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SYNTHESIS, CHARACTERIZATION, ANTICANCER AND BIOLOGICAL ACTIVITIES OF TRANSITION METAL COMPLEXES DERIVED OF CHROMONE-3-CARBOXALDEHYDE SCHIFF BASE LIGAND

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Abstract: *A series of transition metal complexes of Co(II), Ni(II), Cu(II), Zn(II), Mn(II) and VO(II) have been prepared by tridentate Schiff base ligand containing N and O atoms. The Schiff base ligand(E)-1,5-dimethyl-4-(((4-oxo-4H-chromene-3-yl)methylene)amino)-2-phenyl-1H-pyrazol-3(2H)-one) have been synthesized by reaction between chromone-3-carboxaldehyde and 4-aminoantipyrineand characterized by Mass, ^{1}H-NMR, FT-IR and UV-Visible spectroscopy and its metal complexes were characterised by FT-IR, UV-Visible, P-XRD, TGA and CHN analysis. All metal complexes exhibited 1:1 stoichiometry ratio of metal to ligand. The ligand and its metal complexes were screened for antibacterial, antifungal, anticancer and antioxidant activity. The biological activity of Schiff base ligand and its transition metal complexes has been studied by using four bacteria named as Staphylococcus aureus, Bacillus subtilis, Salmonella typhi and Klebsiella pneumonia and three fungi Penicillium chrysogenum, Trichoderma viride, Aspergillus niger by using disc diffusion method. The anticancer activity was screened by using MTT assay against human MCF-7 breast cancer cell line. The antioxidant activity was screened by using DPPH method. From all these observations it can be concluded that the Schiff base ligand and its transition metal complexes exhibited better activities.*

Keywords: *Schiff Base, chromone-3-carboxaldehyde, 4-aminoantipyrine, metal complexes, spectral and biological studies, etc.*

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1. Introduction:

During the last few decades special attentions given to the Schiff base transition metal complexes due to their structural diversity and as stereochemical models in coordination chemistry. Schiff base ligand and its transition metal complexes behaves as active anticancer drug.[1-2] They are useful in some organic reaction and in magneto chemistry as a catalyst, it also useful in metalloproteins as models for metal containing sites in bioinorganic chemistry.[3-4] The

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Schiff base ligand synthesized from 4-aminoantipyrine and its transition metal complexes have various applications in clinical, analytical, pharmacological and biological fields.[5-10] Schiff base prepared from 4-aminoantipyrine with aromatic aldehyde shows an important class of chelating ligand and metal complexes prepared are of great interest due to their great applications in industry, processes of transport, higher oxidation state stabilization, extraction and catalytic properties.[11-16] Such biological applications of these molecules motivate the researchers to prepare new compounds and to evaluate the biological activity by in vivo and in vitro studies. For spectrophotometric determination of metal ions antipyrine derivatives have been used. Most of these reagents gives several colours with transition metal ions which provides sensitive probes and some of the compound can also coordinate with rare earth metals to form interesting structures of metal complexes.[17] Derivatives of pyrazolone are a group of antibiotics have been used in treatment of several bacterial diseases which have antibacterial activity against gram positive and gram negative strain.[18] As per coordination point of view the ligands prepared from 4-aminoantipyrine has an advantage of two potential donor sites to prepare different types of compound with metal ions.[19] In the present work Schiff base ligand and its transition metal complexes are prepared by condensation of 4-aminoantipyrine with chromone-3-carboxaldehyde and resulting transition metal complexes were investigated through different spectroscopic method and also these compounds are examined by antibacterial, antifungal, anticancer and antioxidant activity.

2. Experimental:

2.1 Materials methods:

In the present work all the chemicals used viz. chromone-3-carboxaldehyde, 4-aminoantipyrine and metal(II) acetate are of analytical grade and solvents like ethanol, ethyl acetate, petroleum ether, n-hexane which were used in the present work for synthesis are of spectroscopic grade. The microanalyses (C, H and N) were performed in 2400 Series II CHNS/O, Perkin Elmer analyser. The ^{1}H-NMR spectra of Schiff base ligand were recorded on BRUKER avance 400MHz ^{1}H-NMR instrument using DMSO as solvent. EI-MS spectra recorded on SYNAPT-XS#DBA06. The prepared Schiff base ligand and its metal complexes confirmed by FTIR spectra on JASCO FT/IR- 4700 spectrophotometer ranges from 4000 to 400 cm^{-1}. The electronic spectra recorded on UV-1800 series PERKIN ELMER UV-spectrophotometer by using DMSO as a solvent in between the range 200 to 1100 nm. Thermal analysis of the complexes performed under nitrogen atmosphere on TGA instruments

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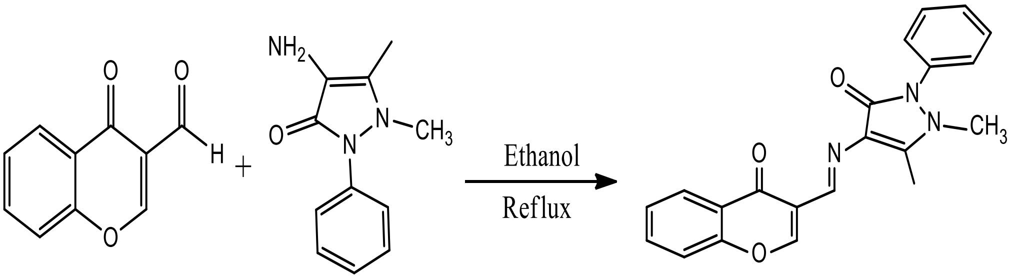
NETZSCH NJA-STA 2500 Regulus TGA thermal system. The Powder XRD was carried out on RIGAKU-JAPAN Miniflex 600 instrument.

