

Minor research project of Ms Jenice Jean Goveas entitled “Synthesis, Characterisation, Electrochemical and Biological studies of Some Schiff base complexes of quinoline-3-Carbaldehyde with transition metal ions”

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### **EXECUTIVE SUMMARY**

Hugo Schiff described the condensation between an aldehyde and an amine leading to a Schiff base in 1864. Schiff base ligands are able to coordinate metals through imine nitrogen and another group, usually linked to the aldehyde. Modern chemists still prepare Schiff bases, and nowadays active and well-designed Schiff base ligands are considered “privileged ligands”.

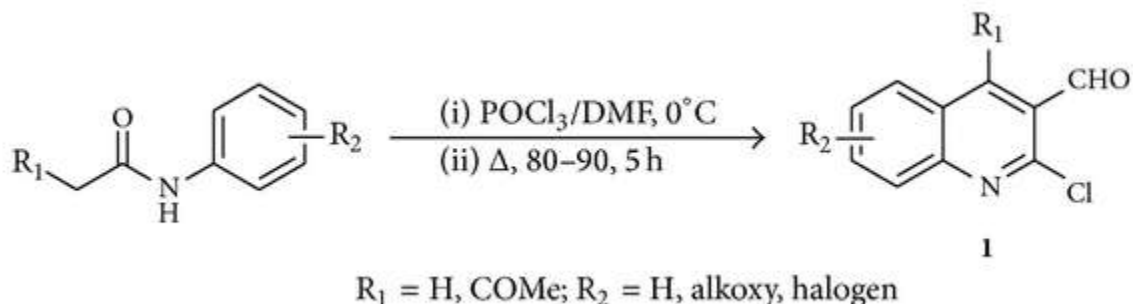
Schiff bases have often been used as chelating ligands in the field of coordination chemistry and their metal complexes are of great interest for many years. It is well known that N and S atoms play a key role in the coordination of metals at the active sites of numerous metalloproteins. Schiff base metal complexes have been widely studied because they have industrial, antifungal, antibacterial, anticancer and herbicidal applications. They serve as models for biologically important species and find applications in biomimetic catalytic reactions. Chelating ligands containing N, S and O donor atoms show broad biological activity and are of special interest because of the variety of ways in which they are bonded to metal ions.

The diversity of biological effects is possessed by benzofused six membered heterocyclic rings. These range from antimicrobial property, CNS and inflammation influencing agents. It can be inferred that ring system itself is primarily a molecular scaffold, upon which the characteristic pharmacophore for the various receptor is involved. Antimicrobial agents are widely used in the management of infectious disease but most of them have developed resistance to micro-organism. The cinchophen, which is water insoluble compound, has reported antimicrobial activity. To overcome this problem and to lower the side effects, many approaches can be utilized and Schiff base approach is one among them. Metal complexes such as cis-platin is used as an anticancer drug. 3-(2'-arylmercaptoethyl)-2-methyl-4-(3H)quinazolin-4-ones or 3-(2'-heterocyclicmercaptoethyl)-2-methyl-4(3H)-quinazolin-4 -ones have been known to have antimicrobial activity. The variety of possible Schiff base metal complexes with wide choice of ligands, and coordination environments, has prompted us to undertake research in this area which is very promising and beneficial .

In the present work schiff's bases were prepared using quinoline-3-Carbaldehyde followed by complexes of these ligands with transition metals like Co(II), Zn(II),Ni(II). The purity of the synthesized Schiff bases were established by spectral studies.

## EXPERIMENTAL PROCEDURE

### Quinoline-3-Carbaldehyde was prepared by the Vilsmeier-Haack Reaction



2-Chloroquinoline-3-carbaldehydes and 2-chloro-4-methyl-quinoline-3-carbaldehyde **1** were prepared from acetanilide and acetoacetanilide via a Vilsmeier-Haack reaction as given above and reported by M. R. Bell and J. H. U. S. Ackerman, US, 4920128, 1990. This was followed by refluxing for an hour. Product obtained was filtered, dried and recrystallised from water.

Triazole was prepared by refluxing a mixture of TCH and Propanoic acid for four hours. Product obtained was filtered, dried and recrystallised from hot water. Same procedure was repeated by taking acetic acid.

Schiff base was prepared by refluxing a mixture of the above prepared triazole with benzaldehyde in absolute alcohol containing drops of sulphuric acid for three hours. The ligand so obtained was filtered, dried and recrystallised from alcohol.

These compounds were examined for their in vitro antibacterial and antifungal activity (MIC-minimum inhibition concentration)] with two gram positive bacteria *S. aureus* and *B. subtilis* and two gram negative bacteria *E. coli*, *P. aeruginosa*. DMSO was used as a diluent which is ineffective to the growth of microbes.

## CHARACTERISATION

FTIR: IR spectrum of the Schiff base complexes showed the absence of carbonyl group in the spectra indicating the formation of Schiff base complex. Infrared spectra of the synthesized Schiff base complexes were recorded using Thermoscientific FTIR iD3 ATR Nicolet iS5 spectrometer.

UV- vis spectra of the synthesized Schiff-base ligand and their complexes were recorded at room temperature using DMF as solvent. UV-Visible spectra showed absorption bands characteristic of the Schiff base.

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