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Title: **Preparation, Characterization and Biological Activity of Metal Incorporated Heteroatomic Ligands**

ABSTRACT

Presently, coordination chemistry is one of the most challenging fields of inorganic chemistry and progressed as an important subject area for chemists around the world. The recent escalate in the popularity of coordination compounds due to their well-known applications in numerous fields such as catalysis, medicine, analytical and agricultural chemistry. With the passage of time more specialized sub fields like homogeneous catalysis, transition metal organometallic chemistry, and bioinorganic chemistry have also came into existence. Among these, bioinorganic chemistry has emerged as an area of paramount interest because of its relationship with chemistry and biological sciences. Transition metals have an important place within medicinal inorganic chemistry. Nowadays, the bioinorganic chemists target the heterocyclic ligands and their metal complexes to study their pharmacology as the main focus of research.

Herein the attention is focused on preparation and characterization of numerous metal complexes containing different heteroatomic ligands to investigate the novel structural features and to explore the biological significance of these complexes. The central theme is of great importance as there is an increasing significance of the metal based drugs and has become a focus of interest for researchers. The ligands used are Schiff bases, 1,10-phenanthroline, dibenzoylmethane and curcumin. The total work has been covered in five chapters.

The **First chapter** starts with a detailed discussion on the basics of coordination chemistry, the metals involved therein and the biological significance of such compounds. This gives an insight to the area of the work reported. The **Second chapter** deals with the preparation of mixed ligand complexes of Cu(II), Co(II), Ni(II) and Zn(II). The characterization of the complexes is done spectroscopically and the geometry of the complexes also ascertained. The **Third chapter** deals with mixed ligand complexes using dibenzoylmethane and Schiff base ligand. The analysis has been done using various physicochemical properties. The NMR, FT-IR, Mass spectrometry further confirm the formation of synthesized complexes that were found to have octahedral geometry. The **Fourth chapter** has taken into use one of the well-researched chemical from natural spice i.e. curcumin. The heteroleptic metal complexes based on curcumin and Schiff base ligand have been synthesized and subjected to characterization by various physical and spectroscopic techniques. The last i.e. **Fifth chapter** discusses the synthesis of heteroleptic complexes from two different Schiff base ligands.

All the compounds synthesized were subjected to antifungal activity and a few exhibited good activity against all the tested strains. The findings revealed that some complexes have the potential to be used as better antifungal therapeutic agents.