2.2 Synthesis:

2.2.1 Synthesis of Schiff base ligand:

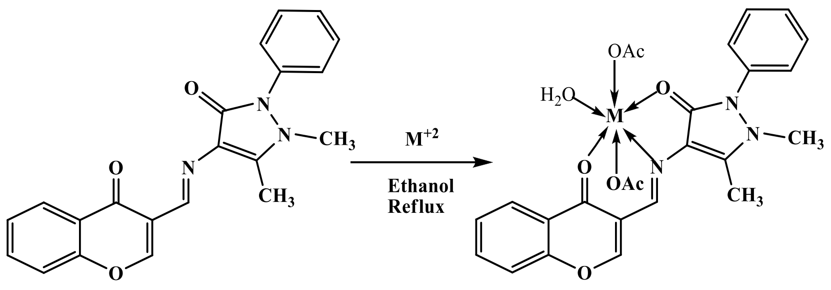
The Schiff base ligand (E)-1,5-dimethyl-4-(((4-oxo-4H-chromene-3-yl)methylene)amino)-2-phenyl-1H-pyrazol-3(2H)-one) was synthesized by condensation of ethanolic solution of chromone-3-carboxaldehyde (0.001 mol) and 4-aminoantipyrine (0.001 mol) by the literature method.[20] The reaction mixture was refluxed for 4-5 hours at 70-80°C and the reaction progress was monitored by thin-layer chromatography (TLC). The yellow solid product was formed, separated by filtration washed with cold ethanol and then dried under vacuum (Scheme1).



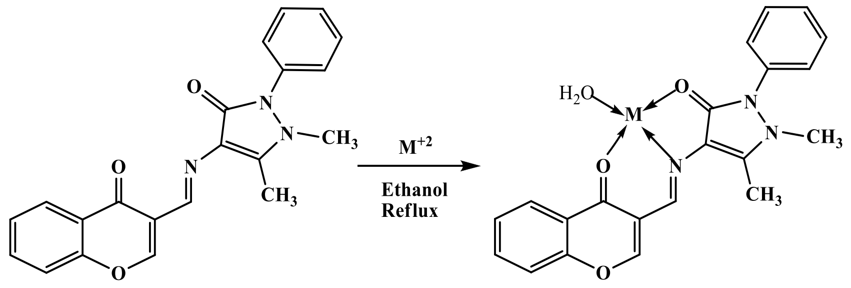
Scheme 1. Schematic route for the synthesis of Schiff base ligand

2.2.2 Synthesis of Schiff base transition metal(II) complexes (1-6):

A solution of metal acetate(II) in ethanol (0.001mol) was added to an ethanolic solution of Schiff base ligand (0.001mol) in 1:1 ratio and refluxed for 3-4 hours at 80-90°C. The pH of reaction mixture was maintained in between 7-8 by adding 10% alcoholic ammonia solution.[21] The coloured solid products were obtained which were filtered, washed with cold ethanol and dried under vacuum.(Scheme 2)



M= Co(II), Ni(II), Cu(II), Zn(II) and Mn(II)



M = VO(II)

Scheme 2. Schematic route for the synthesis of Schiff base transition metal complexes (1-6).

2.3 Anticancer activity:

The Anticancer activity of Schiff base ligand and their metal complexes were carried out using MTT assay on MCF-7 human breast cancer cell line. MCF-7 human breast cancer cell line were used in DMEM medium with 10% fetal bovine serum and incubated in culture medium at a concentration of 1×10^4 cells/ml at 37℃ and 5% CO_2 for 24h. Cells were put in (70μl) 10^4 cells/well in 100μl culture medium 100μl sample (10, 40, 100μg/ml) and control wells were incubated with DMSO and cell line. In triplicate all samples were incubated. Control were maintained to determine the survival of control cell and live cell percentage after culture and the cell cultures were incubated in 5% CO_2 incubator for 24 h at temperature of 37℃. After incubation, 20μl of MTT reagent was added for complete removal of medium and then cells were incubated in CO_2 incubator for 4 hrs. Observed the wells through a microscope for the formation of farmazan crystal. The yellow coloured MTT was reduced to dark coloured formazan only by viable cells. After the medium is completely removed then add 200μl of DMSO (kept for 10 min) then incubated at 37℃. The absorbance of each sample was measured

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against standard 5-fluorouracil using an Elisa micro plate reader (Benesphera E21) at a wavelength of 570 nm.[22,23]

2.4 Antimicrobial activity:

The in vitro antimicrobial screening of Schiff base ligand and its metal complexes has been carried out against gram positive bacteria (Staphylococcus aureus and Bacillus subtilis) and gram negative bacteria (Salmonella typhi and Klebsiella pneumonia) and fungi (Penicillium chrysogenum, Trichoderma viride and Aspergillus niger) using disc diffusion method. The Muller-Hinton agar and Potato dextrose agar have been used as a medium for the growth of bacteria and fungi. All the compounds are dissolved in DMSO which is a negative control which shows no activity against bacteria and fungi. The sample plates were incubated for 24 h at 37℃. After 24 h the resulting inhibition zone were recorded in millimetre by using sliding calipers placed on the back side of the inverted petri plate. The minimum inhibitory concentration of Schiff base ligand and its transition metal complexes which showed antimicrobial activity was determined by using literature method.[24]

2.5 Antioxidant assay:

The antioxidant activity assay of prepared Schiff base ligand and its transition metal complexes were tested by 1,1-diphenylpicrylhydrazyl (DPPH) method using Ascorbic acid as standard.[25] The standard solution was prepared by dissolving 1.95ml of 0.006% DPPH and 50µl of different concentrations (0-10 µg/50 µl) of standard ascorbic acid and taken the optical density of standard sample at 517nm. Then 10µl sample were dissolved in 40µl DMSO assed by 1.95ml 0.006% DPPH then % reduction in absorbance by ascorbic acid and also by sample is calculated. Then finally total antioxidant activity (TAA) in samples calculated by comparing it with standard ascorbic acid and expressed as mg.AAE/g sample (mg ascorbic acid equivalent per gram sample).

