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BACTERIAL SCREENING, MAGNETIC MOMENTA AND SYNTHESIS OF 3d TRANSITION METAL COMPLEXES WITH SCHIFF BASE DERIVED FROM 4-CHLORO BENZALDEHYDE WITH 2 AMINO 4- PHENYL OXAZOLE

RAJESH KUMAR
Mewar University
Gangrar Chittorgarh (Rajasthan)

***ABSTRACT*:** Metal complexes were synthesized which have general formula $[ML_2X_2]$ Where L_2 = Schiff base derived from 4-chloro benzaldehyde with 2-amino 4- phenyl oxazole. Metal were used are Co (II), Ni (II), Mn (II) and Zn (II). By Infrared spectra, elemental analysis, magnetic moment data and magnetic susceptibility measurement characterization of ligand and complexes were done. E.Coli , B.subtilis, S.typhi, S.aureus and A.niger were taken for anti-microbial screening.

***KEYWORDS*:** Co (II), Ni (II), Mn (II) and Zn (II) complexes, Schiff base.

INTRODUCTION

Oxazoline and their derivatives have different importance due to their wide range of activity. The versatility of oxazoline and their derivative is demonstrated by the fact that some of these compounds possess antimalarial' anthalmintic , antifungal , antiplasmodic and antitubercular activities. They are mainly used as asanalgesic, nematocides, bactericides, fungicides etc. In the present day therapy these oxazolines are also popular for their radioprotective activities. These compounds are also used as local anaesthatic anti radiation drugs anti viral and antineoplastic .

EXPERIMENTAL

The entire reagent used were of AR grade otherwise purified before used.

PREPARATION SCHIFF BASE FROM 4-CHLORO BENZALDEHYDE WITH 2-AMINO 4- PHENYL OXAZOLE

The ligand was prepared by the condensation of 4-chloro benzaldehyde with 2-amino 4- phenyl oxazole using conc. Br_2 as condensing agent. First of all 4-chloro benzaldehyde 0.02 mole was added to 0.02 mole of 2-amino 4-phenyl oxazole in 50 ml absolute ethanol. Mixture was refluxed for two hours in a round bottom flask using water condenser fitted with anhydrous $CaCl_2$ guard tube at the top of the condenser. After the reaction approximately 60% of the alcohols were distilled off and the reaction mixture was cooled by immersing the flask in ice. The obtained precipitate filtered , three time washed by cooled ethanol then dried at 65ºC-70 ºC in an electric oven.

SCHEME-1

Preparation of ligand

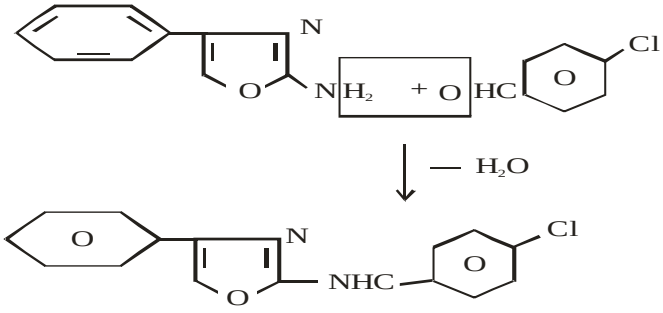

Fig: 1 Schiff bases of 4 – Chlorobenzaldehyde with 2 - Amino - 4 - phenyl oxazole.

PREPARATION OF THE COMPLEXES

0.002 mole of nitrate of the metal [Mn(II),Co(II),Ni(II) and Zn(II)] dissolved in 25 ml of absolute ethanol and 0.002 mole of the ligand dissolved in 25 ml of absolute ethanol and refluxed on water bath for half an hour. The reaction mixture remains just half of its total volume after concentration. The reaction mixture cooled in ice. The precipitate filtered washed by ice cold absolute ethanol then dried at 85-91 ºC in an electric oven.

SCHEME-2

Structure of Metal Ligand - Complexes with Schiff bases of 4 – Chlorobenzaldehyde with 2 - Amino - 4 – phenyl oxazole.

Where M = Mn (II), Ni (II), Co (II), Cu (II) & Zn (II)

X = NO_3^-

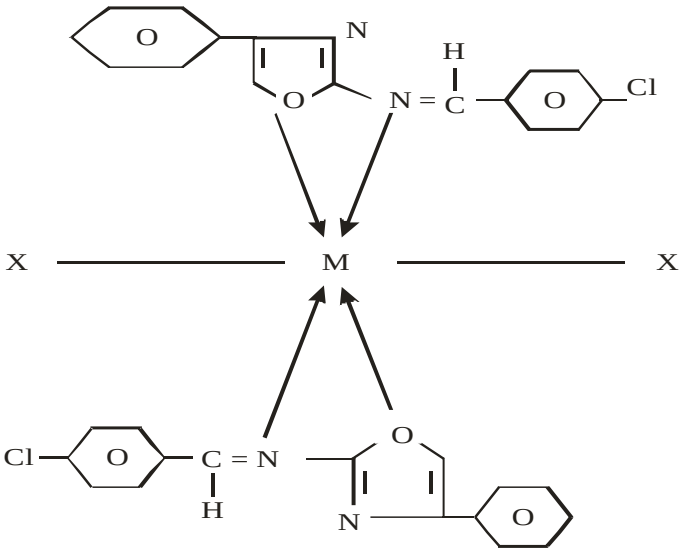

Fig: 2 Structure of complex.

