A. AIMS AND OBJECTIVES OF THE PRESENT WORK

Schiff bases constitute a special class of compounds; these compounds have played a central role as chelating agents for a large number of metal ions and are further associated with a variety of applications[1-6].

Schiff bases have been employed, in analytical chemistry, for the detection and determination of several metal ions. For example, they find use as gravimetric and photometric reagents and as indicators for complexometric titrations[7-13].
Schiff bases are also used in pigments, dyes and polymer industries[14-17].

In biochemical research front, Schiff bases serve as model compounds of several vitamins and enzymes[18-21]. These compounds have also been projected as promising pesticides, fungicides and bactericides[22,23]. Co(II) complexes of some Schiff bases have been investigated as oxygen carriers of biological interest and other applications of these oxygen carriers include their use as catalysts for reactions of molecular oxygen[24,25].

Schiff bases, in addition, possess a wide spectrum of medicinal properties. These compounds have been found to be active against influenza, leprosy, tuberculosis, malaria, certain kinds of cancer, etc[26-31].

The biological activity of these compounds has often been thought to be due to their ability to chelate metal ions, present in the bio sytem. In many cases, the metal ion association exerts a synergistic effect on the activity of the free ligand [32-34].

Sulfonamides, carbohydrazides and pyrazinamides are also reported to be physiologically and pharmacologically active and are further associated with a number of uses.

Considering the importance associated with this class of compounds, the author has taken to the synthesis and characterization of metal complexes of Schiff bases derived from a sulfonamide, carbohydrazide, and pyrazinamide and different aldehydes. The studies have been extended by screening the ligands TMABS, TMPCA and FMABS and some of their metal complexes prepared for biological activity.

B. SYSTEMS INVESTIGATED

In the present study, 4-aminobenzenesulfonamide has been condensed with 2-hydroxybenzaldehyde, furan-2-carbaldehyde and thiophene-2-carbaldehyde; pyridine-4-carbohydrazide with thiophene-2-carbaldehyde and pyrazine-2-carboxamide with thiophene-2-carbaldehyde and the following Schiff base ligands obtained and characterized.

4-((2-Hydroxybenzylidene)amino)benzenesulfonamide (HBABS) (Fig. 1)

4-((Furan-2-ylmethylene)amino)benzenesulfonamide (FMABS) (Fig. 2)

4-((Thiophen-2- ylmethylene)amino)benzenesulfonamide (TMABS) (Fig. 3)

N′-(Thiophen-2-yl-methylidene)-pyridine-4-carbohydrazide (TMPCH) (Fig. 4)

N-(Thiophen-2-ylmethylidene)-pyrazine-2-carboxamide (TMPCA) (Fig. 5)

The Fe(III), Ru(III), Co(II), Ni(II), Cu(II), Pd(II), Zn(II), Cd(II) and Hg(II) complexes of these Schiff base ligands have been prepared and structurally characterized on the basis of elemental analysis, conductance, thermal, magnetic and infrared, electronic and ESR spectral data. Relevant conclusions with respect to the geometry of the complexes have been drawn based on the data obtained.

The work embodied in the thesis also includes results of preliminary investigations of biological activity of the ligands : TMABS, TMPCA and FMABS and their Fe, Ru, Pd, Zn and Hg complexes against the two gram positive bacterial strains: *Basillus Subtillus, Staphylococcus Aurus* and two gram negative bacterial strains: *Escherichia coli, Salmonella typhi*, and two fungal strains: *Aspergillus niger and Penicillium rubrum.* The results obtained in this connection are discussed.

4-((2-Hydroxybenzylidene)amino)benzenesulfonamide (HBABS)

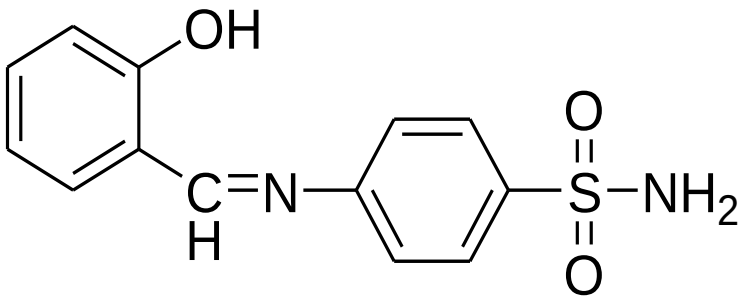

Fig. 1

4-((Furan-2-ylmethylene)amino)benzenesulfonamide (FMABS)

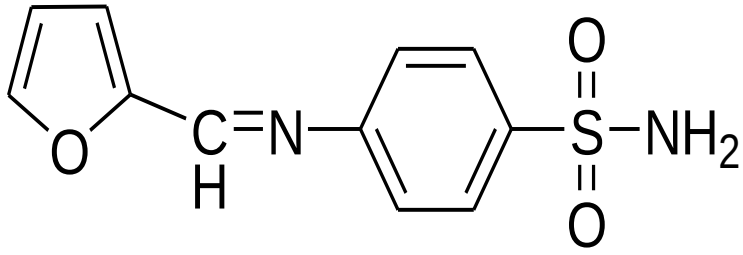

Fig. 2

4-((Thiophen-2- ylmethylene)amino)benzenesulfonamide (TMABS)

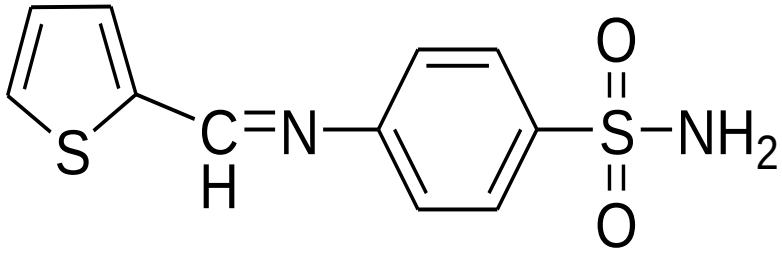

Fig. 3

N'-((Thiophen-2-yl)methylene)pyridine-4-carbohydrazide (TMPCH)

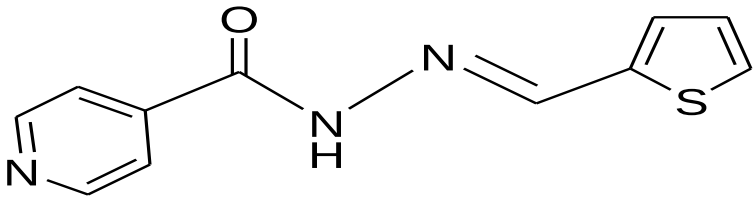

Fig. 4

N-(Thiophen-2-ylmethylidene)-pyrazine-2-carboxamide (TMPCA)

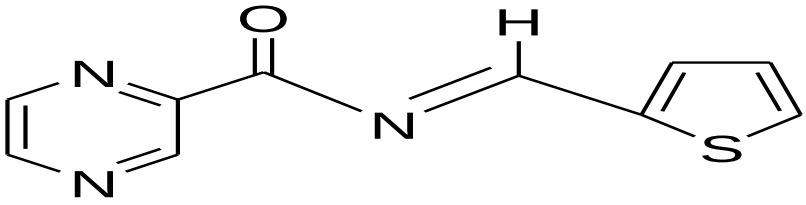

Fig. 5