3. Result and discussion:

The Schiff base ligand and its Co(II), Ni(II), Cu(II), Zn(II), Mn(II) and VO(II) metal complexes are prepared and characterized by using different spectroscopic techniques like IR, ^{1}H NMR, Mass spectral analysis and also screened for biological activities. They are soluble in DMF and DMSO but insoluble in ethanol, methanol and water. The elemental analysis data of Schiff base and its metal complexes are good in accordance with the calculated values. Physical and analytical data of ligand and its metal complexes is shown in Table1.

Table 1. Physical and analytical data of Schiff base ligand and its transition metal complexes

Ligand/ Complexes	**Colour**	**Yield (%)**	**Melting Point °C**	**Elemental analysis found (Calc) (%)**		
				C	**H**	**N**
Ligand	Yellow	87	233	70.20(70.19)	4.40(4.73)	11.69(11.9)
$[Co(II)L(H_2O)(oAC)_2]$ $3H_2O$	Brown	62	>300	48.18(49.30)	4.44(5.09)	7.55(6.90)
$[Ni(II)L(H_2O)(oAC_2]$ $3H_2O$	Dark Yellow	68	>300	48.07(49.37)	4.01(5.09)	7.01(6.90)
$[Cu\ L(H_2O)(oAC)_2]$ H_2O	Green	63	>300	52.04(51.98)	4.72(4.67)	7.28(7.27)
$[Zn(II)L(H_2O)(oAC)_2]$ $3H_2O$	Orange	70	>300	48.83(48.78)	5.08 (5.04)	6.83 (6.84)
$[Mn\ L(H_2O)(oAC)_2]$ H_2O	Light Yellow	60	>300	52.82(52.77)	4.79 (4.74)	7.39 (7.38)
$[VOL(H_2O)]SO_4H_2O$	Black	59	>300	58.88(57.4)	4.47 (4.14)	9.81 (8.97)

3.1. IR spectra:

The IR spectral data of the synthesized Schiff base ligand and its metal complexes is compared to determine coordination sites involved in chelation. The IR spectra of Schiff base ligand and its transition metal complexes are shown in Figure.1. In the IR spectra of ligand, the band observed at 1651cm^{-1} is assigned to υ(C=O)group of the chromone in free ligand on complexation it was shifted to lower frequency wave number indicates the coordination of carbonyl oxygen of the υ(C=O) group to the metal ion.[26] Likewise C=O band at 1623 cm^{-1} assigned to pyrazole carbonyl in free ligand which on complexation shifted to lower frequency wave number indicates that the participation of oxygen of pyrazole carbonyl is in chelation with the metal ion.[27] The C=N of (azomethine) shows band at 1567 cm^{-1} in free ligand shifted to lower or higher frequency which indicates the participation of nitrogen of azomethine in coordination.[28] The IR spectral data of the metal complexes also shows new bands in the range of 590-535 and 457-423 cm^{-1} is due υ(M-O) and υ(M-N) respectively.[29] Therefore, from the IR spectral data it is concluded that the Schiff base ligand act as tridentate ligand with NOO donor sites which coordinate to the central metal ions via the C=O of the chromone, C=O of the pyrazole and nitrogen of azomethine. FT-IR data of Schiff base ligand and its metal complexes as shown in Table 2.

Table 2. FT-IR data of Schiff base ligand and its transition metal complexes

Sr. No.	Ligand/ Complexes	Chromone C=O	Pyrazole C=O	Azomethine C=N	M-O	M-N
1.	L	1651	1623	1567	--	--
2.	Co(II)	1570	1570	1489	586	424
3.	Ni(II)	1610	1600	1555	584	440
4.	Cu(II)	1620	1598	1489	589	457
5.	Zn(II)	1605	1577	1489	582	454
6.	Mn(II)	1632	1590	1490	536	423
7.	VO(II)	1642	1610	1486	543	423

