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## Preparation, Spectral studies and Biological Efficiency of Metal (II) Mixed Ligand Complexes Schiff Base derived from (Benzaldehyde and O-Aminoaniline) with 8-Hydroxyquinoline.

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### ABSTRACT

A novel Schiff base ligand [N<sub>1</sub>-benzylidenebenzene-1,2-diamine(L) = C<sub>20</sub>H<sub>16</sub>N<sub>2</sub>] was prepared through intensification of benzaldehyde (C<sub>6</sub>H<sub>5</sub>CHO) and O- amino aniline O-C<sub>6</sub>H<sub>4</sub>(NH<sub>2</sub>)<sub>2</sub> in ethanol with 8-Hydroxyquinoline (8HQ) . Formed compounds were acquired of 1:1:2 molar proportion reactions for metal ions and ligands (L) and 2(8HQ) during reaction for MCl<sub>2</sub> .nH<sub>2</sub>O salt products complexes conformable into the forms [M(L)(8HQ)<sub>2</sub>] ,where M = Mn(II),Co(II) and Ni(II). Whole the compounds were identified during the basis of their; FT-IR and U.V spectrum, melting point, molar conduct, identify the percentage from the metal at the complexes via flame (AAS), C, H and N content of the Schiff base (L) and metal complexes were analysis and magnetic susceptibility measurements. A hexagonal coordinated metal complexes were proposed to the separated complexes of Mn(II),Co(II) and Ni(II) with the Molecule formulas following on the nature from prepared ligand (L) and (8HQ) existent. The propose geometry from the complexes shows into be octahedral. In order that estimate the influence from the biological efficiency, these composition complexes in comparison with the Schiff base (L), 8HQ and metal complexes have been checked up versus bacterial species (gram +ve) and (gram -ve) as well as versus fungi the consequence are notified.

**Keywords:** 8-Hydroxyquinoline, Mixed ligand complexes, Spectral studies, Biological efficiency.

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## INTRODUCTION

A Schiff base is a group of compounds derived from the chemical reaction (intensification) of primary amines for aldehydes or ketones into afford a product recognized like imines that include C=N double bond. Those imines are purported Schiff bases ever after their composition was first completed through a Germanic chemist Hugo Schiff [1].

The base of the Schiff is the analog nitrogen of aldehyde or ketone in that one the C=O group is replaced the C=N-R group. It is usually modulated by the intensification of aldehyde or ketone to the primary amine [2-3]. Schiff-base compounds are scrutinized into be through the further importantly stereo chemical models in essential group and transition metal chemistry consequent coordination for their availability and structural diversity [4-5]. Schiff bases possess vast applications in food manufacture, dye industry, the field of analytical chemistry, catalysis, fungi, agrochemical and biological efficacy for the growing happening from deep mycosis, there has been raising assurance at the checking from novel and more efficient antimicrobial drugs for low poisoning. A large numeral from Schiff-base compounds has prospect biological benefit, which applied like more or minimal successful patterns from biological components [6-10]. The ring nitrogen of components are specifically quinoline derivatives play a pivotal role at numerous biological practicability's and like synthetic medicines [11]. 8-Hydroxyquinoline or oxine (8HQ) orange crystal color is almost insoluble at water, while easily in organic solvents such as alcohol, acetone and acetic acid. It is a multilateral metal chelating factor at inorganic chemistry; it acts like bidentate ionic ligand as well the shape chelate rings that contain broad area from metal ions. Chelate rings are formative through covalent bond and coordinate bond. The acidic group (-OH) compose covalent bond through replacing of hydrogen ions for metallic ion as well tertiary amine (-N=) the shape coordinate bond through donation from electron pair [12-13]. On medical area, (8HQ) derivatives may be to use as pesticide, antibacterial, fungicidal and neuroprotective agents [14]. On addendum, because of their chelating ability towards a big numbering from metal cations, derivatives from (8HQ) have found many applications at fluorescent sensing of biological and environmentally significant metal ions [15-16]. One of the important molecules to achieve this is (8HQ) and its derivatives due to their chelating capacity about the various metal ions and high of luminescence effectiveness of producing metal complexes [17]. Among each of the (8HQ) complexes, Tris-(8HQ) aluminum  $Al(8HQ)_3$  has attracted great attention at the expansion from luminescence and electroluminescent of materials due to its high thermal stabilization and electroluminescent characteristics to the built of trusted organic light-emitting tools (OLED) [18].

## EXPERIMENTAL

### Materials and Instrumentation

All of the chemicals utilized during that realization were from pure grade (Merck and B.D.H).  $^1H$ -NMR spectra were recorded in DMSO with TMS as an internal standard spectra were acquired in DMSO- $d_6$  solution using Bruker 300 MHz spectrometer, as well as IR spectra (KBr disc) were recorded on Shimadzu, (8400S spectrophotometer in the range of 4000 to 400  $cm^{-1}$ . Elemental microanalyses (C.H.N.) were performed by using (Euro vector model EA 3000, single V.3.O single Series elemental microanalyses. Melting points were obtained on a Stuart SMP -10 capillary. Metals were determined using a Shimadzu (A. A) 620 G. atomic absorption Spectrophotometer, UV-Visible spectra were recorded using (Shimadzu1800A) spectrophotometer. Conductivity measurements were made with DMSO solutions using a Jenway 4071 digital conductivity meter at room temperature Conductivity measurements were made with using a Philips PW- digital. Magnetic moments were measured with a magnetic susceptibility balance (Sherwood balance magnetic susceptibility model MSB-MK).

