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Synthesis, Spectroscopic and Antimicrobial Studies of Mixed Ligand Metal (II) Complexes with three amino acids.

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ABSTRACT

The research includes synthesis and identification of novel three amino acids ligands complexes of some heavy metal (II) ions by using the amino acids like glycine, L-alanine and L-valine. New metal mixed ligand complexes with amino acids are prepared the reaction by reacting the three amino acids with the metals(II) chloride by using 50% ethanolic solution and 50% distall water in the molar ratio [1:1:1:1] (M:Gly:Ala:Val) except for Co(II) and Ni(II) complexes were found after diagnosis the coordination with both L-alanine and L-valine. The prepared complexes identified by using physical properties, flame atomic absorption and conductivity measurements, in addition, mass, FT.IR and UV.vis spectrum as well magnetic moment data. The general formula of the complexes is $Na[M(Gly)(Ala)(Val)].H_2O$ in which the Glycine ($C_2H_5NO_2$) is symbolized as (Gly), the L-alanine ($C_3H_7NO_2$) is symbolized (Ala), L-valine ($C_5H_{11}NO_2$) is symbolized (Val) and M(II) represent Cu(II), Zn(II), Cd(II) and Hg(II), except the Co(II) complex is in the formula $[Co(Ala)(Val)(OH_2)_2]$. and the Ni(II) complex is in the formula $Na[Ni(Ala)(Val)Cl].H_2O$. Each of the glycine, L-alanine and L-valine behave as a bidentate ligand which is coordinated through the oxygen atom of the carboxyl group ($-COO^-$) and the nitrogen atom of the amino group ($-NH_2$). The suggest geometry of the metal(II) complexes to be octahedral except the Ni(II) complex is square pyramid geometry. In the research the study of antibacterial and antifungal activity of the three amino acidsilgands and their complexes.

Keywords: Glycine, L-alanine, L-valine, Mixed ligand complexes, Spectral studies, Antibacterial, antifungal studies.

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INTRODUCTION

Metal complexes have become importance in recent years especially at design from repository, release slow or long acting medicine in nutrition and by the study of metabolism [1]. It is known that metal ions to accelerate the action of the drug [2].Mixed ligand complexes are well known to play an important role in biological processes [3-5]. Many researchers have extensively investigated metal complexes of biologically active ligands [6-7]. The literature survey revealed that mixed ligand complexes of some transition metals with amino acids have been studied for their synthesis, characterization, biological significance and metabolic enzymatic [8- 9]. Amino acids containing $–NH_2$ and –COOH active groups are well known with their inclination at form complexes by metals and have great significance at biological as well as pharmaceutical [10-11] domains. In last year's transition metals amino acids complexes were received lots of interest because they have proven to be beneficial antibacterial and antifungal agents used contra *Staphlococcus aureus*, *Escherichia Coli*, alimentary supplies with humans and animals, etc[12-13].

In this paper, we report the synthesis and characterization of mixed ligand complexes of Cobalt(II), Nickel(II), Copper(II), Zinc(II), Cadmium(II) and Mercury(II) for three amino acids ligands such as glycine, L-alanine and L-valine. The metal complexes were described through different physic-chemical techniques like flame atomic absorption, molar contactance, magnetic susceptibility and mass, FT-IR., UV.vis spectral manners.

EXPERIMENTAL

Chemicals and Methods

All other organic chemicals , solvents and inorganic salts were available from multiple companies , Fluk , B.D.H , Merck , sigma and Alderich and used without further purification.

Mass spectra to all complexes were recorded on MS Model 5973 Network Mass Selection Technology (HP) with Triple –Axis Detector by the analyzer Quadrupole at 230 $^{\circ}$C. The FT.IR. for three ligands (amino acids)and metal (II) complexes were recorded in the range 4000-400cm^{-1}as a (KBr) disc on FT-IR-600 FT-IR Spectrophotometer. Electronic spectral studies were performed on using Shimadzu-U.V-160 to the three ligandsas well as metal(II) complexes at DMSO (10^{-3}M) in the range (200-1100) nm. The metal contents to all complexes weredetermined by using atomic absorption technique by AA – 680 Shimadzu. Molar conductivity measurements were recorded for the three ligands and all complexes on CON 510 Conductivity in dry DMSO (10^{-3} M) solution at room temperature. Magnetic susceptibility for prepared metal(II) complexes was measured on Auto Magnetic Susceptibility Balance Sherwood Scientific. The melting point of the metal(II) complexes measured by using Stuart Melting Point Apparatus.

Preparation of Mixed Ligand Complexes

Sodium glycinato (Na^+Gly^-), sodium alaninto (Na^+Ala^-) and sodium valinto (Na^+Val^-) prepared by naturalization of glycine (GlyH) [0.075gm,1mmole], L-alanine (AlaH) [0.0981gm,1mmole] and L-valine (ValH)[0.117gm,1mmole] with (0.04gm,1mmole) of sodium hydroxide for each amino acidin 50% alcholic solution and 50% distall water at each of the three amino acids. The complexes were prepared by addition (Na^+Gly^-), (Na^+Ala^-) and (Na^+Val^-) to stirred aqueous solution of the respective metal(II) chloride(0.238gm,1mmol) $CoCl_2.6H_2O$, (0.238gm,1mmole) $NiCl_2.6H_2O$, (0.170gm,1mmole)$CuCl_2.2H_2O$, (0.136gm,1mmole) $ZnCl_2$, (0.201gm,1mmole) $CdCl_2.H_2O$ and (0.271gm,1mmole) $HgCl_2$ in the stoichiometric ratio metal:ligands M:Gly:Ala:Val) after leaving the solution in the laboratory. Then were filtered off and washed with aceton followed by drying at room temperature and analyzed employing standared methods.