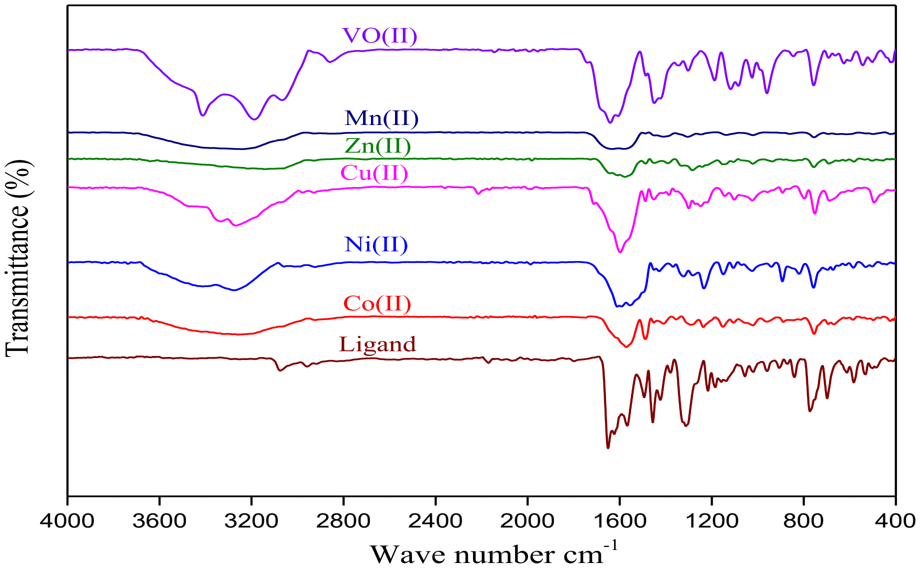

Figure 1. FT-IR Spectra of Schiff base ligand and transition metal complexes

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3.2 ^{1}H-NMR spectra:

The ^{1}H-NMR spectral data of Schiff base ligand was taken at room temperature in DMSO solution. In the ^{1}H-NMR spectrum, singlet observed at 2.4δ and 3.2 δ which attributes to the $-CH_3$, $-NCH_3$ group present in the pyrazole ring of Schiff base ligand. The ligand also shows the signal at 9.6 δ attributed to singlet of azomethine proton (–CH=N).[30] and signal at 8.9δ gives singlet for the aromatic proton of chromone moiety.[31] The bands at 7.4-8.1δ shows phenyl multiplet bands respectively.^{1}H NMR (DMSO): δ= 2.4 (s, 3H, $-CH_3$), 3.2 (s, 3H,$-NCH_3$), 9.6 (s, 1H, -N=CH), 8.9(s, -C=CH), 7.4-8.1 (m, 9H, Ar-H).

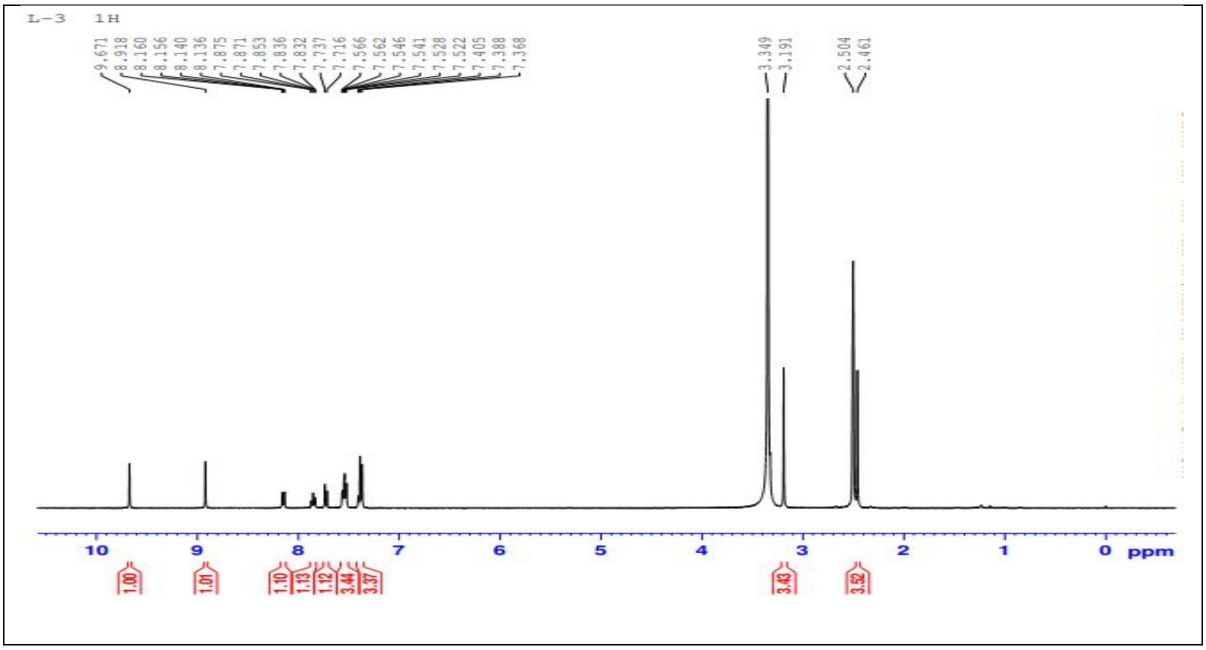

Figure 2. ^{1}H-NMR Spectra of Schiff base ligand

3.3 Mass spectra:

The molecular ion peaks verified the suggested formula for the synthesized compound. The mass spectra of Schiff base ligand exhibit the molecular ion peak at m/z 360 corresponds to $[C_{21}H_{17}N_3O_3]^+$ ion and 361 (M+1) which is in good agreement with the molecular weight of the proposed structure.

