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Microwave-Aided Preparation, Spectroscopic, Pharmaceutical Applicationsof Some Transition Metal Complexes Of Triazole Schiff Bases

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ABSTRACT

We describe here a method for the synthesis under the microwave irradiation of1-(4-(5-(p-tolyl)-1,3,4-thiadiazol-2-yl)phenyl)-N-(1H-1,2,4-triazole-3-yl)methenamine asSchiff base. Thissynthesis is fast,high yield %, and progresses, andpurer componentsthen used ligand to form complexeswithNi(II), Mn(II),Cu(II),and Co(II) ionsina molar ratio (1:2)(metal:ligand).All the complexes ofmetal (II) possessed a system octahedral. The use of mass, UV, and IR spectroscopy for stereochemical support has been approved alongside macro- and TGA analysis.The suggested structures for the coordinate'sarrangement are depended on their magnetic moment and UV-Vis spectra and are studied with TGA analysis.The complexes were studied using an integrated technique of applying Metzger and the Coats & Redfern calculation. Kinetics and decomposition were examined.The metal complex undergoes degradation in three stages. The metal oxides (MO) reside as the final products of the complex. In vitro testing was performed on all compounds produced from two-gram(-) and two (+)bacterial strains and two fungal strains.All of the synthesised compounds demonstrated moderate to substantial antimicrobial effects against one or more strains of bacteria.The antimicrobial activity for compounds examined by restraintefficacy and disc diffusion technology versus(HCT116)colon cancer cell line.

Keywords: Triazole,anticancer, microwave,antimicrobial,Schiff base.

Introduction: With the increase in ecological awareness in the field of research and chemical industry [1], economic [2], clean and effective procedures have extradited increasing interest in neoteric years [3].Developing an effective and simple process, applying a friendly ecologically path to an economic operator is a large request in chelation chemistry[4].In technology,modern developments have now achieved microwave energya better effective way of warming reactions [5].Transformations ofchemicalsthat occupied days or even hours to perform their organic reaction may now beachieved within minutes [6].Microwaves are known to facilitate the creation of a variety of inorganic and organic chemicals by speeding up chemical reactions due to microwaves' eclectic absorption by polar molecules [7].Schiff base ligand has been studied extensively in chelation chemistry because of the electronic

properties, surface synthesis, ease of availability, and solubility in popular solvents. They readilycomposesteady complexes with the generality of the metal ions [8].Several Schiff bases and complexes have been discovered to exhibit biologicaleffectiveness of catalytic because oftheirvaried sides of structural and great elasticity. A broad area of Schiff bases has been traditionally made, and their complex conduct has been intended[9].The development of organic biochemistry has raised attention in the complexes as it has been known.Many of these complexes may avail as patterns for biologically significant types and have been checked for anti-inflammatory[10], anti-fungal[11],anti-spasmolytic[12], antimicrobial[13], anti-cancer,[14]and anti-bacterialefficacies[15].The implementations of sustainable and green chemistry protocols haverecently witnessed a huge breakthrough in developing new and environmentally friendly methodologies to synthesiseworthy synthetic scaffolds and intermediates of drugs [16].In comparison to the synthesis of inorganic and organic components, microwave combinations for coordination and organic components are described in a comparatively few studies in the literature [17]. These heterocyclic components are generally blended into components of pharmaceutical importance [18].Triazoles and their derivatives are central in recent heterocyclic chemistry because of their efficient biological nature[19].S and N atoms also play an important part in the metals chelating at the active sites of many biomolecules [20]. The demand for biological metallocene has increased in recent years[21].

