



## BIOLOGICAL STUDY OF 3-(2-HYDROXY -3,4-BENZOPHENYL- 5-METHOXY)-5-ARYL -1-SUBSTITUTED PYRAZOLINES , PYRAZOLES AND 4-AROYL DERIVATIVES OF PYRAZOLINES

**A.R.BIJWE, S.E.BHANDARKAR<sup>a</sup> , \***

\* Dept. of Chemistry, K.Z.S.Science college Bramhni Kalmeshwar (MS) India  
E mail : archana.bijwe @ gmail.com

<sup>a</sup> Associate Professor , Dept.of Chemistry, G.V.I.S.H. ,Amaravati (MS) India  
E mail : subodhvmv@gmail.com

### ABSTRACT

3-(2-hydroxy -3,4-benzophenyl 5-methoxy) 5-aryl -1-substituted pyrazolines , pyrazoles and 4-aroYL derivatives of pyrazolines were tested against pathogenic bacteria for their antimicrobial and antifungal activities by paper disc method. The organisms tested were *Aspergillus niger*, *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginasa*. The solutions of these compounds were prepared in DMF solvent. The most of the compounds were found to be active against pathogens *Aspergillus niger*, *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginasa*.

**Key Words: Antimicrobial activity, antifungal activities pyrazolines , pyrazoles.**

### INTRODUCTION

According to literature much work has been done on heterocyclic compounds for their antimicrobial activities on gram positive and gram negative bacteria.

Pyrazolines are known to posses antibacterial<sup>1-3</sup> antifungal<sup>4-6</sup> , anti-inflammatory<sup>7</sup>, insecticidal<sup>8</sup>, analgesic<sup>9</sup>, antipyretic<sup>10</sup>, and properties. Several pyrazolines are found important as pharmaceuticals. Pyrazoline derivatives acquire anti-implantation activity<sup>11</sup> and cerebroprotective<sup>12</sup>. pyrazoles exhibit a wide range of biological activities , viz. antipyretic<sup>13-14</sup> , antioxidant<sup>15</sup> , antiinvasive<sup>16</sup>, blood pressure lowering<sup>17</sup> , antidepressant<sup>18</sup> , antiinflammatory<sup>19</sup>, etc.

The present work deals with the study of antimicrobial activities of some newly synthesized pyrazoles and pyrazolines. These compounds were tested against *Aspergillus niger*, *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginasa*.



## EXPERIMENTAL

Melting points were uncorrected. The structures of titled compounds were established on the basis of elemental analysis and spectral data.

The medium used throughout the experiment was HI-Media (Indian make) nutrient agar. For sterilization autoclave is used. The size of zones of inhibition were measured by antibiotic zone reader (Metzer Make).

## METHOD AND RESULTS

The titled compounds were tested against pathogenic bacteria for their antimicrobial activities by paper disc method. The organisms tested were , *Aspergillus niger* , *Escherichia coli*, *Proteus mirabilis* and *Pseudomonas aeruginosa*. The solutions of these compounds were prepared in DMF solvent. The culture medium used was nutrient agar medium for antimicrobial study and the potato-dextrose-agar for antifungal study. After  $24 \pm 2$  hours. of incubation at  $37^{\circ} \text{C} \pm 2^{\circ} \text{C}$  the zones of inhibition were measured in mm and are recorded in Table No. 1 , 2 and 3

**TABLE -1**

Antimicrobial and antifungal activities of 3-(2-hydroxy-3,4-benzophenyl-5-methoxy)-5-aryl-1- substituted pyrazolines(4-6a, 4-6b, 4-6c, 4-6d )

Sr. NO	Name of the compound	E-coli	Pr. mirabilis	Ps. aeruginosa	A. niger
1	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-phenyl-1-carboxamido pyrazoline (4a)	7	8	18	16
2	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-phenyl-1-thiocarboxamido pyrazoline (5a)	16	11	-	7
3	3-(2-Hydroxy-3,4-benzophenyl-5-	-	11	8	7



	methoxy)-5-phenyl-1-isonicotinoylpyrazoline (6a)				
4	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-methoxy phenyl)-1-carboxamido pyrazoline (4b)	14	17	10	11
5	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-methoxy phenyl)-1-thiocarboxamido pyrazoline (5b)	8	9	7	7
6	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-methoxy phenyl)-1-isonicotinoyl pyrazoline (6b)	10	16	-	8
7	3-(2-Hydroxy-3,4-benzophenyl)-5-(4-hydroxy phenyl)-1-carboxamido pyrazoline (4c)	16	16	8	7
8	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-hydroxy phenyl)-1-thiocarboxamido pyrazoline (5c)	16	-	-	8
9	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-hydroxy phenyl)-1-isonicotinoyl pyrazoline (6c)	16	14	12	14
10	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(3,4-dimethoxy phenyl)-1-carboxamido pyrazoline (4d)	16	16	17	18
11	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(3,4-dimethoxy phenyl)-1-thiocarboxamido pyrazoline (5d)	16	-	8	-
12	3-(2-Hydroxy-3,4-benzophenyl)-5-(3,4-dimethoxyphenyl-5-methoxy)-1-isonicotinoyl pyrazoline (6d)	-	14	7	-

