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Life Sciences **Review Article……!!!**

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PYRAZOLONES BASED COMPOUNDS ARE CORE UNITS BIOLOGICAL EVALUATION - MINI REVIEW

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ABSTRACT

Purpose**:** The article is aimed to discuss characterize and screening the biological activity of a series of Pyrazolones Biological evaluation of great biological interest, especially as anti-tubercular antibacterial. The important and structural diversity of biologically active antibiotics led to the development of many novel methods for the construction of appropriately substituted pyrazole with attendant control of functional group and stereochemistry. Pyrazolone derivatives are reported to show a variety of antimicrobial, anticonvulsant, anti-inflammatory and cardiovascular activities, antimycobacterial activity, antibacterial activity, antihypertensive activity.

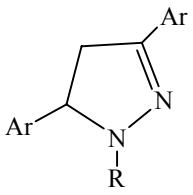
INTRODUCTION

Heterocyclic chemistry is the most challenging and a handsomely rewarding field of study, since it always attracts the attention of scientists working not only in the area of natural products but also in synthetic organic chemistry. Moreover, in tune with the present trend "scientists to the door steps of common man", there is always a challenging and rewarding task in search of more and more new scientific accomplishments. This is reflected by the voluminous data available in the literature on heterocyclic chemistry. Many useful drugs indeed have emerged from such investigations which strengthens the trend. Spectacular advanced has been made in this field to furtherance of the knowledge of relationship between chemical structure and biological activity. Thus, the successful application of this class of compounds in various fields ensures a limitless scope for the development of structurally novel compounds with a wide range of physico-chemical and biological properties.

Amongst different heterocyclic systems, the chemistry of five membered heterocycles with more than one heteroatom has gained importance as many of the them exhibit pronounced bioactive nature. One such type of compounds include pyrazoles and pyrazolines. Hence, any attempt to study their detailed chemistry would add new dimensions to the existing knowledge. Pyrazolones, pyrazoles and related heterocycles possess various types of biological activities. A good deal of importance is given to pyrazolone derivatives. It is due to their wide use in medicinal chemistry and some of them possess antituberculosis antineoplastic, antidiabetic, anti fertility and antithyroid activity.In this perspective a study on synthesis, characterization, antimicrobial activity, electro-organic and bioactive studies on some pyrazolone derivatives have been taken up and incorporated in the thesis.Introduction is kept to minimum in order to draw more attention to the actual dissertation details. A brief account on 2-pyrazolines and 2-isoxazolines, their importance and various methods for their syntheses is discussed.

A five membered cyclic diene containing three carbons and two nitrogens is called a diazole. If two nitrogen atoms are adjacent, it is known as a pyrazole. If one double bond is present, it is a pyrazoline. If two nitrogen atoms are separated by a carbon, it is known as an imidazole. Similarly, heterocyclic compound composed of three carbons, one nitrogen and one oxygen atom is called an oxazole. If two heteroatoms are adjacent it is an isoxazole, whereas if one double bond is present, it is known as an isoxazoline.

The biological properties of pyrazoles are reviewed extensively. Several pyrazolines **(1)** and annelated pyrazoles **(2-4)** posses antimicrobial activity[1-5].



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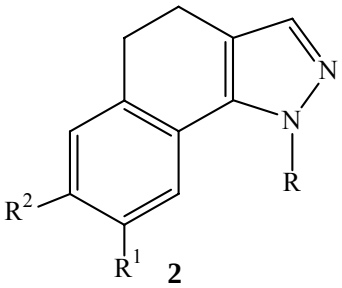

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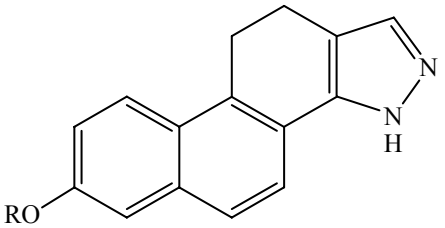

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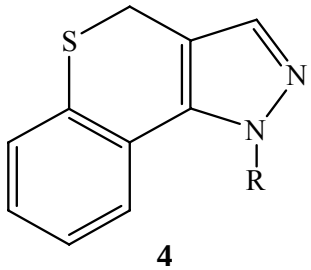

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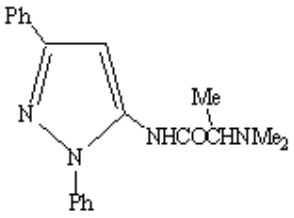

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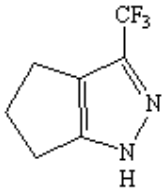

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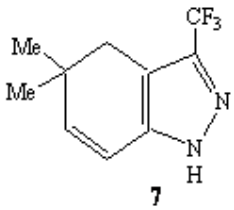

