Synthesis characterization and antimicrobial activity of 2, 3-Dichloro-benzylidene)-(1-phenyl-ethyl)-amine

Mohamed Ameen. KK and M. Syed ali Padusha*

PG and Research Department of Chemistry, Jamal Mohamed College (Autonomous), Affiliated to Bharathidasan University, Tiruchirappalli-620 020

***Corresponding Author:**
Dr. M. Syed Ali Padusha

e-mail:
masan_j20@yahoo.com

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Abstract:

Azomethine group of compounds have a great attention in organic synthesis and biological applications such as antitubercular, anticancer, CNS depressant, antimicrobial activity, anti-inflammatory, anticonvulsant, antitumor, antihypertensive activity, anti-HIV activity, plant growth inhibitors, and insecticidal properties. These compounds are also known as anils, imines or Schiff bases. In the present work, an imine has been synthesized by reacting α-methyl benzyl amine and 2, 3-dichloro benzaldehyde. The compound was characterized by IR, ^{1}H & ^{13}C –NMR and mass spectral studies. Further the compound was screened for antimicrobial activity against *S. aureus, E. coli* and *A.niger.* The result of the investigation showed that the compound possessed good antimicrobial activity.

1. Introduction

Schiff bases are the condensation product of an aldehyde/ketone with primary amine which is otherwise known as azomethines or imines. They are an intermediate in the biologically important trans amination, racemication reactions and amino protective groups in organic synthesis. They were used as protective agent in natural rubber. Imines have attracted great attention owing to its simple synthetic procedure, diverse biological activity and applications. 2N-salicylidene-5-(*p*-nitro phenyl)-1,3,4-thiadiazole was prepared by reacting 4-nitrobenzoic acid and thio semicarbazide in the presence of phosphorous oxy chloride and its antibacterial activity was reported by Emad yousif et.al. Hina zafar et. al, have reported the synthesis of macrocyclic Schiff base by reacting 1, 2-diphenyl ethane-1,2-dione dihydrazone and dimethyl/ diethyloxalate. They also investigated the antimicrobial and anticancer activities of the compounds. In the present work, an imine has been

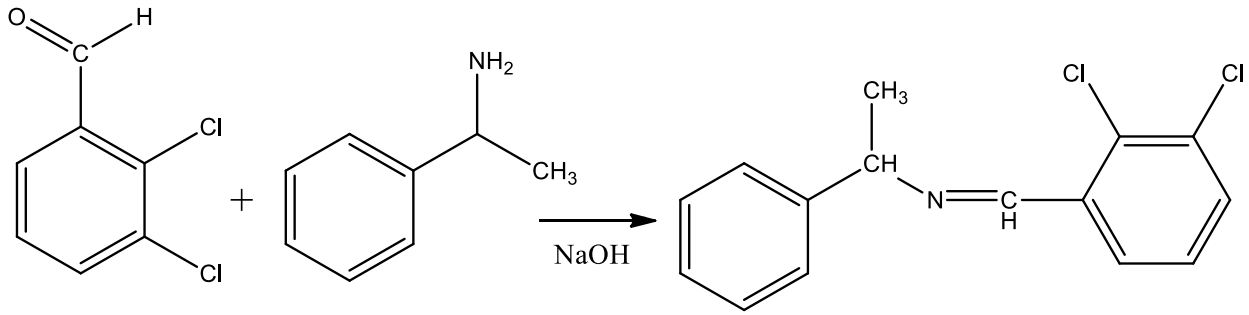
synthesized by reacting methyl benzyl amine and 2, 3-dichlorobenzaldehyde.

2. Materials and methods

All the chemicals were purchased from Alfa aesar and used without further purification unless otherwise noted. Melting points were measured in open capillary on Mel-Temp apparatus and are uncorrected. IR spectra were recorded on Perkin Elmer spectrometer using KBr pellets.^{1}H and ^{13}C NMR spectra were recorded on a Bruker AM-400 spectrometer for solution in DMSO-d_6 with tetra methyl silane (TMS) as an internal standard. All the chemical shifts values were recorded as δ ppm.

Synthesis of (2,3-Dichloro-benzylidene)-(1-phenyl-ethyl)-amine.

