroscopy (^{1}H-NMR):

H^1NMR spectra were recorded on sophisticated multinuclear FT-NMR Spectrometer model Bruker Avance-II 400, $CDCl_3$ as solvent and tetramethylsilane internal standards. The instrument is equipped with a Gryomagnet of field strength 9.4 T. Its ^{1}H frequency is 300 MHz.

The Experimental Work Comprises Of Scheme-I

1. Preparation of *N*'-(substituted) pyrazinohydrazides. (I_1-I_3)
2. Preparation of substituted [5-(4-substituted)-2,3-dihydro-1,3,4-oxadiazol-2-yl] (B_1-B_9).

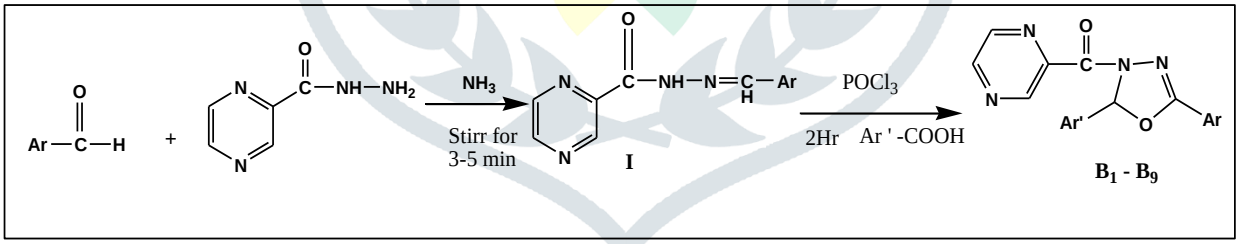
A] Preparation of N'-(substituted) pyrazinohydrazide (I_{1-3}).[8]

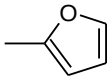
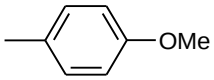
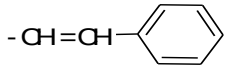
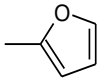
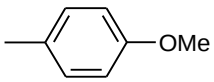
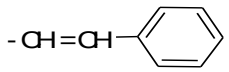
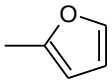
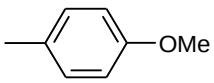
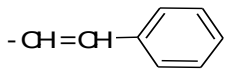
To a mixture of 0.05 mole of pyarazinoic Acid hydrazide in 18 ml of water and 2.4 ml of concentrated ammonia. 0.05 mole of anisaldehyde was added dropwise with stirring over a period of 30-60 minutes. The mixture was stirred for further hour, the solid was collected by suction filtration washed with water and recrystallized from ethanol. Similarly I_2 and I_3 were prepared using cinnamaldehyde and Furfuraldehyde. Analytical data were given in the table.

B] ***Preparation of*** Substituted ***[5-(4-substituted)-2, 3-dihydro-1, 3, 4-oxadiazol-2-yl] (B_1-B_9)*** [9]

To a mixture of 0.01 mole of **I_1** and 0.01 mole of cinnamic acid was added 10 mole of Phosphorus oxychloride at temp. of -5^{0}c. The reaction mixture refluxed at 100 ^{0} C for 2 hrs.The reaction mixture was cooled to room temperature, the excess of $POCl_3$ was concentrated through high vacuum, the residue was quenched with ice and the solid separated was filtered and dried through pump to afford corresponding aryl Oxadiazole (**B_1**). Similarly **B_2-B_9** was prepared using **I_2** and **I_3** along with **Para Amino Benzoic acid and Salicylic acid** respectively.

SCHEME-1



comp	Ar	comp	Ar	comp	Ar
B_1		**B_4**		**B_7**	
B_2		**B_5**		**B_8**	
B_3		**B_6**		**B_9**	

