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A review on screening of novel pyrazoline derivatives for certain pharmacological activities

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ABSTRACT

Pyrazoline are considered as important compounds in organic chemistry because of their application in heterocyclic synthesis and medicinal application. Pyrazoline are compounds with noteworthy application and have been reported to show a wide spectrum of biological activity, including antimicrobial, anti-inflammatory, antidepressant, analgesic, antitumor, and anticonvulsant activity.

Keywords: Chalcones, Pyrazoline, Antimicrobial, Antidepressant, Anti-inflammatory, Analgesic.

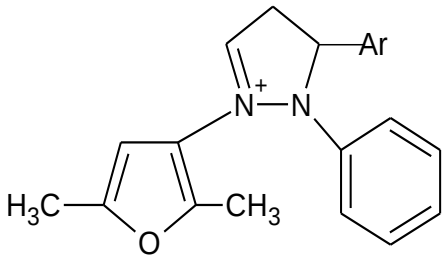
INTRODUCTION

Many heterocyclic analogous of chalcones have been synthesized and after incontestable to method biological and medical specialty activities, which can probably lead to chemotherapeutical agent [1-3]. Because of great potentiality, the heterocyclic analogues of chalcones are most helpful synthons. In the view of varied biological and pharmacological application, we synthesized some heterocyclic derivatives of chalcones. Chalcones found to posses various activities like antimicrobial [4, 5] antidepressant, anti-inflammatory, analgesic, anticancer, antimalarial, antileishmanial, antioxidant, antitubercular, antiulcer, antihyperglycemic.

Pyrazoline derivatives are important nitrogen containing 5-membered heterocyclic compounds. These compounds are generally prepared from the reaction of chalcones with hydrazine derivatives under ordinary conditions. Pyrazoline derivatives have played a crucial role in theoretical development of heterocyclic chemistry and also used extensively in organic synthesis. The pyrazolines offer the reactions of acyclic derivatives, resembling unsaturated compounds in their behavior towards permanganate and nascent hydrogen.

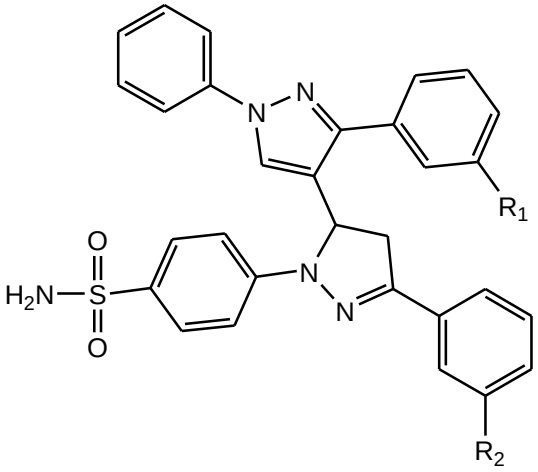
SYNTHESIS AND BIOLOGICAL ACTIVITY

Sridhar *et al*. in 2012, synthesized some new 2-pyrazoline derivatives by reacting 3-acetyl-2,5-dimethyl furan and an aldehyde reacted in the presence of aqueous KOH and ethanol to produce [1-(2'5'-dimethyl-3-foryl)-3-)aryl)-2-propen-1-one] chalcone. This chalcones were condensed with phenyl hydrazine in pyridine in ethanol and the mixture was refluxed for 2-6 hours (on water bath) to get 2-pyrazoline derivatives. All the compounds were characterized by means of their IR, ^{1}H NMR spectral data and micro analyses. All the compounds showed considerable activity. Compounds at the 5th position of the 2-pyrazoline ring posses the maximum analgesic activity [6].



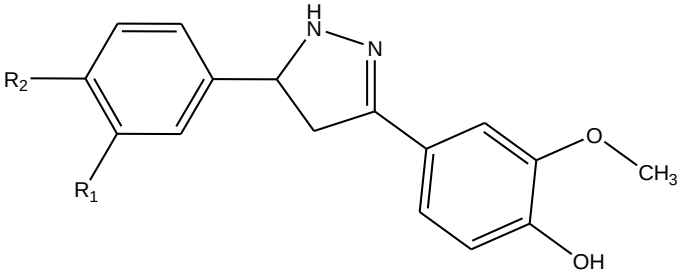
Ar =4"methoxyphenyl , 3'4'5'trimethoxyphenyl

