BIOLOGICAL STUDY OF 3-(2-HYDROXY-3,4-BENZOPHEYL-5-METHOXY)-5-ARYL-1-SUBSTITUTED PYRAZOLINES

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ABSTRACT

A heterocyclic compound is a cyclic compound that has atoms of at least two different elements as members of its ring(s). pyrazolines, consisting of a five-membered aromatic ring with two nitrogen atom, are an important class of heterocyclic compounds that possess important biological properties and also find uses in various industries. Due to the important role of substituted pyrazolines, it was thought to synthesized them and study their biological activities. 2-Acetyl–4-methoxy-naphthalene's were prepared by modified Nenchi's method which on treatment with aromatic aldehydes and KOH gives chalcones in an excellent yield. Then these chalcones were treated with various nucleophiles to yield titled pyrazolines.

The synthesized compounds were characterized by elemental analysis, UV, 1H NMR and IR Spectroscopy. Thin Layer Chromatography on silica gel-G, was used to check the purity of the compounds. Biological study was carried out for all newly synthesized compounds and showed an excellent results.

KEYWORDS: Synthesis , Characterization , Substituted Pyrazolines, Biological study

INTRODUCTION : Pyrazolines are well known and important nitrogen containing five membered ring compounds and various methods have been worked out for their synthesis.1-4. It has been observed that substituted chalkones are best starting compounds for the preparation of the substituted pyrazolines. Various pyrazoline derivatives are most important as pharmaceuticals and they have been found to posses antipytretic5, analgesic6 and anti-inflammatory 7 properties. Pyrazoline derivatives are also posses bactericidal 8, fungicidal 9 and insecticidal 10 properties. Due to these important functions and biological role of pyrazolines derivatives11,12, it was thought of interest to synthesize titled pyrazolines.

Present work deals with the synthesis and biological study of some new pyrazoline derivatives their characterization by elemental analysis, IR and 1 H NMR analysis

EXPERIMENTAL : To check the purity of the compounds, Thin layer chromatography on silica gel-G, was used. 1 H NMR spectra were recorded on a Brucker AC300 FNMR spectrometer (300 MHz), using TMS as an internal standard. IR spectra were recorded on a Nicolet-Impact 400 FT-IR spectrometer. All the melting points were taken in silicon oil bath with open capillary tubes and are uncorrected. Microanalysis of nitrogen was obtained on Colman 29-N analyzer.

Synthesis of 2-acetyl-4 methoxy-1-naphthol (2): In hot glacial acetic acid , fused Zinc chloride was added and refluxed till solid was dissolved. Then powdered 4-methoxy-1-naphthol was added and refluxed for eight hours. The reaction mixture was cooled and then poured in acidulated water. The solid obtained was filtered, washed with water and recrystallized from rectified spirit to obtain compound (2). Physical data of the compounds are given in Table 1.

Synthesis of Chalcone (3-5) : In ethanol solvent, 2-Acetyl-4 methoxy-1-naphthol (0.01mole) and aromatic aldehyde (0.02 mole) were added . To this mixture, dropwise add 10 % of KOH (10 mL) solution with constant stirring. The reaction mixture was kept overnight. Then this mixture was poured over

HCl and crushed ice. The product that is chalcone was filtered and recrystallized from ethanol . Their physical data are given in Table 1.

Synthesis of 3-(2-hydroxy-3,4-benzophenyl-5-methoxy)-5-aryl–1-substituted pyrazolines (6-8) : chalcone and semicarbazide were added to DMF and refluxed for 2 hours. The cooled reaction mixture was diluted with water and the semisolid so obtained was triturated with ethanol to get a solid of titled product, which was recrystallised from ethanol–acetic acid mixture to get desired pyrazolines in 48-52% yield and their physical data are given in Table 1.