**TABLE -2**

Antimicrobial and antifungal activities of 3-(2-hydroxy-3,4-benzophenyl)-5-aryl-1- substituted pyrazoles (9-11a, 9-11b, 9-11c, 9-11d)

Sr. NO	Name of the compound	E-coli	Pr. mirabilis	Ps. aeruginosa	A.niger
1	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-phenyl-1-carboxamido pyrazole (9a)	8	-	8	6
2	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-phenyl-1-thiocarboxamido pyrazole (10a)	9	7	7	8
3	3-(2-Hydroxy-3,4-benzophenyl)-5-phenyl-1-isonicotinoyl pyrazole (11a)	11	-	17	18
4	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-methoxy phenyl)-1-carboxamido pyrazole (9b)	18	12	16	14
5	3-(2-Hydroxy-3,4-benzophenyl)-5-(4-methoxy phenyl)-1-thiocarboxamido pyrazole (10b)	-	15	-	9
6	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-methoxy phenyl)-1-isonicotinoyl pyrazole (11b)	15	16	-	10
7	3-(2-Hydroxy-3,4-benzophenyl)-5-(4-nitro phenyl)-1-carboxamido pyrazole (9c)	12	7	10	18
8	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-nitro phenyl)-1-thiocarboxamido pyrazole (10c)	12	-	14	-
9	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-nitro phenyl)-1-isonicotinoyl pyrazole(11c)	18	15	17	16
10	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-chloro phenyl)-1-carboxamido pyrazole (9d)	-	18	-	14
11	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-5-(4-chloro phenyl)-1-thiocarboxamido pyrazole (10d)	17	-	18	-
12	3-(2-Hydroxy-3,4-benzophenyl)-5-(4-chloro phenyl)-1-isonicotinoyl pyrazole (11d)	18	-	-	8

**TABLE -3**

Antimicrobial and antifungal activities of 3-(2-hydroxy-3,4-benzophenyl-5-methoxy)-4-aryloxy-5-aryl-1-substituted pyrazolines (13-15a,13- 15b,13-15c,13-15d, 13-15e,13-15f,13-15g,13-15h)

Sr. NO	Name of the compound	E-coli	Pr. mirabilis	Ps. aeruginosa	A.niger
1	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5- phenyl -1-carboxamido pyrazoline (13a)	11	10	18	16
2	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5- phenyl -1-thiocarboxamido pyrazoline (14a)	15	-	-	12
3	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5- phenyl -1-isonicotinoyl pyrazoline (15a)	-	12	15	16
4	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(4-methoxy phenyl)-1-carboxamido pyrazoline (13b)	8	-	-	12
5	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(4-methoxy phenyl)-1-thiocarboxamido pyrazoline (14b)	17	11	8	-
6	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(4-methoxy phenyl)-1- isonicotinoyl pyrazoline (15b)	-	-	12	8
7	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(4-hydroxy phenyl)-1-carboxamido pyrazoline (13c)	10	10	16	-
8	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(4-hydroxy phenyl)-1-thiocarboxamido pyrazoline(14c)	10	-	-	8
9	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(4-hydroxy phenyl)-	12	14	14	-



	1-isonicotinoyl pyrazoline (15c)				
10	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(3,4-dimethoxy phenyl)-1-carboxamido pyrazoline (13d)	-	-	14	7
11	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(3,4-dimethoxy phenyl)-1-thiocarboxamido pyrazoline(14d)	15	-	10	7
12	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-benzoyl-5-(3,4-dimethoxy phenyl)-1- isonicotinoyl pyrazoline (15d)	-	16	13	8
13	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-phenyl-1-carboxamido pyrazoline (13e)	9	11	14	8
14	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-phenyl-1-thiocarboxamido pyrazoline (14e)	-	11	14	8
15	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-phenyl-1-isonicotinoyl pyrazoline (15e)	-	9	16	14
16	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(4-methoxy phenyl)-1-carboxamido pyrazoline (13f)	-	8	16	13
17	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(4-methoxy phenyl)-1-thiocarboxamido pyrazoline (14f)	-	11	-	12
18	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(4-methoxy phenyl)-1-isonicotinoyl pyrazoline (15f)	15	8	-	8
19	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(4-hydroxy phenyl)-1-carboxamido	13	7	-	8



