SYNTHESIS AND ANTIMICROBIAL STUDY OF PYRAZOLINE FROM FLAVANONES AND HYDRAZINE

Shrikant A. Patil[1], MangeshV. Kadu[2]
Department of Chemistry, VidnyanMahavidyalaya
Malkapur,Dist. Buldana, Maharashtra,
SantGadge Baba Amravati University, Amravati[1]

Abstract

Pyrazolines the well knownnitrogen-containing heterocyclic compounds have received considerable interests in the field of medicinal chemistry and agriculture chemistry because of their broad spectrum of biological activities. To discover more potent antifungal and antimicrobial compounds, a series of structurally related 3,5-diaryl-4-benzoyl-1-pyridoyl-Δ^2-pyrazoline and pyrazole derivative has been synthesis from flavanones, and tested for their activity against four plant pathogenic fungi and various pathogenic micro-organism. The preliminary bioassay indicates that almost all synthesis compounds had display variable growth inhibitory effect on the tested pathogenic fungi and different pathogenic micro-organism.

Keywords: Heterocyclic, Spectrum, Bioassay.

1) Introduction

Pyrazoline and their derivative embedded with variety of functional groups are important biological agents and significant amount of research work has been directed towards this class. Pyrazoline are known to posse's antimicrobial, antifungal[1],antitubercular[2], analgesic[3], antiviral[4], antibacterial[5], cerebroprotective[6] properties. In a particular they are used as antitumour[7], anaesthetics[8] antidiabetic[9], anticancer[10], immunosupportive[11], antidepressant[12], antiinflamatory[13], and insecticidal agents[14].

A classical synthesis of these compounds involves the formation substituted flavonones from substituted aldehyde, which undergo subsequent cyclization reaction with phenyl hydrazine to form substituted pyrazoline. In recent year significant portion of research in Heterocyclic Chemistry has been devoted. Pyrazoline containing different aryl group as substituent's as evident from the literature. The proceeding section of review is focusing on the resent development of pyrazoline along with their biological properties.

Synthesis and characteristics of pyrazoline derivative has been developing field within heterocyclic chemistry, because their broad spectrum biological activity Pyrazoline has found antitumor, immunosuportive and antifungal activity.

2) Experimental / Materials and Methods

2.1) Synthesis of 1-(2-Hydroxy aryl)-3-aryl -1,3propanedione

2-Bezoloxy acetophononewas dissolve in dry pyridine (dried in KOH). The solution was warmed up to 60^{o}C and pulverized KOH was added slowly with constant stirring. After 4 hours the reaction mixture was acidify by adding ice cold HCl. The brownish yellow product obtain was filtered; wash with sodium bicarbonate solution (2%) and sufficient water. The product obtain was crystallized from ethanol-acetic acid mixture.

2.2) Synthesis of 3-aryl flavonones(P1-P6)

1,3-diaryol-1,3 propanedione and bromo substituted aldehyde (p-bromobenzaldehyde, m-bromobenzaldehyde, o- bromobenzaldehyde) were reflux in ethanol for one hour containing few drops of piperidine. The reaction mixture was cooled and product separate was crystallized from ethanol-acetic acid mixture.

The structures of this compound were confirmed by spectral analysis.

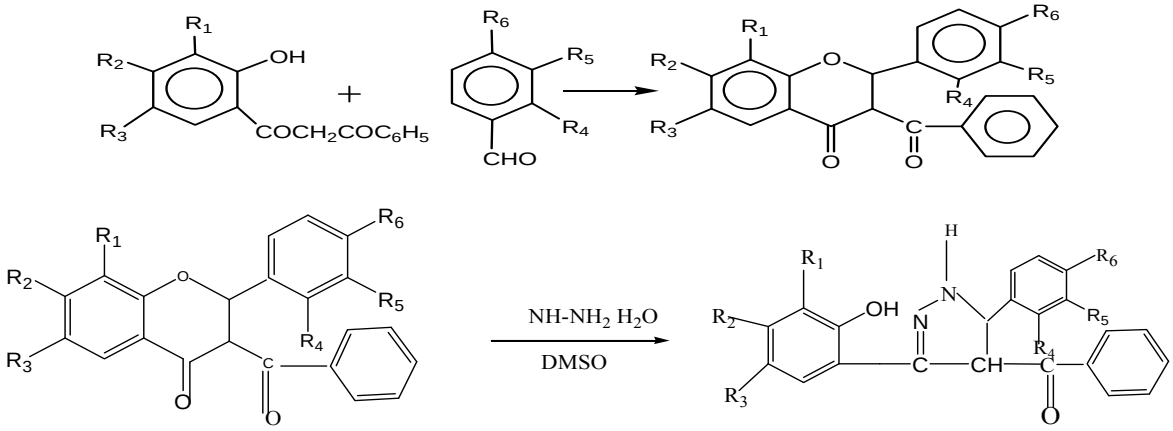
2.3) Synthesis of pyrazolines from flavononesbyusing Hydrazine(P1-P6)

3-aryol flavononeswere refluxed with Hydrazine for 8-10 hours in DMSO solvent. The reaction mixtures was decomposed by acidified water, filtered and wash with water. It was crystallized from ethanol acetic acid mixture to obtain white crystalline product, yield 60-70%. Physical characterization and of data of synthesized 3 (2-Hydroxy- substituted phenyl)-4-(bezoyl bromide)-5-(bromo substituted benzaldehyde) -1-pyrodyol-Δ^2-pyrazoline is given in table no.1. The structures of this compound were confirmed by spectral analysis in table no. 1.