Metallo- and organic chemistry has become an emerging field of study because ofbiological components[22].Numerous studies have established that coupling a medication with a metal component enhances efficacy[23].The compound has more therapeutic features than the original drug in some statuses[24]. The newly synthesised ligands' environmental synthesis, structural description, and antibacterial properties are reported. Use of disc diffusion to test antifungal/antimicrobial/anti-colon cancer (HCT-116) activity

2. EXPERIMENTAL

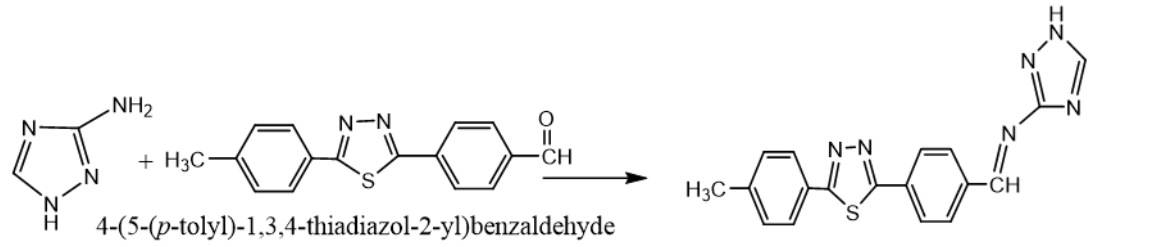
2.1. Material and methods

All of the compounds utilised were of the annular kind. Microwave-assisted (MW) reactions were carried out in a domestic microwave with an energy output of 900 W and a wavelength of 2450 MHz. The microwave reactions were done using on/off cycling to regulate the temperature.TLC and melting point data were used to monitor the reaction's completion, as shown in Fig. 1.

2.1. General procedure for synthesis ligand

Schiff base Ligand

In a grinder, 3-amino-1,2,4-triazole (0.01 mol) was thoroughly combined with 4-(5-(p-tolyl)-1,3,4-thiadiazol-2-yl)benzaldehyde (0.01 mmol) in an equimolar (1:1) ratio.After that, 3-4 mL of ethanol was added to the reaction mixture and microwaved. The reaction took only 1.5 minutes at 90 watts and produced better yields. The orange-coloured product was then recrystallised in hot ethanol before drying under decreased pressure over anhydrous $CaCl_2$.



The general process for installing the complexes

(0.9mmol) of $Cu(AcO)_2.H_2O$,$Ni(AcO)_2.4H_2O$,$Mn(AcO)_2.4H_2O$, and $Co(AcO)_2.4H_2O$ metal salts were mixedin (1:2) proportion withthe ligand. The solution was then microwave-irradiated by using(4ml) of solvent.The reaction is finished in less time withmoreyields. Then the result was recrystallised with ether and ethanol and lastly dried in a dryerover anhydrous $CaCl_2$under decreased pressure. TLC using silica gel was used to monitor product purity and reaction progress.Asimilarway was applied to synthesise the other complexes (Scheme 1). The analytical, spectral physical values are shown in Tables 1-3.

Studies ofAntifungal and bacteria

The newly synthesisedSchiff base ligand and metal(II) complexes were estimated versus their antimicrobial efficacy applying the agar diffusion style. 5 mg/ml of DMSO solution was used.Tested organisms were(Candida albicans and Aspergillus flavus) as fungi and (Salmonella typhimurium and Escherichia Coli bacteria(-)Gram and (Staphylococcus and Bacillus subtilis) as(+)Gram bacteria. Microbes were grown on nutrient agar plates.

Antimicrobial activity was investigated utilising the agar diffusion method:

Prepared components for their antimicrobial efficacy versus diverse organisms were examined with environmental and clinical significance in the chicks. Inoculations of microorganisms spread jointly using a sterile ring; the pure colonies of bacterial culture were captured.The colonies were suspended in sterile physiological saline (5 ml). In In Biological, gently sterile forceps pressed to ensure plate contact were incubated for 1 hour in the refrigerator, followed by 24 hours at 37 °C. The inhibition zone area was evaluated after incubation (containing the whole diameter).

Cytotoxicity Evaluation

A specific influence of chemical compound cells (human colon cell line of cancer) was obtained from the VACSERA tissue culture unit. Chemicals applied (DMSO), blue trypan tincture,and crystal violet from Sigma.

