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SYNTHESIS CHARACTERIZATION AND ANTIBACTERIAL ACTIVITY OF COBALT (II), NICKEL (II) AND COPPER (II) METALS WITH SCHIFF BASE CONTAINING HYDROXAMIC ACID

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ABSTRACT

Benz furan derivatives of CO (complex) Ni (II), Ni (II), Q (II) components have been combined and analyzed by fundamental analysis, magnetic moment, appeal measurement, spectral characteristic, etc. The basic data match the general formula, where L = (E) -7-methoxy-N1- (2,4,5-trimethoxyxy benzyl-dine) benzofuran-2-carbohydrates (L1) or (E) -N1- (2, 3) – di-chloro benzyl-dine) -7-methoxy benzofuran-2-carbohydrates (L2), of the complex. The ligands coordinate the metal ions with the oxygen of the carbonyl group and the nitrogen of the hydrazine group. The electronic spectral data of the complex indicate that the potential geometry is versatile. All complexes and ligands were shown to inhibit the growth of their bacteria.

KEY WORDS: *Benz furan derivatives , fundamental analysis, magnetic moment.*

INTRODUCTION

The bottom of the scaffold in coordinate chemistry is the most widely studied chilting ligament. They are useful in organic synthesis and in medicine as antibiotics, antiallergic and antitumor agents. Recently, metal complexes formed from carbonyl compounds based on heterocyclic rings have become the centre of attraction in many areas. Among them, benzofuran based fused heterocyclic are of great interest because they are abundant in nature and have a wide range of medicinal functions. Benzofuran-based compounds show action as antifungal agents such as antifungal, antiprotozoal, and antitubicular, and have also been reported in the treatment of antiretroviral and cardiovascular diseases. A survey of the literature of recent years has shown an increasing interest in the anti-micro-bacterial activity of benzofuran derivatives, especially on 2-volatile or 2,3-distributed benzofurans derivatives. This is due to the presence of benzofuran derivatives in natural compounds. For example, the seed oil of the Igonoki plant, which contains a benzofuran derivative called insonal, is an effective syringe for rotenone and pyrethrum against domestic fish, mosquitoes, ph fides and many other pests. Similarly, Baker's yeast contains a benzofuran derivative that acts as an antioxidant that inhibits haemorrhagic liver necrosis in rats and haemolysis of red blood cells in vitamin-E deficient rats.

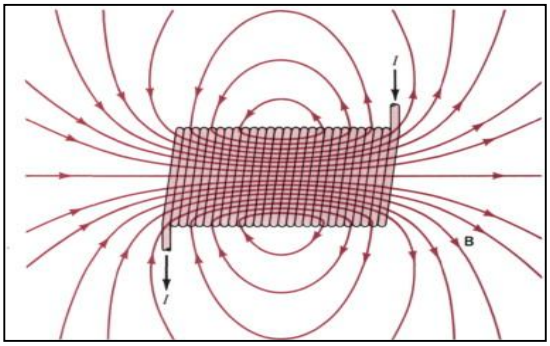
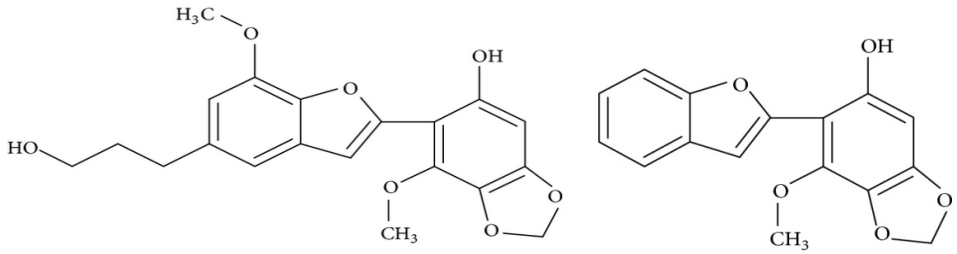


Figure 1.1 Benzofuran Derivatives Structure



We therefore found it beneficial to synthesize and characterize benzofuran-based ligands and their transition metal complexes and to investigate their antibiotic properties. As part of our ongoing study on benzofuran derivatives, we report on the synthesis, properties, and bacteriology of (E) -7-methoxy-N1-(2,4,5-trimethoxyxy benzylidine) benzofuran-2-carbohydride (L1) And (E) -N1- (2,6-dichloro benzylidine) -7-methoxy benzofuran-2-carbohydride (L2) and their metal complexes such as Co (II), Ni (II), CuQ (II)

EXPERIMENT:

The 2,4,5-trimethoxybenzaldehyde, 2,6-dichlorobenzaldehyde and 2 hydroxy-3-methoxyben - zaldehyde sigma-Aldrich were of the transfection grade. All other chemicals were of AR grade and used as supplies. Solvents are dried and distilled before use. The initial material, 7-methoxy-1-benzofuran-2-carbohydrate, was prepared according to the literature method.

