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– A REVIEW

PYRAZOLINES AS PROMISING MEDICINAL AGENTS

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ABSTRACT

Pyrazolines are important five membered ring structures containing two nitrogen atoms at positions 1 and 2 and are partially reduced form of pyrazoles. Pyrazoline derivatives constitute an important class of compounds in drug research. They are found to possess antiimplantation, antiarrhythmic, anti-inflammatory, antihypertensive, abortifacient, antiarthritic, anthelmintic, antidepressant, fungicidal, antiviral, antitumor, anesthetic, hypoglycemic, antifertility and antioxidant activities. This article attempts to review the importance of medicinal aspect of pyrazolines.

Key words: Pyrazole, Pyrazoline, Heterocyclic ring, Biological activity.

INTRODUCTION

A large number of heterocyclic compounds; both synthetic and natural are pharmacologically active and are in clinical use. Chemical modification of drug molecules to locate the member of a series having optimal effect has long been carried out, is widely used, and will probably continue to be a factor necessary to drug discovery. Chemical modification of enzymes by reagents directed to active site is now used and is important in design of drug molecules. The approach to the practice of medicinal chemistry has developed from the empiric one involving organic synthesis of new compounds based largely on modification of structures of known activity, to a more logical and less intuitive approach. This is mostly because of the findings in molecular biology, pharmacology and enzymology and mechanics of drug reception interactions.

Currently several heterocyclic compounds find their applications in agriculture as

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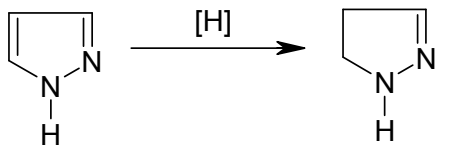
insecticides, fungicides, herbicides, pesticides etc. They also find applications as sensitizers, developers, antioxidants, copolymers etc. The chemistry of heterocyclic compounds has been taken as an interesting field of study for a long time. A number of pyrazoline derivatives were studied extensively because of their diverse chemical reactivity and broad spectrum of biological activity. They are found to inhibit the growth of several pathogenic microorganisms and are reported to possess important therapeutic properties such as antibacterial, antifungal, anti-inflammatory, antiproteolytic and hypoglycemic activity[1, 2]. Pyrazolines are the five membered ring structures containing two nitrogen atoms at positions 1 and 2 and are partially reduced form of pyrazoles.



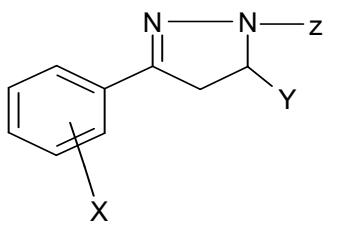
Pyrazole Pyrazoline

Importance of pyrazolines containing compounds

A brief review of pyrazolines is given below:

(a) Antifertility agents

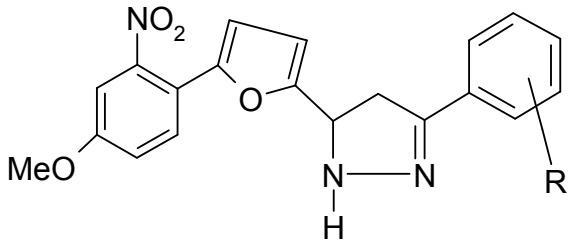
Several pyrazolines are reported to possess contraceptive and abortifacient activities[3]. Fluorine incorporated pyrazoline derivatives possessed good antiimplantation activity.



S. No.	X	Y	Z
a.	4-Fluoro	C_6H_5	$COCH_3$
b.	2,3,4,5,6 – Pentafluoro	C_6H_5	$COCH_3$
c.	3,4-Difluoro	C_6H_5	$COCH_3$
d.	4-Fluoro-3-methyl	C_6H_5	$COCH_3$

(b) Anthelmintic activity

Several 1,3,5-trisubstituted pyrazolines were found to display anthelmintic activity[4].



1[H]-3-aryl-5[5-(2-nitro-4-methoxy phenyl)-2-furyl]-2-pyrazolines

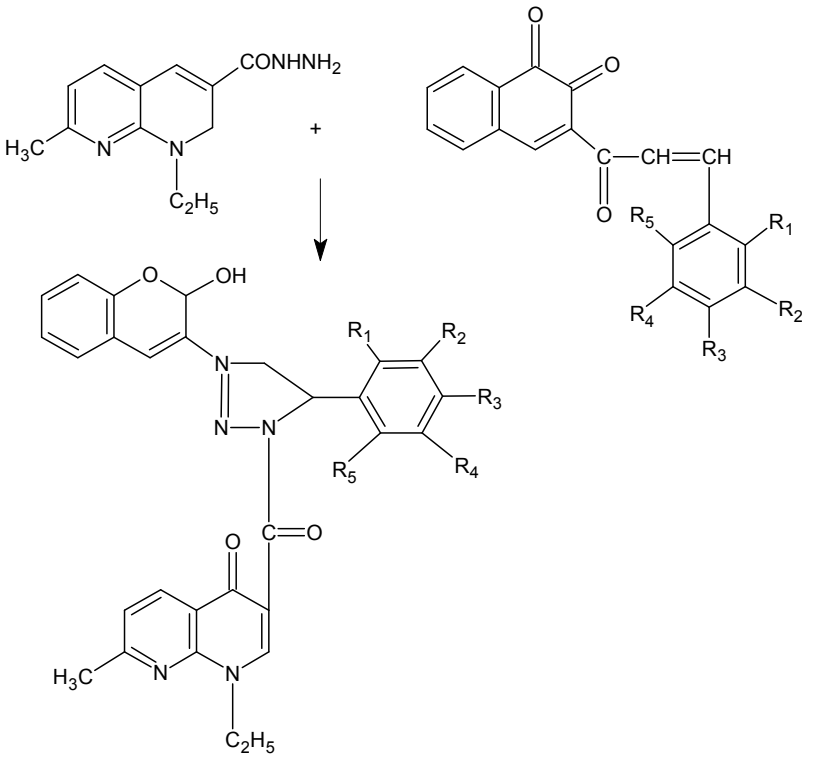
S. No.	a	b	c	d	e	f	g	h
R	H	4-Cl	4-OCH_3	2,4-Cl_2	4-NO_2	4-Br	4-OH	2-OH