	pyrazoline (13g)				
20	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(4-hydroxy phenyl)-1-thiocarboxamido pyrazoline (14g)	11	13	-	12
21	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(4-hydroxy phenyl)-1-isonicotinoyl pyrazoline (15g)	-	8	16	14
22	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl)-5-(3,4-dimethoxy phenyl)-1-carboxamido pyrazoline (13h)	16	-	17	10
23	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl) -5-(3,4-dimethoxy phenyl)-1-thiocarboxamido pyrazoline (14h)	11	14	-	10
24	3-(2-Hydroxy-3,4-benzophenyl-5-methoxy)-4-(4-methoxy benzoyl) -5-(3,4-dimethoxy phenyl)-1- isonicotinoyl pyrazoline (15h)	15	-	14	12

Strongly active , range 15-18      Weakly active, range 7-10 mm

Moderately active, range 11-14mm      Inactive, -

## CONCLUSION

Thus from above results it was observed that most of the heterocyclic compounds are found to be active against *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas aeruginosa* and *Aspergillus niger*. So these compounds can be easily be used for the treatment of diseases caused by test pathogens, only when they do not have toxic and other side effects.

## ACKNOWLEDGEMENT



The authors are thankful to the Director of LIT, Nagpur University Nagpur for providing facilities for testing the compounds against pathogenic bacterias and for their kind cooperation.

## REFERENCES

- Pandeya, S. N.; and Sriram, D. (1998). *Acta Pharm. Turc.* 40, 33.
- Sarangapani, M.; and Reddy, V. M. (1994), *Indian J. Pharm. Sci.* 56, 174.
- Varma, R. S.; Nobles, W. L. *J. Pharm. Sci.* 64, (1975), 1.
- Pandeya, S. N.; Sriram, D.; Nath, G.; and De Clercq, (1999). *E. Indian J. Pharm. Sci.* 61, 358.
- Pandeya, S. N.; Sriram, D.; Nath, and G.; De Clercq, (1999). *E. Sci. Pharm.* 67, 103.
- Pandeya, S.N.; Sriram, D.; Nath, and G.; De Clercq, ,(1999), *E.; Pharm. Acta Helv.*,74,11.
- Udupi R.H., Kushnoor AS and Bhat AR, (1998). *Indian J Heterocycl Chem* , 8, ,63.
- Hes R V Wellinga K and Gregoy AC, (1975). *JAgric Food Chem*, 26, 1057.
- M.A. Metwally, M.Y. Yusuf, A.M. Tsmail and F.A.Amer, (1985) . *J. Indian Chem.,Soc.*,62,54.
- V.G.Vornin, Z.I. Sharmova, S. Ya. Shachilova, L.D. Kulikova and A.S. Zaks. (1985). *Khim, Farm. Zh.*, 19, 1208;*Chem. Abstr.*, 104, 61668m.
- Batulin Y. U. M. *Chem. Abstr.*, 70, (1969), 2236a
- G. E. H. Elgemeie, A. M. E. Attia, D. S. Farag, and S. M. Sherif, (1994). *J. Chem. Soc. Perkin Trans.*, 1, 1285.





- .Behr L C, Fusco R and Jarboe C H, (1967). *The Chemistry of Heterocyclic Compounds*, Pyrazoles , Pyrazolines ,pyrazolidines, Indazoles, and Coindensed Rings, edited by A Weissberger, Interscience Publishers, New York, 1.
- Wiley R H, and Wiley P, (1964). Pyrazolones pyrazolidones and Derivatives, *John Wiley and Sons, New York*, 102.
- Parmar V. S. , Kumar A, Prasad AK, Singh SK, Kumar N, Mukherjee s, Raj HG, Goel S, Errington W and Puar S, (1999). *Bioorg Med Chem*, 17, 1425.
- Parmar V S, bracke M Et al, Philippe J, Wengel J, Jain S C, Olsen C E, Bisht K S, Sharma N K, Courtens A, Sharma S K, Vennekens K, Marck V V, Singh S K, Kumar N, Kumar A, Malhotra S, Kumar R , Rajwanshi V K, Jain R, and Mareel M M, (1997). *Bioorg Med Chem* 5, 1609.
- Rosiere C E and Grossmann M I, (1951). *Science*, 113,651.
- Bailey D M, Hansen P E, Hlavac A G, Baizman E R, Pearl J, Defelice A F, and Feigenson M E , (1985). *J Med Chem*, 28, 256.
- Rainer G, Krueger U, and Klemm K, *Arzneim Forsh*, 31, (1981). 649; *Chem Abstr*, 95, (1981), 90723.