Pawan.K.Sharma *et al.* in 2011, synthesized a new series of 1-(4-aminosulfonylphenyl)-3,5-diarylpyrazolines by the reaction of appropriate chalcones with 4-hydrazinobenzene sulfonamide hydrochloride in ethanol. The synthesized compounds were evaluated for their in-vitro antimicrobial activity against *staphylococcus aureus* and *bacillus subtilis* representing Gram-positive bacteria and *pseudomonous aeruginosa* and *E-coli* representing Gram-negative bacteria and two yeast *candida albicans* and *saccharomyces cervisiae*. Some of the compounds shows excellent antifungal activity than others. Compounds with fluro and bromo as substituents showed good broad spectrum activity against bacterial strain [7].



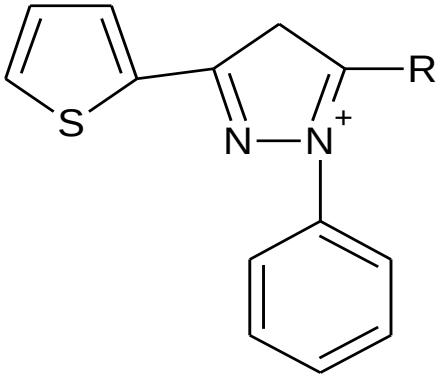
- R =H, -CH_3 , -F , -Br
- R^1= H, -CH_3 , -F , -Br

Akshay Kumar *et al* in 2013, synthesized a series of thirteen 2-pyrazoline derivatives by condensation of various substituted chalcones and hydrazine hydrate in presence of ethanol. The structure of the synthesized molecules was confirmed on the basis of physical data and extensive spectral studies. All the compounds have been screened for antioxidant activity using DPPH radical scavenging method, NO scavenging assay, superoxide radical scavenging assay and hydrogen peroxide radical scavenging assay. All the compounds showed good free radical scavenging activity and three of the compounds show better activity [8].



- R^1 = H, H, CH_3
- R^2 = H, CH_3, H

Ramesh *et al*, in 2010, synthesized some new pyrazoline derivatives by reacting chalcones of 2-acetylthiophene with phenyl hydrazine hydrochloride in the presence of alcohol. The synthesized compounds were identified by spectral data. All the synthesized compounds were screened for their anti-inflammatory activities and some of the compounds showed potential anti-inflammatory activities [9].



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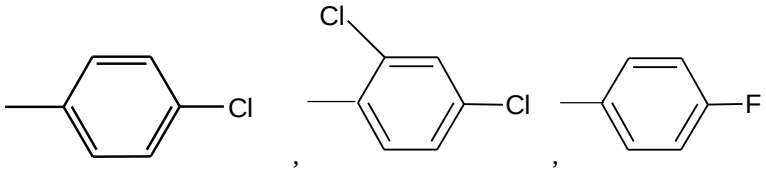
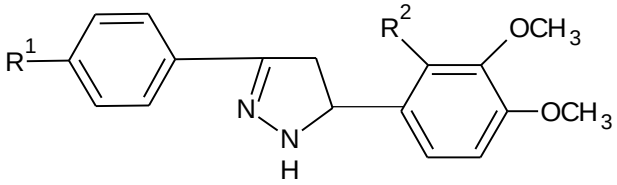


Palaska et al, 2001, a series of ten new 3, 5-diphenyl-2-pyrazoline derivatives were synthesized by reacting 1, 3-diphenyl-2-propen-1-one with hydrazine hydrate. The chemical structures were proved by means of their IR, ^{1}H-NMR spectroscopic data and micro analyses. The antidepressant activities of these compounds were evaluated by 'Porsolt Behavioural Despair Test'. Some of the derivatives which reduces the immobility times. In addition, it absolutely was found that 4-methoxy and 4-chloro substituents on the phenyl ring at the position three of the pyrazoline ring inflated the medication activity [10].



- R^1 = OCH_3, Cl , OCH_3
- R^2 = H, Cl, Cl

CONCLUSION

Pyrazoline are important nitrogen containing 5-membered heterocyclic ring and it can be synthesized in different ways. Many of the pyrazoline derivatives possess different activities such as analgesic, anti-inflammatory, antidepressant, antimicrobial, antioxidant and cytotoxic activities. Therefore, biological significance of pyrazoline compounds used for formulating new chemical entities to various diseases.

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