HEPES buffer solution, DMEM, Fetal Bovine serum, RPMI-1640, L-glutamine, 0.25% Trypsin-EDTA and gentamycin were purchased (1%). The crystal violet stain and Lonza: It formed of 50% methanol and 0.5% crystal violet (w/v),then shaped to size with H_2O and filtered through the paper of Whatman.

ratio Cell line:

The cell was reproduced in a modified eagle medium (DMEM) in Dulbecco completed with an L-glutamine (1%), buffer, gentamycin (50 µg/ml), and heat-defective serum offetal bovine (10%). All cellswere kept in a humid atmosphere at 37°C and sub-collected twice a week.

Cytotoxicity evaluation using viability screening:

For cytotoxicity screening, the cells were seeded at a cell concentration of 1×10^4 cells per well ina 96-well plate in a growth medium (100 µl). A fresh medium containing diverse test sample concentrations was added after 24 hrs.Seedingof Serial two-fold dilutions of the tested chemical compound was added to confluent cell monolayerusing a pipette dispensed into 96-well, flat-bottomed microtiter plates. The microtiter plates were brooded in a dampened incubator at 37°C for a period of 48 hrs.,with5 % CO_2. Three wells were used for each check sample concentration. Control cells were brooded without or with DMSO and without a check sample. The tiny percentage of DMSO present in the wells (maximal 0.1%) did not affect the experiment.

After cells incubation at 37°C, the various concentration of the sample was added, and the pregnancy was continued for 24 hrs. Colorimetrically, After 30 minutes of incubation, the media were aspirated, and the crystal solution (1%) was added to each well.Next, the stain was removed, and the Plates were rinsed with tap water to remove all excess dye. Acetic glacial acid was then added and thoroughly mixed in all wells (30%).Then the absorbance of plates was measured after gently shaking on a reader, using a test wavelength of490 nm. They were corrected for background absorbance in wells without added dye. Control without the tested compounds,treated samples were compared with the cell. All experiments were carried out in triplicate. First, the cell cytotoxic effect of each tested compound was calculated. Next, the reader measured the optical density to determine the number of viable cells, and the viability% was calculated as [1-(ODt/ODc)] x100%.The average optical density of the sample-treated wells is ODt. The untreated optical density is ODc.Finally, The survival curve of each tumour celtumoure after treatment with the specified compound is plotted. The 50% inhibitory concentrationwas estimated from graphic plots of the dose-response curve for each concentration using Graphpad Prism software**.**

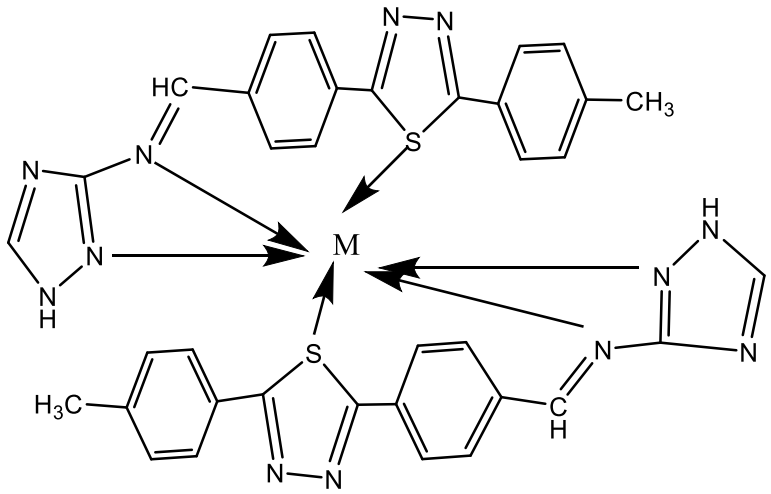
3. **RESULTS AND DISCUSSION**

The different chemical universe demands many green strategic paths in our pursuit of sustainability. The protruding region of green chemistry envisions minimal risks for execution during the new chemicals operations.This goal is to recognisethe reaction mediumto achieve the required chemical transition while minimisingwaste or products and removing theclassicalsolvents of organic.