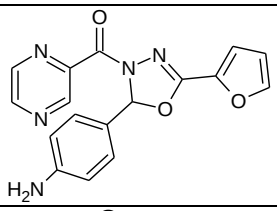
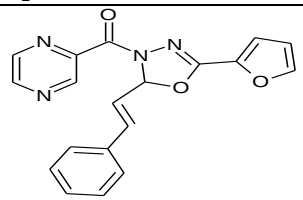
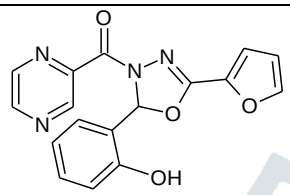
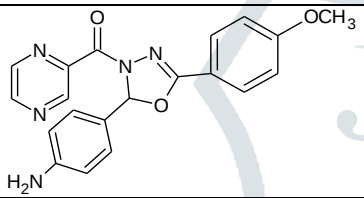
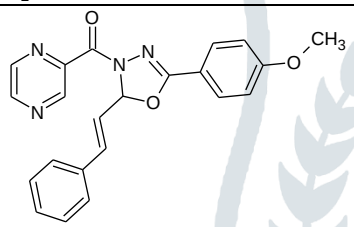
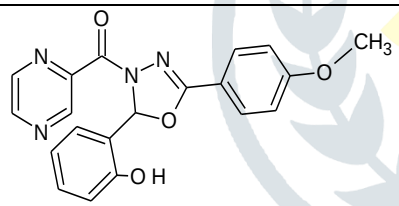
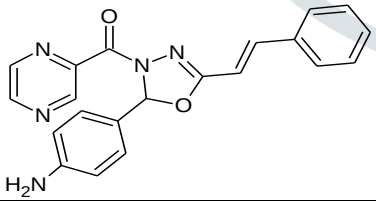
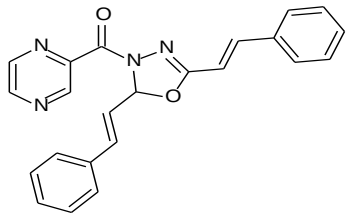
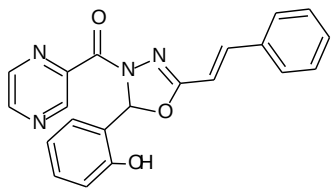
B_1		4-[5-(2-furyl)-3-(pyrazin-2-ylcarbonyl)-2,3-dihydro-1,3,4-oxadiazol-2-yl]aniline
B_2		[5-(furan-2-yl)-2-[(*E*)-2-phenylethenyl]-1,3,4-oxadiazol-3(2*H*)-yl](pyrazin-2-yl)methanone
B_3		[5-(furan-2-yl)-2-(2-hydroxyphenyl)-1,3,4-oxadiazol-3(2*H*)-yl](pyrazin-2-yl)methanone
B_4		4-[5-(2-furyl)-3-(pyrazin-2-ylcarbonyl)-2,3-dihydro-1,3,4-oxadiazol-2-yl]aniline
B_5		[5-(4-methoxyphenyl)-2-[(*E*)-2-phenylethenyl]-1,3,4-oxadiazol-3(2*H*)-yl](pyrazin-2-yl)methanone
B_6		[2-(2-hydroxyphenyl)-5-(4-methoxyphenyl)-1,3,4-oxadiazol-3(2*H*)-yl](pyrazin-2-yl)methanone
B_7		4-{5-[(*E*)-2-phenylvinyl]-3-(pyrazin-2-ylcarbonyl)-2,3-dihydro-1,3,4-oxadiazol-2-yl}aniline
B_8		{2,5-bis[(*E*)-2-phenylethenyl]-1,3,4-oxadiazol-3(2*H*)-yl}(pyrazin-2-yl)methanone
B_9		[2-(2-hydroxyphenyl)-5-[(*E*)-2-phenylethenyl]-1,3,4-oxadiazol-3(2*H*)-yl](pyrazin-2-yl)methanone

Table No. 1 : List of [5-(4-substituted)-2, 3-dihydro-1,3,4-oxadiazol-2-yl] compounds

Comp.	Mol. Formula	Mol. Wt.	M.P 0C	Rf Value	Yield %	Elemental analyses Calcd. (Found)			LogP	ClogP	CMR
						C	H	N			
B1	C17H13N5O4	351.09	132-134	0.51	63	58.12	3.73	19.93	1.17	0.066	8.96
B2	C19H14N4O3	346.10	135-138	0.51	44	65.89	4.07	16.18	2.49	2.201	9.747
B3	C17H12N4O4	336.08	131-133	0.56	64	60.71	3.6	16.66	1.58	0.68	8.922
B4	C20H17N5O4	391.12	126-128	0.54	38	61.38	4.38	17.89	2.43	0.809	10.363
B5	C22H18N4O3	386.13	136-139	0.58	45	68.38	4.7	14.5	3.74	2.944	11.15
B6	C20H16N4O4	376.11	120-122	0.58	52	63.82	4.28	14.89	2.84	1.423	10.32
B7	C21H17N5O3	387.13	133-134	0.52	46	65.11	4.42	18.08	2.89	1.952	11.13
B8	C23H18N4O2	382.14	128-130	0.62	58	72.24	4.74	14.65	4.21	3.983	11.74
B9	C21H16N4O3	372.12	122-125	0.54	54	67.73	4.33	15.05	3.31	1.603	10.826

Table No. 2

Analytical data of [5-(4-substituted)-2,3-dihydro-1,3,4-oxadiazol-2-yl] compounds (scheme- I).

