



CODEN (USA): IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.205887>Available online at: <http://www.iajps.com>

Research Article

**TO STUDIES CONDITIONAL STABILITY CONSTANT OF
SUBSTITUTED THIOCARBAMIDOPHENOL WITH
DIFFERENT TRANSITION METAL IONS COMPLEXES IN
70% ETHANOL-WATER SOLVENTS MEDIUM****D.T.Tayade¹, N. J. Meshram^{2*}**¹Department of Chemistry, Government Vidarbha Institute of Science and Humanities,
Amravati-444604, Maharashtra, India.²Department of Chemistry, R. R. Lahoti Science College Morshi. Dist. Amravati,
Maharashtra, India.

Email: skdtayade@gmail.com, meshramnamdeo358@gmail.com

Abstract:

Present work highlight the investigation of conditional stability constant and formation constant of metal-ligand complexes of ligands 4-(p-Chloro)phenylthiocarbamido phenol (L₂) with Cu(II), Cd(II), Cr(II) and Ni (II) metal ions with ethanol-water systems at different proportions by Jobs method of continuous variation. It is the spectrophotometric study. The stoichiometry of complex formation found to be 1:1. This investigation helps to understand drug effect and drug activity of newly synthesized drugs.

Keywords: 4-(p-Chloro)phenylthiocarbamidophenol or (L₂), stability constant, spectrophotometrically**Corresponding Author:****D. T. Tayade,**

Department of chemistry,

G.V.I.S.H. Amravati444604,

Maharashtra, India.

Email:- ajaywadekar29@gmail.com

QR code



Please cite this article in press as D.T.Tayade and N. J. Meshram, *Substituted Thiocarbamidophenol with Different Transition Metal Ions Complexes In 70% Ethanol-Water Solvents Medium*, Indo Am. J. P. Sci, 2016; 3(11).

INTRODUCTION:

Physical and chemical properties are varied due to complexation. Composition as well as conformation of complex formation can be measured from study of various physicochemical properties by spectrophotometric method. Spectrophotometric technique has a great significance in measurements of stability constant and confirmation of complex formation in solution. Wagh [1] and Deshamukh [2] determined log K value of chalcones pyridine carboxylic acids and hydroxyl ethyl benzene. Galhan et al [3] studied (E)-2-(mercaptophenylaminoethylene)-3-oxo-N-p-tolylbutamide with some metal ion by spectrophotometrically. Boldescu et al [4] Spectrophotometrically studied sanguirine-bicyclodextrin complex formation. Spectrophotometrically determination of phenylprine hydrochloride and salbutamol sulphate drugs in pharmaceutical preparation using diazotized metacloprine hydrochloride was carried out by Al-Abachi and Abed[5]. Alsamarrai et al [6] investigated ephedrine-hydrochloride by spectrophotometrically. Saleha et al [7] investigated sulphsalazine antibiotics drugs. Investigation of ion complex formation of anti-hypertensive drug mehtyldopal was studied[8]. Meshram [9] studied complexation by interaction of Dy (III) with lincomycine and lyrodoxin in 70% ethanol-water medium. Spectrophotometric study of diflunisal febusostate metaxalone, fexofenadine methyl ester and linezolid pharmaceutical dosages using tetracyanoethelene was carried out by Shrinivas et al[10]. Valtierra –Alvardo et al [11] investigated complex formation equilibrium of Cu(II). Solvent effect on dissociation of ammonium and pyridinium ion was studied by Ohataki [12]. Investigation of effect of dielectric constant on Cu(II) –Complexes of phthalic acid in various percentage of dioxane-water mixture was carried by Palaskar [13]. Metal-ligand stability constant and confirmation of complexes formation of 4-(p-chloro)phenylthiocarbamido phenol(L₂) and with Cu(II), Cd(II), Cr(II) and Ni (II) metal ions had been investigated respectively by Spectrophotometric technique at 0.1 M ionic strength. This work mainly base on Jobs method of continuous variation. It is specially associated to study of effect of solvents, effect of ligands and group as well as effect of metal ions during formation of complexes.

MATERIAL AND METHOD:

4-(p-Chloro)phenylthiocarbamido phenol(L₂) has been synthesized in the laboratory by standard method. The nitrate salts of Copper, Cadmium, Chromium and Nickel were used & their solutions were prepared in double distilled water. The solutions of potassium nitrate was prepared (1M) & used for maintaining ionic strength constants. Absorption are measured by UV Spectrophotometer model 106, (Systronic make) with an accuracy = ± 0.005 was used.

RESULTS and DISCUSSION:**Spectrophotometric Measurement****Job's Method**

Jobs method of continuous variation method is reliable method for investigation of formation of complex [14]. Jobs method consist of equimolar solutions of metal and ligand varying proportion in such manner that total concentration of metal plus ligand is constant in resulting mixtures[15]. The compositions of metal ions solution (1 x 10⁻²M) & ligand (1x 10⁻²M) were prepared in ten series. Ionic strength was maintained constant (0.1M) by adding an appropriate amount of 1M KNO₃ solution in 10 ml volume (λ_{max}) was determined using one of the compositions at which there is maximum absorption. The absorption for all the compositions were recorded at a constant wave length (λ_{max}). The data of absorption & % composition of metal ion and ligand solutions at constant pH can be used to construct the curves. It was observed that 1:1 complex formation occurs in the pH range of 3 to 6. Each solution is diluted up to 15 ml and recorded absorption at same (λ_{max}). Conditional stability constants of metal ligand complexes were calculated for all the systems using following expression.

$$K = \frac{X}{(a1-x)(b1-x)} = \frac{X}{(a2-x)(b2-x)}$$

K = Conditional stability constants of complex.

