# Synthesis and Antifungal Screening of Thiazolidin-4-One Derivatives

**S.E.BHANDARKAR[1], S.V.KATHALE[2], B.P.KOBRAGADE[3]**

[1]Associate Professor,Department of Chemistry,G.V.I.S.H.,Amravati- 444604,(M.S) India,
[2] Research Student,Department of Chemistry,G.V.I.S.H.,Amravati- 444604,(M.S.) India
[3] Research Student,Department of Chemistry,YCCE, Nagpur, (M.S.) India
Corresponding author: subodhvmv@gmail.com

## Abstract

*Thiazolidin-4-one derivatives have been the recent target of numerous methodologies, mostly due to their prevalence as scaffolds in synthesis of bioactive compounds and reactions in different media. Thiazolidin-4-one derivatives are an important class of five membered heterocyclic compounds, are widely found as the core structure in a large variety of compounds that possess important agrochemical and pharmaceutical activities. N-[substituted-naphthalen-2-ylmethylidene]substituted-naphthalen-1-amine were synthesised by refluxing an equimolar mixture of substituted naphthalen-1-amine and substituted naphthalene-carbaldehyde in methanol containing acetic acid which were then treated with mercaptoacetic acid to obtained 3-(substituted-naphthalen-1-yl)-2-(substituted-naphthalen-2-yl)-1,3-thiazolidin-4-ones. The easy work-up of the products under mild conditions with rapid reaction are noTable feature of the synthesis of Thiazolidin-4-one derivatives. The structures of the synthesized compounds were elucidated by IR, 1H NMR spectral analysis. The antifungal studies of the synthesized compounds have shown promising activities towards the fungal strains viz., A niger and A. sereus.*

**Keywords:** Thiazolidin-4-one derivatives, antifungal study, A niger and A. sereus.

## Introduction:

Thiazolidinones, which belong to an important group of heterocyclic compounds have been extensively explored for their application in the field of medicine. Thiazolidinone ring occurs in nature[1]. The nucleus of 4-Thiazolidinones is flexible structure which allow to introduce an structural moiety in it, to form valuable derivative. The indroduction of arylidene nuclei at position 5 of the 4-thiazolidinone nucleus significantly improved the biological activity[2].One-Pot Synthesis of 5-arylidene-2-imino-4-thiazolidinones under Microwave Irradiation has also reported[3].

4-Thiazolidinones play a vital role due to their wide range of biological activities and industrial importance. 4-Thiazolidinones are always being an attraction point for researchers because of its efficiency towards various pharmacological usages.

The derivatives of 4-thiazolidinone nucleus have occupied a unique place in the field of medicinal chemistry due to wide range of biological activities like antibacterial[4-5], antitubercular[6-7], anticancer[8-9],

anticonvulsant[10-11], antifunga[12-13], antiinflammatory[14-15], antimicrobial[16-17] and anthelmintic activity[18]. Numerous reports have appeared in the literature, which highlight their chemistry and use.

**Experiemental:**

The melting points (ºC) were recorded by open capillary method and are uncorrected. IR spectra (υ max in cm-1) were recorded on a Shimadzu FTIR 8300 spectrophotometer using KBr pellets. The 1H NMR spectra were recorded on aDRX-300 (300MHZ) instrument using $CDCl_3$ as solvent (chemical shift in δppm), and TMS as internal standard. Thin Layer Chromatography on silica gel-G, was used to check the purity of the compounds.

