



Ain Shams University  
Women's College for Art, Science, and Education  
Chemistry Department

## **Formation of organometallic compounds Through metallating agents**

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MSc.Thesis in Chemistry

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## **Aim of the work**

The present work deals with the reactions of cobalt, nickel, copper, and mercuric acetate with some aromatic compounds containing different functional groups in order to form organometallic compounds. Then the prepared organometallic compounds were reacted with solochrome-cyanine-R to form new compounds having antimicrobial activity against fungi and bacteria. Also the synthesized compounds were used as dyes for dyeing wool and wool/PET. Furthermore the prepared organometallic compounds were reacted with co-polymer (maleic anhydride-alt-acrylic acid) to form new compounds with antimicrobial activity against fungi and bacteria. The structures were confirmed by elemental analyses, IR, UV/Vis,  $^1\text{H-NMR}$ , mass spectra, TGA, DSC and some chemical tests

## Acknowledgement

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# Summary

## Summary

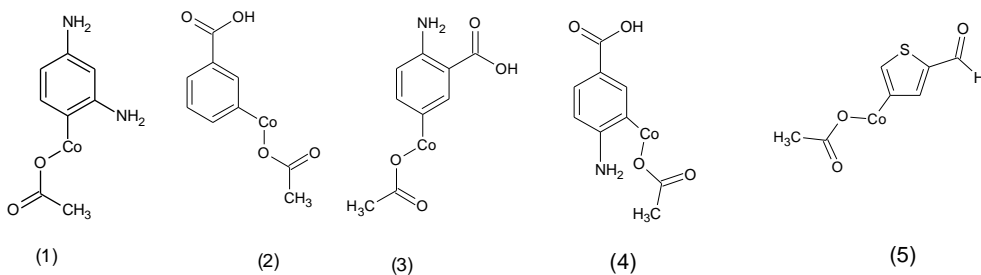
The main object of this work is the study of reaction of cobalt, nickel, copper and mercuric acetate with some aromatic compounds containing different functional groups in order to form organometallic compounds. The prepared organometallic compounds reacted with solochrome cyanine R to form new compounds having antimicrobial activity against fungi and bacteria and also used as a dye for dyeing wool and wool/PET. The prepared organometallic compounds reacted also with co polymer (maleic anhydride-alt-acrylic acid) forming new compounds having antimicrobial activity against fungi and bacteria

### PART 1

#### **I. Metallation of aromatic derivatives:**

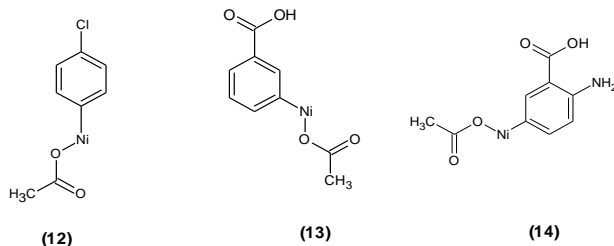
##### **a. The reaction of cobalt acetate**

The reaction of cobalt acetate with m-phenylenediamine, benzoic acid, anthranilic acid, p-aminobenzoic acid and thiophen-2-aldehyde in toluene and acetic acid as a solvent gave rise to compounds (1), (2), (3), (4) and (5) respectively.



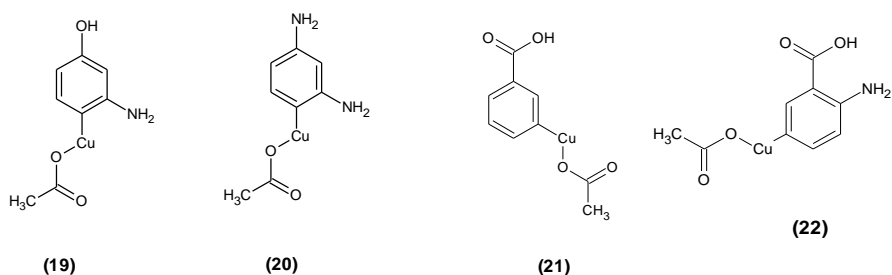
##### **b. The reaction of nickel acetate**

The reaction of nickel acetate with chlorobenzene, benzoic acid and anthranilic acid in toluene and acetic acid as a solvent afforded compounds (12), (13) and (14) respectively.