### Preparation of Schiff base ligand

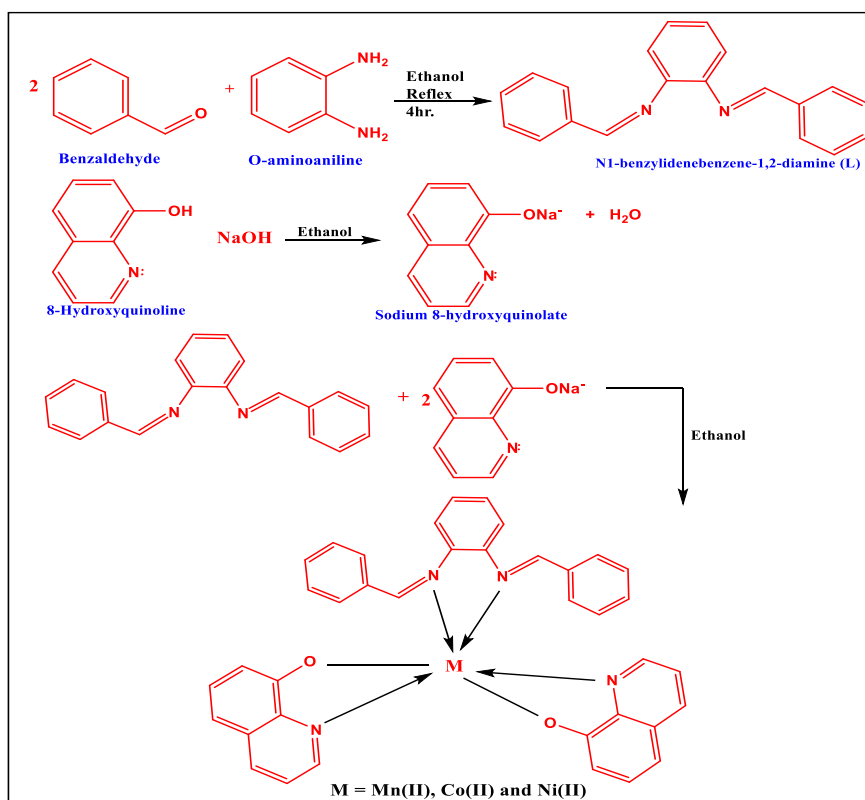
The condensation prepared a novel Schiff base by [0.849 g, 4mmol] of benzaldehyde at 30ml of ethanol for [0.43256 g, 2mmol] from O-aminoaniline in 15ml of ethanol was carried out by heating under reflux at the presence from 5 drops of acetic acid as a catalyst until 4 hr. Then the yellow colored solid was condensed and isolated by filtration and washed with distilled water to obtain a pure sample. Yield: 75%. m.p: (82-85) $^{\circ}C$ .  $M_{wt} = 284.364$  g/mol, ( $C_{20}H_{16}N_2$ ), **Found:** C:83.81%; H:5.33%; N:8.96 %, **Calculated:** C: 84.48% ; H: 5.67% ; N: 9.85.  $^1H$ -NMR (DMSO- $d_6$ , ppm): 7.51-8.13 (m, 14H, C-H), 9.10 (s, 2H, N=C-H).

### Synthesis of the mixed ligands metal complexes

The metal complexes were prepared employing metal chlorides and the Schiff base in general manner. The complexes were preparing in a similar manner about synthesis at the molar ratio of [M: L: 2(8HQ)]. A ethanolic solution (10 mL, 1mmol) of the suitable  $\text{MnCl}_2 \cdot 4\text{H}_2\text{O}$  [0.197g, 1mmol],  $\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$  [0.238g, 1mmol] and  $\text{NiCl}_2 \cdot 6\text{H}_2\text{O}$  [0.238g, 1mmol], was added into a ethanolic solution (10ml) for the Schiff base, primary ligand (0.2843 g/mol, 1mmol) into ethanolic solution and (0.145 g, 2mmol) for the secondary ligand sodium 8-hydroxyquinolate in 10ml of ethanol and added [0.08 g, 1mmol] of the sodium hydroxide was added into the former solution and left in the laboratory atmosphere into 24 hr. The complexes precipitated were filtrated and washed for distilled water. In the research, shows the form Scheme 1 the pattern of reactions obtained through the interaction of the Schiff base and the formation of the metal complexes.

### Bacterial and fungal sensitivity test of chemical compounds

Testing the effectiveness of chemical compounds by agar well diffusion method [19] chemical compounds against fungal and bacterial growth isolated one colony of bacterial and fungal activated from the media of nutrient agar in bacteria and in Sabouraud dextrose agar in fungi and placed in sterile distilled water and compares with the turbidity  $\mu\text{c}$  Farm land tubes containing  $1.5 \times 10^{-8}$  cell / ml. Then 100 microliter from suspension bacterial or fungal are taken by micropipette, thereafter transport to muller hinton agar plate in bacteria but in Fungi. Streaking on the Sabouraud dextrose agar plates after that work wells 8 millimeter / plate by sterilized cork borer. Chemical compounds are dissolving in DMSO applied in the wells and leave the plate 15 minute degree temperature of laboratory, then incubated at  $37^\circ\text{C}$  for 24 hr. and diameters were measured the inhibition zone of bacterial and fungal growth replicated the test three times.