Table 1. Physical Data of Synthesized Compounds

| Sr. No. | Compound | R | $R_1$ | $R_2$ | Molecular formula | Melting Point $^0$C | % Yield | % Nitrogen | | R.F. Value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Found | Calculated | |
| 1 | 6 | H | H | H | C21H15N | 199$^0$C | 57% | -- | -- | -- |
| 2 | 7 | Cl | H | H | C21H14ClN | 189$^0$C | 59% | -- | -- | -- |
| 3 | 8 | H | Cl | H | C21H14ClN | 188$^0$C | 61% | -- | -- | -- |
| 4 | 9 | Cl | Cl | H | C21H13Cl2N | 214$^0$C | 62% | -- | -- | -- |
| 5 | 10 | H | H | Cl | C21H14ClN | 220$^0$C | 58% | -- | -- | -- |
| 6 | 11 | Cl | H | Cl | C21H13Cl2N | 181$^0$C | 55% | -- | -- | -- |
| 7 | 12 | H | Br | H | C21H14BrN | 175$^0$C | 59% | -- | -- | -- |
| 8 | 13 | Cl | Br | H | C21H13BrClN | 99$^0$C | 63% | -- | -- | -- |
| 9 | 14 | H | H | Br | C21H14BrN | 186$^0$C | 56% | -- | -- | -- |
| 10 | 15 | Cl | H | Br | C21H13BrClN | 103$^0$C | 58% | -- | -- | -- |
| 11 | 16 | H | H | H | C23H17NOS | 178$^0$C | 42% | 3.90 | 3.94 | 54 |
| 12 | 17 | Cl | H | H | C23H16ClNOS | 173$^0$C | 46% | 3.57 | 3.59 | 56 |
| 13 | 18 | H | Cl | H | C23H16ClNOS | 128$^0$C | 49% | 3.58 | 3.59 | 58 |
| 14 | 19 | Cl | Cl | H | C23H15Cl2NOS | 183$^0$C | 48% | 3.27 | 3.30 | 53 |
| 15 | 20 | H | H | Cl | C23H16ClNOS | 123$^0$C | 46% | 3.53 | 3.59 | 63 |
| 16 | 21 | Cl | H | Cl | C23H15Cl2NOS | 208$^0$C | 43% | 3.29 | 3.30 | 61 |
| 17 | 22 | H | Br | H | C23H16BrNOS | 122$^0$C | 51% | 3.21 | 3.23 | 56 |
| 18 | 23 | Cl | Br | H | C23H15BrClNOS | 120$^0$C | 46% | 2.93 | 2.99 | 59 |
| 19 | 24 | H | H | Br | C23H16BrNOS | 128$^0$C | 48% | 3.18 | 3.23 | 57 |
| 20 | 25 | Cl | H | Br | C23H15BrClNOS | 145$^0$C | 45% | 2.94 | 2.99 | 58 |

**Spectral interpretation of (16 )**

**IR** ($\nu_{max}$) ($cm^{-1}$) : 3213 (C-S thiazolidin-4-one), 3213 (C-N thiazolidin-4-one), 1680 (C=O 3213 (C-N thiazolidin-4-one), 3033 (CH str in Ar)

**NMR** (δ ppm): 3.37 (s, 2H, -$CH_2$ of thiazolidin-4-one ), 5.93 (s, 2H, -CH of thiazolidin-4-one ), 6.53-7.63 (m, 14 Ar-H)

**Method and Discussion of result:**

**A. Preparation of N-[substituted-naphthalen-2-yl-methylidene]-substituted-naphthalen-1-amines:**

In a 500ml round bottom flask equipped with reflux condenser, the interactions of substituted-naphthalen-1-amines with substituted-naphthalene-carbaldehydes were dissolved in ethyl alcohol in excess solvent. Reflux for 3h. to synthesize substituted azomethines. The reaction mixture were allowed to cool at room temperature. Solid separated by evaporation solvent. The products were recrystallised by using ethanol:ethyl acetate(1:1).

