

RESEARCH ARTICLE	Synthesis, antimicrobial activity of 2-hidroxi-naftaldehide Schiff base of 3-aminoprophanol and metal complexes	
Nangyal Hasnian	Doctor (PhD)	
	Botany Hazara University Mansehra Khyber Pakhtoonkhwa	
	Pakistan	
	Email: bounefla.salih@univ-guelma.dz	
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<b>Abstract</b> Schiff bases and metal complexes have been synthesied by the condensation of 2-hidroxi- naftaldehide and 3-aminoprophanol.The structure of the synthesied compounds assigned on the basis of elemental analysis, IR, HNMR spectral studies.All the products were evaluated for their in vitro antimicrobial activity against various strains of bacteria and fungi.		
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## 1. Introduction.

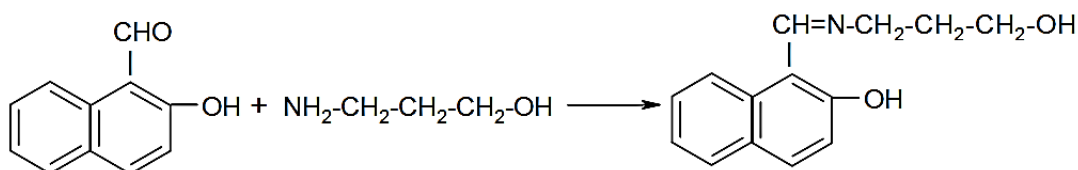
Schiff Bases are condensation of primary amines with carbonyl compounds and they were first reported by Schiff in 1864[1]. Ugo (Hugo) Joseph Schiff (Figure 1), one of the founders of modern chemistry, was born in Frankfurt on the 26 April 1834, into a wealthy Jewish family of merchants, Joseph Moses Schiff (1784–1852) and Henriette Trier (1798–1888). He was the eighth son out of ten, of which only four, Moritz, Hugo, Bertha and Clementine reached adulthood. He studied chemistry and physics in Frankfurt with Professors Böetger and Löwe, and continued his studies in Göttingen, where he got his degree in 1857 under the supervision of professor Wölher. Professor Wölher was, in turn, student of Berzelius in Stockholm and was the first chemist to synthesize urea, an organic molecule, starting from inorganic compounds: the birth of modern organic chemistry is taught to start from this experiment, which, once and for all, excluded the presence of “vis-vitalis” (vital strength residing in the organic matter) demonstrating that there is no metaphysical difference between organic and inorganic substances. This was the origin of organic chemistry and the beginning of a new type of scientific research. Professor Schiff was used to say to his pupils: “Remember that you descend from Berzelius, because Berzelius taught Chemistry to the old Wöhler and the old Wöhler taught me. In 1856 Ugo Schiff moved out of Germany because of his Jewish origins and political ideas and spent six years in Bern before reaching Italy where he remained for the rest of his career. On this base Professor Schiff must be fully considered an Italian Chemist. Schiff retained his liberal views and was a cofounder of the socialist Italian newspaper L'Avanti in 1894.

The common structural feature of these compounds is the azomethine group with a general formula  $\text{RHC}=\text{N-R}_1$ , where R and  $\text{R}_1$  are alkyl, aryl, cyclo alkyl or heterocyclic groups which may be variously substituted. These compounds are also known as anils, imines or azomethines. Several studies showed that the presence of a lone pair of electrons in an  $\text{sp}^2$  hybridized orbital of nitrogen atom of the azomethine group is of considerable chemical and biological importance. Because of the relative easiness of preparation, synthetic flexibility, and the special property of  $\text{C}=\text{N}$  group, Schiff bases are generally excellent chelating agents, especially when a functional group like  $-\text{OH}$  or  $-\text{SH}$  is present close to the azomethine group so as to form a five or six membered ring with the metal ion. The versatility of Schiff base ligands and biological, analytical and industrial applications of their complexes make further investigations in this area highly desirable [3].

