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"NEW METHOD DEVELOPMENT FOR SYNTHESIS OF 2,3 DIPHNYL 4 - "THIAZOLIDIONE

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ABSTRACT

In recent years, 2,3 diphenyl 4- thiazolidinone and their derivatives are prepared by using different organ metallic catalyst and solvents by using microwave irradiation, ultrasound, sonochemical synthesis and under concentrated sunlight fluorescence. In this work, I have developed one pot multicomponent reaction of Benzyl alcohol , aniline and thioglycolic acidto synthesize 2,3 diphenyl 4-thiazolidinone and their derivatives by conventional heating without use of solvents and catalyst in high yields (95- 98%) and shorter reaction time (2.30 hrs). The benefits of this method than earlier methods include efficiency, cleanliness, ease of set-up, high yields, shorter reaction times, low cost, and readily available catalyst, without use of harmful solvents, prevention of waste, mild conditions, This method is easy to use and environmentally friendly.

Keywords: Benzyl alcohol , aniline , thioglycolic acid , 2,3 diphenyl 4- thaizolidinone

1. INTRODUCTION

The development of new medications or leads for specific targets has always beena difficult and significant milestone in scientific study. Modifications to the parent compound are typically appealing and help to improve the molecule's activity to some extent. Furthermore, in most circumstances, it decreases the parent drug's side effects toxicity. To build a novel analogue that will generate a stated therapeutic effect, it is clear that a scientific understanding of the drug action is essential.

Heterocyclic compounds are cyclic organic compounds that have at least one atom that is not carbon. Heterocyclic compounds are five and six member heterocyclic compounds with one or more hetero-atoms in their nucleus that play an important part in the metabolism of all living cells. Acids like proline, histidine, and tryptophan, vitamins and coenzymes, and precursors like thiamine, riboflavin, pyridoxine, folic acid, B12, and E families of vitamins are all sources of heterocyclic compounds utilized in medicine. There are several pharmacologically active heterocyclic compounds on the market, many of which are used in clinical practice.

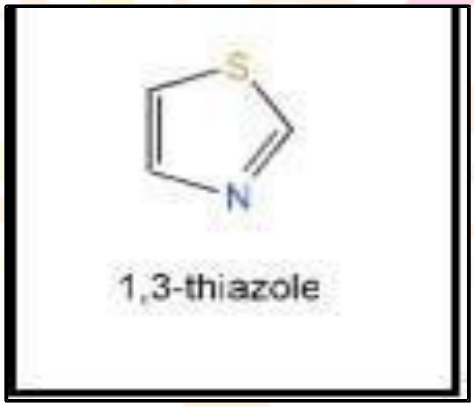
The abundance and variety of heterocyclic compounds that exist naturally or are manufactured commercially by medicinal and dye businesses demonstrates their . In plants and animals, several hetero cycles serve crucial physiological functions. Their research is fascinating from both a theological and a practical standpoint. Life requires a huge number of heterocyclic molecules. The biological properties of the thiazole ring and its derivatives are numerous. The numerous thiazole nucleus-based medication replacements will play an important role inillness therapy.

Thiazole ring :-

Thiazole, also known as 1,3-thiazole, is a heterocyclic molecule containing both sulphur and nitrogen, as well as a broad family of derivatives. Thiazoleis a pale yellow liquid that smells like pyridine. Thiazole is a useful scaffoldin medicinal chemistry and has been shown to have a wide range of biological properties. Thiazole is a heterocyclic chemical molecule having the molecular formula C3H3NS and a five-membered molecular ring structure. It has an electron-donating (-S-) as well as an electron-accepting (C=N) group.

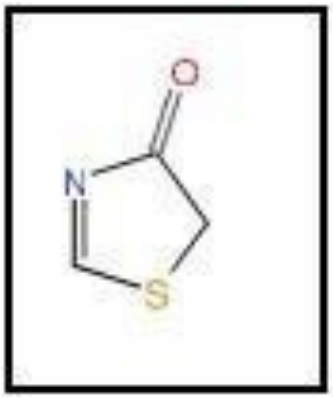
Thiazole is aromatic because a lone pair of electrons from thesulphur atom delocalize, completing the desired 6 p electrons according to Huckel's rule.