Scheme 1: The synthesis of ligand and mix ligands of their metal complexes

### RESULTS AND DISCUSSION

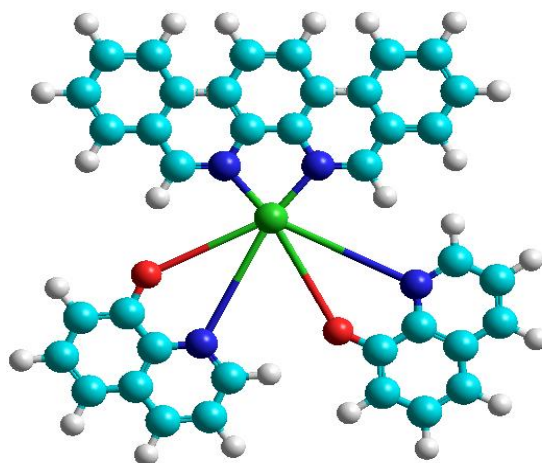
The complexes are crystalline colored powders between brown and green having melting points higher than the ligand. They are stable in air at room temperature. All compounds gave satisfactory elemental analysis, suggesting [1:1:2] (M:L:8HQ) molar ratio. The physical and analytical data of the synthesized

compound and its metal complexes are given in Table 1. Based on the analytical data the molecular formula of the synthesized ligand and its metal complexes are found to be in good agreement with the calculated elemental values of C, H, N, and metal. The synthesized compound and its metal complexes were soluble in solvents like methanol, ethanol, acetone, DMF and DMSO. Completely insoluble in water, carbon tetrachloride, chloroform, Petroleum ether and benzene. Molar conductance values of the soluble complexes in DMSO show value ranging from (4.34-14.03)  $\Omega^{-1} \text{ cm}^2 \text{ mol}^{-1}$  indicating that the complexes are non-electrolytic for metal (II) complexes [20]. Fig 1 shows the proposed molecular structure of the Co(II) complex.

**Table 1: Physical properties of the ligand and their complexes**

Compounds	M.wt	Color	m.p °C	$\Lambda_m$ $\Omega^{-1} \text{ cm}^2 \text{ mol}^{-1}$ in DMSO	Elemental micro analysis, found (Calc.)%			
					M	C	H	N
Ligand	284.3	yellow colored	82-85	-	-	83.81 (84.48)	5.33 (5.67)	8.96 (9.85)
[Mn(L)(8-Q) <sub>2</sub> ]	627.6	Light brown	330 d	4.34	7.78 (8.75)	71.60 (72.72)	4.51 (4.50)	7.36 (8.93)
[Co(L)(8-Q) <sub>2</sub> ]	631.6	Light green	160 d	7.01	8.31 (9.33)	71.09 (72.26)	5.49 (4.47)	8.58 (8.87)
[Ni(L)(8-Q) <sub>2</sub> ]	631.3	Brown	300 d	14.03	8.49 (9.29)	71.62 (72.29)	3.15 (4.47)	7.32 (8.88)

d= decompose



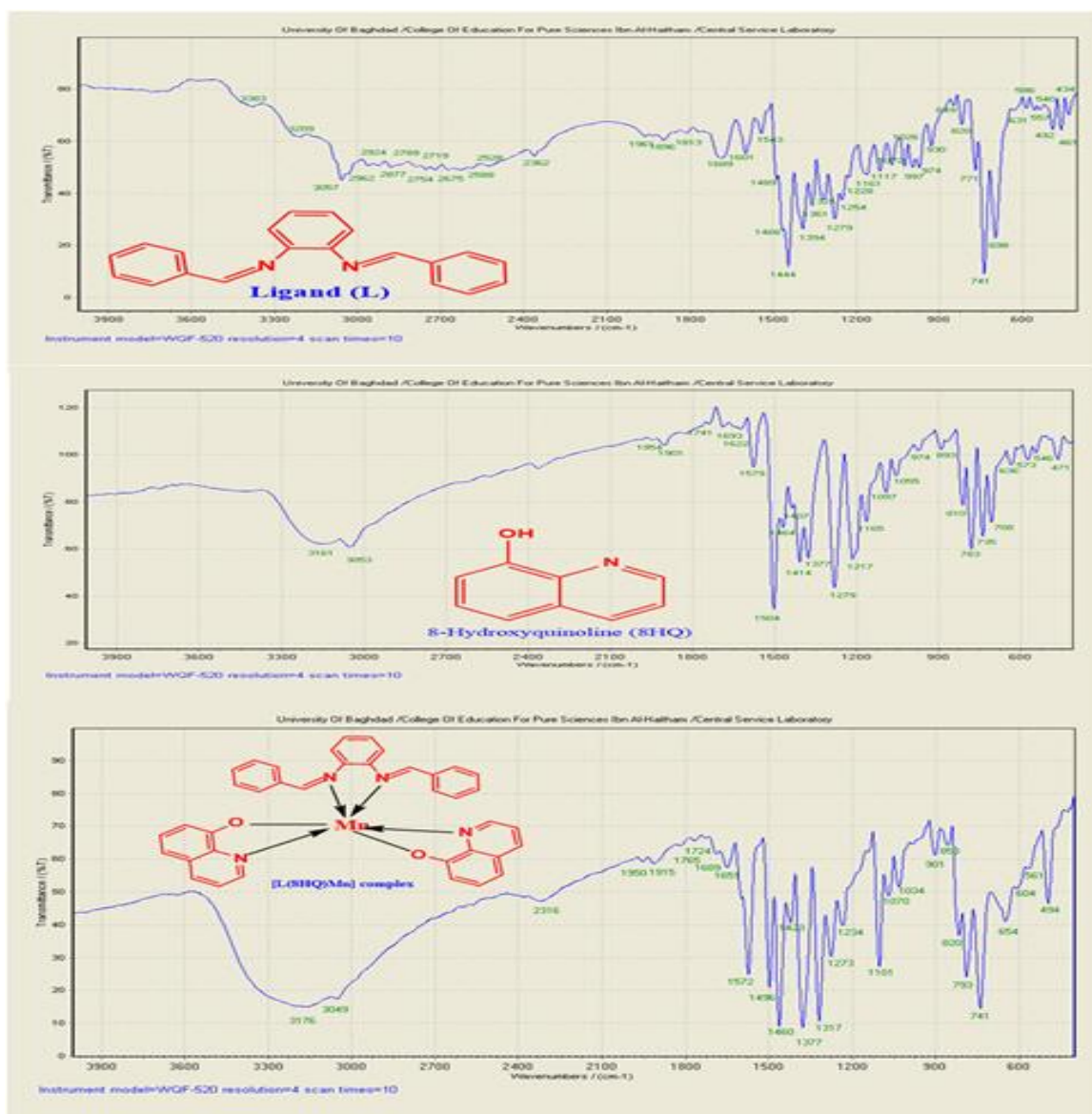
**Figure 1: Molecular modeling to the proposed structure of the Co(II) complex**