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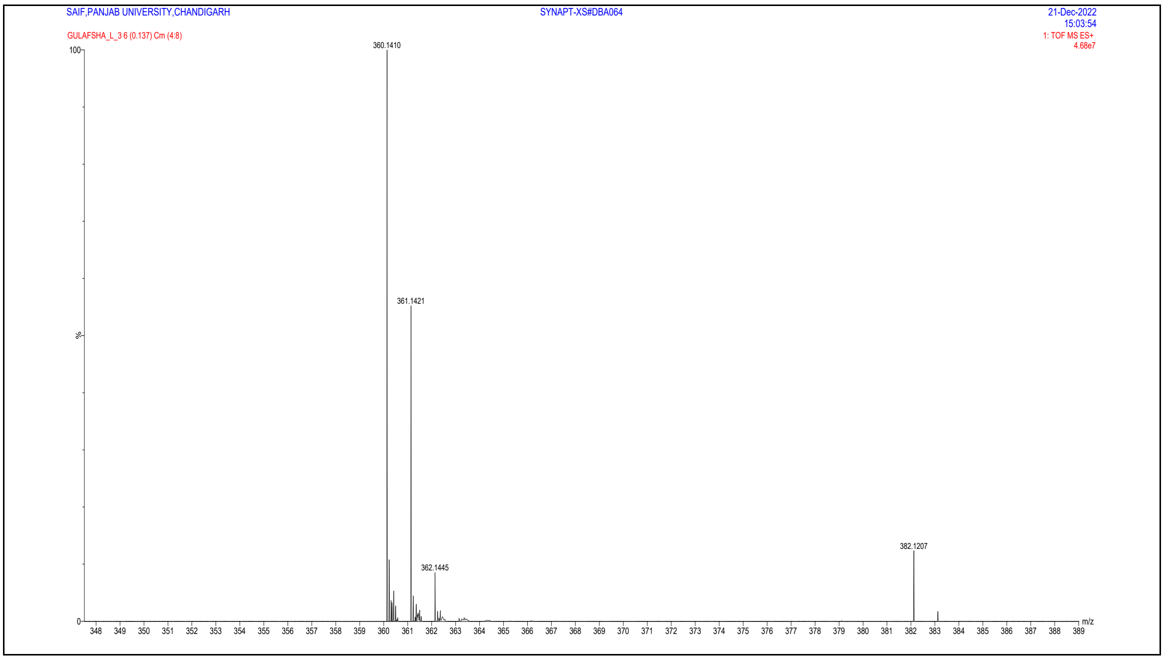

Figure 3. Mass Spectra of Schiff base ligand

3.4 TGA analysis:

The TGA analysis of transition metal complexes are taken which was recorded in the range of 25-800˚C in nitrogen atmosphere with 30°C/10.0(K/min)/800°C heating rate and it can be observed that the transition metal complexes of Schiff base ligand decomposes at higher temperature range which concludes that metal complexes are formed. The Co(II), Ni(II), Cu(II), Zn(II), Mn(II) and VO(II) complexes of ligand were chosen for thermal study. Based on TGA data, the decomposition of all transition metal complexes occurs in two steps. In the first step, weight loss suggests the presence of lattice water and coordinated water molecules in Co(II), Ni(II), Cu(II), Zn(II) and Mn(II) complexes which are removed within the range of 50-150˚C.[32] It is observed from the TGA data that the Co(II), Ni(II) and Zn(II) complexes contain three lattice water molecules and one coordinated water molecule, while the Cu(II) and Mn(II) complexes contain one lattice water molecule and one coordinated water molecule. In the second step,the ligand is lost in the temperature range of 150– 750 °C along with the coordinated two acetate ions in Co(II), Ni(II), Cu(II), Zn(II) and Mn(II) complexes. In case of VO(II) complexes, In first step weight loss between temperature 50-250˚C suggests the presence of one lattice water and one lattice sulphate ion and in second step weight loss between temperature 250-750˚C corresponds to loss of ligand along with coordinate water molecule. The mass of final residue corresponds to stable metal oxide.[33] The TGA graph is shown in Figure 4.

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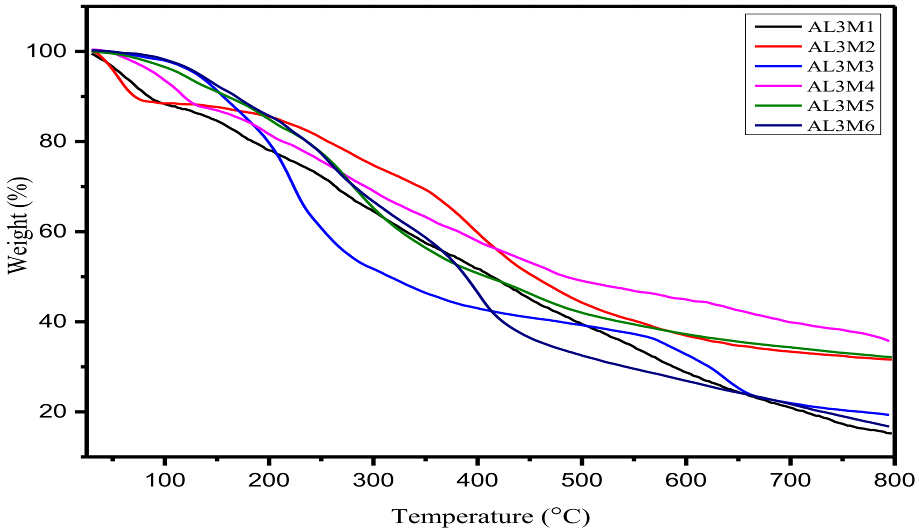

Figure 4. TGA spectra of transition metal complexes

3.5 Electronic spectral analysis and molar conductivity:

The electronic spectra of Schiff base ligand and its metal complexes were recorded in DMSO in the range of 16666 to 50000 cm^{-1} and wavelength range of 200 to 1100 nm.[34-38] The spectral data of Schiff base ligand and its metal complexes with molar conductance are demonstrate in Table 3. The molar conductivity were recorded in DMSO solvent and the values lies in between 2.1-9.8 cm^2 mol^{-1} shows nonelectrolytic nature of Schiff base ligand and its transition metal complexes.[39,40]

3.6 Powder x-ray diffraction:

The P-XRD of metal complexes is analysed in the range of 2θ = 20-80˚ at the wavelength of 1.540 Å which is useful for the knowledge of lattice parameters, cell parameters, crystal system. The pattern of diffraction shows the nature of transition metal complexes are crystalline.[27,30] The P-XRD data of transition metal complexes is summarized in Table 4. Based on P-XRD data, the Ni(II) and Cu(II) complexes shows orthorhombic crystal system, Zn(II) and Mn(II) complexes shows monoclinic crystal system and Co(II) and VO(II) complexes shows triclinic crystal system.