The thiazole ring is found in a variety of natural and synthetic products that have a wide range of biological activities. For example, thiazole-containing vitamin B1 (thiamine) aids in the normal functioning of the nervous system through its role in the synthesis of acetylcholine. Because of the presence ofan acidic proton at C-2, the thiazole ring is highly reactive and has emerged as an important synthon for the generation of a wide range of NCEs (New Chemical Entities). Diverse thiazole ring modifications at various positions resulted in a variety of novel compounds with diverse pharmacological activities such as anthelmintic, antioxidant, antibacterial, antifungal, antitubercular, diuretic, anti- inflammatory, and anticancer properties.



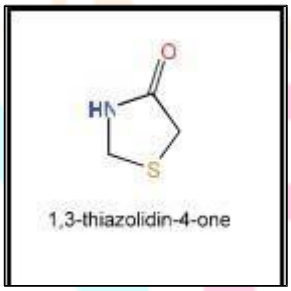
- **Thiazolinones**

- A thiazoline-derived heterocyclic ketone with the carbonyl group opposite the double bond. Thiazolinone is a heterocyclic chemical molecule with themolecular formula C3H3ONS and a five-membered molecular ring structure. Thiazolinone is a physiologically significant heterocyclic ring with a sulphur atom at position 1, nitrogen at position 3, and a carbonyl group at position 2,4,**Thiazolinones** or 5 Because of its diverse biological actions, thiazolinone is a powerfulheterocyclic ring. Thiazolinones are a type of heterocyclic molecule that has anti- inflammatory, antiproliferative, antiviral, and antibacterial properties. Because of their medicinal and pharmacological qualities, thiazolinone synthesis is an important part of synthetic pharmaceutical chemist



- **Thiazolidinone**

Due to its diverse biological actions, thiazolidinone is an extremely powerful heterocyclic ring. This nucleus is constantly being investigated in order to develop and manufacture new chemicals. Thiazolidinone is the oxo derivative of thiazozolidine, which is a tetrahydro derivative of thiazole. On the 2, 3, and 5-positions, a significant variety of replacements are available, resulting in changes in compound characteristics. New derivatives can also be created by changing the substituents bonded to the nitrogen and methylene carbon atoms. The carbonyl group in 4-thiazolidinone is extremely reactive. This scaffold hasanti-diabetic, anti-cancer, anti-arthritic, anti-inflammatory, anti-microbial, and anti-melanoma properties, among others. There are currently a variety of medications on the market that contain the thiazolidinone ring, such as rosiglitazone, pioglitazone, lobeglitazone, and troglitazone.



1,3-thiazolidin-4-one

- **GREEN CHEMISTRY** :-

Green chemistry is frequently discussed in relation to new technology. Green Chemistry, on the other hand, is not reliant on ionic liquids, microwave chemistry, supercritical fluids, biotransformation, fluid phase chemistry, or anyother new technology. Green chemistry is not defined by the techniques utilised, but rather by the goal and outcome of technological application.

Green Chemistry is neither a new sort of chemistry, nor is it an environmental movement, nor is it a condemnation of industry, new technology, or "what we already do. Green Chemistry is just a new environmental priority when carrying out existing science...regardless of the scientific discipline or methodology employed. Green chemistry is a concept based on efficiency and environmental stewardship.

Green Chemistry insists on achieving our synthetic goals while taking into account additional factors such as the needless environmental impact of operations. When utilizing a harmful reagent, see if a less toxic reagent can provide the same results. A literature search may reveal that there is no current alternative with comparable efficiency and lower toxicity, but many people are unaware that simply asking about toxicity reduction signals a new priority and intent, a higher level of awareness and environmental stewardship, and is Green Chemistry! There may be a safer reagent available in some circumstance

3. AIM:

New method development for synthesis of 2,3-Diphenyl 4-Thiazolidinone

OBJECTIVES:

