IJMPR 2022, 6(8), 34-38

International Journal of Modern Pharmaceutical Research

www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Review Article

SJIF Impact Factor: 5.273

REVIEW ON MULTICOMPONENT SYNTHESIS OF TRIAZINE AND THIAZOLIDINONE ANALOGOUS AND EVALUATION OF THEIR BIOLOGICAL APPLICATION

Ennus K. Pathan[1] and Ravindra S. Shinde*[1]

[1]Department of Chemistry and Industrial, Dayanand Science College, Latur–413 512 (MS), India.

Received on: 04/07/2022
Revised on: 24/07/2022
Accepted on: 14/08/2022

***Corresponding Author**
Ravindra S. Shinde
Department of Chemistry and Industrial, Dayanand Science College, Latur–413 512 (MS), India.

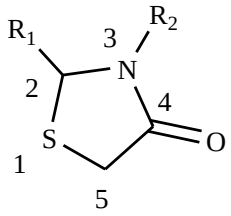
ABSTRACT

Recently, novel heterocyclic analogous are observed from the series of S-triazine and thiazolidinone. Herein, we studied and investigated the synthesis and their pharmacological activity. S-triazine ring moiety with thiazolidinone express their visual spectrum of biological and pharmaceutical apllications. S-triazine and thiazolidinone derivatives has important heterocyclic compounds, which played crucial role in drug designing and it uses for applying in biological and physiological properties of the molecule having their wide diversity.

KEYWORDS: S-triazine, thiazolidinone. Biological activity, Multicomponent, therapeutic agents.

INTRODUCTION

As concern of drug importance, the principal objectives of medicinal and pharmaceutical chemistry is plane to make more efficient in synthesis and manufacturing drug targets possessing worth as human therapeutic agents. The drug targets containing heterocyclic nucleus are play significant role to get special evolution to belong in a class of medicinal chemistry. For example, heterocyclic five-membered ring containing three carbon atoms, one sulfur atom and one nitrogen atom recognized as thiazides. Thiazides are more feasible in drug designing because ring contains different heteroatoms and they have scope in various areas of medicinal and pharmaceutical chemistry. Thiazolidinone moiety, acts as a multifunctional center and enhancing a variety of biological activities. Thiazolidinone has been measured as a supernatural moiety and it is roughly applicative in all types of biological and pharmaceuticals activities assay. The 4-carbonyl derivatives of thiazolidine are known as 4-thiazolidinones and it is cyclic amide bond.



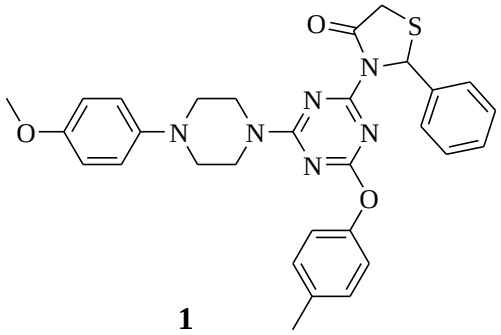
Interestingly, in pathogenic microorganism for reducing the rapid multidrug-resistance, we require to resolve and need of potent drugs, they acts through a new mechanism of action. Multidrug Resistant (MDR) Strain, a rapid growth of pathogens causing a severe infection and it resist towards presently available standard drugs, affection of the frightening threat by rising strict opportunistic microbial infections in the past decades. In visualization of the above trouble, existing situation highlights the urgent need to develop fresh agents with precise activity for improvement of potency to maintain a pool of novel bioactive entities. For the synthesis of unique compound likely to be unchanged by existing resistance mechanism is an area of enormous effect for medicinal chemists. The s-triazine core has a huge scope through verious resource of biological activities such as antifungal**,** antimalarial**,** antibacterial, antiprotozoal, anticancer[1], antimychobacterial[2], and antiviral.[3] In addition to these s-triazine derivatives, thiazolidinone bearing s-triazine analogues are focused as potential bioactive molecules.[4] Moreover, in report thiazolidin-4-one derivatives are having important biological activities such as anti-inflammatory[5], antituberculosis[6], anticancer[7], antitumor[8], anti-HIV[9], antibacterial[10], antifungal[11], antioxidant[12], antiviral[13], anticonvulsant[14], diuretics[15], nematicidal[16], antihistaminic activity etc. This multifunctional variety in the biological activity has offered of many researchers to discover this framework to multiple potential against numerous activities. In the structure activity relationship (SAR) studies, the biological activity of these molecules distinguish with standard reference.

