"STUDIES IN CONDITIONAL STABILITY CONSTANTS AND CONFIRMATION OF COMPLEX FORMATION OF CU (II), NI (II) AND CO (II) COMPLEX WITH 1, 3-THIAZINES, SCHIFF'S BASES & CHALCONE SPECTROPHOTOMETRICALLY"

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ABSTRACT

Spectrophotometric Investigation of Cu(II),Ni(II) and CO(II) complexes with 1,3-Thiazines,Schiff's Bases & Dibromo Chalcone showed 1:1 & 1:2 complex formation between pH range of 2 to 6.00.The formation of complexes has been studied by Isobestic Point method & Job's variation method at 0.1M ionic strength and at 27°C spectrophotometrically. The conditional stability constants are determined for 1:1 complexes at about pH = 3.00.

Keywords: Cu (II), Ni (II), CO (II), 1, 3-Thiazines, Schiff's Bases & Dibromochalcones Etc.

I. INTRODUCTION

In view of analytical applications and antibiotic drugs,one of the drugs 1,3-Thiazines,Schiff's bases & Dibromo Chalcones which acts as a ligand and is selected in the present investigation.

- The metal chelates of hydrazo-dimedone dynes are-

-Studied by Atefetal conditional stability constants of transition metal ions with some amino acid peptides have been studied by S.N.Dawale & Narwade[2].

-Sunita and Gupta[3] have worked on spectrophotometric determination of cyanide in biological complex using a new reagent.

-Narwade *et al*[4] have studied Fe(III) complexes with some substituted Chalcones Spectrophotometrically.

-Raghuwanshi *et al*[5] have shown 1:1 & 1:2 complex formations of Cu(II),Ni(II) and Co(II) with some substituted chalcones & Isoxazolines Potentiometrically.

-Meshram *et al*[6-8] have investigates metal ligand stability constants of transition metal ions complexes with some substituted Isoxazolines by Spectrophotometric & Potentiometric techniques.

-A caustical properties of peptides have been studied in 20% methanol-water mixture by sondawale *et al*[9].

-The study of the conditional stability constants of transition metal ion complexes with substituted Schiff's bases,1,3-Thiazines & Dibromo Chalcones been undertaken to study the complex formation & their confirmation. The present work been carried out by using Isobestic Point method & Job's method.

II. EXPERMENTAL

1,3-Thiazines has been synthesized in the laboratory by standard method.The nitrate salts of Copper Nickel & Cobalt (BDH) & Potassium Nitrate (BDH) were used & their solutions were prepared in double distilled water (0.01M). The solutions of potassium nitrate was prepared (1M) & used for maintaining ionic strength constants.Absorption are measured by using UV-visible spectrophotometric model-106 (systronics).

II. RESULTS & DISCUSSION

2.1 Spectrophotometric Measurement

2.1.1 Isobestic Point Method

Vareille's method of isobestic point was used to study the confirmation of complex formation between Cu(II),Ni(II) and Co(II) & substituted 1,3-Thiazines,Schiff's Bases & Dibromo Chalcones.

The absorption spectro were measured for solution containing metal ion (10×10^{-4}M) & ligand (50×10^{-4}M) at pH values ranging from 2.5 to 6.00. The pH of solution was measured by digital pH-meter.The data of absorption & wavelength in nm for all the pH solutions were used to construct the curves. Most of the curves are intersecting at 460,470,480,490 nm respectively. This indicated the formation of 1:1 & 1:2 complex formations.

2.1.2 Job's Method

Job's variation method was used to know the nature of complexes. Thecompositions of metal ions solution (1×10^{-3}M) & ligand (20×10^{-2}M) were prepared in ten series. Ionic strength was maintained constant (0.1M) by adding an appropriate amount 0f 1M KNO_3 solution in 10 ml volume (λmax) 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 (λmax). 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 2 to 4 & 1:2 complex formation in the pH range of 4 to 5. 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.

$$K = \frac{X}{(a_1-x)(b_1-x)} = \frac{X}{(a_2-x)(b_2-x)}$$

K = Conditional stability constants of complex.

X = Concentration of complex.

a_1 & a_2 = Concentration of metal ions

b_1 & b_2 = Concentration of ligand.

Conditional stability constants of metal ligand complexes were calculated & presented In Table - 1.

Table - 1

Determination of Conditional Stability of Metal Ligand Complexes

System	Concentration Complex mole-1	Conditional Stability Constant (K)
$Cu(II)L_1$	0.1053×10^{-2}	4.022×10^{-2}
$Cu(II)L_2$	0.1970×10^{-2}	1.089×10^{-2}
$Cu(II)L_3$	0.1047×10^{-2}	3.931×10^{-2}
$Cu(II)L_4$	0.1725×10^{-2}	0.7968×10^{-2}
$Cu(II)L_5$	0.1051×10^{-2}	3.965×10^{-2}
$Cu(II)L_6$	0.1850×10^{-2}	2.0108×10^{-2}
$Cu(II)L_7$	0.1416×10^{-2}	5.436×10^{-2}
$Cu(II)L_8$	0.1188×10^{-2}	3.2630×10^{-2}
$Ni(II)L_1$	0.1027×10^{-2}	2.9060×10^{-2}
$Ni(II)L_6$	0.2510×10^{-2}	4.8109×10^{-2}
$Co(II)L_1$	0.1490×10^{-2}	7.1796×10^{-2}
$Co(II)L_5$	0.1592×10^{-2}	2.198×10^{-2}

It could be seen from Table-1 that the values of conditional stability constants is less in some cases & greater in some cases. The greater value of stability constant of Cu(II) complex may be due to the fact.

III. CONCLUSION

Most of the curves are intersecting at 460,470,480,490 nm respectively. This indicated the formation of 1:1 & 1:2 complex formations. the values of conditional stability constants is less in some cases & greater in some cases. The greater value of stability constant of Cu(II) complex may be due to the fact.

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