SYNTHESIS OF SOME NEW 1-H-3-(3'', 5''-DIBROMO-2'',
4''-DIHYDROXYPHEN-1''-YL)-5-SUBSTITUTED
PHENYL-2-PYRAZOLINES AND THEIR ANTIBACTERIAL
ACTIVITY

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Abstract

Some new 1-H-3-(3'', 5''-dibromo-2'', 4''-dihydroxyphen-1''-yl)-5-substitutedphenyl-2-pyrazolines derivative can be obtained by the reaction of 1-(3',5'-dibromo-2',4'-dihydroxyphen-1'-yl)-3-substituted phenyl-2 propen-1 ones with hydrazine hydrate in the presence of ethanol using conventional methods and studied their H1 NMR and IR spectrum. We also studied antibacterial activities of the synthesized compound.

Keywords: Pyrazoline, IR/NMR Spectroscopy, Antibacterial.

Introduction

The term chalcone was given by Kostanecki and Tambor [1]. Chalcones derivatives has pharmacological importance due to presence of reactive keto-ethylenic group. Many heterocyclic derivatives such as pyrazoline[2], isoxazole[3], quinoxaline[4], benzthiazepine[5], oxazine[6], thiazine[7] are synthesized from the chalcones and they have found that heterocyclic derivatives of chalcones has pharmacological importance. So we decide to synthesis of pyrazoline derivatives from chalcones. Pyrazolines

derivatives are important class of five member heterocyclic compounds which bearing two nitrogen atoms. They have been found important due their pharmacological importance. Several worker reported synthesis of pyrazoline derivatives and studied their pharmacological activity such as antibacterial[8-9], anticancer[10], antimalarial[11], antitubercular[12], and anti-inflammatory[13], antimycotics[14] and antitumor[15] activities.

The constitutions of all the synthesized compounds were established by the elemental analysis, IR and ¹H NMR spectral study. Compounds were also evaluated for antibacterial.

Experimental

Material and Methods:

All the chemicals used were of pure grade (Merck and B.D.H). The melting points of all compounds were determined by open capillary method and were uncorrected.

General procedure:

General method for the synthesis of 3',5'-dibromo-2',4'-dihydroxy chalcones [1(a-j)]

A mixture of 3,5-dibromo-2,4-dihydroxyacetophenone (0.01 mol) and aryl aldehyde (0.01 mol) in ethanol (30 ml) was stirred and to it excess of 40% potassium hydroxide (25 ml) solution was added. The mixture was kept overnight at room temperature. The colour of the reaction mixture was change from yellow to orange. The content was then poured over crushed ice and acidified with hydrochloric acid (1:1). The solid separated

was filtered, washed with distilled water, dried and crystallized from ethanol, yield 60-70%.

General method for the synthesis of 1-H-3-(3'', 5''-dibromo-2'', 4''-dihydroxyphen-1''-yl)-5-substituted Phenyl-2-pyrazolines [2(a-j)]

A mixture of 3',5'-dibromo-2',4'-dihydroxy chalcone (0.01 mol) and hydrazine hydrate (0.015 mol) in ethanol (50 ml), was refluxed on water bath at 70 °C to 80 °C gently for 2 hrs. The solution was concentrated and allowed to cool. The resulting solid was filtered, washed with ethanol (90%) and crystallized from ethanol (99%), yield 40-50%.

Reaction scheme

Where R = 4-OH, 4-Cl, 3 & 4-OH, 2-NO₂, 4-OH & 3-OC₂H₅, 4-OCH₃, 4-H, 3-NO₂, 2-Cl, 2-OH

Results and Discussion

Table- 1: Characterization Table of 1-H-3-(3",5"-dibromo-2",4"-dihydroxyphen-1"-yl)-5-substituted Phenyl-2-pyrazoline

	Molecular formula			Yield (%)	M.P. °C.
	No	R	(M. wt.)		
the synth esized comp ound 2(a-j) were scree ned for the antiba cterial activit ies. Amon g the tested comp	2a	4-OH	C ₁₅ H ₁₂ Br ₂ N ₂ O ₃ (428.08)	42	84
	2b	4-Cl	C ₁₅ H ₁₁ Br ₂ ClN ₂ O ₂ (446.52)	44	106
	2c	3-OH,	C ₁₅ H ₁₂ Br ₂ N ₂ O ₄ (444.07)	45	118
		4-OH			
	2d	2-NO ₂	C ₁₅ H ₁₁ Br ₂ N ₃ O ₄ (457.07)	50	105
	2e	4-OH,	C ₁₇ H ₁₆ Br ₂ N ₂ O ₄ (472.13)	44	152
		3-OC ₂ H ₅			
	2f	4-OCH ₃	C ₁₆ H ₁₄ Br ₂ N ₂ O ₃ (442.10)	46	140
	2g	4-H	C ₁₅ H ₁₂ Br ₂ N ₂ O ₂ (412.08)	40	112
	2h	3-NO ₂	C ₁₅ H ₁₁ Br ₂ N ₃ O ₄ (457.07)	40	138
	2i	2-Cl	C ₁₅ H ₁₁ Br ₂ ClN ₂ O ₂ (446.52)	43	125
	2j	2-OH	C ₁₅ H ₁₂ Br ₂ N ₂ O ₃ (428.08)	41	127

ounds 2a, 2c, 2e and 2j showed good activity against the tested organisms. Compounds 2b, 2f, and 2i have moderate antibacterial activity.

