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Synthesis and Antimicrobial Activity of Thiazolidinones Derivatives

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ABSTRACT

A new synthesis of Schiff base 3a-e was prepared from naphthalene 1 amine. All the naphthalene 1 amine Schiff base were refluxed with thioacetic acid in presence of anhydrous zinc chloride and solvent N,N, dimethyl formamide to form Thiazolidinones 4a-e. All synthesized Thiazolidinones were screening their antimicrobial activity.

Keywards: Benzaldehyde, thioacetic acid, ZnCl2, Antimicrobial Activity.

I. INTRODUCTION

In heterocyclic chemistry hetero atom possess interesting pharmacological properties but Thiazolidinones are possess good biological activities [1-2]. antibacterial [3-5], anticancer [6-7], antitubercular [8-11], antifungal [12], anti-inflammatory [13], antiviral [14,15], and analgesic [16,17]. Due to this vital role it was thought to synthesize 4-thiazolidinone derivatives and study for their antimicrobial activities.

II. EXPERIMENTAL

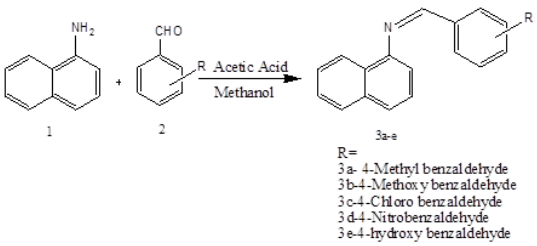
Material and methods

All the chemicals used in present study are of analytical grade purchased from Himedia Chemical Co. All the reactions monitored by thin layer chromatography (TLC) on 0.2 mm silica gel-C plates using iodine vapors for detection. Infrared spectra were recorded in nujol or as potassium bromide pellets on infrared spectrophotometer. 1H NMR spectra were obtained on Brukner advance spectrophotometer 400. MHz mass spectra were recorded on FT-VC-7070 H Mass spectrometer using the EI technique at 70 eV. Melting points of synthesized compounds were determined by a Kofler micro melting point apparatus and were uncorrected. All the reactions were carried out under ambient atmosphere. Elemental analysis was performed on a Heraeus CHN-O rapid analyzer.

General Procedure

Substituted Naphthalene 1 amine Schiff bases (3a-e)
A mixture of Naptahlene 1-amine (1) (0.005mol) and 4-methyl benzaldehyde, 4-methoxy benzaldehyde, 4-chloro benzaldehyde, 4-nitro benzaldehyde and 4-hydroxy benzaldehyde (0.005mol) in 10 ml methanol was refluxed independently on water bath for 3-4 hrs. The reaction mixture was allowed to cool and separated solid was filtered, washed with water dried and recrystallized from ethanol to give products 3a-e. **(Tabel-1)**

Substituted 2-phenylthiazolidin-4-one(4a-e)
A mixture of 3a-e, (0.01 Mol) was refluxed with thioacetic acid (0.01mol) in 10 ml of N,N-dimethyl formamide in presence of anhydrous zinc chloride were refluxed for 5-6 hrs. After complete heating reaction mixture was cooled, which was then poured in ice water, the solid obtained, filtered, dried and recrystallized from ethanol to give fine solid products 4a-e. (Table 1)



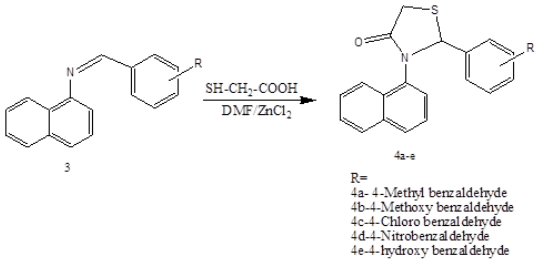


Table 1. Physical data of compounds (3a-e)

Sr.No	Compounds	M.P(^{0}C)	Yield
1.	3a	72	73
2.	3b	86	78
3.	3c	106	84
4.	3d	166	64
5.	3e	156	88
6.	4a	190	68
7.	4b	184	80
8.	4c	165	75
9.	4d	180	73
10	4e	196	85

III. RESULT AND DISCUSSION

The compound naphthalene 1 amine were condensed with 4-methyl benzaldehyde, 4-methoxy benzaldehyde, 4-chloro benzaldehyde, 4-nitro benzaldehyde and 4-hydroxy benzaldehyde to afforded Schiff bases 3a-e.

The structure were 3,3a-e,4a-e were supported by their spectral data. The IR KBr spectra showed the presence of absorption band in the region 1495-1525 cm^{-1} due to –CH=N- stretch. Mass spectra of these products exhibit molecular ion peaks at M^{+2} and M^{+} which corresponds to their molecular weight.^{1}H NMR (DMSO-d6) spectra of these compounds revealed signals in the region δ 7.1-7.8 (m, due to Ar-H), and 8.1-8.4 (s, due to N=CH). All the newly synthesized compounds gave satisfactory C,H and N analysis and spectral data.

The IR in KBr showed absence of absorption in the region 1495-1525 cm^{-1} due to –CH=N-and presence of absorption band in the range 1725-1730cm^{-1} due to C=O of thiazolidinone. ^{1}H NMR (DMSO-d6) signals appeared at δ 3.1-3.9 ppm due to $–CH_2$- of 4-thiazolidinone.

Antimicrobial Activity:

All the tested compounds were found their antimicrobial activity using disc diffusion technique against *S.aureus, B.substilis*, *S. Typhi*, *E.Coli*. These compounds were dissolved in dimethyl sulphoxide. Incubation period for bacteria was 24 hours. The newly synthesized compounds shows zone of inhibition 7-18 mm in diameter where as standard streptomycin exhibit zone of inhibition 18-22 mm in diameter against *S.aureus, B.substilis*, *S. Typhi* and *E.Coli.* Compounds 4b, 4c, 4d were found moderate to best active against *S.aureus, B.substilis*, *S. Typhi and E.Coli* respectively.

Compounds	Zone of inhibition in mm			
	S.aureus	***B.substilis***	***S. Typhi***	***E.Coli***
4a	12	14	10	06
4b	10	09	07	09
4c	18	15	12	11
4d	18	13	11	13
4e	12	07	09	10
Positive control	22	20	18	18

IV. ACKNOWLEDGMENT

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