#### Infrared spectra:

The characteristic vibration and assignments of (L), (8HQ) and their complexes are described in table (2) and the spectrum of the (L), (8HQ) and Mn-complex in Fig 2. The spectrum of (8HQ) exhibited the strong band of  $1279 \text{ cm}^{-1}$ , this could be  $\nu(\text{C-O})$ , while another strong absorption bands at  $1097 \text{ cm}^{-1}$  and  $3161 \text{ cm}^{-1}$ , this could be attributed to  $\nu(\text{C-N})$  and  $\nu(\text{O-H})$  respectively [21-22]. This observation leads to a conclusion that the complex formation occurs through removing proton from the (OH) group of (8HQ) moiety, suggesting the displacement of the hydroxyl proton by M(II) ion leading to covalent (M-O) bonding with the (8HQ) ligand [23]. The  $\nu(\text{C=N})$  mode observed at  $1579 \text{ cm}^{-1}$  on the spectra of free (8HQ) ligand is converted to be shifted into lower wave number at the range of (1496, 1504 and  $1504 \text{ cm}^{-1}$ ) in the spectra of Mn(II), Co(II) and Ni(II) complexes, respectively. A negative shift at that vibrational mode upon complexation refers to coordination out of nitrogen donor to the (8HQ) [24-25]. Upon comparison it was found the (C=N) stretching vibration from the  $\nu(\text{CH=N})$  of azomethine group is found in the Schiff base at  $1622 \text{ cm}^{-1}$ . This band is shifted to lower (36-37  $\text{cm}^{-1}$ ) wave number in the complexes indicating the participation of the azomethine nitrogen in coordination [26]. Metal – nitrogen and metal – oxygen bonds have also been confirmed through presence to the stretching vibration of  $\nu(\text{M-N})$  and  $\nu(\text{M-O})$  between (590-650)  $\text{cm}^{-1}$  and (501-511)  $\text{cm}^{-1}$  respectively [27].

**Table 2: Characteristic IR bands (cm<sup>-1</sup>) of the ligands and its metal complexes**

Compounds	ν(O-H)	ν( C-H) aromatic	ν( C=C)	ν( C=N)	ν( M-N)	ν( M-N)	ν( M-N)	ν( M-O)
Ligand	-	3057	1583	1678	-	-	-	-
8HQ	3161	3053	1593	-	-	-	-	3161
[Mn(L)(8-Q) <sub>2</sub> ]	-	3053	1576	1651	650	604	501	-
[Co(L)(8-Q) <sub>2</sub> ]	-	3053	1579	1641	644	595	511	-
[Ni(L)(8-Q) <sub>2</sub> ]	-	3049	1576	1633	644	590	503	-



**Figure 2: Infrared spectrum of L, 8HQ and Mn-complex**

**Electronic spectra**

The absorption and assignments related to the (L), (8HQ) and their metal complexes listed in table (2). The electronic spectrum of ligand (8HQ) exhibits a very strong absorption band in ultraviolet region at 316nm (32786cm<sup>-1</sup>) in DMSO solvent, this band is attributed to (n→π\*) transition [30]. The Uv-Vis spectrum of the (L) of (CH=N) group in DMSO solvent appeared a high, intense absorption band at (301nm) 33222 cm<sup>-1</sup>. This band is attributed to (n→π\*) transitions inside the organic ligand.



The solution spectrum of the Mn(II) complex showed three bands at 914nm(10940cm<sup>-1</sup>), 694nm (14409cm<sup>-1</sup>) and 398nm (25125cm<sup>-1</sup>) due to the <sup>6</sup>A<sub>1g</sub>→<sup>4</sup>T<sub>1g</sub>(G), <sup>6</sup>A<sub>1g</sub>→<sup>4</sup>T<sub>2g</sub>(G) and <sup>6</sup>T<sub>1g</sub>→<sup>4</sup>A<sub>1g</sub>(G), <sup>4</sup>E<sub>1g</sub> and two bands at 332nm (30120cm<sup>-1</sup>) and 274nm (30196cm<sup>-1</sup>) due to charge transfer (C.T) and ligand field (L.F.), respectively. These assignments when compared with those published to octahedral geometry [31]. On the measured magnetic moment from this complex was found to be (5.90B.M). The showed a high – spin (d<sup>5</sup>) complex to five unpaired [32], while appearance of two bands in 332nm (30120cm<sup>-1</sup>) and 274nm (36496cm<sup>-1</sup>) attributable into (C.T.) and (L.F.) respectively.