As a result, many modern plantings have emerged like solvent-free (dry matter), (grinding) solid/solid, and supported solid reactions. The employedreaction medium of water, ionic fluids, and supercritical CO_2room temperaturecan be concerned with ultrasound or microwave. The excellentsolvent is not a solvent, but in such problem cases of heatand masstransfer aspects and material handling, it must be addressed in lock collaboration with engineers of chemical

Table (1):The some of physical properties and microanalysis of all prepared products

Compounds	formula	Molecular Weight	Colour	Yield%	M.P.	%Elemental Analysis Found % (Calculated)			
						C	H	N	M
TPTM	$C_{18}H_{14}N_6S$	346.41	orange	65	153	61.83 (62.41)	3.87 (4.07)	24.03 (24.26)	-
$[Co(TPTM)_2].H_2O$	$C_{36}H_{30}CoN_{12}OS_2$	723.13	blue	60	257	35.87 (36.54)	3.90 (3.76)	4.12 (3.87)	17.10 (16.30)
$[Mn(TPTM)_2].H_2O$	$C_{36}H_{30}CoN_{12}OS_2$	722.65	Green	68	264	35.87 (36.57)	4.12 (3.77)	3.23 (3.88)	16.76 (16.24)
$[Ni(TPTM)_2].H_2O$	$C_{36}H_{30}CoN_{12}OS_2$	732.36	Pale-brown	77	221	36.66 (36.08)	4.21 (3.72)	3.18 (3.83)	16.56 (17.35)
$[Cu(TPTM)_2].H_2O$	$C_{36}H_{30}CoN_{12}OS_2$	736.02	Brown	69	200	36.21 (35.90)	3.06 (3.76)	4.32 (3.81)	17.08 (17.77)
$[Zn(TPTM)_2].H_2O$	$C_{36}H_{30}ZnN_{12}OS_2$	736.02	Brown	69	200	36.21 (35.90)	3.06 (3.76)	4.32 (3.81)	17.08 (17.77)



The ligand was synthesised by reacting a 4-(5-(p-tolyl)-1,3,4-thiadiazol-2-yl)benzaldehydewith 3- amino-1,2,4-triazole.Thefeatured frequencies of IR spectra of ligand and its metal(II) complexes are listed in the empirical portion and Table 2. All the ligand possessed potential donor sites like (N-H) group of pyrrole linkage (-C=N)azomethine, S ofthiadiazol (-C-S),and N of (-C=N)triazole ring, thatinclineto chelate with the ions of metal. Thus, the ligand spectra appeared the frequencies at 3178, 1606respectively attributed to vibration of (N-H), (C=N) group.

The generalconclusions derived from therapprochement of the spectra of the ligand with the metal complexes are as next:

1)In complexes spectra, band designated to (C=N) changed at 1593-1580cm^{-1}detectedthe metal atomcoordination toN- azomethine. The coordinationof metal to N atomis further justified by a new band that appeared at 610-623 cm $^{-1}$ due to M-N.
2) The ligand spectra displayed the frequency at 3122 cm^{-1} due toNH vibrations. This band disappeared in complexes spectra, attributed to the deprotonation of the NHgroup during chelation. The appearance of a weak band at 532–547cm^{-1} due to υ(M–N) vibrations further supported the evidenceof the metal–nitrogen (M–N) linkage.
3) A new frequencydisplayed at 657-672 cm^{-1} due to υ (M-N) modes mentioning the chelation of N of two (C=N) with metal ionsin all complexes. Nevertheless, in the complexes spectra,the band at 1072cm $^{-1}$ was designated to υ (N-N) vibrationin the triazole ringthat has not changed. So, nitrogen υ (N-N) was not involvedin the triazole ring.
4)The band was shown at 965 cm^{-1} attributed to (C-S) vibration in the ligand spectrum. In contrast, this band showed942–955cm^{-1}that shifted to15–20 cm^{-1} involvement chelation ringthienylin the complexesspectra. This coordinationis further justified by the appearance of a new band at 460- 466 cm^{-1} due to M–S.
4) The compoundsspectra showed decisively that the ligand was coordinated with the metal atom across the triazole-N,thiadiazol-S,and N- C=Ngroups.
5) ll other bands have not changed in the ligandspectra and theiridentical complexes.