The anthelmintic activity was evaluated on worms *Pheritima postuma.* The screening data indicated that among the compounds tested, compounds **4a**, **4b** and **4h** were found to be active compared to standard piperazine at concentration of 1 mg/mL.

c) Analgesic activity

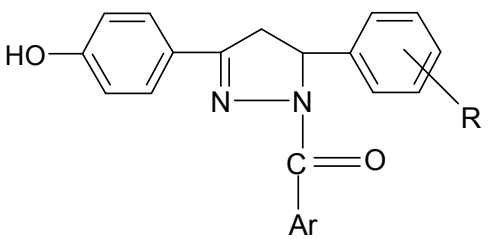
Several chalcones were condensed with nalidixic acid hydrazide in presence of piperidine to afford the following pyrazoline derivatives. Among them compound **Id** was found to be more active[5].

	R_1	R_2	R_3	R_4	R_5
Ia	H	OCH_3	OCH_3	OCH_3	H
Ib	H	H	Br	H	H
Ic	H	Br	H	H	H
Id	Cl	H	Cl	H	H
Ie	H	H	Cl	H	H
If	Cl	H	H	H	H
Ig	Cl	H	H	H	Cl



(d) Antitubercular activity

The following pyrazoline derivatives were screened for *in vitro* antitubercular activity against *Mycobacterium tuberculosis* $H_{37}R_v$ strain at 1, 10 and 100 µg/mL. The compounds **IIa**, **b** and **c** were found to be active at 10 µg/mL, **III a-h** and **IV a-h** were found to be active against 1µg/mL. All the others were active at 100 µg/mL concentration and the standard drug streptomycin was active at 10 µg/mL[6].



IIa-h : Ar = Phenyl

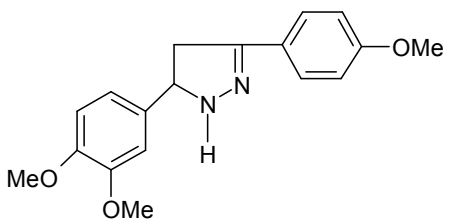
IIIa-h : Ar = Pyridine 4-yl

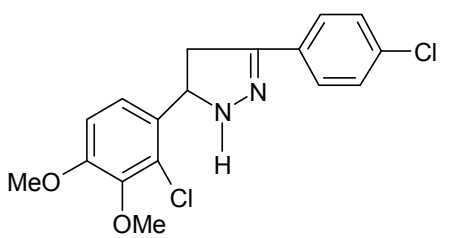
IVa-h : Ar = Hydroxyl phenyl

II	III	IV
R	R	R
a. H	a. H	a. H
	b. 4-Cl	b. 4-Cl
c. 4-methyl	c. 4-Methyl	c. 4-Methyl
	d. 4-Methoxy	d. 4-Methoxy
	e. 4-Br	e. 4-Br
f. 2,4-dichloro	f. 2,4-Dichloro	f. 2,4-Dichloro
	g. 3,4-Dimethyl	g. 3,4-Diethoxy
	h. 2-Cl	h. 2-Cl

(e) Antidepressant activity

New 3,5-diphenyl-2-pyrazoline derivatives were synthesized and antidepressant activity of these compounds was evaluated[7]. It was found that 4-methyl and 4-chloro substituents on the phenyl ring at position 3 of the pyrazoline ring increased antidepressant activity, and the replacement of these groups by Br and CH_3 substituents decreased the activity in mice.

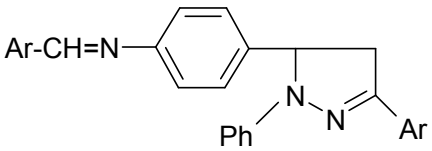




(f) Antimicrobial and antifungal activity

Several pyrazoline derivatives were found to be active as antimicrobial and

antifungal agents[8].



CONCLUSION

So, from above study it is predictable that pyrazolines are important pharmacophore and have a wide range of therapeutic properties. It plays vital role as medicinal agents due to different biological activities. Thus, we can conclude that pyrazolines are important emerging moiety in pharmaceutical study and a lot of work can be carried out on this molecule for obtaining better therapeutic activity.

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