Int. J. Chem. Sci.: 8(4), 2010, 2353-2357

ANTIMICROBIAL STUDY OF 1,1-BIS- {2-HYDROXY-3-(1´-PHENYL-5´-ARYL-PYRAZOLIN 3´-YL)-5 METHYL PHENYL} METHANE

RAJESH P. GANORKAR*

Department of Chemistry, Mahatma Fule Arts, Commerce & Sitaramji Chaudhary Science Mahavidyalaya, AMRAVATI – 444906, Dist. Warud (M.S.) INDIA

ABSTRACT

Titled bis-pyrazolines have been synthesized by condensation of phenylhydrazine hydrochloride with bis-chalcones in pyridine medium. All compounds have been evaluated for their *in vitro* growth of inhibitory activity against *Staphylococcus aureus*, *Escherichia coli*, *Proteus mirabilis* and *Salmonella Typhi* using paper disc-method. The culture medium was nutriert agar medium. Most of the titled bis-pyrazolines were more or less effective against these microorganisms.

Key words: Bis-pyrazolines, Antimiorobial activity.

INTRODUCTION

Pyrazolines have diverse chemical reactivity with broad spectrum of biological activity[1], variety of applications and an important role in medicinal chemistry. Substituted pyrazolines were found to posses antimicrobial activity.[2-5] In addition, they show anti-inflammatory[6], antipyratic activity[7], fungicidal activity[8,9] and insecticidal activity[10] also.

It was thought of interest to study the antimiorobial activity of bis-pyrazolines against gtam + ve and gram –ve microorganisms. All compounds have been evaluated for their *in vitro* inhibitory activity against different microorganisms like *Staphylococcus aureus*, *Escherichia coli, Proteus mirabilis* and *Salmonella typhi.*

The following bis-pyrazolines were selected for antimicrobial activity studies

*Author for correspondence; E-mail: rajesh.ganorkar@rediffmail.com

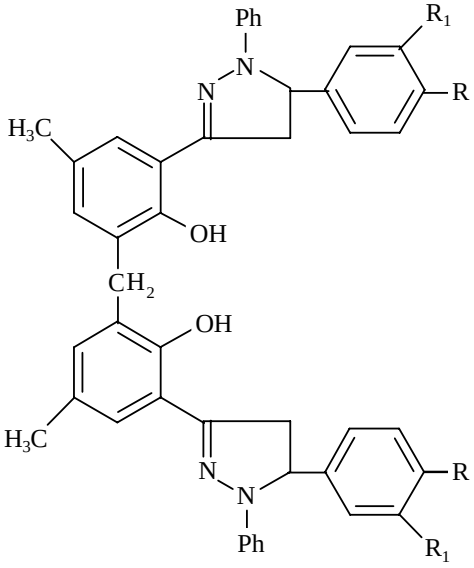

Fig. 1: Bis-pyrazolines (1a-h)

EXPERIMENTAL

Bis-pyrazolines were synthesized by the condensation of phenylhydrazine hydrochloride with bis-chalcones in pyridine medium.

The structures of synthesized compounds were characterized by spectral study and elemental analysis[11] (UV, IR & NMR).

All compounds were screened for antimicrobial activity. These compounds were tested against *Staphylococcus aureus, Escherichia coli, Proteus mirabilis and Salmonella typhi* four pathogenic microbes for their antibacterial activity using paper disc method at the concentration of 50 µg/mL using DMF as a solvent. The culture medium used was nutrient agar medium. Zones of inhibitions were measured in mm and recorded in Table 2.

Table 1: Physical data of 1,1-bis {2-hydroxy-3-[l´-phenyl-5´-aryl pyrazolin-3´-yl]-5-methyl phenyl} methanes (1a-h)

Comp.	R	R_1	M.P. (^{0}C)	Yield (%)	M.F.	N%	
						Found	Calc.
1a	H	H	228-231	75	$C_{45}H_{40}N_4O_2$	8.16	8.38

Cont…

Comp.	R	R_1	M.P. (^{0}C)	Yield (%)	M.F.	N%	
						Found	Calc.
1b	OCH_3	H	218-222	74	$C_{47}H_{44}N_4O_4$	7.53	7.69
1c	OH	OCH_3	265-267	72	$C_{47}H_{44}N_4O_6$	7.12	7.36
1d	OH	H	268	78	$C_{45}H_{40}N_4O_4$	9.62	8.00
1e	NO_2	H	278	80	$C_{45}H_{38}N_6O_6$	12.47	11.08
1f	$N(CH_3)_2$	H	201	85	$C_{49}H_{50}N_6O_2$	10.35	11.14
1g	H	OCH_3	191-201	70	$C_{47}H_{44}N_4O_4$	7.27	7.69
1h	OCH_3	OCH_3	235-238	72	$C_{49}H_{48}N_4O_2$	7.03	7.10