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Table 3. Electronic spectra of Schiff base ligand and its transition metal complexes

Ligand/ Complexes	**Maximum absorption (nm)**	**Maximum absorption (cm^{-1})**	**Band assignment**	**Molar conductance S mol^{-1} cm^2**
Ligand	268	37313	$n \rightarrow \pi^*$	2.1
	222	44943	$\pi \rightarrow \pi^*$	
Co((II)	402	24875	$^4T_{1g}(F)\rightarrow{}^4T_{2g}(F)$	9.1
	328	30487	$^4T_{1g}(F\ )\rightarrow{}^4A_{2g}(F)$	
	261	38240	$^4T_{1g}(F\ )\rightarrow{}^4T_{1g}(P)$	
Ni(II)	371	26954	$^3A_{2g}\ (F)\rightarrow{}^3T_{2g}(F)$	9.0
	279	35842	$^3A_{2g}(F)\rightarrow{}^3T_{1g}(F)$	
	275	36363	$^3A_{2g}(F))\rightarrow{}^3T_{1g}(P)$	
Cu(II)	338	29585	$2E_g\rightarrow{}^2T_2g$	7.2
	276	36231	Charge transfer	
Zn(II)	348	28694	Charge transfer	9.8
Mn(II)	385	25974	$^3T_{1g}(F\ )\rightarrow{}^3T_{1g}(P)$	7.8
	390	25614	$^3T_{1g}(F\ )\rightarrow{}^3A_{2g}(F)$	
	325	30721	Charge transfer	
VO(II)	889	11248	$^2B_2\rightarrow{}^2E$	8.1
	363	27548	Charge transfer	
	276	36231	Charge transfer	

Table 4. P- XRD data of transition metal complexes

Complexes	**Co(II)**	**Ni(II)**	**Cu(II)**	**Zn(II)**	**Mn(II)**	**VO(II)**
No. of reflection	17	32	17	33	30	35
Maxima (2θ)	40.43	53.65	55.28	46.71	43.64	50.22
Intensity	100	100	100	100	100	100
d value	12.684	10.715	7.312	10.087	13.750	9.553
Lattice constant (Å)	a=7.765 b=10.59 c=13.59	a=7.150 b= 12.307 c= 21.431	a= 14.322 b= 13.320 c= 8.504	a= 8.393 b= 14.922 c= 10.093	a= 13.914 b= 7.500 c= 16.254	a =7.472 b =8.235 c =9.667
Unit cell volume	1014.274	1886.033	1622.300	1263.455	1676.434	570.875
Axis and axis angle	a ≠ b ≠ c and α ≠β ≠γ≠90	a ≠ b ≠ c and α=β=γ= 90°	a ≠ b ≠ c and α=β=γ=90°	a ≠ b ≠ c and α=γ≠β≠90°	a ≠ b ≠ c and α=γ≠β≠90°	a ≠ b ≠ c and α≠β≠γ≠90
Z Value	4	8	4	2	4	2
Crystal system	Triclinic	Orthorhombic	Orthorhombic	Monoclinic	Monoclinic	Triclinic

3.7 Anticancer activity:

The anticancer activity of synthesized Schiff base ligand and its metal complexes was measured in vitro at different concentration (10, 40, 100 µg/ml) using MTT assay method against MCF-7 human breast cancer cell line in comparison with standard 5-Fluorouracil shown in figure 5. It was observed that all the tested compound show good activity for different concentration some metal complexes shows lowest activity but are active in comparison with standard 5-Fluorouracil. Hence Schiff base ligand and its transition metal complexes are excellent anticancer agent against human breast cancer cell line MCF-7.[26,41] Estimation based on IC50 values of the transition metal complexes are higher than their parent Schiff base ligand which was compared with standard shows moderate values.[42] Among these all the synthesized Schiff base ligand and its metal complexes show good activity as compared to standard compound. The % of inhibition for different concentration and IC50 values of the prepared compound are presented in Table 5.

Table 5. Anticancer activity of Schiff base ligand and its transition metal complexes

Sr. No	Compounds	% of inhibition for Concentrations (µg/ml)			Ic50
		10	40	100	
1.	Ligand	72.77	74.3	74.19	24.56
2.	Co(II)	54.08	63.67	71.34	38.53
3.	Cu(II)	69.18	73.14	76.54	39.01
4.	Zn(II)	78.83	78.09	78.40	59.8
5.	5-Fluorouracil (Standard)	79.14	83.29	88.79	42.08