The combustion analysis of compounds synthesized was found to be within the limits of permissible errors.

***TLC solvents: (b_1- b_9)*:** Toluene: Methanol (2:1).

SPECTRAL STUDY

Infrared Spectra:

The peaks in IR Spectrum gave an idea about the probable structure of the compound. IR region ranges between 4000-650 cm^{-1}. The derivatives including intermediates were recorded on IR spectra were recorded on Thermo Nicolet IR 200 spectrophotometer using potassium bromide pellet technique, which showed different vibration levels of molecules by using KBr pellet technique.

^{1}H-NMR Spectra:

NMR Spectroscopy enables us to record differences in magnetic properties of the various magnetic nuclei present and to deduce in the large measure about the position of these nuclei within the molecule. We can deduce how many different kinds of environment are there in the molecules and also which atoms are present in neighboring groups. The proton NMR spectra, enables us to know different chemical and magnetic environments corresponding to protons in molecules.

^{1}H-NMR was recorded in BRUKER AV-400 MHz using $CDCl_3$ as a solvent and TMS as an internal standard. The chemical shift data were expressed as δ-values related to TMS.

Comp.	IR Bands (cm^{-1})	Types of Vibrations	δ ppm	Proton nature
B_1	3411 2958 1693 1657 1482 1210	N-H str.(primary) -C-H Ar.str.(broad) -C=O str. -C=N str. -C=C- Ar ring str. -C-N str.		
B_2	2984 1709 1641 1658 1483 1239	-C-H Ar.str.(broad) -C=O str. -C=N str. -C=C- str. -C=C- Ar ring str. -C-N str.		
B_3	3369 3072 1693 1652 1465 1165	-OH str. -C-H Ar.str. -C=O str. -C=N str. -C=C- Ar ring str. -C-N str.	6.5-7.1 7.6-7.7 8.8-9.0 9.9	3H *d* of furyl 4H *m* of aromatic 3 H *d* of pyrazine 1H *s* of OH
B_4	3411 2933 1701 1655 1477 1226	N-H str.(primary) -C-H Ar.str. -C=O str. -C=N str. -C=C- Ar ring str. -C-N str.	3.70 7.26-7.81 8.2 8.82 9.52	3H *s* of CH_3 8H *m* of aromatic 1H *s* of oxadiazole 3H *d* of pyrazine 2H *d* of NH_2
B_5	2987 1681 1612 1643 1501 1248	-C-H Ar.str.(broad) -C=O str. -C=N str. -C=C- str. -C=C- Ar ring str. -C-N str.		
B_6	3391 3052 1704 1653 1477 1119	-OH str. -C-H Ar.str. -C=O str. -C=N str. -C=C- Ar ring str. -C-N str.		
B_7	3381 2934 1711	N-H str.(primary) -C-H Ar.str. -C=O str.		

	1660 1474 1242	-C=N str. -C=C- Ar ring str. -C-N str.		
B_8	2990 1674 1648 1581 1250	-C-H Ar.str.(broad) -C=O str. -C=C- str. -C=C- Ar ring str. -C-N str.		
B_9	3372 3051 1779 1664 1589 1107	-OH str. -C-H Ar.str. -C=O str. -C=N str. -C=C- Ar ring str. -C-N str.		

Table No. 3: Spectral data of [5-(4-substituted)-2, 3-dihydro-1, 3, 4-oxadiazol-2-yl] compounds.

MICROBIOLOGICAL SCREENINGS

Anti-bacterial activity [10,11]

a) Method: Cup-plate agar diffusion method using Nutrient agar.