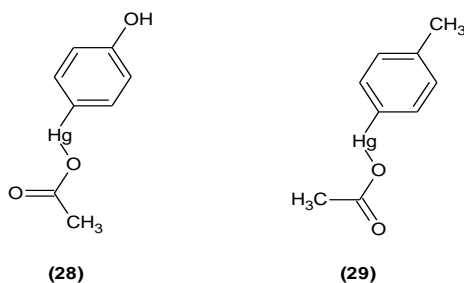
### c. The reaction of copper acetate:

The reaction of copper acetate with m-aminophenol, m- phenylenediamine, benzoic acid and anthranilic acid in toluene and acetic acid as a solvent gave rise to compounds (19), (20), (21) and (22) respectively



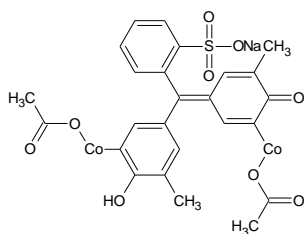
### d. The reaction of mercuric acetate:

The reaction of mercuric acetate with phenol and toluene gave rise to compounds (28) and (29) respectively

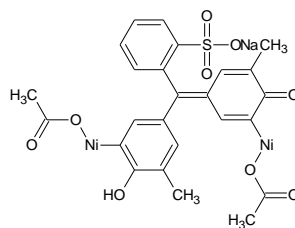


## II. Action of metal salts on solochrome cyanine R

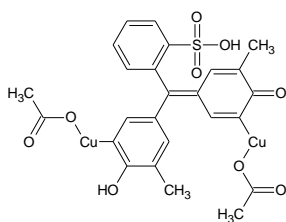
By The reaction of solochrome cyanine R with cobalt, nickel, copper and mercuric acetate in a mixture of toluene and few drops of acetic acid gave rise to compounds (6), (15), (23) and (30) respectively.



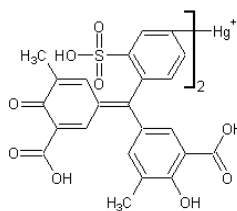
(6)



(15)



(23)

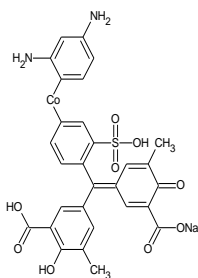


(30)

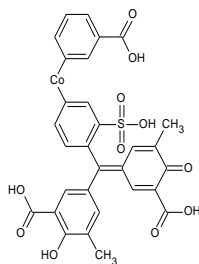
### III. Metallation of solochrome cyanine R using acetoxy cobalt derivatives

(1), (2), (3), (4) and (5).

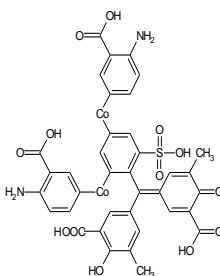
The reaction of solochrome cyanine R with acetoxy cobalt derivatives of m-phenylene diamine, benzoic acid, anthranilic acid, p-amino benzoic acid and thiophene-2-aldehyde in toluene and few drops of acetic acid gave rise to compounds (7), (8), (9), (10) and (11) respectively.



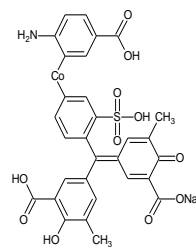
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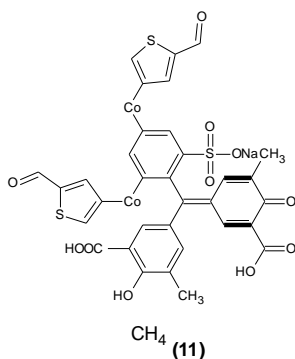
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(9)



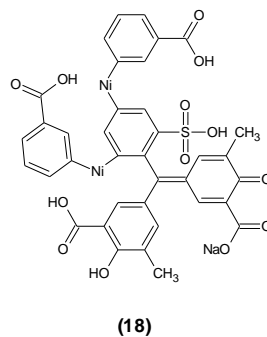
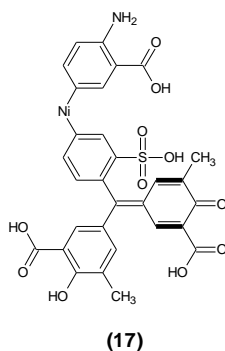
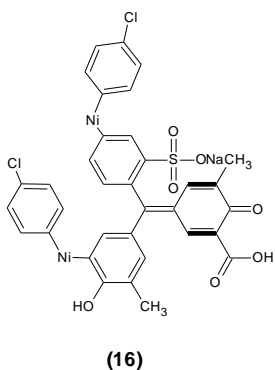
(10)



#### IV. Metallation of solochrome cyanine R using acetoxy nickel derivatives

(12),(13), and (14):

The reaction of solochrome cyanine R with acetoxy nickel derivatives of chlorobenzene, benzoic acid and anthranilic acid gave rise to compounds (16), (17) and (18) respectively.



#### V. Metallation of solochrome cyanine R using acetoxy copper derivatives (19),(20), (21) and (22) respectively:

The reaction of solochrome cyanine R with acetoxy copper derivatives of m-aminophenol, m-phenylene diamine, benzoic acid and anthranilic acid gave rise to compounds (24), (25), (26) and (27) respectively.