Deposids have appeared in different colors for complexes, deep yellow, pale blue, blue and pale brown for each Cobalt(II), Nickel(II), Copper(II) and Mercury(II) complexes, respectively. But the Zinc and Cadimum complexes were colorless. The all complexes are soluble in water except Cobalt(II) complex.

Antibacterial and Antifungal Activities

All the metal ion complexes, three amino acids ligands were screened against*Bacillus Subtilus* and *Staphylococcus MRSA*(gram positive) and*Entreabacter clocae*, *Escherichia. Coli* and *Klebsiella Pneumonia*(gram

negative) bacteria as well fungi such as *Penicillium expansum*, *Fusarium graminearum*,*Macrophomina phasealina*,*Aspergillus niger*, *Candida albicans*, *Candida tropicalis*, *Candida parapsilosis* and *Candida glabrata*, through employing the wall agar diffusion method.25 Soil samples were collected from various sitesof soils in the city of Baghdad and were taken at adepth of (5-10) cm and the sample was taken 100 grams of each site and placed in anylonbag and recorded information of the type of the soil and the type of agricaltural crop. Then the samples were taken to the laboratory and attended a series of blurred decimals by takingo.lmlof the cavity to the agar nutrient medium. Then incubating between (15-45)°C. For (24-48) hours and then transferred each bacterial colony name to different circles for the purpose of purification and was diagnosed by the form of phenotypic and biochemical test [14-15]. The Fungi were isolated by taking the samples and laying then on potato dextrose agar and incubated at atemperature 28 ± 2 of seven days. It was studied in terms of general and microscopic properties and cultured on differential media [16-17]. Then isolation of isolates has been confirmed using the Vitek device. After diagnosed biological efficacy was measured by the agar well diffusion method. By taking a colony of bacterial or fungal isolation and diluted with 5ml normal saline and compared with Mc Far Land. Then laying 0.1 microliter and culturing them on the mullerhinton agar for bacteria. While for fungus sabourd dextrose, making holes by cork borer. Then added oil microliter of amino acids complexes with holes and incubated for 37°C and measured the diameter inhibition and re-experimented with three replicates.

RESULTS AND DISCUSSION

Physico - Chemical Properties

Table (1) shows the elemental microanalysis data of the three amino acids and their complexes. The solid complexes have been produced through reaction from alcoholic solution from amino acids ligands (glycine, L-alanine and L-valine) for the aqueous solution to the metal ions at a (M:Gly:Ala:Val) of (1:1:1:1) ratio, except Cobalt(II) and Nickel(II) complexes the ratio on (M:Ala:Val). The complexes are air-stable, non-hydroscopic, colored soilds except Zn(II) and Cd(II) complexes. Molar conductance to the complexes as (10^{-3} M) at DMSO attributed to electrolytic type (1:1) ratio [18] except Co(II) complex appear non-electrolyte. Magnetic estates to the Co(II) and Cu(II) compounds have been happened to a paramagnetic that was accounted for octahedral structure, the magnetic moment for Ni(II) complex was found μ = diamagntic due to square pyramid geometry.

Table 1: Observed Color, Temperature, Flame Atomic Absorption and Conductivity Measurements

Compounds	$M._{Wt.}$	Empirical Formula	Color	M.P°C (Dec)	M%(found) Calculate	Λ_m($ohm^{-1}.cm^2.mol^{-1}$) in DMSO10^{-3}M.
Glycine(Gly)	75.07	$C_2H_5NO_2$	White	233	-	7.01
Alanine(Ala)	89.09	$C_3H_7NO_2$	White	258	-	2.47
Valine(Val)	117.15	$C_5H_{11}NO_2$	White	298	-	2.76
Co(Ala)(Val)$(H_2O)_2$	299.28	$CoC_8H_{20}N_2O_6$	Deep yellow	290	19.69 (18.06)	2.79
Na[Ni(Ala)(Val)Cl]H_2O	339.39	$Na[NiC_8H_{16}N_2O_4Cl].H_2O$	Pale blue	265	17.29 (16.86)	30.1
Na[Cu(Gly)(Ala)(Val)]H_2O	382.86	$Na[CuC_{10}H_{20}N_3O_6].H_2O$	Blue	245	16.33 (15.49)	30.7
Na[Zn(Gly)(Ala)(Val)]H_2O	384.71	$Na[ZnC_{10}H_{20}N_3O_6].H_2O$	White	190	16.99 (15.46)	30.6
Na[Cd(Gly)(Ala)(Val)]H_2O	431.73	$Na[CdC_{10}H_{20}N_3O_6].H_2O$	White	216	26.04 (25.53)	30.2
Na[Hg(Gly)(Ala)(Val)]H_2O	519.91	$Na[HgC_{10}H_{20}N_3O_6].H_2O$	Pale brown	220	38.58 (37.33)	41.9