Table (*2*):The IR specral of all prepared products

Compounds	υ(NH)	(HC=N)	(C=N)	N-N	(S-C)	υ(M-N) υ(M-S)
TPTM	3122	1606	1578	1072	965	––
$[Co(TPTM)_2].H_2O$	3130	1590	1595	1073	945	657 617 532
$[Mn(TPTM)_2].H_2O$	3125	1587	1590	1076	950	661 610 545
$[Ni(TPTM)_2].H_2O$	3120	1580	1593	1068	942	672 617 547
$[Cu(TPTM)_2].H_2O$	3127	1585	1596	1070	948	666 623 541
$[Zn(TPTM)_2].H_2O$	3118	1593	1589	1074	953	668 620 538

3.2. ^{1}H NMR

The apparent signs of all the ligand protons indicate that groups of aromatic/heteroaromatic are found to be in their predictable area.The ligand spectrum offeredprotons(-CH=N)of triazole and (-CH=N)azomethine was shown as singles at 8.57and9.12ppm, respectively.A singlet appeared at 3.49 ppm attributed to the proton of CH_3 for triazole in the ligand.The ligand exhibited protons of =C-H aromatic for the phenyl groups as multiplein range(6.86-7.45) ppm.

A broad singlet appeared at 14.40 ppm attributed to the proton of N-H for triazole in the ligand displaying tautomerism. These peaks by the downfield moving signals of (-CH=N) azomethine and triazole (-CH=N) protons observe at 8.86 and 9.45 ppm in the zinc complex in complexes.The chelation of thienyl-S was excused by the lower-fieldmoving of the S-CH proton from 8.11 in ligand spectrum to 8.42 ppm in its Zn(II) complex attributed to its impactdeshielding.All other protons, in general, underwent a downward move of 0.15-0.28ppm, which was attributed to the growing conjugation in this complex spectrum.

The ^{13}CNMR spectra of the Schiff base ligand were recorded in DMSO-d6 and are depicted in Fig. 3. The experimental section reports ^{13}CNMR spectral information and possible assignments.The carbons were all in the expected place.The azomethine carbon (-CH=N) was detected at 160.32 in ^{13}CNMR spectra of the Schiff base ligand. At 123.21-152.54 ppm, all carbons of the phenyl groups in the ligand were visible. Due to the attachment of the methyl (CH_3) group, carbon CH_3 was observed downfield at 23.56ppm in this ligand.The carbons of ligand were observed at 131.45 ppm, 136.23 ppm,147.98 ppm and 156.43 ppmby attachment of the retreat of C=N groups ofthiadiazol triatriazoles.

Mass spectra

The mass spectrometric values and shatter manner in the ligand warrant the peak ion m/z =346.10(Calcd. 346.41) from $[C_{18}H_{13}N_6S]^{\cdot+}$ that lacks radical as hydrogen (H) to get the most steady fraction at m / z =2*55* and showed the molecular ligand spectra of $[C_{11}H_7N_6S]^{+\cdot}$ The shatter manner follows the cleavage of bonds C = N (endocyclic and exocyclic), C-N, C-C and, C-S.