Literature Report

The desire of this review is to present the chemistry, various biological activities, potential, pitfalls of thiazolidinones and limitations. We gone through the literature survey.

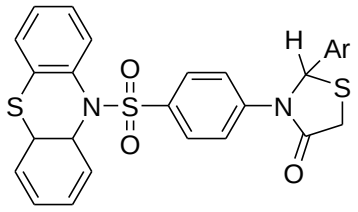
Patel et *al.*[17] was reported for the synthesis of various new class of compounds containing 2-(2-substituted

benzylidene hydrazinyl)-4-(4-methoxyphenyl) piperazin-1-yl)-6-(4-tolyl oxy)-1,3,5-triazine derivatives. The obtained compounds have been analyses by physical methods and spectral data (IR and NMR) and the resulting compounds were evaluated for antimicrobial activity.



1

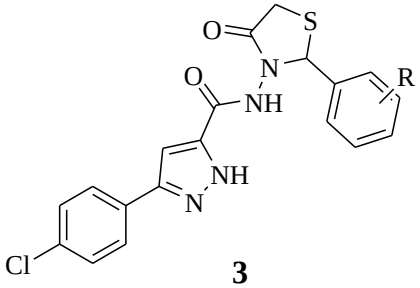
Hassan *et al.*[18] have synthesized a series. Condensation of 10-(*p*-substituted arylidenesulphanilyl) phenothiazines with substituted aromatic aldehydes. The reaction between of mercaptoacetic acid with schiff bases, to furnish 10-(p-thiazolidinonyl benzene sulphonyl) phenothiazines.



2

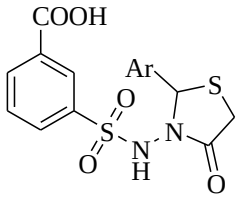
Where, Ar = -Ph, furfuryl, p-OCH_3–C_6H_4, etc.

Pathak and co-workers *et al.*[19] have synthesized substituted thiazolidin-4-one derivatives and evaluated for their biological activity. The majority of the synthesized compound possessed significant antimicrobial activity (0.35e1 mg/mL) against M. tuberculosis H37Rv.



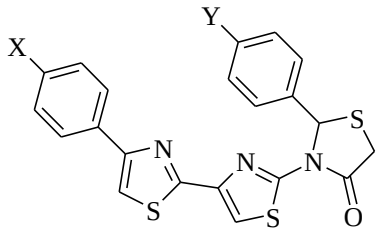
3

Baxi *et al.*[20] have previously studied synthesis of novel series of 3-(3'-carboxyphenyl sulphonamido)-2-aryl-5*H*-4-thiazolidinone by condensation pathway and were evaluated for their antimicrobial activity.



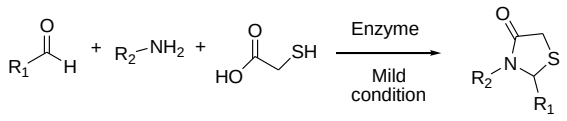
4

Bhagwat *et al.*[21] was reported the synthesis of thiazolidinone derivatives bearing 2,4-bithiazol moiety. There is bithiazol moiety containing thiazolidinone with different substituent which is a very applicative in pharmacological chemistry and this compound characterized by NMR, IR etc.



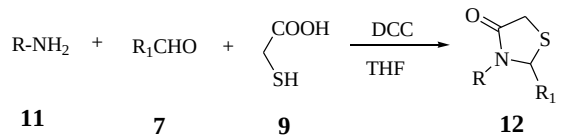
6

Zheng *et al.*[22] was synthesized a new enzymatic multicomponent synthesis of 4-thiazolidinones and it is bioenzymediated reaction, enzyme is catalyst. The trypsin from porcine pancreas shows good catalytic activity to support the reaction of amine, mercaptoacetic acid and aldehyde with excellent yields. The trypsin-catalyzed one pot manner technique provided a fresh approach to synthesize thiazolidinones and stretched the application of trypsin in organic heterocyclic production.



7 **8** **9** **10**

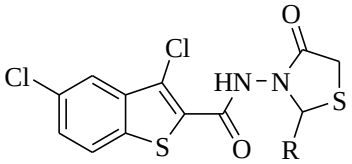
Srivastava et *al.*[23] accomplished and designed the synthesis of new 4-thiazolidinones by DCC mediated multicomponent reaction of aldehyde, amine and mercaptoacetic acid and it is one pot manner. The final products were calculated in quantitative yields and agreeable to increase rate of reaction. The yields of the thiazolidinones were not depending on the nature of the reactants. All reactants are very reactive and form a stable five membered thiazolidinones derivative.