2.4) Antimicrobial activities of synthesizedPyrazolinecompound

In case of antimicrobial activity from table no.-3 and 4, it has been observed that the synthesis compound show to moderate to strong activitiesagainst pathogenic micro-organism and fungi

.



3) Result and discussion:

Table No. 1 Infrared Spectral data of synthesized Pyrazoline Derivative

Types of vibration	Vibration mode	Frequency in cm^{-1}
Aromatic	Ar-H str	3050
CH_2	C-H str	2951
N-N	N-N bending	850
C=N	C=N str	1530
C-N	C-N str	1319
Aromatic ring	C-H bending	835
COC_6H_5	C-O-C bending	1065
Di substituted aromatic	Ar-H bending	750

Table No.2Physical Characterization of SynthesizedPyrazoline Compound P1-P6.

Compound	R_1	R_2	R_3	R_4	R_5	R_6	Yield (%)	M.P.(^oC)
P1	CH_3	H	H	H	H	Br	65	147
P2	CH_3	H	H	Br	H	H	75	165
P3	CH_3	H	H	H	Br	H	70	168
P4	H	CH_3	H	H	H	Br	40	160
P5	H	CH_3	H	Br	H	H	50	170
P6	H	CH_3	H	H	Br	H	68	167

Table No. 3 Antifungal Activity of the Synthesis Heterocyclic Pyrazoline Derivative.

Compound code	Zone of inhibition in mm			
	Aspergillusniger	Trichodermaviride	Aspergillusflavus	Cadidaalbicans
P1	20	22	17	20
P2	15	14	16	23
P3	17	16	19	19
P4	16	18	27	22
P5	20	20	27	24
P6	17	20	30	26

Table No.4: Antimicrobial activities of synthesis pyrazolines derivatives mention in table.

Micro-organisms	Zone of inhibition in mm					
	P 1	P 2	P 3	P 4	P 5	P 6
S. typhi	16	19	16	16	11	19
E. coli	20	20	25	22	22	26
B. megatherium	26	26	24	22	20	17
S. aureus	19	19	16	14	19	16
P. mirabilis	16	19	25	19	17	15
C. frundii	19	18	19	15	19	21
P. aeruginosa.	22	19	20	29	22	23

Strongly active range: >12mm, moderately active range: 8-12mm, weakly active range <8mm.

4. Referances:

1) DileshIndorkar, O.P.Chourasia, S.N. Limaye*J. Curr.Microbiol.App.Sci*2015**,** 4(2):670-678
2) Babu, V. H.;Manna, S. K.; Srinivasan, K.K. and Bhat, G.V., *Indian J Heterocyclic Chem.*, 3,2004**,** 253;*ChemAbstr*, 141, b, 314227b.
3) Banoglu, S. R.; Sukuroglu, M.; Calickan, B.; Nacak, S.; Aypar, E.; Ark, M., *Turk J. Chem*. 2007, 31,677.
4) Sechi, M.; Sannia, L.; Carta, F.; Palomba, M.; Dallocchio, R.; Dessi, A.; Derudas, M.; Zawahir, Z. and Neamati, N., *Antiviral Chem. Chemother*. 2005, *16*, 41.
5) Mohamed, A.M.; Magdy, M.G.; Magd, N.N. and Waleed, A.H.B., Arch Pharm Med Chem. 2004; 337:427-433.
6) Ohto, N. and Shigo, Y., *Jpn J Pharmacol*, 73, 1997,317.
7) Taylor, E. C.; Patel, A. and Kumar, H., *Tetrahedron*, 48, 1992, 8089.
8) Batulin, Y.M.;Farmakol, Toksikol, 1968; 31:533. *Chem. Abstr*. 1969, 70:2236a.
9) Cottineau, B.; Toto, P.; Marot, C.; Pipaud, A.; Chenault, J. *Bioorg. Med. Chem. Lett*.2002, *12*, 2105.
10) Abdolhamid, A. O.; El-Ghandour, A. H.; El-Reedy, A. A. M., *J. Chin. Chem. Soc*. 2008, *55*, 406.
11) Lombardino Joseph, G. and Otterness Ivan, G., *J Med Chem*,24,1981**,** 830;*ChemAbstr,* 95,1981**,** 17984h.
12) 8. Ruhoglu, O.; Ozdemir, Z.; Calis, U.; Gumusel, B. and Bilgin, A, A., *Arzneim Foresch*, 55, 2005,431.
13) Udupi, R.H.; Kushnoor, A.R.and Bhat, A.R., *I.J.Heterocycl.Chem*., 1998,8: 63.
14) Kristopher, S.S. and David, M.S., *PesticBiochem and Phiysiol*, 81, 2005,136.