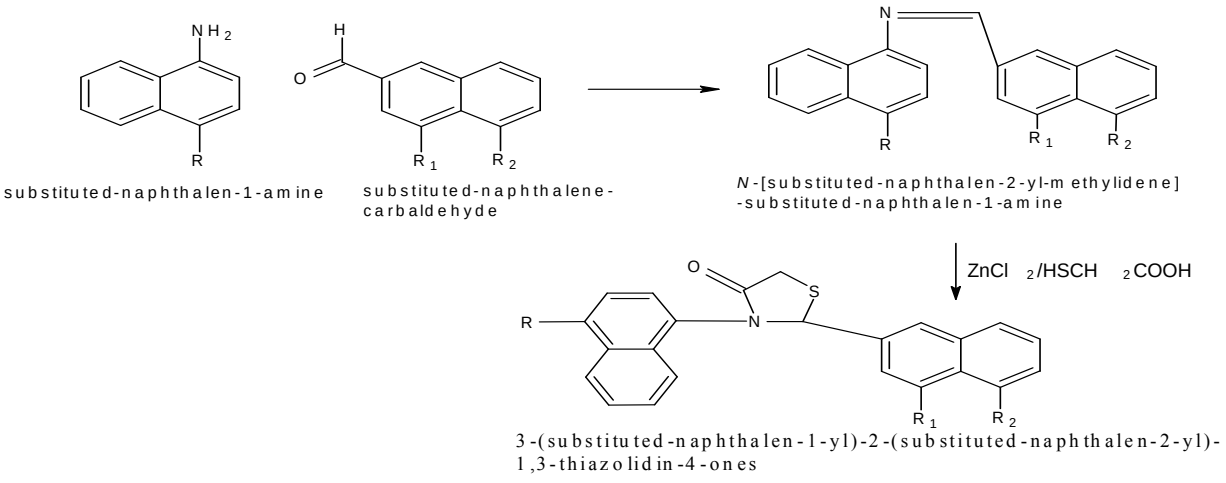
**B. Preparation of thiazolidin- 4 -one derivatives:**

N-[substituted-naphthalen-2 - yl - methylidene] - substituted - naphthalen - 1 - amines were heated with 2-mercaptopropionic acid in excess of benzene solvent. Reflux for 5 hours. The reaction mixture cooled at room temperature. Solid separated by evaporation of solvent. The products were recrystallised by ethanol:dioxane(1:1)

**Antifungal Studies :**

All above substituted pyrazolines have been studied for their antifungal activity against A niger and A. sereus. The culture of each species was incubated at $37^0$C and the zone of inhibition was measured after 24 hr. Most of these compounds were found active.

**SCHEME**




**Acknowledgment :**

The Author are thankful to Dr.A.R.Raut, Head , Department of Chemistry and Directror, G.V.I.S.H. Amravati for providing necessary lab facility

**References:**

[1]. S.P.Shrivastava et al., E-Journal of Chemistry 2012, 9(2).

[2]. P. Mishra et al.; Indian J. pharm.scie, 2007, 69 (5), 665-668.

[3]. SouadKasmi-Mir, AyadaDjafri et al., Molecules 2006, 11, 597-602.

[4]. Archana A Sawale1, Ratnmala S Bendre and Pradip R Patil., RJPBCS., July-September 2012,Vol.3(3), 414-420.

[5]. Ahmed N. Ayyash, , Hamed J. Jaffer, Jumbad H. Tomma., American Journal of Organic Chemistry 2014, 4(2), 52-62.

[6]. Samia Bouzroura, Yamina Bentarzi, Rachedine Kaoua, Bellara Nedjar-Kolli, Sophie Poulain-Martini and Elisabet Dunach., Org. Commun. (2010) ,3:1, 8-14.

[7]. Beena Thomas, Anju LS and Jyoti Harindran., IJRPC 2014, 4(2), 351-359.

[8]. Chandra Kant Belwal, Kaushik A. Joshi., Am. J. PharmTech Res. 2012; 2(5),740-749.

[9]. Sushma Kadoor et al., Der Pharma Chemica, 2014, 6 (5), 265-271.

[10]. Pramilla Sah and Chandra Prakash Gharu., JCPR 2012, 9 (1), 44-48.

[11]. Nidhi Patel et al., RJC, 2011, 4(4), 790-794.

[12]. A. G¨Ursoy, N. Terzioglu., Turk J Chem. 2005, 29, 247 - 254.

[13]. Sugumaran Murugesan et al., JPBMS, 2012, 16 (13), 1-5.

[14]. Ludmyla Mosula, Borys Zimenkovsky et al., Farmacia, 2009, 57(3), 321-330.

[15]. A. Colombo et al., Tetrahedron Letters 2008, 49, 1569–1572.

[16]. Haider Behbehani and Hamada Mohamed Ibrahim., Molecule 2012, 17, 6362-6385.

[17]. Jain, A. K.; et al., Bioorg. Med. Chem., (2012).

[18]. Sushma Kadoor et al., Der Pharma Chemica, 2014, 6 (5), 265-271.