CHAPTER-III

SCOPE OF THE PRESENT WORK

The metal complexes of Schiff bases find interesting application in medicine, material science and catalysis. Hence there is a continuing interest in the synthesis of new Schiff bases and their complexes. It was therefore considered worthwhile to synthesise some new complexes of Schiff bases and study their physicochemical properties and application as antimicrobial, DNA binding and cleaving agents.

The work presented in this thesis is mainly concerned with metal complexes of Schiff bases containing aminopyridine ring. There has been considerable interest in the studies of aminopyridine due to their unusual coordination modes when bound to metals. The wide applications and structural diversity of Schiff base ligands prompted us to synthesize the two tetradeutate NNNO donor and their metal complexes. Due to good chelating ability, the present work is mainly concerned with the studies on complexes of binucleating Schiff base ligands.

The work embodied in this thesis mainly aims at weaving a network about their interesting spectroscopic and biological properties. By emphasizing this point the objectives of the present work are as follows:

- To develop methodology for the synthesis of binucleating Schiff base ligands with interesting structural features.
- To synthesize binuclear Schiff base metal complexes from synthesized ligands. (i)
  The effect of incorporation of bases into the coordination sphere of various metal ions, such as copper, cobalt, manganese and nickel in their structure.
- To recognize the spectroscopy of these structures.
- The redox behaviour of coordinated metal ions of our interest.
Scope of the present work

- To study the biological activities of the synthesized binucleating Schiff base ligands and its metal complexes.
  
  (i) To appreciate the effect of donor group in the amino pyridine moiety and their biological activity.
  
  (ii) To identify the changes in biological activity upon complexation with metal ions.

- To arrive at a structure to activity correlation.

The investigations are done to bring about an overall understanding of the structure-activity relationship and to aid the development of better and effective metal based drugs.

In this attempt we have prepared four Binucleating Schiff base ligands of 2,6 diaminopyridine based ligands and their metal complexes. The following ligands were selected for the research

i) Precursor (Benzene-1,4-dicarbaldehyde and 2,6-diaminopyridine) and 2-hydroxybenzaldehyde (H$_2$L$^1$)

ii) Precursor (Benzene-1,4-dicarbaldehyde and 2,6-diaminopyridine) and 2-hydroxy-5-bromobenzaldehyde (H$_2$L$^2$)

iii) Precursor (Benzene-1,4-dicarbaldehyde and 2,6-diaminopyridine) and 2-hydroxyacetophenone (H$_2$L$^3$)

iv) Precursor (Benzene-1,4-dicarbaldehyde and 2,6-diaminopyridine) and 2-hydroxynaphthaldehyde (H$_2$L$^4$)

New complexes of Cu(II), Co(II), Ni(II) and Mn(II) with the above mentioned ligands were synthesised and characterised. Further their DNA binding and cleaving ability and Antibacterial activity of the complexes were also studied. Details of these studies are embodied in this thesis.