COMPLEX PREPARATIONS:

Co (II), Ni (II), Q (II) complex, were prepared by mixing a calculated volume of L1 and L2 in ethanol and an aqueous solution of the corresponding metal chloride in a 2: 1 ring ratio. The reaction mixture was reflected in a water bath for 3-4 hours. The thin layer was examined by chromatography upon completion of the reaction. Once the reaction was complete, approximately 50% of the solvent was removed from the hot solution. The residue was then cooled to room temperature. The prepared solid complex was filtered, washed with hot water (15 mL, 5-6 times) and ethyl alcohol (15 mL, 5-6 times), and finally dried in a vacuum decanter at anhydrous $CaCl_2$.

PHYSICAL MEASUREMENT:

Basic analyses were performed using the Verio EL CHNS analyzer. Magnetic sensitivity measurement is carried out on a magnetic sensitivity balance. Molecular carrier measurements were performed on the DMF (15-10 m) on the Aalico CM-85 driver bridge. Cell stent 0.1 using a dip-type conductivity cell with a platinum electrode fitted with Scheme-1. The ESR spectra of the complex were recorded at a liquid nitrogen temperature in the DMSO on a Varian E-122 X-band spectrophotometer. Ligand's FT-IR spectra and their complex Shimadzu FT-IR spectrophotometers were recorded as KBR discs in the 4500-500 cm range 1 range. The Booker 300MHz spectrophotometer reported 1H NMR spectra in the DMSO-D6 using TMS as the internal standard. The electronic spectrum was recorded on the ELISO-SL-159 single beam UV-Vis. N, spectrophotometer in the range of 300-1200 nm in N-dimethyl form amide (DMF) (10−3 m) solution. The FAB mass spectra was recorded at CDRI Lucknow using JEO SX102 / DA-6000 mass spectrophotometer, 8 KV and FAB gas and ten mA as matrix as m-nitro benzyl alcohol.

ANTIBACTERIAL ACTIVITY:

The in vitro antibacterial action of the newly synthesized compound includes Staphylococcus aurous, Staphylococcus citrus, Bacillus polymex, Bacillus cerius and Lactobacillus, and the five gram-negative species Proteus mirabilis, Klebias. E. coli,, and Pseudomonas aeruginosa by agar well diffusion method. Nutritious agar was used as a bacteriological medium. The extract was dissolved in 25% aqueous dimethylsulfoxide (DMSO) to a final concentration of 60/g/µL. Pure DMSO was taken as control,115 µL inoculum was sterilized

on the surface of sterilized agar plates and sterile cotton swabs were also used for even distribution of inoculums. The wells were constructed using sterile cork borers of 8.0 mm diameter in agar plates. 50 inL test and control compound was brought to the well. The same procedure was used for all stretches. Plates were aerobically carved at 35^0C and examined after 20 h. The diameter of the blocking area created by each agent was measured with a ruler.

RESULT AND DISCUSSION:

Ligand/complex	Molecular weight	Yield (%)	Colour	M.P °C	Elemental analysis found (cal)			(BM)	(ohm^{-1} cm^2mol^{-1})
					C	H	N		
	383.378	**75**	**Yellow**	**252**	**62.62 (62.65)**	**5.2 (5.3)**	**7.45 (7.306)**	—	—
$Cu(C_{20}H_{20}O_6N_2)Cl_2$	517.858	80	Green	244	46.53(46.39)	3.95(3.89)	5.98(5.41)	1.74	18.452
$Co(C_{20}H_{20}O_6N_2)Cl_2$	513.211	78	Dark brown	238	46.95(46.81)	3.84(3.93)	5.81(5.46)	4.68	15.951
$Ni(C_{20}H_{20}O_6N_2)Cl_2$	512.968	72	Light brown	262	46.54(46.83)	3.68(3.93)	5.63(5.46)	2.85	14.274
	363.198	**80**	**Brown**	**130**	**56.26 (56.22)**	**3.43 (3.33)**	**7.6 (7.7)**	—	—
$Cu(C_{17}H_{12}N_2O_3)Cl_2$	497.637	75	Green	>300	41.58(41.03)	3.56(3.44)	5.85(5.63)	1.79	16.653
$Co(C_{17}H_{12}N_2O_3)Cl_2$	493.030	70	Light brown	123	41.65(41.41)	2.55(2.45)	5.75(5.68)	4.87	15.032
$Ni(C_{17}H_{12}N_2O_3)Cl_2$	492.788	73	Light brown	>276	41.57(41.44)	2.82(2.45)	5.69(5.68)	2.92	15.965