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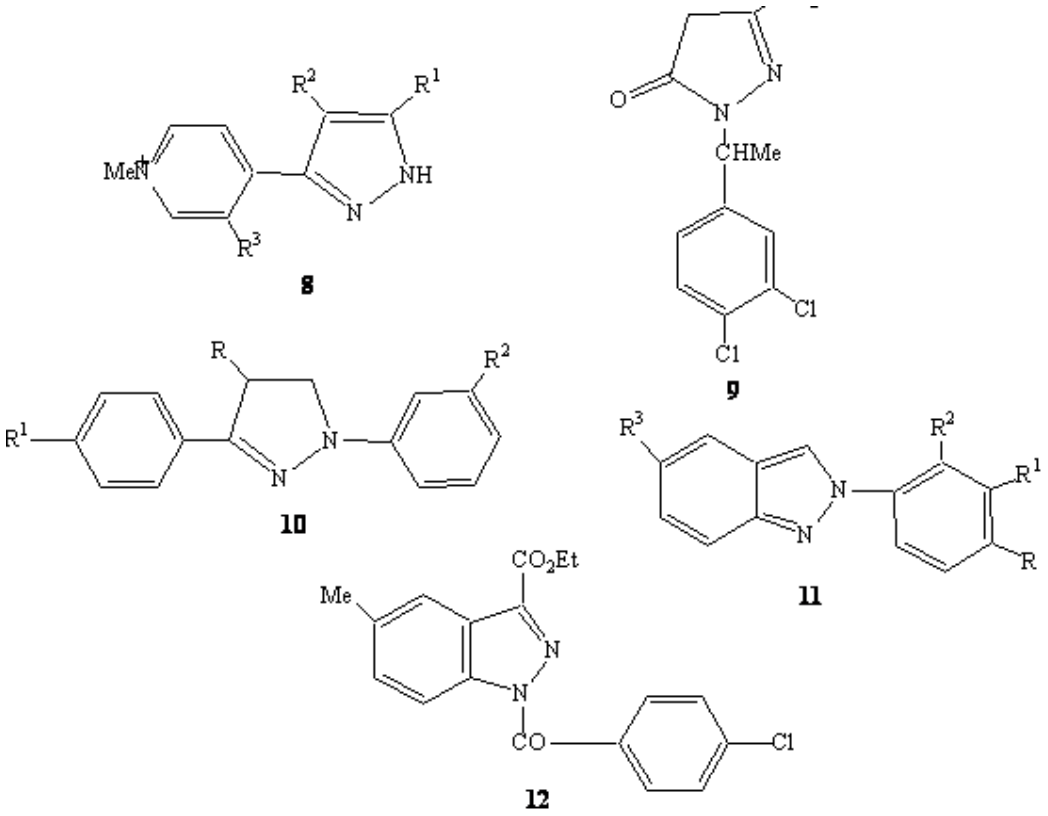
Pyrazole and its N-substituted derivatives are potential inhibitors and deactivators of liver alcohol dehydrogenase. Difenamizole **(5)** posses analgesic activity greater than that of

aspirin. The trifluoro derivatives of pyrazoles **(6&7)** are about 0.5% as effective as an amebicide, comparable with emetin and metronindazole.

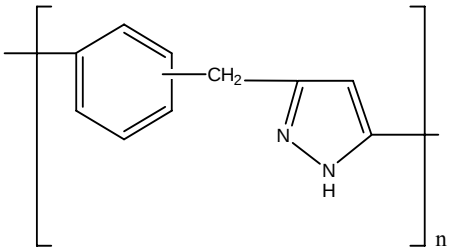
Several di- and trisubstituted pyrazole and pyrazoline derivatives[6] and 4-pyrazolyl pyridinium salts **(8)** possess hypoglycemic activity. Muzolimine **(9)**, 1-substituted 2-pyrazolin-5-one derivative is a highly active diuretic. It differes from other diuretics as it contains neither sulfonamide nor carboxyl group. Besides this, pyrazoline and indazole derivatives **(10-12)** are pharmacologically active and are useful as antinflammatory drugs[7,8].



As well as 3,5-pyrazolidinedione derivatives such as phenylbutazone **(13)**, oxyphenbutazone **(14)** sulfinpyrazone **(15)** etc, are some of the important class of anti-inflammatory agents which are most widely used.

The organophosphates **(16)** which contain pyrazole moiety find application in agrochemical field as insecticides and pesticides. Dimetilan **(17)**, isolan **(18)** and 1-phenylcarbomoyl-2-pyrazolines **(19)** also possess useful insecticidal properties[9-11]. It was reported that 3,4-diphenyl substitution in the heterocyclic ring increases the potency of insecticides when compared to 3-phenyl or 3,5-diphenyl substitution by a factor of 3 to 100.

Apart from these, 5-pyrazoline derivatives have many applications as dye stuffs[12]. Pyrazole, pyrazoline and pyrazolone derivatives are used in colour photography and as optical brighteners etc. polymers with a back bone of five memebered heterocyclic rings were developed; a polypyrazole **(20)** and a polypyrazoline **(21)** belongs to such a class.



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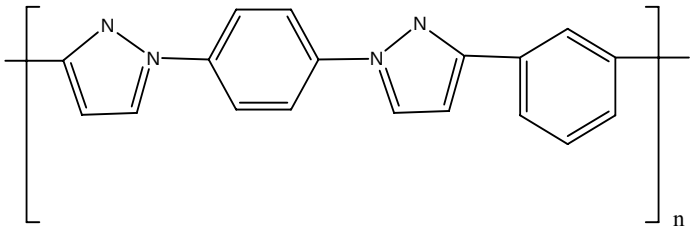

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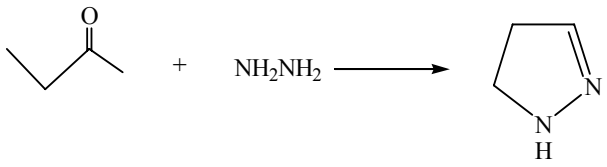
2-Pyrazolines

A. Hydrazine based reactions

Pyrazoline was first synthesized in 1894 by Curtius and Wirising[13] by the spontaneous reaction of acrolein with hydrazine in low yields **(22)**. The principle of this method was adopted by many scientists over the years and found that it has been a facile one for the synthesis of a variety of 2-pyrazolines.



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In fact the cyclocondensation of different α,β-unsaturated ketones having alkyl, aromatic and heteroaromatic substituents with hydrazine and its alkyl and aryl derivatives was extensively utilized for the synthesis of 2-pyrazolines[5,6,14-19] **(23,24,25).**

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