¹H NMR Spectroscopy

Nuclear magnetic resonance (NMR) spectroscopy is one of the latest physical methods which is used for the structure determination of organic compounds. ¹H-NMR spectra of pyrazolines derivatives were recorded on Bruker WM 400FT MHz NMR instrument. Spectra were examined in CdCl₃ at room temperature using TMS as internal standard. The data of compound (2a) is summarized in table -2.

Table-2 (¹H-NMR)

Signal positio(δ ppm)	Inference
9.90	-NH
9.30	-OH
4.01	-CH
3.80	-CH ₂
5.97 to 7.89	Aromatic Protons

Infrared Spectra

Infrared absorption spectra were recorded by using potassium bromide pallets method. The spectra were recorded by using Shimadzu FTIR spectrophotometer. The data of

Table-3: (IR)

Adsorption	2a
-NH (st)	3430
-OH	3450-3350
-C=N	1620-1580
-C-N	1230-1210
Ar (C=C)	1554
In plane Ar-H	1034
Ar-H (b) Vib.	840.80

compound (2g) is summarized in table -3.

Antimicrobial Activity

The synthesized compounds, 2-pyrazolines derivatives were employed for antibacterial activity using *S.aureus* and *E.coli*. The result obtained were compared with the antibacterial activities of ampicillin and gentamycin. All the compounds showed mild activity.

Conclusions

Anti-bacterial activity of the synthesized compounds were compared with the that of standard drug Ampicilin and Gentamycin. Among the tested compounds no. 2a, 2c, 2e and 2j have shown the maximum activity against all the compounds towards gram +ve bacteria i.e. *S.aureus* while rest of the compounds have shown good activity against *S.aureus* bacteria. The compound no. 2d, and 2h have shown the maximum activity amongst all the compounds towards gram –ve bacteria i.e. *E.coli* and the compound no. 2b, 2f, and 2i have shown the medium activity against *E.coli* bacteria while the reast of the compounds have shown weak activity against *E.coli* bacteria. The rest of the compounds are found less active against both the bacteria.

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References

1. S.V. Kostanecki and J. Tambor, *Chem. Ber.*, **32**, 1921 (1899).
2. S.M. Naik and H.B. Naik, *Asian J. Chem.*, **11**, 1537 (1999).
3. K.S. Kumar, K.T. Reddy, A. Vamsikanth, G. Omprakash and P.K. Dubey, *Der Pharma Chemica*, **3(5)**, 113-122 (2011).
4. N.A. Kalambe, P.B. Raghuwanshi and H.R. Dhanbhar, *Int. J. Chem. Sci.*, **12(3)**, 1028-1032 (2014).
5. K.G. Desai and K.R. Desai, *Indian J. Chem.*, **46B**, 1179-1186 (2007).
6. G. Tony, M. Chandran, A.R. Bhat, K. Krishnakumar, *J. Pharmacy Research*, **8(2)**, 136-138 (2014).
7. A.S. Dighade and S.R. Dighade, *Der Pharma Chemica*, **4(5)**, 1863-1867 (2012).
8. A. Ozdemir, G. Turan-Zitouni, Z.A. Kaplancikli, G. Revial and K. Guven, *Euro. J. Med. Chem.*, **42**, 403-411 (2010).
9. P.M. Sivakumar, S. Ganesan, P. Veluchamy and M. Doble, *Chem Biol Drug Des*, **76**, 407-411 (2010).
10. M. Shaharyar, M.M. Abdullah, M.A. Bakht and J. Majeed, *Euro. J. Med. Chem.*, **45**, 114-119 (2010).

11. B.N. Acharya, D. Saraswat, M. Tiwari, A. Srivastava, R. Ghorpade, S. Bapna
and M.P. Kaushik, *Euro. J. Med. Chem.*, **45**, 430-438 (2010).
12. P.T. Chovatia, J.D. Akabari, P.K. Kachhadia, P.D. Zalavadia and H.S. Joshi, *J. Serb. Chem. Soc.*, **71(7)**, 713-720 (2007).
13. S.K. Sahu, M. Banerjee, A. Samantray, C. Behera, M.A. Azam, *Trop. J. Pharm. Res.*, **7(2)**, 961-968 (2008).
14. D. Nauduri and G.B.S. Reddy, *Chem. Pharm. Bull*, **46(8)**, 1254-1260 (1998).
15. P.J. Jainey, and I.K. Bhat, *J. Young Pharmacists*, **4(2)**, 82 (2012).

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