CHARACTERIZATION OF METAL COMPLEX:

They showed analytical data of packages, 1-6 that all packages were of stoichiometry, [M (L1 / L2) clean]. The molar conductivity values of packages in DMF (15-5M) are in the range of 13.8–20.3 - cm^1 cm^2 mole - 1 in which the packages do not have electrolytic form. All complexes are partially or almost insoluble in common organic solvents, but soluble in DMF, DMSO and pyridine. With room temperature magnetic sensitivity measurements, the Q&A represents the paramagnetic nature for the complex. The six-coordinate co (co) packages contain 4.68 and 4.87 B.M. The magnetic moments of are shown, indicating the octedral geometry for Co (II) 2.85 and 2.92 B.M. in the Ni (II) complex. The magnetic moment value of was shown; it was only slightly higher than the spin (2.83 bm) value, which indicates the octahedral atmosphere around the Ni (II) ion. The magnetic moments observed for the Cu (II) complex are 1.74 and 1.79 bm. Are, which indicate distorted octahedral geometry around Cu (II).

In the electronic spectra of the C (II) complex of L (C), two absorbent bands 16539 cm^{-1} appeared at L1 and 16201, 21123 cm^{-1}, respectively. These bands are transferred to the octahedral atmosphere, respectively. The band cannot be celebrated; however, the band will be calculated using the fitting procedure. Octadral geometry is further supported by the values of ligand field parameters such as Rica inter-electronic repulsion parameter, ligand field splitting energy, covalence factor and ligand field stabilization energy (LFSE).

The six coordinates are assigned to the Ni (II) complex at 15528, 25945 cm^{-1} and 15511, 25739 cm^{-1}respectively, and display the bands for transition. In case of high energy bands Co (II) and Ni (II) complex in the region of 34000-35000 cm^{-1}, transfer charge has been assigned. The octedral geometry is supported by further ratios, and ligand field parameters such as the LFSE value. The values of the complex were lower than the free ion values, which is an indication of orbital overlap and delocalization of de-orbitals. The values obtained were less than unity, indicating abundant support for metal-ligand bonds. The value of the Ni (II) complex is lower than that of the Co (II) complex, indicating greater flexibility of the M-L bond.

The ESR spectra of the copper (II) complex were recorded at the copper nitrogen temperature in the DMSO. Tetracycline (TCNE) values were calculated from the spectrum using free radicals as markers. The typical ESR spectrum of [Q (L1) CL2], Neman and Kiwelson reported that the complex is less than 2.3 for the ionic character of the metal-ligand bond and more than 2.3 for the ionic character of the metal-ligand bond in the complex. As seen that the values of the current complex are slightly higher than 2.3, indicating a slight amount of ionic character of the metal-ligand bond. The trend suggests that the asymmetric electron is mainly in the orbital feature of square planner or octet geometry in the copper (II) complex. The value of these packages indicating the presence of co-characters is greater than 2. The axial symmetry parameter ()

values (greater than 4) of the complex indicate that there is no interaction between the copper centers in the DMSO medium. Empirical factor $f (=g_{II} A_{II})$ cm $^{-1}$ is a measure of deviation from ideal geometry. Values from 165 to 171 cm Values 1 for current packages indicate moderate to considerable distortion in geometry.

ANTIBACTERIAL ACTIVITY:

Examination of the inhibitory growth of substituted benzofuran derivatives and their metal complexes, "Proteus mirabilis", "Klebsiella pneumonia," "E. Bacterial species such as spiders "Salmonella taffy, "and" Pseudomonas aeruginosa "by the method of diffusion,in all complexes [Q (L2) CL2], [Ni (L2) CL2] and [Co (L2) CL2] complexes showed good action against all organisms (MIC = 25 µg / mL), while zinc And cadmium complexes are moderately active, but mercury complexes are less active.The minimum activation of mercury may be due to the toxic type of microorganisms.However, the synthesized compounds exhibit relatively more or less action than the standard drug streptomycin.

CONCLUSION:

Based on analytical data from stichiometries and ligands, (E) -7-methoxy-N1- (2,4,5-trimethoxyxy benzyl dine) benzofuran-2-carbohydride (L1) or (E) -N1- (2,6-) Dichloro benzylidine) -7-methoxy benzofuran-2-carbohydride (L2) Neutral, biodate ligands coordinate through the “O” and “N” of the amide and omezomethine groups, respectively. All complexes have 1:1 (M:L) stoichiometry based on analytical and spectral data of chloride-bridged polymeric octahedral structures of solid (II), CO (II) and Ni (II) complexes. HG complexes are less active; The ZN and CD complexes show very good anti-bacterial action in the Cu, Co, and Ni complexes.

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