Table 2: Antimicrobial activities of 1,1-Bis {2-hydroxy-3-[l´-phenyl-5´-aryl pyrazolin-3´-yl]-5-methyl phenyl} methanes (1a-h)

Compounds	*S. aureus*	*E. coli*	*Pr. mirabilis*	*S. typhi*
1a	-	+	+	-
1b	-	-	+	-
1c	+ +	-	-	-
1d	+	+	+	-
1e	+ +	-	-	+ +
1f	-	-	-	+ + +
1g	-	+ +	+ +	-
1h	-	+ +	+	+

N.B. : Zone of inhibition: - : Inactive (Resistance); + : Weakly active; ++ : Moderately active; +++ : Strongly active

RESULTS AND DISCUSSION

The titled compounds were screened for their anitimicrobial activities using micro-organisms; *S. aureus*, *E. coli*, *Pr. mirabilis*, and *S. typhi* are as follows.

From Table 2, compound **(1a)** showed weak activity towords *E. coli* and *Pr. mirabils* and was inactive towards *S. aureus* and *S. typhi*.

The compound (**1b)** showed weak activity towords *Pr. mirabilis*, but was inactive towords *S. aureus, E. coli* and *S. typhi*.

The compound (**1c)** showed moderate activity against *S. aureus* but against others, it was inactive.

The compound **(**1**d)** showed weak activity against *S. aureus*, *E. coli*, and *Pr. Mirabilis,* except *S. Typhi* is inactive.

The compound **(1e)** showed moderate activity against *S. auresus* and *S. typhi* but it was inactive against *E. coli* and *Pr. mirabilis*.

The compound **(1f)** showed strong activity against *S. typhi* and was inactive towards all other *S. aureus, E. coli* and *Pr. mirabilis*.

The compound **(1g)** showed moderate activity against *E. coli* and *Pr. mirabilis* and inactive towards *S. aureus* and *S. typhi*.

The compound **(1h)** showed moderate activity against E. coli; weakly active against *Pr. mirabilis, S. typhi* and inactive against *S. aureus*.

It has been also found that the antimicrobial activities of the test compounds increases with increase in its structure complexity.

Hence from screening results, it was found that most of the bis-pyrazolines are found to be more or less effective against these microorgamisms and can be used for treatment of diseases only if they do not have any toxic and other side effects.

ACKNOWLEDGEMENT

The authors are thankful to Dr. D. H. Tambekar, Head, Department of Microbiology, S. G. B. Amravati University, Amravati and Miss Vishakha Pathak for providing necessary laboratory facility.

REFERENCES

1. J. S. Horsfall and S. Rich, Chem. Abstr., **46**, 11543 (1952).
2. N. K. Sangwan, B. S. Varma and K. S. Dmndsa, Indian J. Chem., **25B**, 672 (1986).

3. Jigar Desai, K. B. Nair and A. N. Misra, Indian J. Heterocyclic Chem., **10 (4),** 261 (2001).

4. R. M. Kedar, Asian J. Chem., **13 (2**), 477 (2001).

5. K. Mogilaiah, D. S. Chowdary and R. B. Rao, Indian J. Chem., **40 (b)**, 43 (2001).

6. J. P. Dusza J. P. Joseph and S. Bernstein, U. S. US4, 360, 680(CI 548-362, CO7D231/06) (1982).

7. V. G. Vornin, Z. I. Snarmova. S. Va Sachilova L. D. Kulikormova and A. S. Zaks, Khim Pharm. Zh., **1**9, 1208 (1985).

8. N. B. Das and A. S. Mitra, Indian J. Chem., **16B**, 638 (1978)

9. S. P. Schar and A. K. Singh, J. Indian Chem. Soc., **62**, 142 (1985),

10. D. B. Reddy, T. Seshamma and S. Reddy, J. Indian Chem. Soc., **68**, 281 (1991).

11. R. P. Ganorkar and V. S. Jamode, Asian J. Chem., **15(1)**, 475 (2003).

Revised : 06.06.2010 *Accepted : 10.06.2010*