In a radial or 2D technique, Petri dishes of agar are prepared by pouring melted agar media previously inoculated with selected microorganism. After the solidification of agar cups are made with the help of borer and cups are filled with solution of suitable concentration of sample and standard respectively and are inoculated at 37°C for 24 hours. The anti-microbial agents diffuses through the agar around its cup and produces a characteristic zone of inhibition of the microorganism sensitive to the sample, the diameter of which can be measured.

b) Materials Used:

1) Culture: Two G+ve and one G-ve was chosen for screening

Gram positive organisms: *Staphylococcus aureus* (ATCC 29737) and *Bacillus subtilis* (ATCC 6633)

Gram negative organism: *Escherichia coli* (NCTC 10418)

2) Apparatus: Sterile Petri plates, sterile cotton swabs, sterile cork borer, sterile test tubes, 1mL syringes, Micropipette, Inoculating loop and Spirit lamp

3) Media: Nutrient agar media from Hi-Media was used with composition:

Peptic digest of animal tisuue	5.00 gm/lt.
Sodium chloride	5.00 gm/lt.
Beef extract	1.50 gm/lt
Yeast extract	1.50 gm/lt.
Agar	15.00 gm/lt

Dissolve 28gm of media in 1000ml of distilled water by heating, sterilized by autoclaving at 121°C temperature and 15 Lb/Inch^2 pressure for 15 minutes.

c) Preparation of Inoculums:

One day prior to these testing, inoculations of the above bacterial cultures were made in the Nutrient agar media and incubated at 37°C for 18-24 hrs.

d) Preparation of test solutions:

Each test compound (2 mg) was dissolved in dimethylformamide (5 mL) to give stock solution of concentration 200 µcg/mL. Then 0.1 mL of this solution was used for testing.

e) Preparation of standard solution:

Standard drug Gentamicin was used at the concentration of 200µcg/mL.

f) Method of testing:

Nutrient agar plates were prepared by pouring 15-20 mL of the medium into each sterilized Petri dish and were allowed to set at room temperature. The cell suspension was standardized to the density of 530 nm using spectrophotometer and was inoculated over the surface of agar medium using sterile cotton swab. The cups were scooped in each plate using a sterile cork borer of 6 mm diameter.

Then the solutions of test compounds (0.10 mL) were added in cups by using micropipettes and these plates were incubated at 37°C for 48 hrs. The zone of inhibition was measured in mm for each organism.

g) Observation:

Plates were observed within 20 to 24 hours and may be continued to incubate for 48 hours. Zone of inhibition of the compound discs were measured and compared with the standard compound discs.

Anti-fungal activity: [174-175]

a) Method: Cup-plate agar diffusion method using Nutrient agar.

b) Materials Used:

1. Test organisms: *Aspergillus niger* (NCIM 596), *Candida albicans* (NCIM 3102).

2. Sterile Petri plates, sterile cotton swabs, sterile cork borer, sterile test tubes, 1mL syringes, Micropipette, Inoculating loop and Spirit lamp

3) Media: Sabouraud-Dextrose agar media was used with composition:

Mycological peptone	10.00 gm/lt
Dextrose	40.00 gm/lt.
Agar	15.00 gm/lt

c) Preparation of Sub-culture:

One day prior to this testing, inoculation of the above fungal cultures were made in the Sabouraud-Dextrose agar and then incubated at 37°C for 18-24 hrs. A suspension of cell from this culture was made in sterile distilled water. Five colonies of >1mm diameter were mixed with 5 mL of normal saline and vortexed for 15 sec.

d) Preparation of test solutions:

Each test compound (2 mg) was dissolved in 5mL of dimethylformamide to give stock solution of concentration 200 µcg/mL. Then 0.1 mL of this solution was used for testing.

***e) Preparation of standard solution*:**

Standard drug Nystatin was used. The concentration was 200µcg/mL.

f) Method of testing:

Sabouraud-Dextrose agar plates were prepared by pouring 15-20 mL of the medium into each sterilized Petri dish and were allowed to set at room temperature. The cell suspension was standardized to a density of 530 nm using a spectrophotometer and was inoculated over the surface of medium using a sterile cotton swab. Three cups were scooped in each plate using a sterile cork borer of 6mm diameter, standard and test solution. The solution of each test compound (0.10 mL/0.15 mL) was added in the cups by using micropipettes and these plates were subsequently incubated at 37°C for 48 hrs. The zone of inhibition was measured in mm for each organism.

g) Observation:

Plates were observed within 20 to 24 hours and may be continued to incubate for 48 hours. Zone of inhibition of the compound discs were measured and compared with the standard compound discs.