Dec.= Decompose

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Electronic Spectra and Magnetic Moment:

The electronic absorption spectra of the three amino acids ligands and their metal(II) complexes were measured in DMSO and the data along with their magnetic moment values are summarized in Table (2). The electronic spectrum of the three amino acids ligands exhibits intense absorption at (38461.5 and 27700.8) cm^{-1} to the glycine, (38314.2 and 27624.3) cm^{-1} to the L-alanine [19] and (38314.2 and 27624.3)cm^{-1} to the valine [20] attributed to every amino acid to (π–π *) and (n–π *), respectively.

Co(Ala)(Val)$(H_2O)_2$ d^7: The deep yallow complex of Co(II) gives at (38167.9 and 31055.9)cm^{-1}described to ligand field and other band at 12722.6 cm^{-1} is caused by the electronic transfer [21] $^4T_{1g}(F) \rightarrow {}^4T_{2g}(F)$. The volue of measured μ_{eff} for the Co(II) complex is 4.76 B.M. the typical for adidtorted octahedral geometry [22].

Na[Ni(Ala)(Val)Cl]H_2O d^8: The spectrum of pale blue complex of Ni(II) has revealed the following electronic transfer at (37174.7 and 34013.6)cm^{-1} lead to the ligand field, the peak 15243.9cm^{-1} due to $^3A_{2g} \rightarrow {}^3T_{1g}(F)$ transition [23]. The magnetic moment for Ni(II) complex was found μ= 0 due to square pyramid geometry.

Na[Cu(Gla)(Ala)(Val)].H_2O d^9: The spectrum of blue complex of Cu(II) shows peak at 33783.7cm^{-1} which was assigned to ligand field, other peaks at (16806.7, 15128.6 and 13679.9) cm^{-1} due to $^2B_{1g} \rightarrow {}^2A_{2g}$, $^2B_{1g} \rightarrow {}^2B_{2g}$ and $^2B_{1g} \rightarrow {}^2E_g$, respectively [24]. The μ_{eff}value is 1.84B.M. suggest octahedral geometry around Cu(II) complex [25].

Na[Zn(Gly)(Ala)(Val).H_2O, Na[Cd(Gly)(Ala)(Val).H_2O and Na[Hg(Gly)(Ala)(Val).H_2O :

The spectrum of colorless complexes of [Zn(II) and Cd(II)] and pale brown complex of Hg(II) exhibited absorption peaks at (36496.4 and 28735.6) cm^{-1} of the Zn(II0 complex, (28735.6, 12285.0 and 10111.2) $cm^{-1}$of the Cd(II) complex and (36630.0 and 12936.6) cm^{-1} of the Hg(II) complex. The electronic spectra of Zn(II), Cd(II) and Hg(II) complexes do show the ligand field and charge transfer transitions. The three complexes are diamagnetic moment for d^{10} ions and the electronic spectra of the three complexes do not show any (d-d) transitions, also suggested an octahedral stereochemistry [26]. The electronic spectra of the three amino acids and their complexes display various bands and various wavelengths, each one is corresponding to a particular transition that proposes the geometry to the complexes. Table (2) displayed the various assignment to the complexes.

Table 2: Electronic Spectral Data and Magnetic Moments of the Amino Acids Ligands and Their Complexes

Compounds	(λ nm)	ABS	Wave number	ϵ_{max} ($L.mol^{-1}.cm^{-1}$)	Assignments	μ_{eff}(B.M.)
Glycine	260 361	2.232 1.545	38461.5 27700.8	2232 1545	π-π* n-π*	-
Alanine	261 362	1.472 0.737	38314.2 27624.3	1472 737	π-π* n-π*	-
Valine	261 362	1.204 0.885	38314.2 27624.3	1204 885	π-π* n-π*	-
Co(Ala)(Val)$(H_2O)_2$	262 322 786	0.274 0.588 0.031	38167.9 31055.9 12722.6	274 588 31	L-F L-F $^4T_{1g}(F)$-$^4T_{2g}(F)$	4.76
Na[Ni(Ala)(Val)Cl].H_2O	269 294 656	0.425 0.368 0.053	37174.7 34013.6 15243.9	425 368 53	L-F L-F $^3A_{2g} \rightarrow {}^3T_{1g}$	diamagnatic
Na[Cu(Gly)(Ala)(Val)].H_2O	296 595 661 731	1.678 0.076 0.068 0.051	33783.7 16806.7 15128.6 13679.9	1678 76 68 51	L-F $^2B_{1g} \rightarrow {}^2A_{2g}$ $^2B_{1g} \rightarrow {}^2B_{2g}$ $^2B_{1g} \rightarrow {}^2E_g$	1.84
Na[Zn(Gly)(Ala)(Val)].H_2O	274 348 745	0.268 0.200 0.268	36496.4 28735.6 13422.8	268 200 268	L-F L-F C-T	Dia