RESULTS AND DISCUSSION

Yield (Calculated/observed) = 9.06/7.86 g
Percentage = 87%

Melting point = 189 ºC

Analytical data suggested 1:1 stoichiometry for the binary complexes. The complexes were soluble in common organic solvents i.e. DMSO (Dimethyl silane organic solvent) and DMF (Dimethyl furane).

TABLE - 1

COLOUR, ANALYTICAL, CONDUCTANCE AND MAGNETIC MOMENT DATA OF METAL COMPLEXES

Complex	Color of the complex	Elemental analysis % calculated (found)						Ωcm/mol	μ_{eff}(BM)
		M	C	H	N	O	Cl		
$[Mn(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	Yellow	7.38	51.61	2.95	11.29	17.20	9.54	71.4	6.81
		7.36	51.59	2.93	11.27	17.18	9.52		
$[Co(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	Pink	7.87	51.34	2.94	11.23	17.11	9.49	69.2	4.36
		7.85	51.32	2.92	11.21	17.09	9.47		
$[Ni(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	Light Green	7.85	51.35	2.94	11.23	17.11	9.49	72.3	4.36
		7.83	51.33	2.92	11.21	17.09	9.47		
$[Zn(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	White	8.66	50.90	2.91	11.13	16.96	9.41	68.2	4.27
		8.64	50.88	2.89	11.11	16.94	9.39		

In above table M=Metal C= carbon H= Hydrogen N= Nitrogen O= Oxygen Cl= chlorine.

The magnetic moment values of complexes are found to be 3.37 – 5.90 B.M. The spectra of these complexes exhibit three bands at 10900, 16100 and 22400 cm^{-1} corresponding to the transition 3A2g(F) 3T2g(F), 3A2g(F) 3T1g(F) and 3A2g(F) 3T2g(P) respectively, which corresponds to octahedral geometry. Magnetic moment value 5.80BM of the Mn(II) complexes was revels that 6A1g in ground state for d5 configuration for high spin octahedral complexes . The electronic spectra of Mn(II) complexes exhibit three bands at 15650-15500, 18630-18400 and 23650-23450 cm^{-1} which can be assigned to the transition 6A1g 4T1g, 6A1g 4T2g and 6A1g 4Eg, 4A1g(G) respectively. From a careful comparison of the infrared spectra of metal complexes with those of ligands, it is inferred that a band at 1200cm^{-1} due to C=N bonding disappears during chelate formation. This indicates formation of complexes between the metal and the ligand resulting a new entity. In the chelate the band observed around 480 cm^{-1} corresponding to M-O vibration suggests that phenolic groups forms bond with metal ions**.** The M-N stretching frequency in the Schiff base complex is obtained at higher wave number because of the character of M-N due to M-N π interaction. Nakamato has shown that M-N stretching frequency undergo coupling with other stretching, vibration resulting in a number of bands. The bands around 740 and 620 cm^{-1} may correspond to the coupled ν(M-N). From these results it is concluded that the primary ligand is being utilized with various species showing

absence of CHO group and generation of new entities. Further loss in weight of complexes at 150-190ºC is due to coordination of a water molecule.

BACTERIAL SCREENING

The paper disc plate methods were used for the evaluation of antimicrobial activity of the complexes. The MTCC (Microbial type culture collection) culture of *E.coli*, *S.aureus*, *B. Subtilis. S.typhi* and *A.nige*r were taken for the antimicrobial screening. The result of the antibacterial screening in terms of zone of inhibition is shown in table 2 . DMSO and chloroform were taken as controlled standard. From the antibacterial screening it is observed that Ni-complexes were found to be more active against B.subtilis, S.Typhii and A.niger as gram positive bacteria**.** The entire synthesized compounds along with the parent compound were screened for their antibacterial activities. Against A.niger all compounds were found active amongst the synthesized complexes.

TABLE -2
ZONEINHIBITION
(mm)

Complexes	Solvent	E.Coli	S.aureus	B.subtilis	S.typhi	A.niger
		630	111	456	546	296
$[Mn(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	Chloroform	_	_	_	_	0.4
$[Co(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	Chloroform	_	_	55	_	25
$[Ni(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	Chloroform	_	_	47	23	30
$[Zn(C_{16}H_{11}N_2OCl)_2](NO_3)_2$	DMSO	_	_	_	_	50

TABLE - 3
CONTROL (mm)

Solvent	E.Coli	S.aureus	B.subtilis	S.typhi	A.niger
DMSO	-	12	-	-	10
Chloroform	-	8	-	-	-

CONCLUSION

In the above discussion colour, elemental analysis, conductance and magnetic momenta of the metal complexes have been determined**.** From the above results it has been observed that amongst the synthesized complexes were found active against *S.aureus*. So it may be concluded that it is pursue further invention by developing the structure as well as concentration ratio.

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