Time	*Zone of inhibition at 200µcg/mL (in mm.)*			
	E. coli	***S. aureus***	***A. niger***	***C. albicans***
B_1	15	17	14	19
B_2	**19**	12	17	15
B_3	**21**	**23**	**20**	**23**
B_4	**22**	**21**	15	18
B_5	**21**	**23**	17	13
B_6	14	18	**23**	15
B_7	16	**21**	**21**	**19**
B_8	**23**	**22**	19	14
B_9	14	18	**23**	17
Gentamicin	**28**	**26**		-
Nystatin	-	-	**29**	**25**

Table No. 4 : Anti-bacterial and Anti-fungal activity of [5-(4-substituted)-2, 3-dihydro-1, 3, 4-oxadiazol-2-yl].
The Compounds **B_3 and B_7** have shown promising **antifungal** activity against *A.niger*, *C.albicans* (NCIM 3102). Nystatin was used as standard drug. Compounds **B_3, B_4** , **B_5**and **B_8** have shown promising **antibacterial** activity against *E.coli* (ATCC25922**)) ,** *S. aureus* (ATCC 29737). Gentamicin was used as std.drug.

Anti-tubercular activity [12]

The antitubercular screening was carried out by Middle brook 7H9 agar medium against H_{37}Rv. Strain. Middle brook 7H9 agar medium containing different derivatives, standard drug as well as control, Middle brook 7H9 agar medium was inoculated with *Mycobacterium tuberculosis* of H_{37}Rv Strain. The inoculated bottles were incubated for 37°C for 4 weeks. At the end of 4 weeks they were checked for growth.

Sr. No.	Compounds	25 *µcg* /mL	50 *µcg* /mL	100 *µcg* /mL
1.	**B_1**	R	R	**S**
2.	**B_2**	R	R	**S**
3.	**B_3**	R	R	**S**
4.	**B_4**	R	R	**S**
5.	**B_5**	R	R	**S**
6.	**B_6**	R	R	**S**
7.	**B_7**	R	R	**S**
8.	**B_8**	R	R	**S**
9.	**B_9**	R	R	**S**
STD.	**Streptomycin**	**S**	**S**	**S**

R- Resistance; **S**- Sensitive.

Table No.5 : Anti-tubercular activity of the synthesized compounds.

The Compounds **B_1 - B_9** have **not** shown promising antitubercular activity at both the concentration. H_{37} Rv strain was used as standard tubercular organism. Streptomycin was used as standard drug. However, Streptomycin have shown antitubercular activity at ***25 µcg /ml.****not potent activity found during performance.*

PHARMACOLOGICAL SCREENINGS

Antioxidant activity:

Method-I:

Hydrogen peroxide radical scavenging activity [13-15]**:**

1ml of (20 - 200µg/ml) test drug/standard (Ascorbic acid) was added to 0.6ml of hydrogen peroxide solution (Ashwin fine chemicals and pharmaceuticals) in phosphate buffer (P^H - 7.4). After incubating for 10 minutes at 37ºC the absorbance was measured at 230nm. Corresponding blanks were taken. The experiment was performed in triplicate. The absorbance of hydrogen peroxide in phosphate buffer as control was measured at 230nm. The

scavenging effect (%) was measured using following equation. Hydrogen peroxide produces hydroxyl radicals in cells. Scavenging of these radicals by the test drug is used as a test for antioxidant activity. The reduction of these radicals is seen by the decreased absorbance at 230nm with increasing concentration of the test drug.

$$\text{Scavenging Effect (\%)} = \frac{\text{Control absorbance} - \text{Test absorbance}}{\text{Control absorbance}} \times 100$$

Comp. code	Scavenging effect (%) at		
	50 µg/ml	150 µg/ml	250 µg/ml
B_1	34.56	45.13	50.18
B_2	25.84	40.48	53.69
B_3	33.19	**54.65**	**70.03**
B_4	30.37	46.46	56.25
B_5	32.16	45.64	54.56
B_6	29.14	**53.97**	**69.16**
B_7	34.44	45.17	52.34
B_8	21.24	40.42	56.36
B_9	34.55	**56.42**	**65.13**
Ascorbic acid	**54.33**	**67.46**	**85.35**

Table No.6 : Anti-oxidant activity by hydrogen peroxide radical scavenging .