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Na[Cd(Gly)(Ala)(Val)].H_2O	348 814 989	0.142 0.037 0.037	28735.6 12285.0 10111.2	142 37 37	L-F C.T C.T	Dia
Na[Hg(Gly)(Ala)(Val)].H_2O	273 773	1.274 0.078	36630.0 12936.6	1274 78	L-F C.T	Dia

FTIR Spectroscopy

The FT.IR. spectrum of the three amino acids ligands and their metal(II) complexes have been registered as KBr discs on the range (4000-400)cm^{-1}. On the rules from reported infra-red spectrum from the ligands and their metal(II) complexes some to the significant bands were showed in Table (3) the main parts to the IR spectral are presented to the three amino acids ligands and their complexes as well as Fig.(1) for the Co(II), Ni(II) and Cu(II) complexes. The N-H asym and N-H sym vibration noticed in (3105-3093)cm^{-1} and (2954-2995)cm^{-1} of the glycine, alanine and valine. In the free amino acids are shifted into higher wave number to the range (3285-3150)cm^{-1}as well (3176-3070)cm^{-1}, at the spectrum to the complexes proposing coordination to the amino group by nitrogen for the metal(II) ions [27]. Absence of the distinctive absorption bands from COOH group in (1700-1750)cm^{-1}at IR spectral from the free amino acids ligands detects which the free amino acids, one excepts two stretching vibrations with the COO^- moiety present at system namely υ_{asym} (COO^-) and υ_{sym} (COO^-) at range (1595-1527) cm^{-1} and (1394-1358)cm^{-1}respectivily, the first one is usually from medium density at IR spectrum, while the second is strong and wide. The bands due to υ_{sym} (COO^-) as wellυ_{asym} (COO^-) stretching vibrations to the free amino acids show to the complexes in (1383-1354)cm^{-1} and (1618-1585)cm^{-1}, respectively. The magnitude from $\Delta\upsilon$[$\Delta\upsilon=\upsilon_{asym}$ (COO^-) - υ_{sym}(COO^-) is found to be > 200cm^{-1}be inverted the monodentate coordination from carboxylate group to the amino acid on the synthesized complexes. Difference ($\nu_{asym.}-\nu_{sym.}$) isat range (202-257) cm^{-1} indicating which the M-O bond is purely covalent (28-30).The spectral to the complexes exhibit a broad band around (3750-3332)cm^{-1}referedto the presence from coordinated as well hydrated water molecule[31]. The existence for coordinated water molecules the Co(II) complex is confirmed through the weak into medium density bands at range 976cm^{-1}that are due into (H_2O) rocking and wagging mode of vibrations [2,32]. The complexes show band at (544-596) cm^{-1} and (480-544)cm^{-1} range due to the υ(M-N) and υ(M-O) vibrations, respectively[33-34].

Mass spectra for complexes

The mass spectra of Fig.(2) are for all complexes. The prepared complexes have been measured by mass spectroscopy to provide the molecular weight of the complexes. Displayed peaks referred in the molecular ions m/z at 299.28, 339.39 and 382.86, 384.71, 431.73 and 519.91 M^+ into Co(Ala)(Val)(H_2O)$_2$, Na[Ni(Ala)(Val)Cl]H_2O, Na[Cu(Gla)(Ala)(Val)].H_2O, Na[Zn(Gly)(Ala)(Val)].H_2O, Na[Cd(Gly)(Ala)(Val)].H_2O and Na[Hg(Gly)(Ala)(Val)].H_2O complexes, Consecutively. That datum is at good convention for the suggest molecular formulation into the complexes.

Table 3: The Infrared Spectra Data to the Amino Acids Ligand and Their complexes in(cm^{-1})

Compounds	$\upsilon(N-H)_{asym}$ + $\upsilon(N-H)_{sym}$	$\upsilon(H_2O)$	$\upsilon(COO^-)$asym	$\upsilon(COO^-)$sym	$\Delta\upsilon$= υasym (COO^-) - υsym (COO^-)	υ(M-N)	υ(M-O)
Glycine	3105 br. 2962 br.	-	1595 s.	1394 sh.	-	-	-
Alanine	3093 br. 3995 br.	-	1527 sho.	1358 sh.	-	-	-
Valine	3149 br. 2954 br.	-	1583 s.	1387sh.	-	-	-
Co(Ala)(Val)(H_2O)$_2$	3250 br. 3170 br.		1593 sh.	1360 sh.	233	555 w.	511 w.
Na[Ni(Ala)(Val)Cl]H_2O	3285 br. 3176 br.	3332 br.	1588 s.	1383 s.	202	544 w.	509 w.
Na[Cu(Gly)(Ala)(Val)]H_2O	3248 br. 3145 sho.	3427 br.	1618 s.	1361 sho.	257	579 w.	544 w.