The spectrum of Co(II) complex showed three bands at 990nm(10101cm<sup>-1</sup>), 788nm (12690cm<sup>-1</sup>) and 411nm (24330cm<sup>-1</sup>) due into the transitions <sup>4</sup>T<sub>1g</sub>→<sup>4</sup>T<sub>2g</sub>(F), <sup>4</sup>T<sub>1g</sub>→<sup>4</sup>A<sub>2g</sub>(F) and <sup>4</sup>T<sub>1g</sub>(F)→<sup>4</sup>T<sub>1g</sub>(P) as well as two bands at 339nm (29498cm<sup>-1</sup>) and 281nm (25587cm<sup>-1</sup>) due to charge transfer (C.T) and ligand field (L.F.), respectively, correspond to those of octahedral geometry. The magnetic moment of the solid complex (4.50 B.M.) showed a high spin of Co(II) complex, this value refers to high-spin (d<sup>7</sup>) complex to three unpaired electron [33]. The electronic spectrum display of Ni(II) complex has three bands in 1001nm (99900cm<sup>-1</sup>), 680nm (14705cm<sup>-1</sup>) and 407nm (24570cm<sup>-1</sup>), these bands may be assigned to three spin-allowed transition <sup>3</sup>A<sub>2g</sub>→<sup>3</sup>T<sub>2g</sub>(F), <sup>3</sup>A<sub>2g</sub>→<sup>3</sup>T<sub>1g</sub>(F) and <sup>3</sup>A<sub>2g</sub>→<sup>3</sup>T<sub>1g</sub>(P), thus, the position of bands suggest mostly of octahedral geometry [34]. The magnetic moment value was (3.30 B.M.) correspond to two unpaired electron [35].

**Table 3: UV-Vis, magnetic susceptibility and conductance measurements data**

Compounds	λ <sub>max</sub> (nm)	Wave number (cm <sup>-1</sup> )	Assignment	μ <sub>eff</sub> (B.M.)	Suggested Structure
(L)	300	33333	n→π*	-	-
(8HQ)	316	31645	n→π*	-	-
[Mn(L)(8-Q) <sub>2</sub> ]	274	30196	L.F.	5.90	Octahedral
	332	30120	C.T.		
	398	25125	<sup>6</sup> A <sub>1g</sub> → <sup>4</sup> A <sub>1g</sub> (G), <sup>4</sup> E <sub>1g</sub>		
	694	14409	<sup>6</sup> A <sub>1g</sub> → <sup>4</sup> T <sub>2g</sub> (G)		
	914	10940	<sup>6</sup> A <sub>1g</sub> → <sup>4</sup> T <sub>1g</sub> (G)		
[Co(L)(8-Q) <sub>2</sub> ]	281	35587	L.F.	4.50	Octahedral
	339	29498	C.T.		
	411	24330	<sup>4</sup> T <sub>1g</sub> (F)→ <sup>4</sup> T <sub>1g</sub> (P)		
	788	12690	<sup>4</sup> T <sub>1g</sub> → <sup>4</sup> A <sub>2g</sub> (F)		
	990	10101	<sup>4</sup> T <sub>1g</sub> (F)→ <sup>4</sup> T <sub>2g</sub> (F)		
[Ni(L)(8-Q) <sub>2</sub> ]	271	36900	L.F.	3.30	Octahedral
	343	29154	C.T.		
	407	24570	<sup>3</sup> A <sub>2g</sub> → <sup>3</sup> T <sub>1g</sub> (P)		
	680	14705	<sup>3</sup> A <sub>2g</sub> → <sup>3</sup> T <sub>1g</sub> (F)		
	1001	99900	<sup>3</sup> A <sub>2g</sub> → <sup>3</sup> T <sub>2g</sub> (F)		

#### Study of biological activity

Isolated four species of bacteria *Staphylococcus aureus*, *Bacillus Subtilis*, *Escherichin Coli* and *Proteus Mirabilis* showed in table 4 and chart (1) of newly prepared solutions (New) and table (5) and chart (2) in the case of solutions prepared a year ago (Old) as well as Shows the antibacterial study of ligands and complexes appear the inhibition zones against pathogenic with *Staphylococcus Aureus*, In the case of (New) and (Old) in Fig.(3). Also isolated four species of fungi *Candida Albicans*, *Candida Tropicalis*, *Candida Glabrata* and *Candida Parapsilosis* from the urine sample isolated from people with urinary infection showed in table (6) and chart (3) of (New) and table (7) and chart (4) of (Old). As well Shows the antibacterial study of ligands and complexes appear the inhibition zones against Fungi with *Candida Tropicalis* in the case (New) and (Old) in Fig.(4).

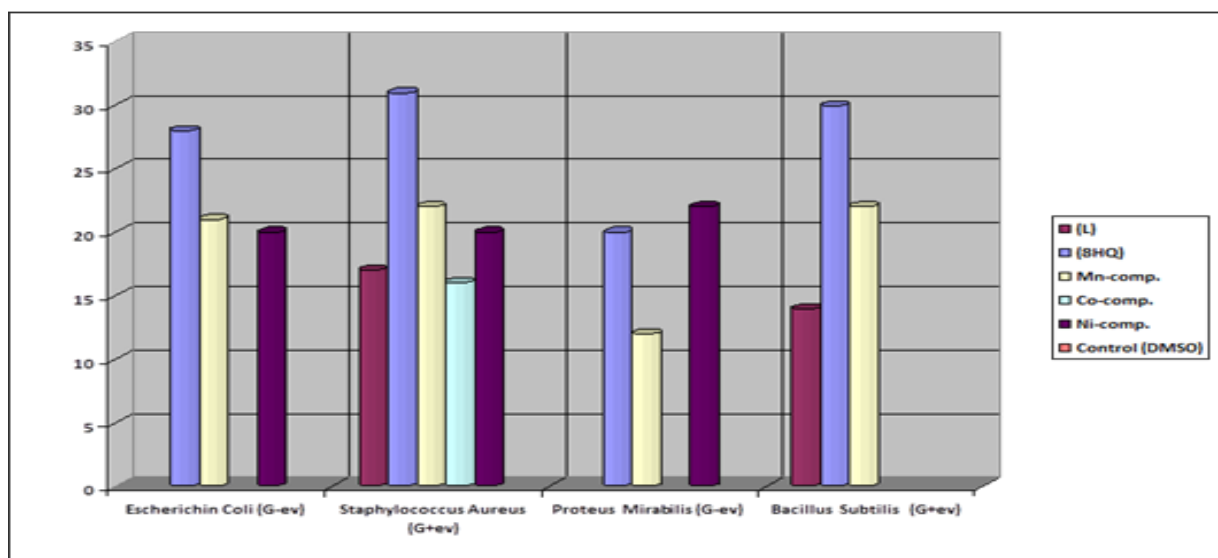
The chemical compounds prepared impacts have shown varying levels of bacterial and fungal isolation. The new of (L) was more effective than the (Old) of (L) on bacteria *S. Aureus*, *B. Subtilis* and it is not effective for bacteria *P. Mirabilis* and *E. Coli* isolated from Urinary Tract Infection (UTI) .As shown a (New) of