The Compounds **B_3, B_5 ,and B_9**, have shown promising **anti-oxidant** activity. Ascorbic acid was used as standard drug

Method-II:

Phosphomolybdenum method [16,17]

An aliquot of 0.1 mL of compound solutions (50 µM, 100 µM) was combined with 1 mL of reagent solution (0.6 M sulfuric acid, 28 mM sodium phosphate and 4mM ammonium molybdate). In case of blank 0.1 mL of methanol was used in place of compound. The tubes were capped and incubated in a boiling water bath at 95^0 C for 90 min. After the samples had cooled to RT, the absorbance of the aqueous solution of each was measured at 695 nm against blank in spectrophotometer. For compound of unknown composition, antioxidant capacity was expressed as equivalent of ascorbic acid (µM/mg of compound).

comp. code	Ascorbic acid equivalence µg/mg		
	50	150	250
B_1	12.87	21.29	35.29
B_2	14.55	22.84	37.61
B_3	20.15	**32.65**	**46.67**
B_4	18.96	26.43	41.56
B_5	13.34	22.60	43.25
B_6	20.21	**33.37**	**47.16**
B_7	17.42	10.40	42.55
B_8	13.25	23.44	34.59
B_9	15.57	**33.83**	**49.23**

Table No.7: Anti-oxidant activity by Phosphomolybdenum method.

The Compounds **B_3 B_5 ,and B_9**, have shown promising **anti-oxidant** activity. Ascorbic acid was used as standard drug.

RESULTS AND DISCUSSION

From the review of literature it is known that substituted aryl oxadiazole have been reported for number of pharmacological activities. Here we have synthesized some novel aryl oxadiazole and screened them for their anti-bacterial, antifungal, antiinflamatory, antioxidant and antitubercular activities and the results are as follows.

The synthesized aryl oxadiazole derivatives were screened for anti bacterial activity using DMF as a solvent against the organisms *S.aureus,* and *E.coli*. and Antifungal activity using A. *niger and C. albicans* by disc diffusion method on nutrient agar media. The standard drug used was Gentamicin for antibacterial and Nystatin as standard for antifungal activity.

Antibacterial activity:

All the compounds were screened for antibacterial activity at 200 µcg/ml concentration. However the compounds **B_3, B_4, B_5, and B_8** have shown promising antibacterial activity, while the remaining compounds have also shown moderate antibacterial activity, when compared with standard drug Gentamicin against *Staphylococcus aureus* (Gram positive) ATCC 29737, *Escherichia coli* (Gram negative) NCTC 10418.

All the compounds were screened for antifungal activity. However compounds **B_3** and **B_7** have shown promising antifungal activity, while the remaining compounds have also shown moderate Antifungal activity, when compared with standard drug Nystatin against Aspergillus niger (NCIM 596) and *Candida albicans* (NCIM 3102).

Anti-tubercular activity:

All the compounds were screened for antitubercular activity by Middle brook 7H9 agar medium as described by Elmer WK et al. against H_{37}Rv Strain. Compounds have not shown promising antitubercular activity. Streptomycin was used as standard drug. However Streptomycin has shown antitubercular activity at 25 ucg/ml.

Anti-inflamatory activity:

All the compounds were screened for antiinflamatory activity by *Inhibition of protein denaturation method.* **The** Compounds have shown moderate Antiinflamatory activity, when compared with standard Ibuprofen at different concentration.

Anti-oxidant activity:

All the compounds were screened for antioxidant activity by *Hydrogen peroxide radical scavenging activity method.* The Compounds **B_3, B_5 ,and B_9**, have shown promising anti-oxidant activity while the remaining compounds have also shown moderate anti-oxidant activity, when compared with standard ascorbic acid at different concentration.

The Discussion part mainly deals with the about the synthesized compounds against the antibacterial and anti fungal activity. The compounds **B_3, B_4, B_5, and B_8** have shown promising **anti bacterial** activity due to the presence of electron donating groups like-OCH_3, -CH_3 and Phenyl groups.

The compounds **B_3** and **B_7** have shown significant **antifungal** activity it may be due to the presence of electron donating group –OCH_3, CH_3 and phenyl groups.

The compounds **B_3**, **B_5 ,and B_9**, have shown promising **antioxidant** activity may be due to presence of - N-H donating group and donating lone pairs of electrons.

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