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Na[Zn(Gly)(Ala)(Val)]H_2O	3269 br. 3161 sho.	3431 br.	1587 s.	1361 sho.	226	586 w.	544 w.
Na[Cd(Gly)(Ala)(Val)]H_2O	3153 br. 3059 br.	3427 br.	1587 s.	1354sh.	233	596 w.	544 w.
Na[Hg(Gly)(Ala)(Val)]H_2O	3150 sho. 3070 sh..	3417 br.	1589 s.	1354 sh.	235	544 w.	480 w.

br.=broad, sh.-sharp, s.-strong, sho.=shoulder, w.=weak

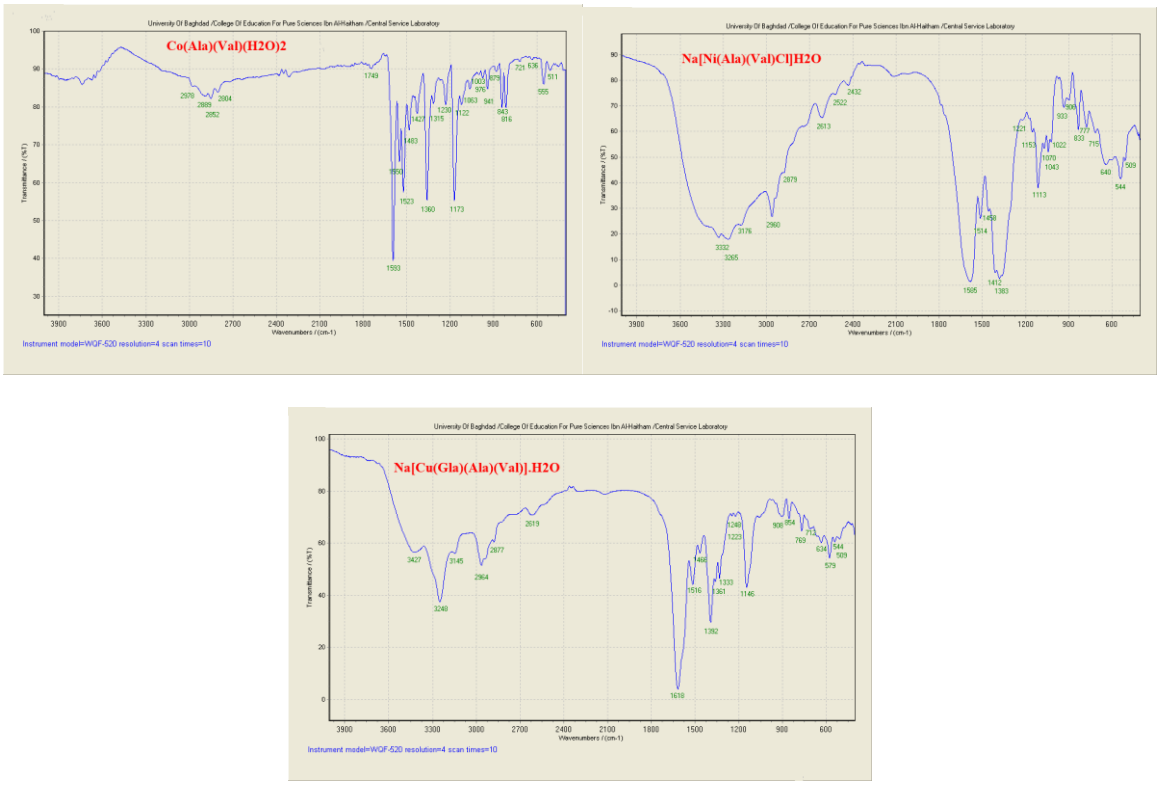
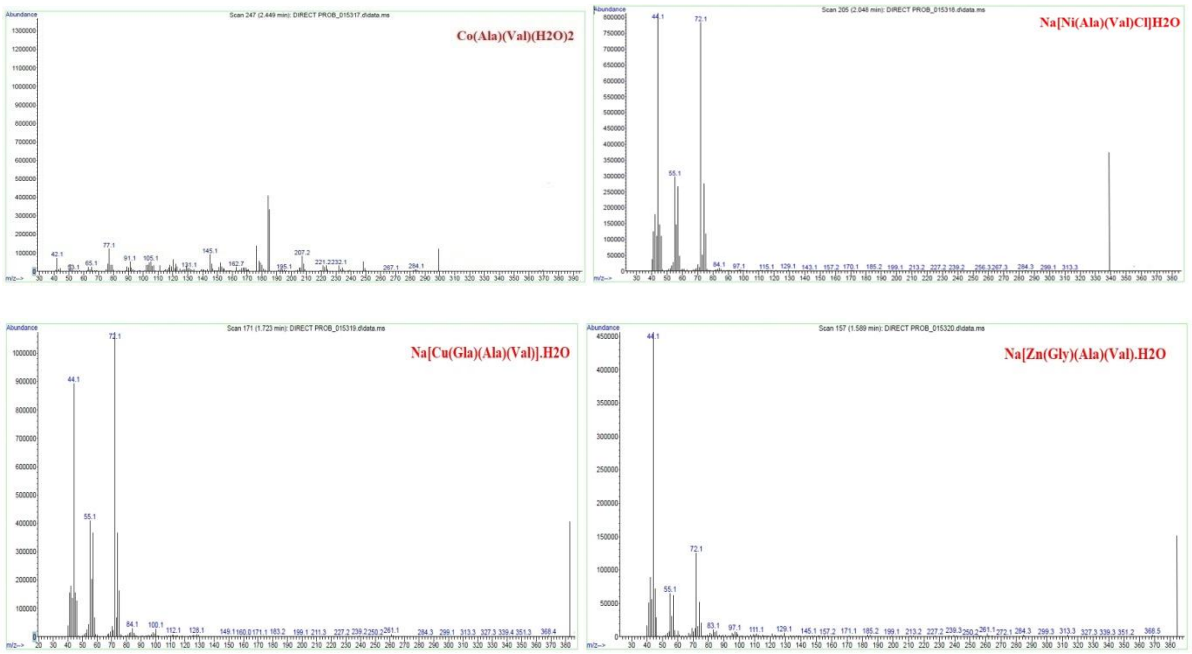


