SUMMARY OF THE WORK

Schiff base ligands are excellent coordinating ligands. During the past three decades, considerable attention has been paid to the chemistry of the complexes of the Schiff base containing nitrogen and other donors. This attributed to their stability, biological activity and potential applications in many fields making the behavior of Schiff base complexes with transition metals a worthy research topic. The coordination chemistry of amino acid Schiff base ligand is also of considerable interest due to their biological importance. Transition metal complexes of Schiff bases are one of the most adaptable and thoroughly studied systems.

The thesis deals with the synthesis, characterization and biological studies of some Schiff base complexes derived from 3-Pyridinecarboxaldehyde, 4-Pyridinecarboxaldehyde and the amines such as L-tryptophan, 3-aminopyridine, 4-aminopyridine, L-histidine. The thesis is divided into 5 chapters.

In the chapter I of the thesis an introduction to metal complexes of Schiff base ligands, synthesis of Schiff base complexes, types of Schiff base complexes, applications of Schiff base complexes in various fields such as NLO devices, sensors, etc., and review on Schiff base complexes and the scope of the present investigation were given.

Chapter II deals with the chemicals used, details of the experimental methods and techniques, adopted analytical procedures, materials used along with purification of solvents, procedure for biological studies such as anti-microbial studies and nuclease activity studies.
Chapter III gives details about the synthesis and characterization of Schiff base metal complexes of L-tryptophan with 3-pyridine carboxaldehyde and 4-pyridine carboxaldehyde. This chapter includes the introduction, synthesis of Schiff base ligand (L₁) from 3-pyridine carboxaldehyde and L-tryptophan, synthesis of Schiff base ligand (L₂) from 4-pyridine carboxaldehyde and L-tryptophan, preparation of Schiff base metal complexes of the ligands (L₁, L₂) and their characterization and biological studies such as antimicrobial activity and nuclease activity. The Schiff base metal complexes were characterized by elemental analysis, molecular weight determination, IR spectra, NMR spectra, Electronic spectra, magnetic susceptibility, molar conductivity, thermal analysis, X-ray diffraction analysis and Scanning Electron Microscope. Based on the above studies the complexes of ligand L₁ and L₂ are hexa coordinated which binds the metal via pyridine nitrogen, azomethine nitrogen and nitrate moiety of the metal salt used in the preparation. Scanning Electron Microscope and XRD studies of complexes were taken and they indicated micro crystalline nature of the complexes. The micro crystalline nature of the complexes can be confirmed by the grain size which can be calculated with the help of Scherer's formula. Thermal studies reveal that thermal degradation takes place in four stages. The antimicrobial and nuclease activity studies of the complexes indicated that they are effective in their antimicrobial and DNA cleavage activities.

Chapter IV gives details about the synthesis and characterization of Schiff base metal complexes of 4-pyridinecarboxaldehyde with 3-aminopyridine and 4-aminopyridine. This chapter includes the introduction, synthesis of Schiff base ligand (L₃) from 4-pyridinecarboxaldehyde and 3-aminopyridine, synthesis of Schiff base ligand (L₄) from 4-pyridinecarboxaldehyde and 4-aminopyridine, preparation of Schiff base metal complexes of the ligands (L₃, L₄) and their characterization and biological studies such
as antimicrobial activity and nuclease activity. The above complexes were characterized by elemental analysis, molar conductivity, magnetic susceptibility, molecular weight determination, IR spectra, NMR spectra, electronic spectra, thermal analysis, powder X-ray diffraction analysis and Scanning Electron Microscope. Powder XRD studies and SEM images of the complexes of ligands L₃ and L₄ showed microcrystalline nature of the complexes. The microcrystalline nature of the complexes can be confirmed by the grain size which can be calculated with the help of Scherer's formula. The thermal studies reveal that thermal degradation takes place in three steps. The antimicrobial activities of the ligands L₃ and L₄ and its complexes can be studied. All the ligands and complexes were active due to the presence of pyridine ring, –N=CH group etc. Nuclease activity studies of the complexes were studied by gel electrophoresis. The result reveals that all complexes showed enhanced nuclease activity.

Chapter V deals with the synthesis and characterization of Schiff base metal complexes of L-histidine with 3-pyridinecarboxaldehyde and 4-pyridinecarboxaldehyde. This chapter includes the introduction, synthesis of Schiff base ligand(L₅) from 3-pyridine carboxaldehyde and L-histidine, synthesis of Schiff base ligand(L₆) from 4-pyridine carboxaldehyde and L-histidine, preparation of Schiff base metal complexes of the ligands (L₅,L₆) and their characterization and biological studies such as antimicrobial activity and nuclease activity. The Schiff base metal complexes were characterized by elemental analysis, IR spectra, NMR spectra, electronic spectra, magnetic susceptibility, molar conductivity, molecular weight determination, X-ray diffraction analysis and Scanning Electron Microscope. Based on the above studies the complexes of ligands L₅ and L₆ are hexa coordinated. Powder XRD studies and SEM images showed the microcrystalline nature of the complexes. The grain size calculated with
the help of Scherer's formula confirmed the micro crystalline nature of the complexes. The antimicrobial activities of the ligands L₅ and L₆ and its complexes can be studied. All the ligands and complexes were moderately active due to the presence of pyridine ring, -N=CH-group, metal ion. The nuclease activity studies reveal that the compounds posses significant activity.