X = Concentration of complex.

a1 & a2 = Concentration of metal ions; b1 &

b2 = Concentration of ligand.

Conditional stability constants of metal ligand complexes showed in Table-1

Table 1: Determination of Conditional Stability of Metal Ligand Complexes

System	Conditional stability constant	Log K
L ₂ +Cu(II)	2.4740 X 10 ⁻³	0.3934 X 10 ⁻³
L ₂ +Cd(II)	1.4590 X 10 ⁻³	0.1641 X 10 ⁻³
L ₂ +Co(II)	1.4896 X 10 ⁻³	0.1731 X 10 ⁻³
L ₂ +Ni(II)	2.1136 X 10 ⁻³	0.3250 X 10 ⁻³

CONCLUSION:

From **Table 1** it was conclude that resultant values obtain are fairly good. There is no appreciably change in log K values. This indicated the simultaneously complex formations. Variation in Log K values observed due to direct interfere of dielectric constant, solvent-solvent interaction, solute-solvent interaction and solute-solute-solvent interaction. Table 1 reveal that Log K value of L₂ greater for Cu (II) than Cd(II) Cr (II) and Ni (III). Thus L₂ form more stable complex with Cu (II) than Cd (II) , Cr(II) and Ni (II). This investigation helps to study of drug activity and drug effect of newly synthesized drugs.

REFERENCES:

- 1.Wagh S. P., Metal-ligand stability constant value of chalcones pyridine carboxylic acids Ph.D. Thesis Amravati University, Amravati, 2004.
- 2.Deshmukh CN., M-L stability constant of chalcones hydroxyl ethyl benzene Ph.D. Thesis Amravati University, Amravati, 2004.
- 3.Gahlam AA., El-Sayed AY., Marouf MA. And Taufij MM., To study of (E)-2-(mercapto-phenylamino ethylene)-3-oxo-N-p-tolylbutamide with some metal ion by spectrophotometrically Int. J. of Advance Research, 2015; 3(1): 630-642.
- 4.Boldescu V. , Irina Kacso, Ioan Bratub and Gheorghe Duca, to study the sangurine - bcyclodextrin complex formation, Chemistry J. of Moldova, 2008; 3(1): 85-88.
- 5.Mouyed Q, Al-Abachi & Sadeem S. Abed, Spectrophotometrically determination of phenylprine hydrochloride and salbutamol sulphate drugs in pharmaceutical preparation using diazotized metacloprine hydrochloride Baghdad Science J., 2015;12(1).
- 6.Khalaf F., Alsamarrai, Sarmad B. Dikram, Mumin F. Alsamarrai, spectrophotometrically study of ephedrine-hydrochloride, International journal of science technology and management, 2015;4(1): 1738-1746.
- 7.Magda M. S. Saleha, Elham Y. Hashem,Ahmed K. Youssef and Doaa A. Abdel-Kadir, study of sulphsalazine antibiotics drugs, World Journal of

pharmacy and pharmaceutical science, 2015; 4(5): 205-226.

8.Tehmina Fiaz, Nasreen Fatimal, S. Zafar Abbas Zaidi, Tanveer Abbas Mohib R. Kazimi, Investigation of ion complex formation of anti-hypertensive drug mehtyldopal was studied, American Journal of Analytical chemistry 2016; 6: 551-558.

9.Meshram YK., studied complexation by interaction of Dy (III) with lincomycine and lyrodoxin in 70% ethanol-water, Ph.D. thesis in chemistry Amravati university, Amravati, 2000.

10.Shrinivas B., Yadagoroswami P. and Venketeswarlu G., Spectrophotometric study of diflunisal febuxostate metaxalone, fexofenadine methyl ester and linezolid pharmaceutical dosages using tetracycloethelene, International Journal of Pharmaceutical Science and Research, 2015; 6(6):1002-1010.

11.Valtierra-Alvarado MA., Pamela Solano-Garcia M., Maria del Refigio Gonzalez-Ponce, Jose J. N. Segoviano-Garfis, Complex formation equilibrium of Cu(II), International Journal of Science and research publication, 2015; 5(6): 1-8.

12.Ohataki H., Solvent effect on dissociation of ammonium and pyridinium Bull. Chemical Society of Japan, 1969; 42: 1573.

13.Palaskar NG., Effect of dielectric constant on Cu(II) –Complexes of phtalic acid in various percentage of dioxane-water mixture, Ph.D. Thesis Marathvada University, Aurangabad.1971.

14.Krunz MM. and Fendth L. B. P., Complex formation by Jobs method, Microchemistry Journal, 1983; 28: 162.

15.Raghuvanshi PB., Doshi AG. and Narwade ML., Journal Indian Chemical Society 1996; 73: 21.