Figure (1): FT – IR Spectral of the Co(II), Ni(II) and Cu(II) Complexes



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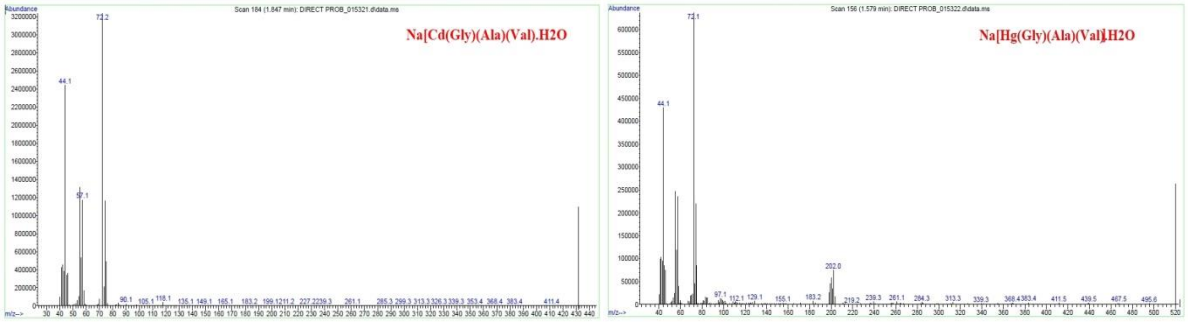

Figure 2: Mass Spectral of the Co(II), Ni(II), Cu(II), Zn(II), Cd(II) and Hg(II) Complexes, respectively

Antibacterial and Antifungal assay

The following bacterial and fungal species were isolated and diagnosed. *Bacillus Subtilus* and *Staphylococcus MRSA* (Methicillin resistant) (gram positive) and *Entreabacterclocae*, *Escherichia.Coli* and *Klebsiella Pneumonia* (gram negative). The fungi are *Penicilliumexpansum*, *Fusariumgraminearum*, *Macrophominaphasealina*, *Aspergillusniger*, *Candida albicans*, *Candida tropicalis*, *Candida parapsilosis* and *Candida glabrata*. The efficacy of amino acids and their complexes towards isolated bacteria was measured in table (4), in Chart(1) and Fig.(3). As amino acid complexes showed a high inhibitory effect for *Escherichia. Coli* and recordrd an effective effect of Cd(II) complex on *Escherichia. Coli* bacteria. However, the strong effect of inhibitors between the strong and the weak differed due to the effect of Zn(II) complex on bacteria *Staphylococcus MRSA*, *Escherichia. Coli* and *Bacillus Subtilus* as was the inhibitory action of Hg(II) complex are clear on the *Staphylococcus MRSA*. The Cu(II) complex had very little inhibitory effect on the *Staphylococcus MRSA* and *Klebsiella Pneumonia*. As a marker of the amino acid of the glycine and alanine effictively inhibitory against the *Klebsiella Pneumonia* as either Cd(II) complex, it was effective inhibitory the growth of bacteria *Staphylococcus MRSA*, *Escherichia. Coli* and *Bacillus Subtilus*. The inhibitory effect against the bacteria may be due to the effect of heavy metals, as their effect on the microbial clusters are effected by the effect on growth, shape and biochemical events which leads to a decrease in the biomass [35]. Heavy metals have the membrane and change the specific enzymes of a specific biological type and disrupt cellular functions and the break down of DNA synthesis [36]. The heavy metals are characterized by the displacement of the basic metals from the site of their original bonding or through interaction with the surrounding molecules, but at the same times some bacteria posses mechanisms to resist heavy metals such as the flow mechanism, which removes the toxic ions inside the cell through cellular transport systems and remove of high toxicity by their enzymes [37].The fungus was measured in Fig(4) , in Fig (4) have shown high resistance these complexities except Cd(II) complex effect on *Candida glabrata*, it may be due to the cadmium complex increasing of the branch of the hyphae to the Candida glabrata and the surface of the fungus is smooth and thus inhibited [38], but all the fungus have shown high resistance to these complexities due to ability of its cells to regulate the internal concentration of the cells of the metal ions [39]. Many fungi can store and carry high concentrations of heavy metals and so that the fungus have a defensive system in the form of enzymes or molecules of low oxidation know as the antioxidant system [40-41]. Fung's active defense mechanisms called immobilization limit the toxicity of metals such as the heavy metals in the cells and their resistance. This confirms the addition of heavy metal in the soil promotes the growth of some fungi in the soil by changing the pH or change some of its metabolic activities [42].