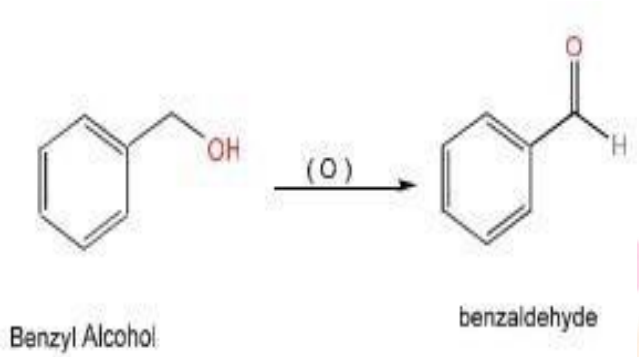
This project is concerned with the development of new compounds by novel method and which has better efficacy, lesser side effects and well tolerability. Therefore we have planned to synthesize 2,3-Diphenyl 4-Thiazolidinone and its derivatives.

2,3-diphenyl 4-Thiazolidinone derivatives have continued to attract a widespread interest for a long time due to their diverse pharmacological activities. Therefore, this investigation focus to develop high selectivity towards the new entities and an alternate option.

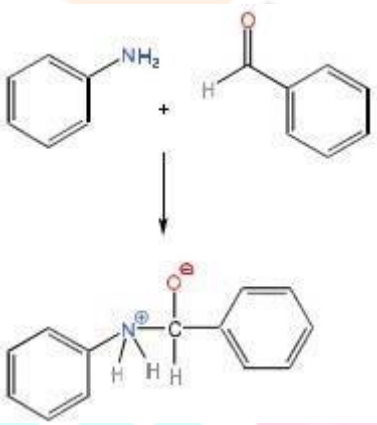
Experimental work

- **Plausible mechanism for synthesis of 2,3 Diphenyl 4- Thiazolidinone**

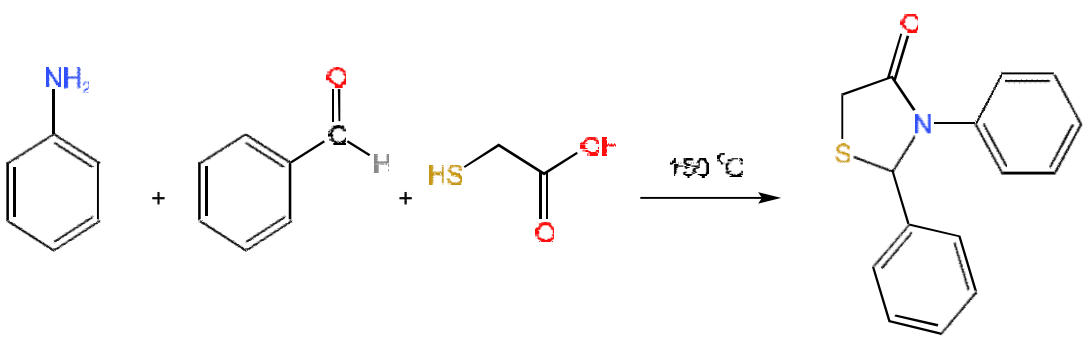
1. Oxidation of Benzyl Alcohol to Benzaldehyde



2. **Condensation and cyclisation**



- Substrate study



Result And Discussion :-

In recent years, one of the key goals of research has been to develop a new cost-effective, environmentally friendly method. Many studies employed a catalyst or solvent for the synthesis of compounds that are toxic to the environment, and catalysts are expensive, thus method development is more expensive and not environmentally friendly. As a result, our goal is to create a new technique for synthesizing 2,3- diphenyl-4-thiazolidinone that does notrequire the use of a solvent or a catalyst. We invented a new method by employing a new reactant. In previous literature, aldehyde, aniline, and thioglycolic acid were used as reactants. However, we used benzyl alcohol, aniline, and thioglycolic acid as reactants and completed the transformation without requiringany solvent or catalyst. this method overcome all the limitations of previous method.

Conclusion

We have successfully prepared and characterized 2,3 Diphenyl 4- thiazolidinone and its derivatives by novel method using conventional heating without use of solvents and catalyst, which are considered as biologically and pharmacologically active compounds. The significant merits of this method is effective, clean, safer chemical design, non- toxic, prevention of waste, mild conditions, avoid hazardous chemical solvents, metallic catalyst, short reaction time with high product yield (93-98%) are some advantages of the presented in environmentally friendly one pot multicomponent reaction of heterocyclic compounds.

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