Magnetic sociability and Electronic spectra of complexes

The electronic spectra and the arranging constructof the compounds, electronic spectra of solid-state of the studied complexes showed absorption ranges in two distinct regions. The first area ranges between (200-1000). The UV-Vis spectra of the Mn (II) complexes showed three bands in the range at17,064 cm $^{-1}$,13,192 cm $^{-1}$and 12,150cm $^{-1}$designated to $^{3}A_{2g(F)} \rightarrow {}^{3}T_{1}g_{(P)}$, $^{3}A_{2}g_{(F)} \rightarrow {}^{3}T_{1}g_{(F)}$,and $^{3}A_{2}g_{(F)} \rightarrow {}^{3}T_{1}g_{(F)}$ transmissions. Observation of these bands indicates anoctahedral formation around Mn(II) ion.The Co (II) complex spectrumappearswith threepeaks with noticeable density at 8768 cm^{-1}, 17,325 cm^{-1} and 29,748 cm^{-1}. These transitions were temporarily assigned to $^{4}T_{1}g \rightarrow {}^{4}T_{2}g$ (F), $^{4}T_{1}g \rightarrow {}^{4}A_{2}g$ (F), and$^{4}T_{1}g \rightarrow {}^{4}Tg$(P), respectively. Magnetic sensitivity is 4.32 BM.Consequently, anoctahedral arrangement has been proposed for Co (II) complex, relative to the Ni complex and the broadbands detection at 29,231 cm^{-1}, 16,239 cm^{-1}and11,376 cm^{-1}designated for the

transmissions $^3A_2g(F) \rightarrow {}^3T_2g(F)$, $^3A_2g(F) \rightarrow {}^3T_1g(F)$ and $^3A_2g(F) \rightarrow {}^3T_2g(F)$.This octahedralarrangement around a nickel(II) ion suggested that another band in a 30,395cm^{-1} range be observed to transfer the L-M charge. The electronicspectra of Cu(II) complexes displayed a low-energy absorption peakfor Cu(II) complexthat appeared spectrum absorption at 14,886 cm^{-1}suggestedfor ($^2Eg \rightarrow {}^2T_2g$) transmission.Thehigh-energy band at 325,267cm^{-1} is due to illegalL→ Mcharge transfer. A distortedoctahedral formation is suggested for Cu(II) complexes assumingoctahedral formation.Thediamagnetic Zn(II) complex did not display any d–d transmissions. Its spectrum was controlled only by the peak of charge transferat 28,765cm^{-1}also. The electronic spectra and magnetic moment data (BM) specified for all metal (II) complexes were recorded in Table 2. Magnetic moment values for Mn (II), Co(II), Ni(II), and Cu(II)were foundin 5.23, 4.17, 3.46, and 1.78 BM, respectively.Indicate high-spin with an unbound electron in anoctahedralarrangement.

Table 3:The electronic spectra and magnetic moment data for all metal (II) complexes

Compounds	**μeff BM**	**Λ_m(S.cm^2.mol^{-1})**	**λ_{max}(nm)**	**Wave number (cm^{-1})**	**Assignments**	**structure**
TPTM		-	276	36231	n→π*	-
			321	31152	π→π*	
$[Co(TPTM)_2].H_2O$	4.17	78	259 336 577 729	38610 29,748 17,325 13,717	C.T $^4A_{2(F)} \rightarrow {}^4T_{1(P)}$ $^4A_{2(F)} \rightarrow {}^4T_{1(F)}$ $^4A_{2(F)} \rightarrow {}^4T_{2(F)}$	Octahedral
$[Mn(TPTM)_2].H_2O$	5.23,	77	264 312 586 758 823	37878 31645 17,064 13,192 12,150	L.F C.T $^3A_{2g(F)} \rightarrow {}^3T_1g$ $_{(P)}{}^3A_2g_{(F)} \rightarrow {}^3T_1g_{(F)}$ $^3A_2g_{(F)} \rightarrow {}^3T_1g_{(F)}$	Octahedral
$[Ni(TPTM)_2].H_2O$	3.46	79.4	266 329 342 615 879	37,593 30,395 29,231 16,239 11,376	L.F C.T $^3A_2g(F) \rightarrow {}^3T_2g(F)$ $^3A_2g(F) \rightarrow {}^3T_1g(F)$ $^3A_2g(F) \rightarrow {}^3T_2g(F)$	Octahedral
$[Cu(TPTM)_2].H_2O$	1.78	81.6	269 307	37,174 32,573	L.F C.T	Octahedral