Table 4: Effect of Amino Acids Ligands and Their Complexes on Bacteria Isolated from Soil.

Compounds	*Bacillus Subtilus* (G+ev)	*Staphylococcus MRSA* (G+ev)	*Entreabacterclocae* (G-ev)	*Escherichia. Coli* (G-ev)	*Klebsiella Pneumonia* (G-ev)
Gly	-	-	-	**12**	**15**
Ala	-	-	-	**13**	**10**
Val	-	-	-	**10**	-
Co-comp.	-	-	-	**20**	-
Ni-comp.	-	-	-	**19**	-

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Cu- comp.	-	8	-	20	13
Zn-comp.	17	12	10	20	-
Cd-comp.	23	18	14	24	-
Hg-comp.	-	18	-	18	-

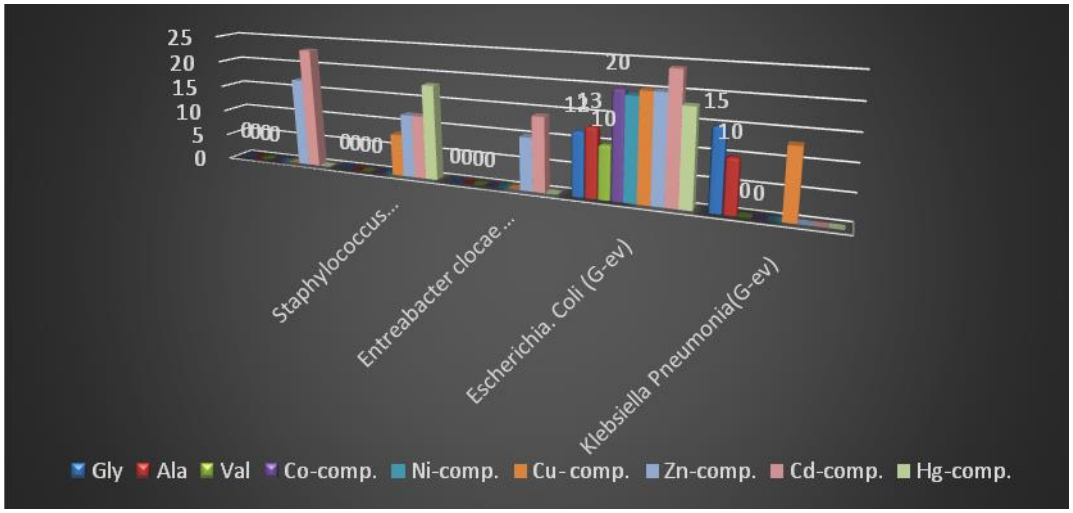

Chart 1: Results of Antimicrobial Screening of the Amino Acids Ligands and Their Complexes.

Figure 3: Antibacterial Evaluation of the Investigated Three Amino Acids Ligands as well Their Complexes against *Bacillus Subtilus* , *Staphylococcus MRSA*, *Entreabacterclocae* and *Escherichia. Coli* bacteria.

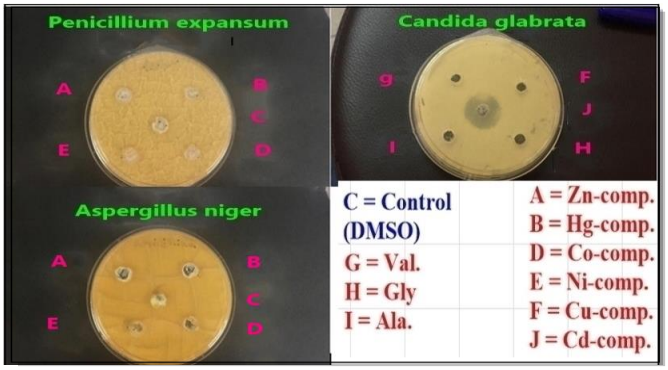

Figure 4: Antifungal Evaluation of the Investigated Three Amino Acids Ligands and Their Complexes against *Penicillium expansum*, *Candida glabrata*and *Aspergillusniger* Fungi.

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CONCLUSION

In this research, new complexes were prepared from the reaction of three ligands for amino acids such as glycine, L-alanine, and L-valine, which were mixed with the metal(II) salts acid forming a coordination complexes by diagnosing them through some physical properties, with study of FT.IR spectra, UV.-vis spectra and the study of the mass spectra of the complexes. It has been shown through the form complex, it may be a six membered chelated ringcomplex .In the case of cobalt complex, cobalt was found to be coordinate through the alanine acid and the valine acid with the coordinate of two molecules of water component octahedral complex described in Fig.(5).

