Transition Metal Complexes of Sodium Phenylcarbamodithioate; Synthesis,Characterizationand Biological Activities

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IN THE NAME OF ALLAH WHO IS THE MOST MERCIFUL AND BENEFICIANT

Lord Muhammad

(Peace be upon HIM)

“The Calamity of Knowledge is forgetfulness; and to lose knowledge is this, to speak of it to the unworthy.

Who are the learned? Those who practice what they know”.

DECLARATION

I **Mariam Hameed** D/O **Abdul Hameed** ID: 15004140010, Session 2015-2017 hereby declare that the matter printed in the thesis titled **"Transition metal complexes of sodium phenylcarbamodithioate; synthesis, characterization and biological activities"** is my own work and has not been printed, published and submitted as research work, thesis or publication in any form in any university, research institution etc. in pakistan or abroad.

Dated: _____ _____

(Mariam Hameed)

RESEARCH COMPLETION CERTIFICATE

Certified that the research work contained in this thesis titled, **"Transition metal complexes of sodium phenylcarbamodithioate; synthesis, characterization and biological activities"**has been carried out and completed by **Mariam Hameed, ID: 15004140010**.The quantum and the quality of the work contained in this thesis is adequate for the award of degree of MS.

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Dedicated to my loving parents, teachers and friends,

without their knowledge, wisdom, and guidance, I

would not have met the goals

And reach my dreams!

Content:

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This thesis owns many thanks to a number of people for their assistance, patience and kindness. Without their support, I could not have achieved my goal.

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Mariam Hameed

Abstract

The eight new metal complexes [$Zn(dtc)_2$], [$Cd(dtc)_2$],[$Co(dtc)_2$], [$Cu(dtc)_2$], $Zn(dtc)_2(en)_2$], [$Cd(dtc)_2(en)_2$], $Co(dtc)_2(en)_2$], and [$Cu(dtc)_2(en)_2$] have been prepared from sodium ligand of phenylcarbamodithioate. Sodium-phenylcarbamodithioate ligand was prepared by the treatment of primary amine with CS_2 under aqueous condition in the presence of Na_2CO_3. The synthesized compounds have been characterized by FT-IR, conductance measurement and the biological activity was done by Alkaline phosphatase Assay (ALP). The formation of ligand was confirmed by the appearance of C-S peak at 998 cm^{-1}, which was shifted to lower wave number (at 983-872.29 cm^{-1})upon complexation. Metal–sulfur coordination was confirmed by the observed the vibrational frequency of N-CSS at 1431-1471 cm^{-1}.From conductive measurement, it was foundthat all prepared compoundsare non-electrolytic in nature.From ALP profile, it was observed that the activity of enzyme becomes low by increasing the concentration of a metal complex. Among all complexes, [$Cu(dtc)_2(en)_2$] and [$Zn(dtc)_2(en)_2$] showed the highest ALP inhibition.

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ALP	Alkaline phosphatase assay
dtcs	dithiocarbamates
en	ethylenediamine
CS_2	carbon disulfide
THF	tetrahydrofuran
p-NPP	*para*-nitrophenylphosphatase
D	Sodium-phenyldithiocarbamothioate
D-1	$[Zn(dtc)_2]$
D-2	$[Cd(dtc)_2]$
D-3	$[Co(dtc)_2]$
D-4	$[Cu(dtc)_2]$
D-5	$[Cu(dtc)_2(en)_2]$
D-6	$[Co(dtc)_2(en)_2]$
D-7	$[Cd(dtc)_2](en_2)]$
D-8	$[Zn(dtc)_2](en_2)]$

Chapter: 1

Introduction

1. Introduction

Throughout the last few years ago, the main objective in the organic synthesis of chemistry was to raise the development of the green and economically competitive process for the efficient synthesis of biological active compounds which has the potential in the pharmaceutical as well as in agrochemical industries (Najmedin. A, 2006). In this regard dithiocarbamates has been synthesized which was used as an intermediate in rubber industries and agrochemical industries due to their biological and pharmaceutical properties (Adam. H, 1967). No one can be suggested that when dithiocarbamate has been synthesized first but probably it has been synthesized over 150 years. Although transition metal complexes synthesis were not exact calculated in the previous as well as current record. Now a day's dithiocarbamate synthesis method has been selected on the behalf of simple method of synthesis which were supporting the wide range of oxidation states of transition element by binding as well as potential ability. Due to the existence of dithiocarbamate, the complexes were either utilized in medicines or in agrochemicals (Sanjay K. V, 2015).