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# PREPARATION,CHARACTERIZATION AND MICROBIAL ACTIVITIES OF AZOMETHINE COMPOUND DERIVED FROM SULPHA DRUG

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## *ABSTRACT*

*Azomethine compounds (Schiff's bases) are one of the important classes of the ligands, which are obtained by the condensation of primary amine and more efficient carbonyl compounds. The Schiff's bases are widely considered because they show excellent biological activities such as antimicrobial, antitumor, antibacterial, and anti-fungal properties. The present studies deal with synthesis of azomethine compound derived from 2-hydroxy-2-methylpropiophenone and sulphamethizole sulpha drug. The synthesized complexes were characterized by physical and spectral analysis. They were also tested in vitro biological activities.*

Keywords: Schiff base, 2-Hydroxy-2-methylpropiophenone, Sulphamethizole, and Antimicrobial activity.

## INTRODUCTION

Schiff bases with the azomethine (-RC=N-) are often created when a primary amine condenses with an energetic carbonyl molecule. Huggo Schiff, a German scientist and Nobel Prize laureate, invented this substance initially. They may adjust the ligation features by changing their denticity and basicity[1-2], and they are stable. Since the middle of the nineteenth century, and even before the report of the universal production of the Schiff base ligands, metal Schiff base complexes have been recognized. A thorough review and comparison of the existing literature on these kinds of compounds is necessary after extensive study on the physicochemical characteristics and molecular structure of complexes containing Schiff bases has produced some intriguing new findings. Since Schiff bases have the ability to form stable complexes with metal ions, they are crucial for the creation of Schiff base complexes in the field of coordination chemistry[3]. Schiff bases, which

are employed in organic synthesis, chemical catalytic activity, medical science, the pharmaceutical industry, scientific research, and emerging technologies, have attracted interest in metal complexes. In many different domains, including analytical, biological, and inorganic chemistry, Schiff bases are among the most frequently utilized classes of organic molecules. The most often used class of organic molecules are Schiff bases, which have a wide range of uses in areas including analytical, biological, and inorganic chemistry.

Due to a wide range of biological activities including anti-inflammatory[4] analgesic[5] antimicrobial[6],anticonvulsant[7], antitubercular[8], anticancer[9], antioxidant[10-11] and so forth, Schiff bases have grown in importance in the medical and pharmaceutical fields. Azomethines nitrogen atom may participate in the creation of a hydrogen bond with the active centers of cell components, which would disrupt typical cell functions .Thiosemicarbazones transition metal complexes' broad spectrum of pharmacological action, which offers a wide range of molecules with various activities, led to the chemistry of these compounds being particularly alluring. Besides these, they also bear strong catalytic activity in various chemical reactions in chemistry and surfactant activities and as memory storage devices in electronics[12].

In this study, we have concentrated on the synthesis of new Schiff's bases ligand by the condensation of 2-hydroxy-2-methylpropiophenone and sulphamethizole sulpha drug. The prepared azomethine characterized by elemental analysis, IR, spectral studies. The *in vitro* activities of the compound was tested against bacterial strains (*Bacillus subtilis* and *Escherichia Coli)* and fungus strains (*Aspergillus niger*, *Penicillum chrysogenum)* by well-diffusion method. The minimum inhibitory concentration (MIC)were also calculated.

**Experimental**

**Synthesis of 2-hydroxy-2-methyl propiophenone sulphamethizole (HMPSMO)**

All chemicals were analytical grade and of the highest available purity, and used without further purification. 2-Hydroxy-2-methylpropiophenone and sulphamethizole were obtained from Sigma- Aldrich. To synthesize 2-hydroxy-2-methylpropiophenonesulphamethizole (HMPSMO), 0.1 M solution of 2-hydroxy-2-methylpropiophenone was dissolved in 15 ml