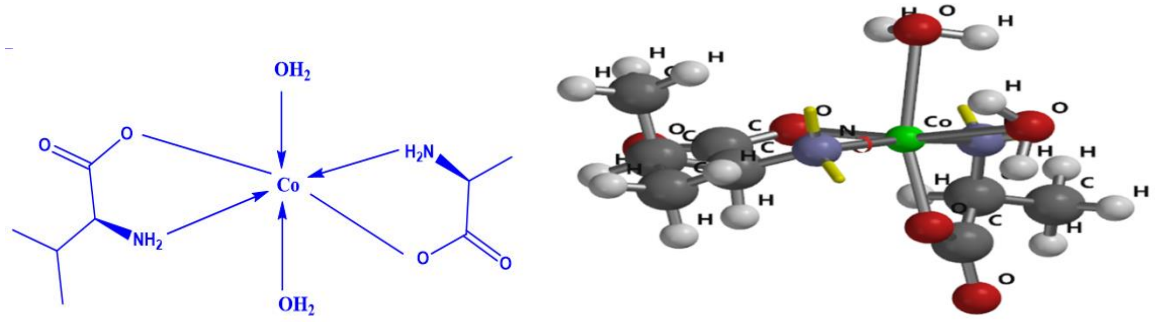

Figure 5: The Proposed Structure and 3D-Geometrical Structure of the Cobalt (II) Complex

In the case of the nickel complex, the both alanine and valine acid was coordinated with the associated of a single chlorine atom, a complex component with a five-dimensional symmetry in a square pyramid geometry shown in Fig.(6).

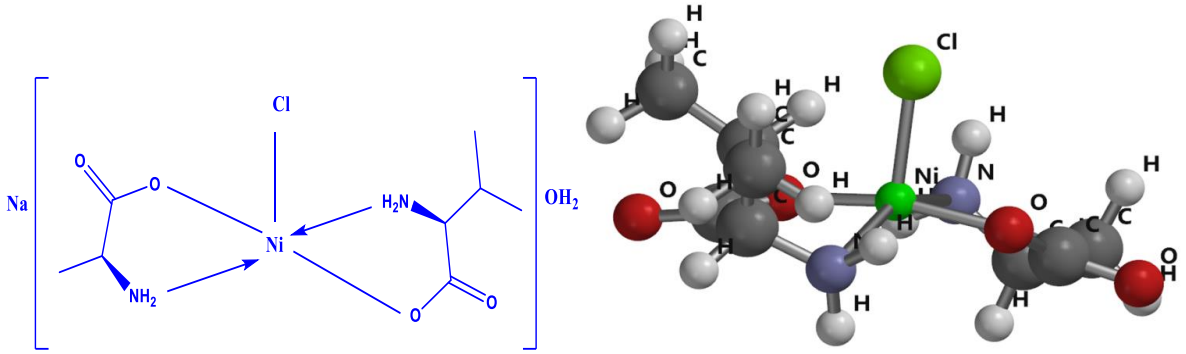

Figure 6: The Proposed Structure and 3D-Geometrical Structure of the Nickel (II) Complex

In the case of the rest of the other complexes with Copper(II), Zinc(II), Cadimum(II) and Mercury(II) metal salts, coordination for three amino acids (glycine, alanine and valine) composed six membered chelated ring with octahedral geometric structures, as in Fig.(7).

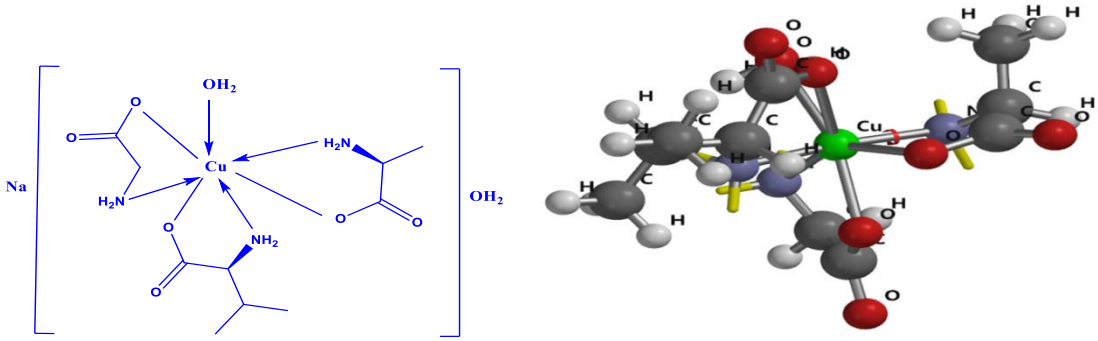

Figure 7: The Proposed Structure and 3D-Geometrical Structure to the Co (II), Zn(II), Cd(II) as well Hg(II) Complexes

In all the complexes, it was found that the metals were coordinated with the amino acids found to be bidentate and it has been found to coordinate with the atom of the central metal by the carboxylate oxygen as well the amino group. In situation fromalanineantibacterial activity at *Escherichia. Coli* and of the Glycine at*Klebsiella Pneumonia*is higher activitycompared to the amino acids. When compared to metal (III)complexes, the Cd(II) complex has a higher activity with *Escherichia. Coli,Bacillus Subtilus* and*StaphylococcusMRSA,* as compared with the rest of the complexes.While the fungus have confirmed high resistance these complexes except Cd(II) complex effect on *Candida glabrata*.The consequences of biological checking reference that in several complexes are more effective than free ligands, increased activity of the complexes can exist, illustrated at the fundamental in chelation theory [43] .

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