SYNTHESIS AND SPECTROSCOPIC INVESTIGATIONS OF SOME TRANSITION METAL DERIVATIVES WITH HETEROCYCLIC COMPOUNDS CONTAINING OXYGEN AND NITROGEN AS DONOR ATOMS

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1. INTRODUCTION:

Nature has incorporated molybdenum into a number of redox enzymes\(^{(1)}\). The cis–[MoO\(_2\)]\(^{+2}\) centre dominates the chemistry of d\(^0\) MO(VI) complexes\(^{(2)}\) and participates in many oxygen atom transfer reactions\(^{(3-5)}\). A critical investigation of the relevant literature unfolds that there is immense scope for venturing methodical studies on N and O/S−donors systems. On account of their biochemical significance\(^{(6-9)}\) in different horizons of human behaviour.

A substantial amount of work has been reported on the metal. Complexes of azomethines derived from indoline 2,3−dione\(^{(10-11)}\). A variety of compounds including 2–3 thio acyl hydrazones of indoline−2,3−dione and cyclic derivatives such as 1,2,4 or 1,3,4 tri−azinoindoles have been tested on mice and rats for their anti-inflammatory activity considerable emphasis has been placed on the synthesis of Sb(III) complexes in mixed environments i.e. hard and soft ligands in the coordination sphere. However in many cases the steric blockade may substantially modify the reactivity at the Sb(III) centre. Although ketoimines as well as dithiophosphates of antimony(III) are well known and some of these are fully characterized by single crystal x−ray analysis, the corresponding mixed ligand complexes with these ligands do not appear to have received much attention\(^{(12-14)}\).
Synthetic models for nonheme protein have been studied by various workers in order to have a better understanding of the structure and function of the metalloenzymes. Recently it has been shown\(^{(15)}\) that some of the nonheme iron proteins, such as catechol deoxygenases, transferring and uteroferrin, contain a high spin iron(III) centre\(^{(16)}\) coordinated to at least two tyrosines and two histidines at the active site. The salen and salophen systems provide the right coordination, geometry for synthetic models of the active sites of non heme iron proteins.

(2) **LITERATURE REVIEW:**

Salicyclic acid has been suggested to be the simplest model for humic substances in natural waters\(^{(17)}\) and a convenient ligand substrate for biologically relevant tyrosine phenoxide and glutamic/aspartic carboxylate functions. It can adopt several bonding modes and act as an effective agent for the synthesis of photoactive carboxylato polynuclear manganese complexes. Salicylates of different metal ions have widespread application both as antiseptics and medicinal agents. Incorporation of \(\alpha\)–dimine as second ligand\(^{(18)}\) in metal–salicylato frame increases the cytotoxicity and the neutral molecule gets easily transporated accross the cell membranes\(^{(19)}\).

The coordination chemistry of pyrazole and 5–pyrazolone derived ligands has received much attention in recent years primarily because of their biological importance\(^{(20–21)}\). Although in recent years there has been a great interest in the synthesis, structure and bonding of mixed–ligand cyanonitrosyl complexes of Cr(I) with 2– or 3– pyrazoline–5–one derivatives, there is no report on cyanonitrosyl complexes of Mn(I) with 2– or 3– pyrazoline–5–one derivatives\(^{(22)}\).

(3) **AIM, OBJECT AND PLANNING OF WORK:**

Pyrimidine and its derivative are of considerable biological significance. Many pyrimidine derivatives exhibit anti rombotic activity\(^{(23–25)}\). They are also used as antimicrobial, antibacterial and antimalarial drugs\(^{(26–30)}\). Some pyrimidyl ureas and thioureas are also used as effective herbicides\(^{(31–33)}\). 2–mercapto benzothiazoles are reported to have many industrial and medicinal application\(^{(34–38)}\).
In continuation of our studies on the synthesis and characterization of bi-heterocyclic ligands and their metal complexes, we thought here the synthesis and characterization of the polystyrene–anchored Schiff bases synthesized by the reaction of aminomethylated polystyrene and acetyl acetone, 2–hydroxy–4–methyl aceotphenone, 3–amino propanethiol, 2–aminothionaphthol, 2–Amino–carboxy–5–methyl pyrazine, 2–amino–3–carboxy–5–methyl nicotinic acid, 3–Formyl salicylic acid, phenyl semicarbazide, propanol amine and Alanine complexes with Cu(II), Co(II), Cd(II), Ni(II), Zn(III), Fe(III), dioxomolybdenum(VI) and dioxouranium(VI).

The results reveal that the ligand coordinating through azomethine – nitrogen and thiocarbonyl–sulphur atoms of the mercapto group, complexes having chlorine bridged dimeric octahedral structure. The compounds will be tested in vitro and in vivo against a number of fungal and bacterial strains.

Compounds as well as complexes will be identified on the basis of different physico–chemical methods eg IR, UV–spectra electronic spectra and magnetic measurements.

(4) **UTILITY AND IMPORTANCE:**

Various ligand field parameters, such as axial/rhombic distortions and the (Fe–N) bond distance have considerable influence on the Fe(III)/Fe(II) redox potential and on the rate of heterogeneous electron transfer (K_S). Correlation of magnetic moments with (K_S) may indicate that high–spin complexes have faster rates of electron transfer in comparison with those of low-spin complexes.

(5) **METHODOLOGY AND TECHNIQUE:**

Modern methods such as spectroscopy (UV–visible, Infrared); ESR magnetic susceptibilities will be used.
REFERENCES