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PREFACE

Aqua complex ions of metals must have existed since the appearance of water on the earth, and the subsequent appearance of life depended on, and may even have resulted from the interaction of metal ions with organic molecules. Studies on the coordinating ability of metal ions with other molecules and anions culminated in the theories of Alfred Werner. Thereon the progress in the studies of metal complex chemistry was rapid. Many factors, like the utility and economic importance of metal chemistry, the intrinsic interest in many of the compounds and the intellectual challenge of the structural problems to be solved, have contributed to this rapid progress. X-ray diffraction studies further accelerated the progress.

The work cited in this thesis was carried out by the author in the Department of Applied Chemistry during 2001-2004. The primary aim of these investigations was to synthesise and characterize some transition metal complexes of 2-benzoylpyridine *N*(4)-substituted thiosemicarbazones and to study the antimicrobial activities of the ligands and their metal complexes. The work is divided into eight chapters.

Chapter 1 involves a brief introduction of the metal complexes of thiosemicarbazones including their stereochemistry and biological activities. The different analytical and spectroscopic techniques employed for the analysis of the ligands and their complexes are discussed in this chapter.

Chapter 2 deals with the synthesis and spectral characterization of the ligands, 2-benzoylpyridine *N*(4)-cyclohexylthiosemicarbazone (HL^1) and 2-benzoylpyridine *N*(4)- phenylthiosemicarbazone (HL^2). Single crystal X-ray diffraction studies of HL^1 also are given in this Chapter.

Chapter 3 contains the synthesis, spectral characterization, single crystal X-ray diffraction studies and antimicrobial activities of copper(II) complexes of 2-benzoylpyridine *N*(4)-cyclohexylthiosemicarbazone. Chapter 4 deals with the

synthesis, spectral characterization and antimicrobial activities of copper(II) complexes of 2- benzoylpyridine *N*(4)- phenylthiosemicarbazone

Chapters 5 and 6 contain the synthesis, spectral characterization and biological studies of iron(III) and manganese(II) complexes respectively. Chapter 7 describes the synthesis and spectral characterization of the nickel(II) complexes. And Chapter 8 describes the synthesis and spectral characterization of zinc(II), cadmium(II) and mercury(II) complexes.