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SYNTHESIS OF P-TOTYL DITHIO CARBAMATE COMPLEXES AND THEIR ANTIMICROBIAL ACTIVITY

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Abstract

Ammonium P-Totyldithiocarbamates complexes with different metals have been synthesized by the interaction of ammonium p-totyldithiocarbamate and various metals like Ni, Cu, Co, Hg, Cd. The complexes have been tested for their antibacterial activity against, *Proteus vulgaris* and *Pseudomonas auriginosa*. The newly synthesized Complexes have been characterized by IR, ¹H NMR.

Key word : Ammonium P-Totyldithiocarbamates, antibacterial activity, *Proteus vulgaris*, *Pseudomonas auriginosa*.

1. INTRODUCTION

Dithiocarbamates are of growing interest due to their biological potencies, such as antihistaminic, antibacterial, anticancer activities. [4-10]. Dithiocarbamate acid ester (1) is a common class of organic molecules. They exhibit valuable biological effects, including antibacterial activity, antifungal activity, antioxidant activity, inhibition of cardiac hypertrophy. Besides being widely used as fungicides to protect crops from fungal diseases, dithiocarbamic acid esters have a number of other applications such as in photochemistry, catalysis in the sulfur vulcanization of rubber, detection and analysis of biological NO produced endogenously from NO synthases, [14] and polymerization. Furthermore, functionalized carbamates are an important class of compounds and their medicinal and biological properties warrant study. Dithiocarbamic acid esters were recently reported as potent anticancer agents and cell apoptosis inhibitors. [17]

Organic dithiocarbamates are valuable synthetic intermediates, which are ubiquitously found in a variety of biologically active compounds. Functionalization of the carbamate moiety offers an attractive method for the generation of derivatives, which may constitute interesting medicinal and biological properties. [19]

2. METHOD OF PREPARATION :

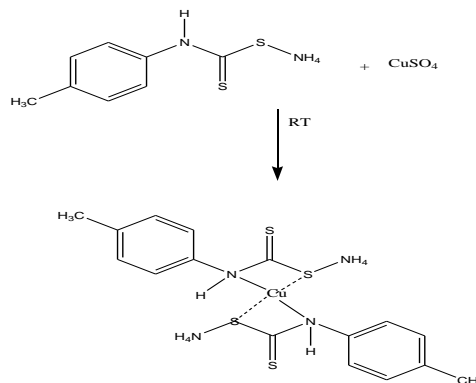
A] Preparation of Complexes :

1] Copper Complex

1M ammonium P-totyldithiocarbamate and 1M copper chloride solution are heated for an hour, complex is formed.

Structure

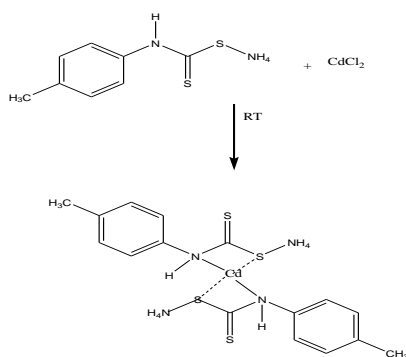
Complex of Ammonium paratotyldithiocarbamate with Cu metal ion



2] Cadmium Complex

1M ammonium P-totyldithiocarbamate and 1M Cadmium chloride solution are heated in round bottom flask, complex is formed.

Structure :

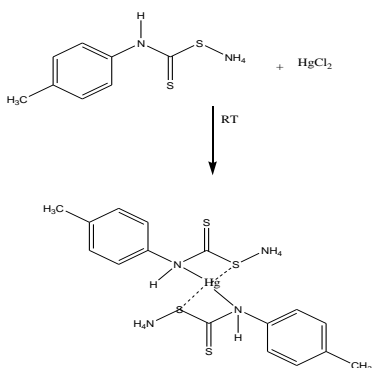


3] Mercuruscomplex

1M ammonium P-toty1dithiocarbamate and 1M Mercurus chloride solution in are heated , complex is formed.

