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Medicinal efficiency of halo chlconemines by determination of stability constant

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Abstract : For any compound to be act as drug and should use as a good and effective medicine its stability constant should be fairly very good , in content to this in present work the proton ligand stability constant and metal ligand stability constant of halo substituted chalconeimines 2-Hydroxy naphthalene phenyl-N-(4-fluoro chalconeimine (FB) are studied with highly reactive transition metal like (Cu (II),Co(II),Cr(II)and Fe(III)). The solvent system used in the experiment is 70% dioxane water system.The use of 0.1 M ionic strength indicate that there is presence of –OH group confirmed. The metal (Cu (II),Co(II),Cr(II)and Fe(III)) used and the ligand form 1:1 and 1:2 complex with all values of log k1 and log k2 positive

I. INTRODUCTION

Proton ligand stability constant is an important physicochemical property which play very important role in the field of coordination chemistry for the study of metal complexes. The proton ligand and metal ligand stability constant were studied in various solvents, some are pure and some are mixed solvent.The antioxidant activity of eco friendly synthesized chalconeimine were studied by R.Asaithambi [1] Prithvirajbalu et al.[2] have desingn the substituted chalconeimine which act as a alpha amylase inhibitor the biological potency was investigated through in vitro which indicate the very significant inhibitor activity the structure was confirmed by using the spectroscopic terms like IR, 1H and 13C-NMR. Mithun rudrapal and mullapudi sowmya [3] have synthesized some new chalconeimines and screen for the antioxidant and antibacterial activity by using the reference Gallic acid the standered drug and with ciprofloxacine Patil et al[4] have synthesized and screen the chalconeimines agained the bacteria and fungus ,and it shows moderate activity. Pradip V. Tekade et al [5] . have determine the stability constant of substituted dihydropyrimidine with transition metal like Ni (II),Cu (II),Co(II) and observe that there is stepwise formation of complex as the ratio of logK1/logK2 is positive.

II. RESEARCH METHODOLOGY

The synthesized compound FB have wide spectrum of microbial activity and to act as drug its stability constant should

The halosubstituted chalconeimine are synthesized by amination of chalcone with substituted amines (chloro,and fluro substituted) by ,this chalcone are synthesized by using general claisen Schmidt method . For evaluating the stability constant the very pure and analytical grade solvent and extra pure double distilled water is used. The densities of pure solvent and solutions are determined by using specific gravity bottle.

The ligand was synthesized by microwave irradiation method in laboratory. The pH metric titration was carried out with EQ-614-pH meter equipment. AR and LR grade chemicals are used. The stock solution of ligand were prepared by dissolving require amount of ligand in ethanol solvent. The solution involved in the pH metric titration is

1) Perchloric acid (1× 10-2m) free
2) Perchloric acid (1× 10-2m) free + Ligand (20×10-4m).
3) Perchloric acid (1× 10-2m) free + Ligand (20×10-4m).+ Metal ion solution(4×10-4m)

The titration was carried out in 70% dioxane-water mixture

The readings were recorded for 0.1 ml addition. The graph were plotted between volume of alkali(NaOH) and pH. Ligand involve in this titration is consider as monobasic having only one dissociable H+ ion and it can be represented as HL. The dissociating equilibrium can be shown as

HL H+ + L-…… (1)

By the law of mass action we have……

K= [HL]/ ([H+][L-])……(2)

PH- metric studies pH-metric titrations were performed between rare earth (III) metal ions and biprotic ligands at constant ionic strength maintained by NaClO4 (μ=0.01, 0.05 and 0.1 mol/L). Titrations were performed with the under mentioned

solutions (Table 1) using carbonate free 0.01 mol/L standard NaOH solution, which was prepared by Gran method [6] Calculation of dissociation constant Irving and Rossoti [7,8] modified the method proposed by Bjerrum. They reported an alternative method to calculate dissociation constants of acidic ligands and formation function for metal-ligand chelates, from direct pH meter readings obtained during a titration. Equations (1), (2) were employed to evaluate dissociation constant of biprotic ligand

The plots between volumes of NaOH and pH of the solutions were used to determine the proton ligand formation numbers (representing the replacement of H+ from functional group of ligand with respect to pH value) and evaluate the proton-ligand stability constants of the ligands. The horizontal difference (V2 –V1) was measured accurately between the titration curves of acids and acids + ligands. It was used to calculate the formation proton ligand formation number n̄A at various pH values and fixed ionic strength μ = 0.1 M using Irving and Rossetti's equation.

$$\bar{n}_A = \gamma - \frac{(V_2 - V_1)\,(N + E^0)}{(V^0 + V_1)(T_L^0)}$$

Where Vo is the initial volume of the solution, E0, are the total concentrations of the mineral acid and ligand respectively. V1 and V2 are the volumes of alkali of a normality N during the acid and ligand titration at a given pH, □ is the number of replaceable proton from the ligand.

The metal-ligand formation number (n̄) is estimated by Irving-Rossotti's equation.

IV. RESULTS AND DISCUSSION

4.1 The stability constant for the ligands with different transition metal ions are given below

Sr.No	System	Logk1 LogK2	Half integral method	Point wise calculation Method
1	FB- Cu(II)	Logk1 LogK2	4.5359 2.1150	4.7742 2.1578
2	FB- Co(II)	Logk1 LogK2	4.4161 1.4714	4.4121 1.7156
3	FB- Fe(III)	Logk1 LogK2	3.8896 2.1150	4.1643 2.5323
4	FB- Cr (II)	Logk1 LogK2	4.6344 1.3699	4.8218 1.7514

For ligand FB with different transition metal ions follow the order

Cr(II)> Cu(II)>Co(II)>Ni(II)>Fe(III) CONCLUSION -

•The difference between log K1 and log K2 values is smaller, indicate the simultaneously complex formation.

•The difference between log K1 and log K2 values is greater, indicate the formation of stepwise complex formation.

•The difference between log K1 and log K2 values greater than 2.5 indicating 1:1 and 1:2 complex formation.

So the compound under investigation for stability constant indicates that there is simultaneous and stepwise formation of complex with metal ion take place, from result data it is also clear that the metal complexes formation is depend upon the ability of metal and ligand interaction

The pattern of curve was shown below which is observe by plotting the log k1 /logk2 vs pK which shows the straight line graph this conclude that log value is directly proportional to increase in value in pk

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