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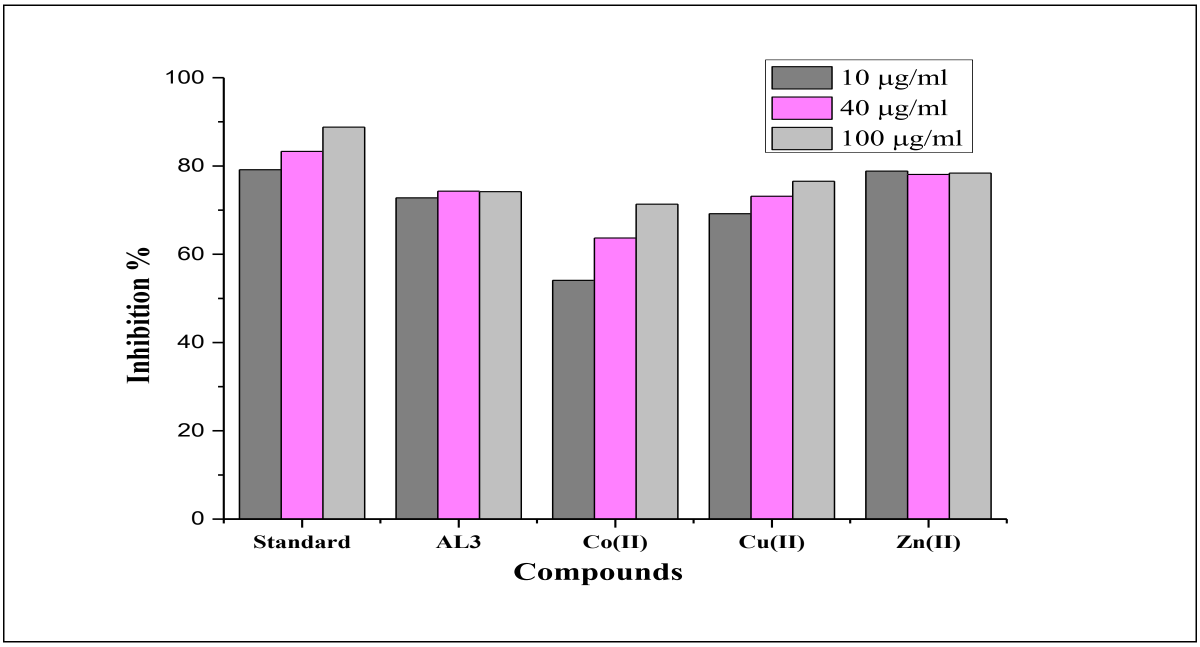

Figure 5. Anticancer activity of Schiff base ligand and its transition metal complexes

3.8 Antimicrobial screening:

3.8.1 Antibacterial activity:

The antibacterial activity of prepared Schiff base ligand and its metal complexes were tested against *Staphylococcus aureus, Bacillus subtilis, Salmonella typhi* and *Klebsiella pneumoniae* by using disc diffusion method.[43] The results of antibacterial activity in graphical form are shown in figure 7. From findings it can be suggested that Schiff base ligand and its some metal complexes resistant up to 8 mm and sensitive in between 12-18 mm and highly sensitive ≥ 18 mm zone of inhibition against different bacteria. It was found that Schiff base ligand show higher activity than the corresponding transition metal complexes.[44] The zone of inhibition for prepared compounds are summarized in Table 6.

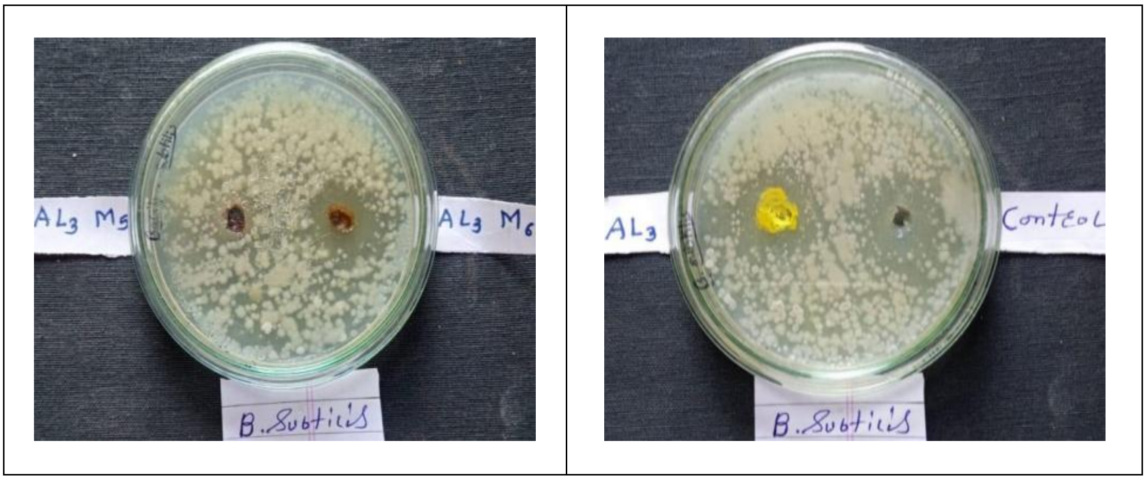

Figure 6. Antibacterial activity of Schiff base ligand and its transition metal complexes

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Table 6. Antibacterial activity of Schiff base ligand and its transition metal complexes.