11 **7** **9** **12**

Joshi *et al.*[24] was completed the synthesis of some 4-thiazolidinones bearing benzo[b] thiophene core which

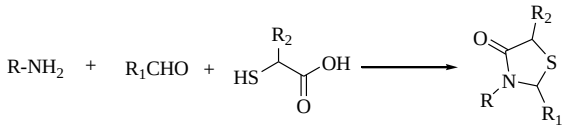
are having potential antimicrobial and antitubercular agents. Thiazolidinones ring attached with benzo-thiophene ring, the compound having two sulphur atoms and there is possibility to having multivalency conjugation in protiens.



13

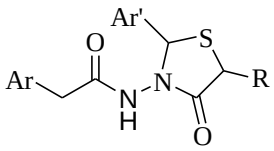
Where, R = 3-Br–C_6H_4, 3-Cl–C_6H_4, etc.

Dubreuil *et al.*[25] identified a novel series library of 4-thiazolidinones by a multi-component reaction under microwave heating technique. Reaction was performed under microwave conditions and it is little unique with others report.



11 **7** **14** **15**

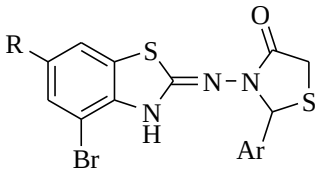
Srivastava *et al.*[26] was studied and reported a various 5-arylidene-2-aryl-3-(2-chloropheno thiazino acetamidyl)-1,3*(H)*-thiazolidin-4-ones as anticonvulsant and antifungal agents.



17

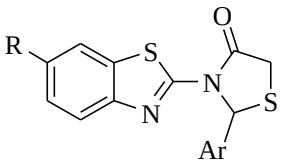
Where, Ar = 2-chloro-10,10a-dihydro-4aH-phenothiazine.
Ar' = 2-Cl–C_6H_4, 3-Cl–C_6H_4, etc. R = -H, -Cl, -Me, etc.

Bhagat and co-workers *et al.*[27] was synthesized a variety of thiazolidinone based benzothiazolyl moiety tested against *B. Subtilis*, *E. Cartovara* and E. *coli*. Herein, they report given target or compound was useful against bacterial infections.



16

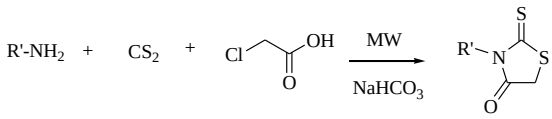
Pareek *et al.*[28] was reported the synthesis and bioevalution of 4-thiazolidinone derivatives inserting benzothiazole derivatives. Structure looking a planar, and it is useful in biological applications.



18

Where, R = -OCH_3, -F, -COOH
Ar = -C_6H_5, o-C_6H_4-OH, *p*-C_6H_4-OCH_3, *p*-C_6H_4Cl

Khot *et al.*[29] was reported the synthesis of thiazolidinone derivatives by reaction with different amines, carbon disulfide and chloro acetic acid in presence of $NaHCO_3$ with microwave assisted multicomponent reactions (140watts) in a scientific microwave oven. The resulting compound promoted with various aldehydes and hydrazides provide the 1,3,6-Triaryl-hexahydro-pyrazolo[3,4-d] thiazole-5-thione derivatives. All compounds were subjected to PASS for discovery of biological activity. The QSAR study of the all compounds was done. Some of the compound found to be most active as *insulin inhibitor and* Mcl-1 antagonist.



19 **20** **21** **22**

R' = -C_6H_5 NH_2, -C_6H_5 -CH_2-NH_2, 4-Cl- C_6H_5 NH_2, 2-Methyl-C_6H_5 NH_2, C_6H_5 NH- NH_2, 2,4-Dinitrophenyl hydrazine, 2-amino-5-chlorobenzoacetophenone.

CONCLUSION

In this review, we focus on the recent trends and literature reports in the area of functionalized triazine thiazolidinone derivatives synthetically. And these analogoues are made for works against cell proliferation. We discuss a different review article and it covers the synthesis of aryl morpholino methylamino, triamino substituted triazines, antimitotic agents coupled triazines etc. Many substituted triazine derivatives, both uncondensed and hetero-fused have shown numerously in antitumor activities. We have already discuss various derivative of 1,3,5-triazine coré with thiazolidinone targeting different way with an aim to help researchers for developing new 1,3,5-triazine derived compound for antitumor activity.

ACKNOWLEDGEMENTS

The author is thankful to the Principal, Head Department of Chemistry, Dayanand Science College Latur for his encouragement and providing research Facility.

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