(8HQ) effect on bacteria *S. Aureus*, *E. Coli*, *P. Mirabilis* and *B. Subtilis* better than the chemical compound After a year of preparation (Old).

While a (New) complex of Mn(II) are better efficacy than inhibition after leaving one year (Old) of complex for bacterial *B. Subtilis*, *S. Aureus*, *P. Mirabilis* and *E. Coli*. Also the (New) complex of Ni(II) gave varying effectiveness on *S. Aureus*, *P. Mirabilis* and *E. Coli*, while the (Old) complex of Ni(II) had an inhibitory effectiveness to growth of *B. Subtilis*. But the (Old) complex of Co(II) are better effect than (New) complex prepared on bacteria *E. Coli*, *B. Subtilis*, *P. Mirabilis* and *S. Aureus*. The all inhibit reaction to them chemical complexities may be due to the formation of free radicals that leads to bacterial cell damage [36] or the effect of these chemical compounds on the penteraion of the cellular wall of the bacteria or coagulation protein or DNA construction may overlap or interefer with the metabolic process of the bacteria it is a protein mutant and inhibition of enzymes and hence the killing of bacteria [37]. It also was found that the (New) complexes of Mn(II), and Ni(II) and (8HQ) efficacy of inhibition fungi of *C. Albicans*, *C. Tropicalis*, *C. Glabrata* and *C. Parapsilosis*, but the (Old) of (L) and the (Old) complex of Co(II) the best effective inhibition than (New) complexity on fungi because these are causted by fungal cell damage or in plasma membrane areas or mitochondria and endoplasmic membrane are damage by effect of chemical compounds[38]. The (Old) and (New) of DMSO are not effective against bacterial and fungal growth

**Table 4: Showed the Inhibition Circle Dimeter in Millimeter for the Bacteria with Escherichin Coli, Staphylococcus Aureus, Proteus Mirabilis and Bacillus Subtilis for the Ligands and Metal Complexes of (New)**

compounds	Escherichin Coli (G-ev)	Staphylococcus Aureus (G+ev)	Proteus Mirabilis (G-ev)	Bacillus Subtilis (G+ev)
(L)	-	17	-	14
(8HQ)	28	31	20	30
[Mn(L)(8-Q) <sub>2</sub> ]	21	22	12	22
[Co(L)(8-Q) <sub>2</sub> ]	-	16	-	-
[Ni(L)(8-Q) <sub>2</sub> ]	20	20	22	-
Control (DMSO)	-	-	-	-



**Chart 1: Chart of antibacterial study with Escherichin Coli, Staphylococcus Aureus, Proteus Mirabilis and Bacillus Subtilis of some for the studied ligands and metal complexes in the case (New)**

Table 5: Showed the Inhibition Circle Dimeter in Millimeter for the Bacteria with Escherichin Coli, Staphylococcus Aureus, Proteus Mirabilis and Bacillus Subtilis for the Ligands and Metal Complexes of (Old).

compounds	Escherichin Coli (G-ev)	Staphylococcus Aureus (G+ev)	Proteus Mirabilis (G-ev)	Bacillus Subtilis (G+ev)
(L)	-	16	-	-
8HQ	-	15	-	11
[Mn(L)(8-Q) <sub>2</sub> ]	19	19	-	20
[Co(L)(8-Q) <sub>2</sub> ]	25	24	20	23
[Ni(L)(8-Q) <sub>2</sub> ]	10	15	-	25
Control (DMSO)	-	-	-	-

