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Title of the Thesis : *Synthesis, Characterization and Anti microbial Studies of Newly Developed Coordination Polymers Containing Transition Metals*

ABSTRACT

This Ph.D. thesis focuses on the synthesis, characterization and anti microbial studies of coordination polymers containing transition metals. The work has been divided into seven chapters.

Chapter 1. This chapter deals with the introduction of coordination polymers, detailed survey including historical development, their classification and applications.

Chapter 2. This chapter describes detailed information of the instruments and experimental methodologies utilized in the research work with their theoretical background. All synthesized compounds were characterized by elemental analysis, magnetic moment, FT-IR, ¹H-NMR and electronic spectroscopy. All synthesized polymeric compounds were screened for antimicrobial activity against some clinically important microorganisms and their thermal stability was deduced with the help of thermogravimetric analysis.

Chapter 3. This chapter consists of synthesis, characterization and antimicrobial evaluation of polychelates derived from semicarbazide / thiosemicarbazide. The polymeric Schiff bases SSFB/STFB were synthesized. Then its metal polychelates were

prepared with Mn(II), Co(II), Ni(II), Cu(II) and Zn(II) acetates. Metal polychelates had better antimicrobial and heat resistant properties than their polymeric Schiff bases.

Chapter 4. This chapter concerns with the synthesis and characterizations of metal incorporated aniline formaldehyde resin modified by amino acids (Lysine/Glycine). The analytical data revealed that the polymer metal complexes of Mn(II), Co(II) and Ni(II) are coordinated with two water molecules, which are further supported by FT-IR spectra and TGA data.

Chapter 5. This chapter contains synthesis of new antimicrobial agents of Schiff base polymers derived from 2-hydroxyacetophenone and hydrazine / o-phenylenediamine containing transition metals with their characterization and applications. Polymer metal complexes have been synthesized by the reaction of polymeric Schiff base with Mn(II), Co(II), Ni(II), Cu(II) and Zn(II) acetate.

Chapter 6. This chapter involves synthesis and spectral aspects of biologically active and thermally stable polymeric Schiff bases and its metal polychelates of manganese(II), cobalt(II), nickel(II), copper(II) and zinc(II) containing formaldehyde and piperazine / barbituric acid moieties. The polymer metal complexes show better anti-microbial and enhanced thermal activity than their polymeric Schiff bases.

All synthesized polymers in chapter 3 to chapter 6 have been characterized by techniques as described in chapter 2. The results revealed that polymer metal complexes are thermally more stable than their parent ligand. Similarly the antimicrobial activity results revealed that coordination of metal enhances the antimicrobial nature of the compounds.

Chapter 7. This chapter briefly describes the future research directions based on the work presented in chapter 3 to chapter 6.