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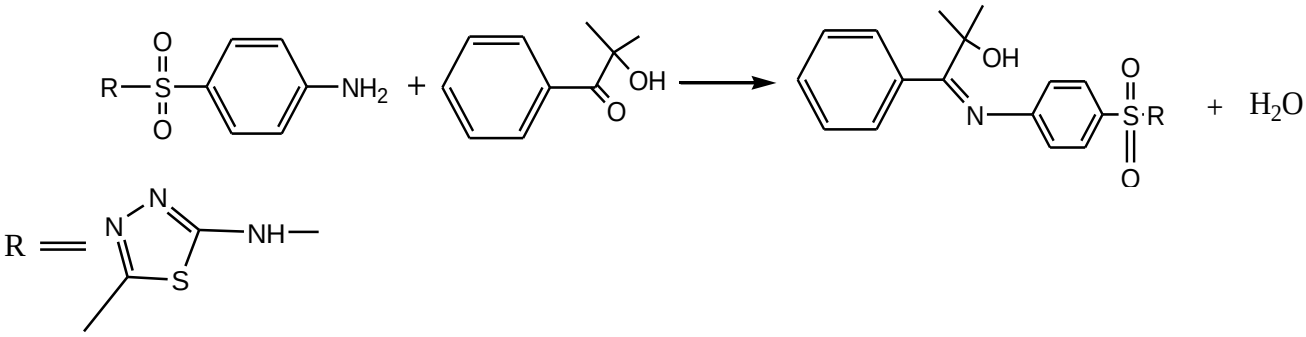
absolute methanol in a round bottle flask. Sulphamethizole was dissolved in 15 ml absolute methanol, and the solution was added to the solution containing the 2-hydroxy-2-methylpropiophenone. The reaction mixture was refluxed about five hour at 60°C. The product thus obtained was purified by washing with distilled water and then with ethanol. The yellow solid crystals were obtained after recrystallization in ethanol. Melting point and yield were found 190°C and 75 % respectively.




**Preparation of sulpha drug based azomethine compounds**

**Elemental analysis**

Elemental analysis of HMPSMO was carried out using micro analytical technique on C, H, N, S elemental analyzer. Analytical data were found (Cal.): M. Wt.; 416.47 (416.51), C; 54.77 (54.79), H; 4.89 (4.84), N; 13.48 (13.45), and S; 15.42 (15.39).

**IR studies:-**

The infrared spectra of HMPSMO azomethine were scanned in the range 4000-667 cm-1 using FT-IR spectrometer (Model 8400S, Schimadzu) in KBr pallets. The data's are shown as; FTIR spectrum (KBr, $cm^{-1}$): 3122 ν (C–H), 1588 ν (C=C), 1630 ν (C=N), 434 ν (N–M), 1332 ν ( $_{asy}$ ($SO_2$), 1140 ν ( $_{sy}$ ($SO_2$), 3410 ν ν(OH), 1460 ν (C-O), 3360 ν (-NH), It is confirmed that the azomethine group formation in prepared compound on the basis of IR spectra.

**Microbial studies:-**

By using the well diffusion method[13], the studied compound was examined for its in vitro antibacterial activity against gram positive and gram negative bacteria like Escherichia coli

and Bacillus subtilis, as well as fungi like Aspergillus niger and Penicillum chrysogenum. A minimal inhibitory concentration test was performed on the ligand, and the results are summarized in the table below. The ligand's inhibitory zones have been contrasted with those of two common antibiotics: ketokenazole, an antifungal, and ciprofloxin, an antibacterial.

The concentration of the test item gradually changed in the agar around each well. To allow the organisms to proliferate, the plates are then incubated in an incubator (37 °C) for 48 hours. By measuring the width of the zone of inhibition in terms of millimeters, the antibacterial activity of the test agents was ascertained. The tests were run more than three times, and the mean readings are kept as a record. The biological study data in the case of the antimicrobial assay discloses that azomethine showed higher antibacterial activity against gram positive bacteria than gram negative bacteria.