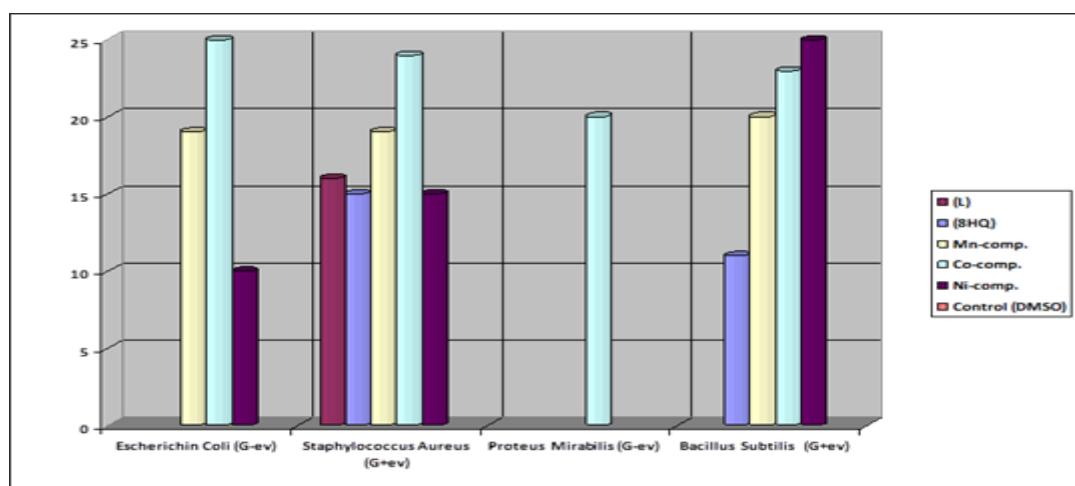


Chart 2: Chart of antibacterial study with Escherichin Coli, Staphylococcus Aureus, Proteus Mirabilis and Bacillus Subtilis of some for the studied ligands and metal complexes in the case (Old)

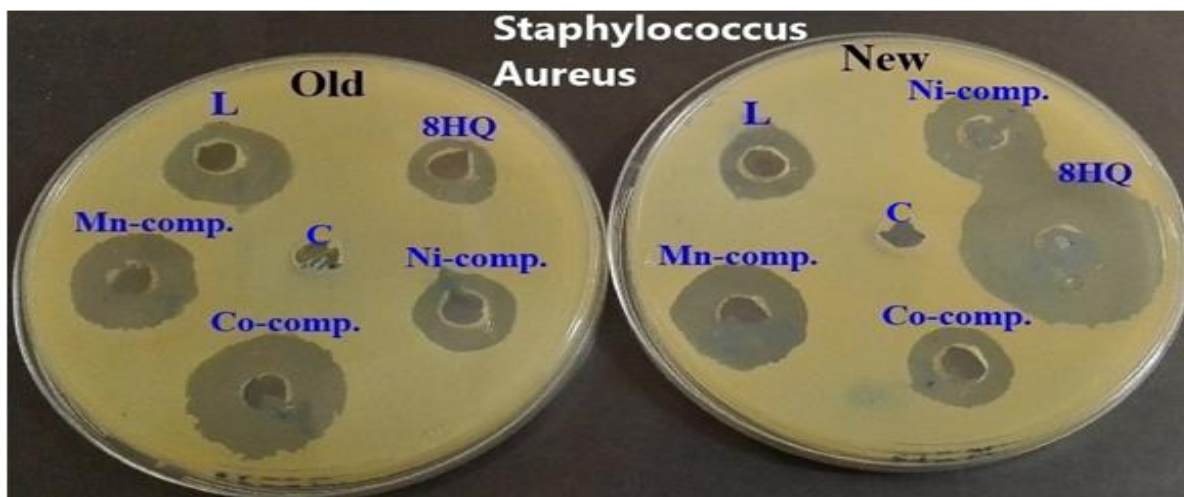
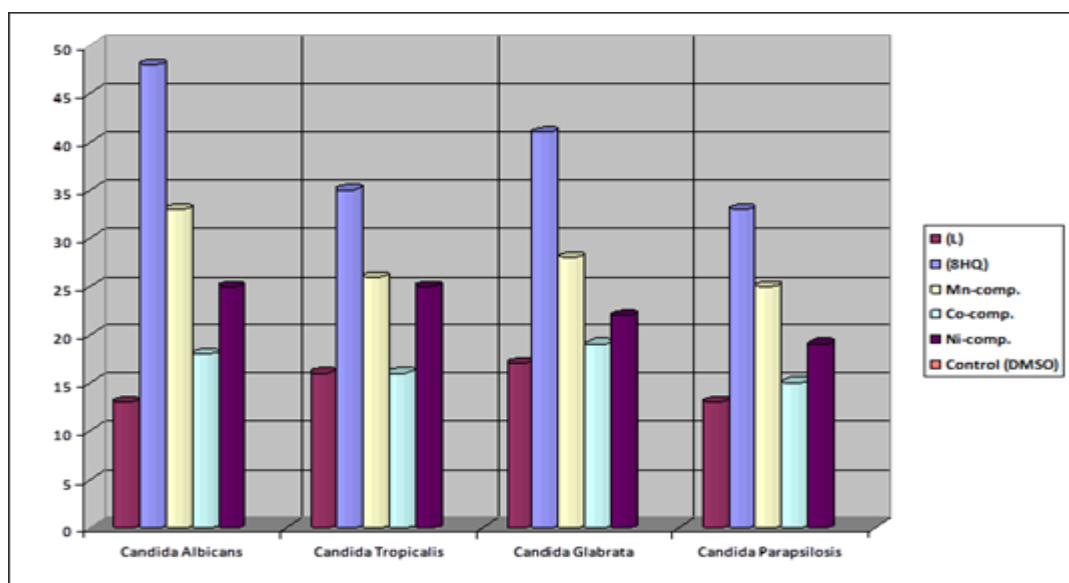


Figure 3: Shows the antibacterial study of ligands and complexes appear the inhibition zones against pathogenic with Staphylococcus Aureus, In the case of newly prepared solutions (New) and in the case of (Old)



**Table 6:** Showed the Inhibition Circle Dimeter in Millimeter for the fungi with *Candida Albicans*, *Candida Tropicalis*, *Candida Glabrata* and *Candida Parapsilosis* After 24h Incubation at 37°C for the Ligands and Metal Complexes of (New)

compounds	<i>Candida Albicans</i>	<i>Candida Tropicalis</i>	<i>Candida Glabrata</i>	<i>Candida Parapsilosis</i>
L	13	16	17	13
8HQ	48	35	41	33
[Mn(L)(8-Q) <sub>2</sub> ]	33	26	28	25
[Co(L)(8-Q) <sub>2</sub> ]	18	16	19	15
[Ni(L)(8-Q) <sub>2</sub> ]	25	25	22	19
Control (DMSO)	-	-	-	-