			670	14,886	$^2Eg \rightarrow {}^2T_2g$	
$[Zn(TPTM)_2].H_2O$	-	81.6	264 320 368	37,872 31,234 28,765	L.F C.T C.T	Octahedral

4. Bacterial efficacy

4.1 Antimicrobial efficacy

The effectiveness of antibacterial compounds was tested with fungi and Gram (-), Gram (+) bacteria.The results obtained were compared with miphinicol asa criterion drug in gram-(-)bacteriain5 mg/mlconcentration. While flucoral was used as the criterion for fungi, checked as the criterion with the attention of 5 mg/mlligandsimples. The ligand showed an altered grade of restrained influences on the expansion of various checked strains. Their complexes showed medium to high effects on the development of multiplestrains of bacteria. Theligand has efficacyversus all checked fungi and (Gram-(-) bacteria) exclude for Staphylococcus aureus as if there was no Gram-(+) efficacy.Cu (II) complex appeared in higher restraint regions versusfungi such as Aspergillus Niger and Gram-positive bacteria as Bacillus subclause bacteria. At the same time,Pseudomonas Aeruginosa Staphylococcus aureus and Candida albicans,Escherichia coli and have only the efficacy and Ni (II) efficacy for Niger Aspergillus as fungi and effectivenessofbacteria gram-(-) andgram-(+).

The antimicrobial outcomesappeared that:

It recruits a biologically active ligand. Thus, its antibacterial activity and the right group that clarifies the transformation mechanism in biological systems may be responsible for its efficacy.It recruits biologically efficiently.Activity may compose the new moiety of (C=N), which has a significant role in the anti effectiveness efficacyimine moiety indicated in cases in biological regulations.

1- Prepared components were highly toxicanalogised with their free ligand under similar empirical situations andthe analogous microorganism.The biological efficacy is growing of metal coordinatesmaybebecause of the influence of the metal ion on the standard procedure of cells. A potential way to increase toxicity could be reflected in the bewitching light (Tweedy chelation theory).The chelation process significantly decreases the metal ion polarity due to the partial involvement of its (+) charge with the donor moiety and the capacity to remove electrons within the whole chelate ring system composed during chelation.
2- Such coordinating can reinforce the lipophilicbehaviour of the central metal atom and thus increase this behaviour of complexity. This behaviour prefers to penetrate through the lipid layers of the cell membrane, increasing the absorption/entry rate and, hence, the checking components' antimicrobial efficacy.
3- These increased lipophilic properties deactivate respiratory enzymes and possibly other cellular enzymes required to control metabolic pathways. In addition, the components'

action mode may also form an H-bond via an N-azomethine (C= N) with the efficient centres of cell components, interfering with the natural cell method.Thus, antimicrobial efficacy can be requested in the following order: Cu(II)>Ni(II)>Mn(II)>Zn(II)>TPTM. As all complexes: i- Have similar atoms ofthe donor, which are N / Nwithinequalchelation number. ii-Have a similar effect as chelating (all forming two chelating rings of 6 members), iii- Neutral and no counter ions, having the same oxidation number in their complexes (M^{2+}) activeagents are the octahedral geometry and the central atoms kind.The presence of H_2O in the formula indicates that the Cu(II)complex has higher antimicrobial efficacy than the Ni(II) complex. Cu(II) complex can form a strong bond (Cu (II) – ligand of Ni (II)- ligand, which increases the lipophilic behaviour of Cu (II) from Ni (II). From the points mentioned above, connections between activity and structure indicate that complexity with Cu (II) enhances theantimicrobial efficacy forligand versusseveral checked organisms.Since Co(II) coordinates have strengthened their antimicrobial effectiveness, compared to similar Ni(II) ions, the metal appears to play a related role in the efficacy of these components.The same character was shown for increased Cu(II) derivatives antibacterial efficacy compared to the coinciding Ni (II) coordinate. The complexes tested were more active against fungi than bacteria Gram-(-) and gram-(+). It can be inferred that the compound's efficacy is regarded to structure the bacteria cell wall.It is potentialdue to the cell wall being fundamental for some antibiotics. The existence of bacteria candie bacteria by preventing a stage in the peptidoglycan synthesis.Gram-(+) bacteria have a thick cell wall containingteichoic acids and peptidoglycan strata.