Structure:

Complex of Ammonium paratoty1 dithiocarbamate with Hg metal ion



3. RESULT AND DISCUSSION

The reaction of ammonium phenyl thiocarbamate solution and metal like Copper Chloride(M¹), Nickel Chloride(M²), Cobalt Nitrate(M³), Cadmium Chloride(M⁴), Mercurus Chloride(M⁵) gives complexes The IR, 1H NMR elemental analysis (Table-1)

Spectral data

Copper complex

H-NMR spectrum analysis of Complex of Cu²⁺ showed the presence of following peaks. The chemical shift can be correlated as shown below in table No. 2

IR DATA :

3204 cm⁻¹ (N-H), 1593cm⁻¹ (C=S), 1450 cm⁻¹ (C-N), 756 cm⁻¹ (C-S), 691 cm⁻¹ (Cu-N) and NMR data as bellow in table 1

Table-1: The IR, 1H NMR elemental analysis

Sr. No.	Signal Position (δ-ppm)	Relative No. of H-atom	Multiplicity	Assignment
1	7.4	10	S	Ar-H
2	4.2	2	d	N-H
3	9.87	8	S	NH ₄

Spectral data :

II) Mercury complex :

¹H-NMR spectrum analysis of Complex of Hg²⁺ showed the presence of following peaks.

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IR VALUE:

3201 cm⁻¹ (N-H), 1546cm⁻¹ (C=S), 1403 cm⁻¹ (C-N), 756 cm⁻¹ (C-S), 696 cm⁻¹ (Hg-N) and NMR data as bellow in Table No.2

Table- 2:

Sr. No.	Signal Position (δ-ppm)	Relative No. of H-atom	Multiplicity	Assignment
1	7.4	1	S	Ar-H
2	4.4	1	d	-NH
3	10.3	4	S	NH ₄

III) Cadmium complex

H-NMR spectrum analysis of Complex of Cd²⁺ showed the presence of following peaks. The chemical shift can be correlated as shown below. Table No .3

IR VALUE:

3245 cm⁻¹ (N-H), 1598cm⁻¹ (C=S), 1498 cm⁻¹ (C-N), 758cm⁻¹ (C-S), 689 cm⁻¹ (Cd-N) and NMR data as bellow in table No.3

Table-3:

Sr. No.	Signal Position (δ-ppm)	Relative No. of H-atom	Multiplicity	Assignment
1	7.6	1	S	Ar-H
2	3.9	1	d	N-H
3	9.87	4	S	NH ₄

On the basis of elemental analysis and spectral data the molecular formula of Ni²⁺, Cu²⁺, Hg²⁺, Cd²⁺ was established as, C₁₄ H₂₀ N₄ S₄ M

The M.P.recorded in the

Table-4 :

A)Metal Complex (Ammonium phenyl dithiocarbamate)	Melting Point
Copper complex	112 ⁰ C
Cadmium complex	110 ⁰ C
Mercurus complex	105 ⁰ C

Microbial activity

All the compounds have been screened for both antimicrobial using cup plate agar diffusion method 17-18 by measuring the inhibition zone in mm. The compounds were taken at concentration of 1 mg/ml using DMF. as solvent. The compounds were screen for antibacterial activity against candida albican ,T.mentangrophytsin nutrient agar medium. The results are presented in Table-6

From the observation ,Copper complex Candium complex and mercury complex show significant activity against T.mentangrophyts

Table :5Antimicrobial activities of Metal Complexes of Ammonium phenyl dithiocarbamate

Compound	Biological Activity	
	Candida albican	T.mentagrophyts
Copper complex	16	19
Mercury complex	12	14
Cadmium complex	10	15

4. CONCLUSION

The new series complex of ammonium phenyl dithiocarbamates were synthesized by utilizing a simple and efficient method in good yields. The structures assigned have been supported by adequate spectral data. The results of antimicrobial activity revealed that of the compounds exhibited prominent activity against the Candida Albican and T. mentagrophyts.

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