Compounds	Zone of inhibition(mm)			
	S. aureus	***B. subtilis***	***S. typhi***	***K. neumoniae***
Ligand	25.5	32	26.5	39.5
Co(II)	24.5	–	–	15
Ni(II)	16	–	–	18.5
Cu(II)	–	17	18.5	39
Zn(II)	–	23	17	38
Mn(II)	15	14.5	20	23.5
VO(II)	24	21.5	26.5	19
Control	-ve	-ve	-ve	-ve

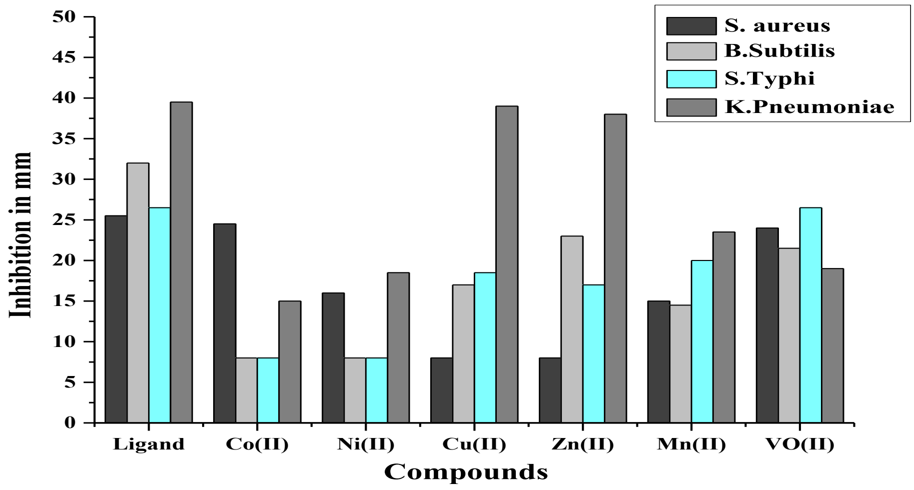

Figure 7. Antibacterial activity of Schiff base ligand and its transition metal complexes

3.8.2 Antifungal activity:

The antifungal activity of prepared Schiff base ligand and its metal complexes were tested against *Penicillium chrysogenum, Trichoderma viride* and *Aspergillus niger* using disc diffusion method.[43] The findings in graphical form are shown in figure 9. From results it can be suggested that Schiff base ligand and its some metal complexes resistant to up to 8 mm and sensitive in between 12-18 mm and highly sensitive ≥ 18 mm zone of inhibition against different fungi. Though the Schiff base ligand and its metal complexes possess good antifungal activity.[44] The zone of inhibition for of the prepared compounds are presented in Table 7.

Figure 8. Antifungal activity of Schiff base ligand and its transition metal complexes

Table 7. Antifungal activity of Schiff base ligand and its transition metal complexes

Compounds	**Zone of inhibition (mm)**		
	P. chrysogenum	***T. viride***	***A. niger***
Ligand	17	20	14
Co(II)	15.5	20.5	24.5
Ni(II)	13.5	26.5	33
Cu(II)	25	24	–
Zn(II)	–	–	15.5
Mn(II)	12	12.5	19.5
VO(II)	25	28	31.5
Control	-ve	-ve	-ve

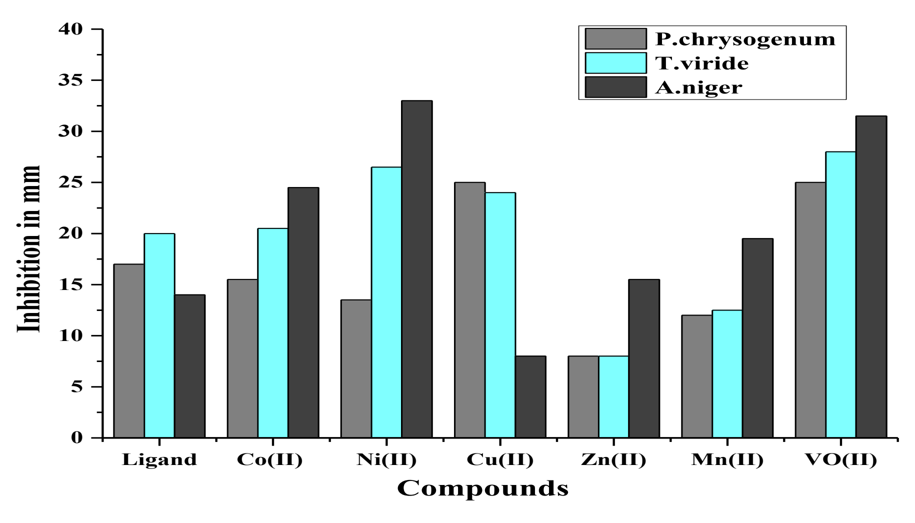

Figure 9. Antifungal activity of Schiff base ligand and its transition metal complexes

3.9 Antioxidant activity:

The antioxidants in the Schiff base ligand and their transition metal complexes were studied by DPPH method while Table.8 shows antioxidant values of prepared compounds at concentration of 10µl of sample compound and 40µl of DMSO are taken in which R denotes the reduction power. From finding it can be concluded that only zinc complex shows higher antioxidant activity in comparison with standard ascorbic acid.[45,46]

Table 8. Antioxidant activity of Schiff base ligand and its metal complexes

Compounds	TAA on DPPH scale (mg.AAE/g)		
	R_1	R_2	R_3
Ligand	-	-	-
Co(II)	-	-	-
Cu(II)	-	-	-
Zn(II)	23.38	23.23	22.69
Ascorbic acid (Standard)	19.79	19.70	19.99

4. Conclusion:

In this research paper we have synthesized the Schiff base ligand along with its transition metal complexes. Based on all spectroscopic techniques, ligand shows tridentate character. Based on P-XRD data, the Ni(II) and Cu(II) complexes shows orthorhombic crystal system, Zn(II) and Mn(II) complexes shows monoclinic and Co(II) and VO(II) complexes show triclinic crystal system. From the biological studies of transition metal complexes, it is found that some transition metal complexes shows moderate antibacterial and antifungal activities than ligand and also some transition metal complexes shows good anticancer activities than ligand.

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