Nowadays, the research field dealing with Schiff base coordination chemistry has expanded enormously. The importance of Schiff base complexes for bioinorganic chemistry, catalysis and material science, separation and encapsulation processes, and formation of compounds with unusual properties and structures has been recognized and reviewed [4].

## 2. Experimental. Preparation of the ligand

The ligand was synthesized by the condensation of 2-hydroxy-naphthaldehyde with 3-aminopropanol in 1:1 molar ratio using absolute alcohol as the reaction medium. The mixture was refluxed on a water bath for 1 and a half hour and then allowed to stand overnight at room temperature. The product was crystallized from the same solvent, yield 65%.



## 3. Preparation of the complexes.

The complexes of Cu (2), Ni (2) have been prepared by reacting ethanolic solution of metal acetates with ethanolic solutions of the ligand in the molar ratio 1:2. The solid coloured complexes which are separated on cooling were filtered, washed with ethanol, dried in oven, yield in all cases 60 %.

## 4. Results and Discussion.

### IR Spectra.

The IR spectra of the ligand exhibit strong and broad at  $1650\text{ cm}^{-1}$  assignable to  $\nu_{\text{C}=\text{N}}$ . The band is shifted to lower wave number after complex formation proposes involvement of azomethine N in the banding with metal ions. The linkage with N atom is further supported by the appearance of a band in far IR region at  $425\text{--}395\text{ cm}^{-1}$  in the complexes assignable to  $\nu_{\text{M}=\text{N}}$ . This band undergoes to shift after complex formation propose coordination of metal ion through carbonyl oxygen. It is further supported by the appearance of a new far IR band at  $525\text{--}505\text{ cm}^{-1}$  in the complexes which is assignable to  $\nu_{\text{M}=\text{O}}$ .

## 5. Antimicrobial activity

In literature, it is maintained that ligands and their metal complexes are considerably active against *Bacillus megaterium* and *Candida tropicalis*, but that the effect of metal complexes is stronger than that of ligands. It was also reported that ligands and

their metal complexes are active against *Escherichia coli*, *Barilum* sp and *Pseudomonas aeruginosa*, while that Cu are more effective. Moreover, Cu complexes of ligands were reported to be inhibiting active agents against bacteria and fungus. It was also determined that ligands could produce an inhibiting effect on the development of *Aspergillus niger*, *Penicillium rubrum* and *Aspergillus terreus*. Furthermore, it was also established that ligands had an antibacterial effect at 100ppm concentration and they had an antifungal effect.

Antimicrobial activity of the compounds of tested against using *Pseudomonas aeruginosa*, *Mycobacterium lacticolum*, *Aspergillus niger*, *Cladophium resinale*, *Penicillium chrysogenum*, *Chaetomium globosum* *Trichoderma viride*. The sterilized (autoclaved 121° C for 15 min) medium (40- 50<sup>0</sup>) was poured into the Petri dishes to give a depth of 3-4 mm and allowed to solidify. The suspension of the microorganism was streaked on plates. The paper discs impregnated with the test compounds was placed on the solidified medium. The plates were pre-incubated for 24 hours at room temperature and incubated at 37° C for 24 hours.

**Table 1: (I-III) Researching of functional properties of compounds.**

No	Ligand and complexes	Concentration%	Bactericidal	Fungicidal
1	Ligand	0,5	3,0-3,0	3,3-3,3
		1	2,5-2,5	2,4-2,4
2	Complex of Cu	0,5	3,2-3,2	3,2-3,2
		1	2,6-2,6	2,2-2,2
3	Complex of Ni	0,5	3,3-3,3	3,0-3,0
		1	2,6-2,6	2,3-2,2

## 6. Conclusion.

From the result of antimicrobial effect we can conclude that all compounds exhibited strong to moderate activity. Metal complexes have been found to be more effective than their ligands as the process of complexation dominantly affects the overall biological behavior of. The compound also the zone of inhibition increases with the concentration. The result suggest to chemical entities with potential for clinical use.

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