4- On the other hand, gram-(-) has a relatively thin cell wall with a few peptidoglycan strata containing lipoproteins and Lipopolysaccharides by a secondary lipid membrane. These variations in the structure cell wall structurevariations in susceptibility to antibacterial. Some antibiotics can only kill Gram (+) bacteriaandare contagious vspathogens of a gram (-).Importance of like work lies in the potential that the new components may be more active drugs. The relationship between toxicity activity and the structure of their physical inflictions can be thoroughly investigated,which could help design more effective antibacterial agents for treatment. Strains of bacterial were listed their outcomes in Table 4.

Table 4: Antibacterial of ligand and its complexes.

Organisms Test	Recorded zone diameter (mm) for each test microorganism					
	Bactria				Fungi	
	Gram-positive		Gram-negative			
Sample	Bacillus subtitles	Staphylococcus	Escherichia coli	Pseudomonas Aeruginosa	Aspergillus Niger	Candida albicans
TPTM	11	6	10	16	10	7
$[Co(TPTM)_2].H_2O$	12	8	12	14	9	6
$[Mn(TPTM)_2]$	20	8	7	6	20	30

.H_2O						
[Ni(TPTM)$_2$].H_2O	15	12	15	18	29	20
[Cu(TPTM)$_2$].H_2O	22	18	15	26	30	39
[Zn(TPTM)$_2$].H_2O	13	9	11	18	15	8
Standard	35	40	34	28	21	28

Efficacyof Anticancer

The study of anticancercompounds versus(HCT116) colon cancer and the cell datathat the compounds exhibit efficacy versus these cancerous cells with IC50 data of 30-5µg/ml, respectivelyTable 5.

They categorise these compounds as having chemotherapeutic relevance, where IC50 concentrationmay decrease cancer cell growth by 50%. The order of potency as a function of the coordination metal ion directs the arrangementTPTM <Mn<Co<Ni<Zn<Cuvscancer cells of HCT-116. The values reference that in vitro IC50 data for ligand versus cell lines are more than metal complexes;therefore, complexes have better antitumor efficacy than the parentcomponent. It meant that the parent ligand has failed to cause necessaryrestrainedconduct on both cancer cells, as evidenced by more IC50 celldata. The outcomes indicate that inhibition of the growth of cancer cells is due to programmed cell death in all the compounds.

Table 5: IC50 data of ligand and its complexes.

Compound	IC50 against HCT116cells, µg ml^{-1} (µM)
TPTM	*24.*0
[Co(TPTM)$_2$].H_2O	*43.*90
[Mn(TPTM)$_2$].H_2O	37.4
[Ni(TPTM)$_2$].H_2O	89.0
[Cu(TPTM)$_2$].H_2O	1*28.*0
[Zn(TPTM)$_2$].H_2O	100.70

Conclusions

The recently prepared Schiff base present as trident ligand and prepared complexes are chelated through the N- triazole ring, N-azomethine(C=N), andS-thiadiazol groups to a metallic ion chelated via.All prepared complexes have anoctahedral structures. Ligandappears high activity andbreast efficacy can be improved upon coordinating based on

chelation theory and the concept of overtone. . In addition, the components' action mode may also form an H-bond via an N-azomethine (C= N) with the efficient centres of cell components, interfering with the natural cell method. Results of cytotoxic efficiency of the cancer cell HCT-116 (in vitro) TPTM <Mn <Co <Ni <Zn <Cu complex secures expansion of restraintefficiency versuscell lines of human colon cancer (HCT116). The values reference that in vitro IC50 data for ligand versus cell lines are more than metal complexes; therefore, complexes have better antitumor efficacy than the parent component.

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