To the ethanolic solution of 2,3 dichloro benzaldehyde (17.5 µl, 0.1 M) α-methyl benzylamine (12.1 µl, 0.1 M) was added. The reaction mixture was taken in a RB flask and kept over a magnetic stirrer and stirred for 6 hours. The solid separated out was washed, filtered, and dried over vacuum and recrystallized using absolute ethanol.



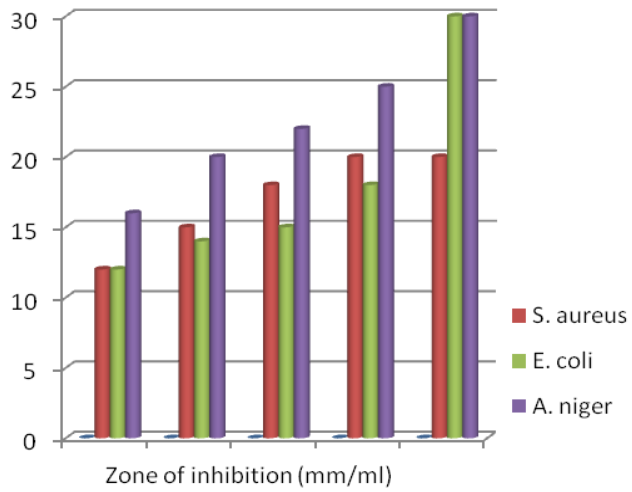
3. Results and Discussion

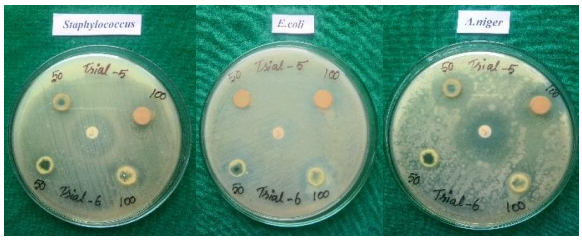
(2, 3-Dichloro-benzylidene)-(1-phenyl-ethyl)-amine: IR:cm^{-1} 3156 (Ar C-H), 1600 (C=N), 817 (C-Cl);^{1}H NMR: δ 1.47 (3H), 6.25 (1H), 7.24 (1H), 7.32-7.51 (6H), 6.35 (1H); ^{13}C-NMR: δ 159 (-CH=N), 140 (C-Cl), 125- 132 (Ar-C), 66 (-CH); Mass m/z: 277.04; MP: 171 ^{0}C.

Antimicrobial activity

Antimicrobial screen was carried out employing agar dilution method against *Staphylococcus aureus*, *E.coli* and *A.niger* using oflaxacin and amphotericin-B as standard drug. Microbial strains were maintained on Nutrient agar slants (Hi media) at 4˚C. Bacterial cultures were sub cultured in liquid medium (Nutrient broth) at 37˚C for 8 hours and further used for the test (10^{5}-10^{6}CFU /ml). These suspensions were prepared immediately before the test was carried out. The nutrient broth was prepared by the same composition without agar. After adding all the ingredients into the distilled water it is boiled to dissolve the medium completely and sterilized by autoclaving at 15 lb psi pressure (121˚C) for 15 minutes. The nutrient broth were prepared, then identified pathogens were inoculated into the broth culture were used for antimicrobial activity. The results of zone of inhibition were given in the figure and table.

Micro Organisms	Zone of inhibition (mm/ml)				
	25 µl	**50** µl	**75** µl	**100** µl	Control
S. aureus	12	15	18	20	20
E. coli	12	14	15	18	30
A. niger	16	20	22	25	30





4. Conclusion

A new azomethine compound was synthesized by reacting α-methyl benzyl amine and 2, 3-dichlorobenzaldehyde. The compound was characterized by IR, ^{1}H & ^{13}C –NMR and mass spectral studies. The synthesized compound was screened for antimicrobial activity. The compound exhibited excellent activity against *S. aureus*, higher activity against *A. niger* and considerable activity against *E. coli* when compared to the standard drug employed. Results of the antimicrobial screening revealed that the compound was potent against gram positive bacteria and moderate against fungi pathogen but less active against gram negative bacteria. Antibacterial activity of the compound is found to be higher than the anti fungal activity.

5. References

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