Abstract of the Thesis entitled
SYNTHESIS AND CHARACTERIZATION OF TRANSITION METAL COMPLEXES OF SCHIFF BASES

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BY

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SYNOPSIS

The present work undertaken entitled “SYNTHESIS AND CHARACTERIZATION OF TRANSITION METAL COMPLEXES OF SCHIFF BASES”, is presented in six chapters. A chapter wise summary is given below.

CHAPTER I:-

This chapter deals with the introduction of coordination chemistry and it’s theories in brief. An account of Schiff bases, their metal complexes and their applicational importance has been discussed in this chapter. A brief review of literature on previous studies on transition metal complexes and in particular recent work on the imines of dehydroacetic acid related to the present work has been incorporated. At the end of this topic the aim of present investigation has been outlined.

CHAPTER II:-

- In this chapter (a) synthesis of Schiff base ligands and their characterization, (b) preparation of transition metal complexes of the ligands and their analysis by various physiochemical methods is presented. The ligands used in the present work are listed below:
  - 4-(3-nitrobenzylideneamino)-6-methyl-1,3,5-triazin-2-ylimino)ethyl)-4-hydroxy-6-methyl-2H-pyran-2-one
4-(2-hydroxybenzylideneamino)-6-methyl-1,3,5-triazin-2-ylimino)ethyl)-4-hydroxy-6-methyl-2H-pyran-2-one

4-(3-phenylallylideneamino)-6-methyl-1,3,5-triazin-2-ylimino)ethyl)-4-hydroxy-6-methyl-2H-pyran-2-one

4-(4-hydroxybenzylideneamino)-6-methyl-1,3,5-triazin-2-ylimino)ethyl)-4-hydroxy-6-methyl-2H-pyran-2-one

4-(4-hydroxy-3,5-dimethoxybenzylideneamino)-6-methyl-1,3,5-triazin-2-ylimino)ethyl)-4-hydroxy-6-methyl-2H-pyran-2-one

4-(2-hydroxybenzylideneaminomethane)-6-methyl-1,3,5-triazin-2-ylimino)ethyl)-4-hydroxy-6-methyl-2H-pyran-2-one

The experimental procedure followed in the synthesis of Schiff bases has been described. The procedure and techniques employed for characterization by elemental analysis, electronic absorption spectral and $^1$H NMR spectroscopy have been included.

The general procedure for the preparation of transition metal complexes of Cr(III), Fe(III), Co(II), Ni(II), Cu(II) and Zn (II) with derived Schiff bases has been described.
CHAPTER III:-

This chapter considers various experimental techniques employed and their role in the characterization of metal complexes. The experimental details of various techniques used have been given. The techniques used in the present study are:

1. Magnetic susceptibility measurements.
2. Solution conductivity measurements.
3. Ultra Violet Spectroscopy
4. Infra-red spectroscopy.
5. $^1$H NMR spectroscopy
6. X-ray diffraction
7. TGA-DTA

CHAPTER IV:-

In this chapter the experimental data on conductivity, magnetic susceptibility, electronic absorption spectra, thermo analytical and X-ray diffraction measurements of Cr(II), Fe(III), Co(II), Ni(II), Cu(II) and Zn(II) complexes of Schiff bases are presented and discussed. It also includes discussion on elemental analyses of the complexes.
Thermal behavior of metal complexes with the help of simultaneous TGA-DTA curves has been discussed. Thermodynamic and kinetic parameters for decomposition of metal complexes are calculated by different methods.

The unit cell data and crystal lattice parameters of metal complexes calculated from strong refluxes in the XRD pattern by using computer programme are presented and discussed with respect to Z values, density, porosity, percentage, crystal system and probable space group.

CHAPTER V:-

This chapter mainly considers result and discussion pertaining to infrared absorption spectra of Schiff bases and their metal complexes. The infrared spectral studies are presented and discussed with respect to assignments of band frequencies for different groups involved in complex formation, mainly from the point of view of locating coordination position in the metal complexes. The assignments of band frequencies for different groups are empirical and tentative and are based on the information from literature on similar metal complexes.

CHAPTER VI:-

Antibacterial and antifungal activity of ligands and their metal complexes are described in this chapter. It is divided into two sections.

First section includes introduction to fungi, the *Aspergillus Niger* and *Trichoderma* species in particular. Aspects of fungal growth and their biotechnological, industrial and economic importance and their harmful effects
are discussed in brief. Experimental procedure of screening of antifungal activity of ligands and their complexes is incorporated in this section. Fungicidal activities in the presence of ligands and their metal complexes on GN medium are compared.

The second section includes experimental procedure of measurement of antibacterial activity of ligands and their metal complexes in vitro against *E.coli*, and *Staphylococcus sp.* by disc diffusion method. The inhibitory zone and data are presented. Antibacterial activities in presence of ligands and metal complexes are studied and compared in the second section. At the end of this chapter our conclusions are presented.

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