**Chart 3:** Chart of antibacterial study of some for the studied ligands and metal complexes against fungi with *Candida Albicans*, *Candida Tropicalis*, *Candida Glabrata* and *Candida Parapsilosis* in the case (New)

**Table 7 .**Showed the Inhibition Circle Dimeter in Millimeter for the fungi with *Candida Albicans*, *Candida Tropicalis*, *Candida Glabrata* and *Candida Parapsilosis*

compounds	<i>Candida Albicans</i>	<i>Candida Tropicalis</i>	<i>Candida Glabrata</i>	<i>Candida Parapsilosis</i>
L	25	17	20	15
8HQ	13	14	10	12
[Mn(L)(8-Q) <sub>2</sub> ]	30	16	27	20
[Co(L)(8-Q) <sub>2</sub> ]	34	25	28	24
[Ni(L)(8-Q) <sub>2</sub> ]	14	18	15	15
Control (DMSO)	-	-	-	-

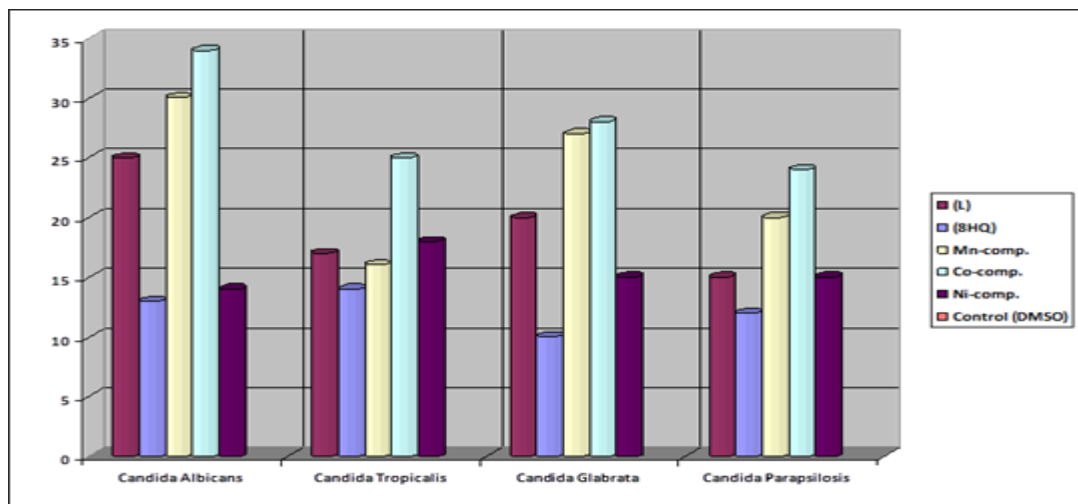


Chart 4: Chart of antibacterial study of some for the studied ligands and metal complexes against fangi with *Candida Albicans*, *Candida Tropicalis*, *Candida Glabrata* and *Candida Parapsilosis* in the case (Old)

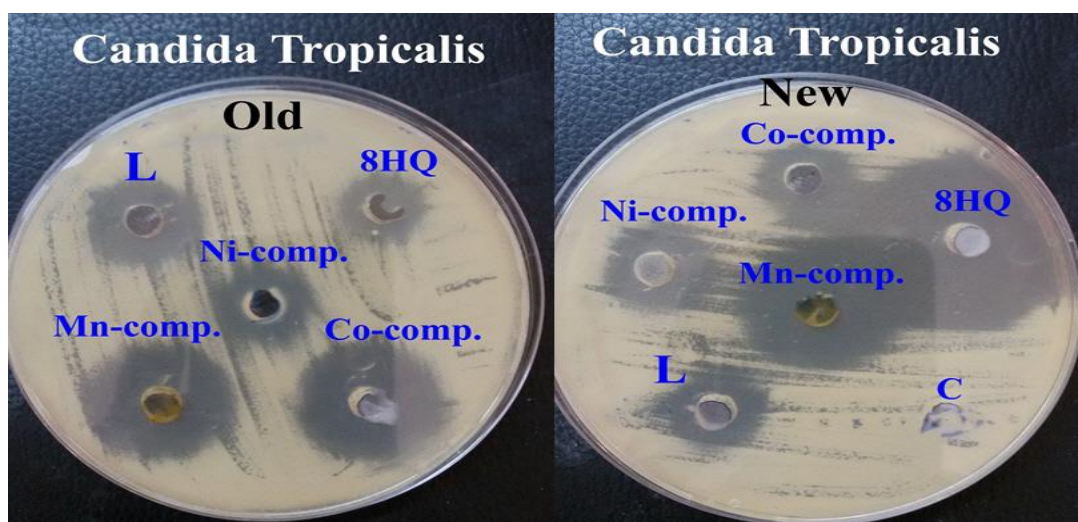


Figure 4: Shows the antibacterial study of ligands and complexes appear the inhibition zones against fungi with *Candida Tropicalis* in the case (New) and (Old)

In this research, the current study has been synthesis, characterization and chelating properties of metal complexes of some divalent transition metal ions Mn(II), Co(II) and Ni(II) with schiff base ligand [N<sub>1</sub>-benzylidenebenzene-1,2-diamine](L) was prepared via condensation of benzaldehyde and O- aminoaniline as a primary ligand and the ligand of (8HQ) as secondary ligand. The antibacterial and antifungi activity was tested of ligands and metal complexes to the effectiveness of pathogenic bacteria has been studied.

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