Spectral interpretation of (6)

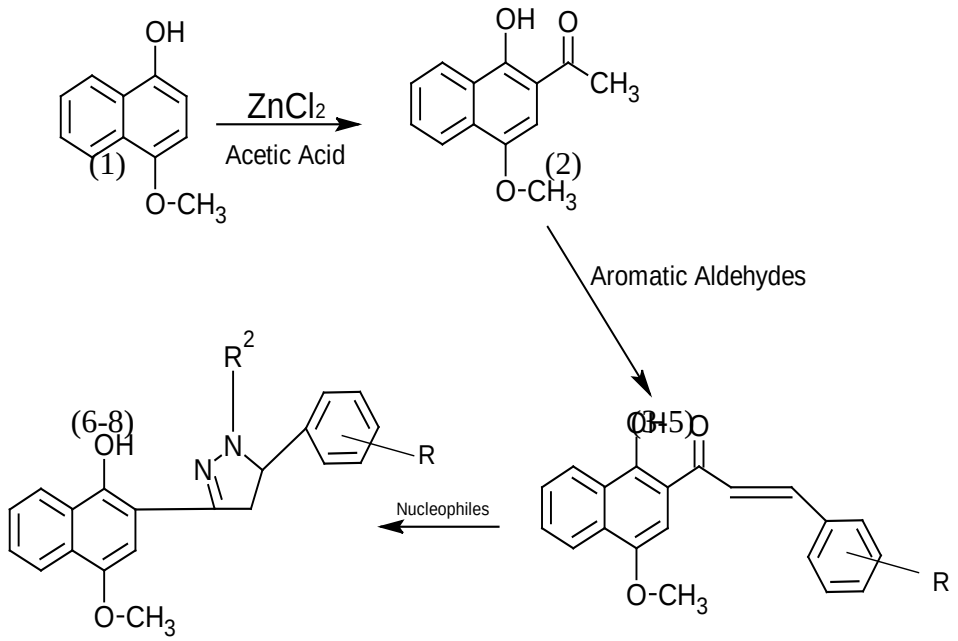
IR (vmax) (cm-1): 3430 (OH str), 3199 (N-N pyrazoline), 1660 (C-O), 1597(C=N str), 1565 (NO_2 Str).

NMR (δ ppm): 3.10–3.18 (dd, 1H, H) , 3.79-3.82 (dd, 1H, H) , 3.85 (s,3H, OCH_3) 5.19-5.21, (dd, 1H, H), 5.95 (s, 2H, NH2), 6.91-7.92 (m, 9Ar-H) , 9.95 (s, 1H, OH).

Table 1: Physical data of synthesized compounds

Sr.No.	Compound no.	Molecular formula	M. Pt. 0C	R	R1	Yield (%)
1	3	$C_{20}H_{15}NO_5$	122	NO_2	--	65
2	4	$C_{20}H_{15}NO_5$	158	NO_2	--	62
3	5	$C_{20}H_{15}NO_5$	151	NO_2	--	75
4	6	$C_{21}H_{18}N_4O_5$	295	NO_2	$CONH_2$	51
5	7	$C_{21}H_{18}N_4O_5$	310	NO_2	$CONH_2$	48
6	8	$C_{21}H_{18}N_4O_5$	299	NO_2	$CONH_2$	52

SCHEME - 1



BIOLOGICAL STUDIES :

Above synthesized pyrazoline derivatives have been studied for their antimicrobial activity against *escherichia coli*, *proteus mirabilis*, *staphylococcus aureas*, *A.Nigar*. The culture of each species was incubated at 37^0C and the zone of inhibition was measured after 24 hr. Most of these compounds were found active.

Sr. No.	Compound Number	Antimicrobial and antifungal activity			
		E-coli	Proteus mirabilis	Staphylococcus aureas	*A.Niger*
1	6	18	17	14	07
2	7	16	10	12	15
3	8	14	13	17	12

Strongly active , range 15-18 Weakly active, range 7-10 mm
Moderately active, range 11-14mm

Thus from above results it was observed that these heterocyclic compounds were found effective against *escherichia coli*, *proteus mirabilis*, *staphylococcus aureas*, *and A. Niger*. So all synthesised compounds can be easily be used for the treatment of diseases caused by these above pathogens, only when they does not have poisons and other side effects.

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