**Antibacterial evaluation of HMPSMO azomethine**

| Conc. of compound µg/ml | *Bacillus subtilis* | | | | *Escherichia coli* | | | | *Aspergillus Niger* | | | | *Penicillum Chrysogenum* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | IZ of S | IZ (MM) | AI | MIC | IZ of S | IZ | AI | MIC | IZ of S | IZ (mm) | AI | MIC | IZ of S | ZI (mm) | AI | MIC |
| 30 | 22 | NA | NA | 60 | 31 | NA | NA | 60 | 31 | 6 | .19 | 30 | 12 | NA | NA | 60 |
| 60 | | 4 | .18 | | | 3 | .09 | | | 13 | .41 | | | 4 | .33 | |
| 90 | | 7 | .31 | | | 5 | .16 | | | 18 | .58 | | | 7 | .58 | |
| | | | | | | | | | | | | | | | | |

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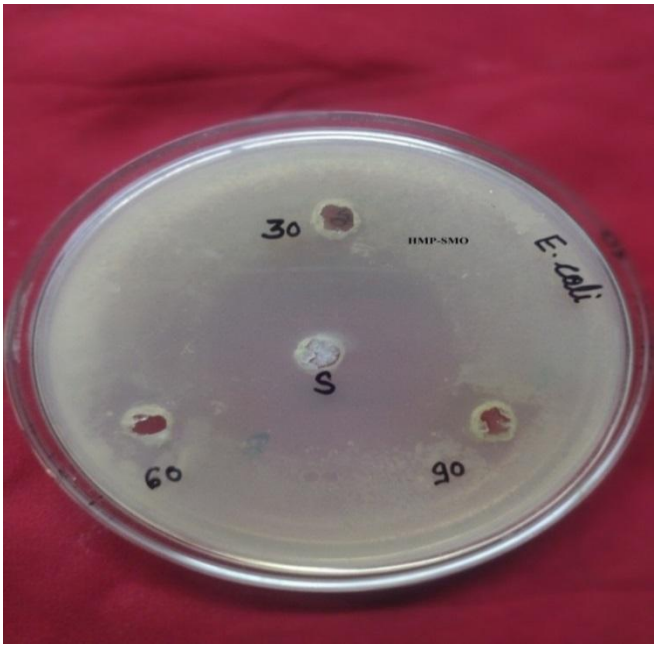
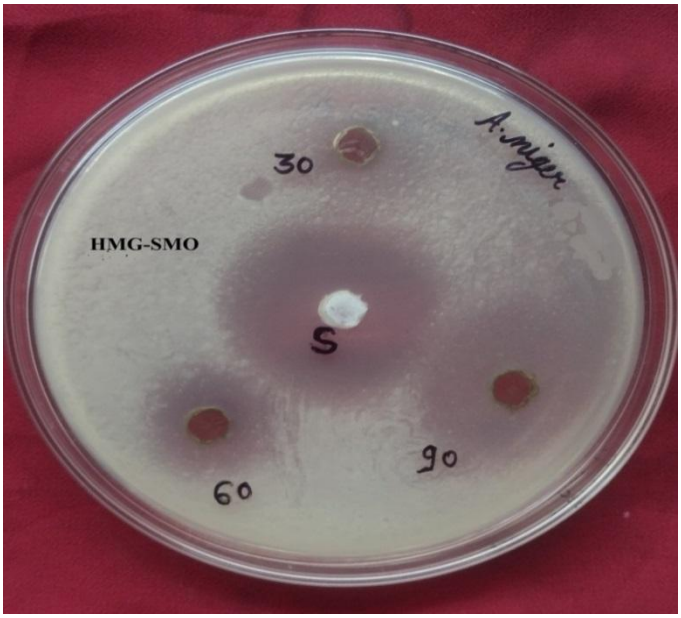
**IZ- Inhibition Zone (mm), AI- Activity Index, MIC- Minimum Inhibitory Concentration (mg/L), S- Standard antimicrobial**




**Antimicrobial screening effects of the HMPSMO azomethine against *Escherichia coli and Aspergillus niger***

## CONCLUSION:

This article highlights the role that Schiff bases played in the design and creation of innovative lead that may have biological activities and less negative side effects. Researchers' interest in obtaining the most definitive and suggestive access to numerous Schiff bases of therapeutic value from previous decades has been maintained by this bioactive core. The current study described the synthesis of an azomethine compound based on sulpha drug and its characterisation using various physical-chemical techniques. The compound that was reported showed encouraging antibacterial activity.

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