INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

STABILITY CONSTANT OF DESONIDE WITH TRANSION METAL IONS AT 303K

Science

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ABSTRACT

The interaction of transion metal ion with Desonide drug have been investigated by pH metric titration at 0.2 M ionic strength at room temperature in 10 % Ethanol-Water mixture. The data obtained use to estimate the values of proton-ligand stability constant (P^k) and Metal -ligand stability constant (logK). It is observed that transition metal ion form 1:1, 1: 2 complexes with all the systems.

KEYWORDS

INTRODUCTION: -
The studies of metal-ligand complexes in solution of a number of metal ions with carboxylic acids, oximes, phenols etc. would be interesting which throw light on the mode of storage and transport f metal ion in the biological kingdom.

In the earlier papers extensive data base on metal complexes with substituted drugs was presented. Desonide is a prescription topical treatment for redness, swelling, itching, and discomfort of various skin conditions [1]. Studies the Formation and Stability constant of thorium (IV) complex with some substituted pyrazolines [2]. The studies stability constant of Cu(II) and Ni(II) complexes of trans –dioxopentaaza macrocycles in aqueous solution by different technique. Stability constant of Cu (II) and Co (II) complexes with CNBAC in water sample spectrophotometrically[3]. The stability constant of binary complexes of Nicotinamide with Mn (II) by pH metrically. He also determines change in free energy, change in enthalpy and change in entropy from stability constant at different temperature[4]. The complex formation of Cu (II) and Co (II) metal ion complex with substituted isoxazolines [5]. Stability constant of metal complexes amino acids with charged side chain by pH–metrically[6]. Hayati Sari et.al.[7] studied the stability constant of glyoxime derivative and their Nickel, Copper, Cobalt and Zinc complexes potentiometric and theoretically.

After review of literature survey the detail study of complex formation under identical set of experimental condition is still lacking. It was thought of interest to study the chelating properties of substituted drug under suitable condition with lanthanide by pH metrically.

MATERIAL AND METHOD:-
pH measurement were carried out with equip-tronic EQ-610 pH meter (accuracy ± 0.01 units) using combine glass electrode at room temperature. Metal ions solution were prepared in triply distill water and concentration estimated by standard method [8]. The solution of drug prepared in 10% ethanol .The pH metric reading in 10% ethanol – water mixture were converted to [H^+] value by applying the correction proposed by Van Uitert Haas.
The overall ionic strength of solution was constant and calculated by the equation
$$m = 1/2 \ S \ C_i Z_i^2$$

The concentration of other ion in addition to Na^+ and ClO_4^- were also taken into consideration.

RESULT AND DISCUSSION:-
Substituted heterocyclic drugs may be ionized as acid having replaceable H^+ ion from -OH group. Therefore it is represented as HL i.e.
HL H^+ +L^-

The titration data used to construct the curves between volume of NaOH and P^H They are called acid-ligand titration curves.

It is observed from titration curves for all systems ligand start deviating from the free acid curves at P^H 3.5 and deviating continuously up to P^H =12. The deviation shows that dissociation of proton in substituted drugs.

The average number of proton associated with the ligand

(n_A) was determined from free acid and acid – ligand titration curves employing the equation of Irving and Rossotti[9]. The P^k values were determined from formation curves   ($n_{A \ V}^{\ s} P^H$) by noting the P^H at which n_A =0.5.   The accurate values of pk were calculated by point wise calculations which are presented in table -1. The pK values are found.

Table-1
DETERMINATION OF PROTON-LIGAND STABILITY CONSTANT (pK) OF SOME SUBSTITUTED HETEROCYCLIC DRUGS AT 0.2M IONIC STRERNGTH.

System	Constant pK	
	Half integral	Point wise calculation
Ligand-1	6.35	6.375. ± 0.05

METAL -LIGAND STABILITY CONSTANT (Log k):-
Metal-ligand stability constant of transition metal ion chelate with drug were determined by employing Bjerrum calvin P^H metric titration method as adopted by Irving and Rossotti . The formation of chelate between transition metal ion with drug was indicated by the significant separation starting from pH =3.5 for transition metal ion with ligand.

Table-2
Determination of metal –ligand stability constant (logK) of transition metal ion WITH drug at 0.2M ionic strength .

System	$Logk_1$	$Logk_2$	$Logk_1 - Logk_2$	$Logk_2 / Logk_1$
Cu(II)-Ligand	4.75	6.56	1.81	1.38
Fe(II)-Ligand	4.92	6.68	1.76	1.36
Ni(II)-Ligand	4.84	6.70	1.86	1.38
Mg(II)-Ligand	4.45	6.75	2.30	1.52
Co(II)-Ligand	5.25	6.95	1.70	1.33

The result shows the ratio of $Logk_2/Logk_1$ is positive in all cases. This implies that there is little or no steric hindrance to the addition of secondary ligand molecule .The smaller difference may be due to trans structure.

Acknowledgements

REFERENCES: -
1.   Wong, Vicky Kwan; Brian Fuchs; Mark Lebwohl (2004). "Overview on desonide 0.05%: a clinical safety profile". Journal of Drugs in Dermatology: JDD. 3 (4): 393.
2.   M. L. Narwade, V.S. Jamode, and S.K. Gudadhe, Acta.Ciencia Indica ,XIc : 234 (1985)
3.   Mathieu W.A. steenland, Use dirack Gerrit G. turnan, Bart Devreese, Werner Lippens, Jozef Van Beeuman and Andre M. Goeminne, J.Chem.Soc. Dalton trans,: 3637-3647(1997)
4.   Hong Wen Gao and Jian-Fu-Zhao, Croatica Chemica Acta ,CCACAA ,Vol. 76(1) : 1-6(2003)
5.   Tuba sismanoglu, Chinese Chemical Letters, Vol. 14 No. 11 : 1207-1210(2003).
6.   P.V. Tekade, K. N. Patil, M.L. Narwade , P.S. Bodake , Y.K. Meshram,   Asian J. Chem. 18 (2006) 2657.
7.   O. Yamauchi and A. Odani, Pure and Applied chemistry, Vol.68No.2:469-496(1996).
8.   Hayati Sari , Muzaffer Can and Mustafa macit, Acta Chim Slov. Vol.52 : 317-322(2005)
9.   A.I. Vogel, Longmans Green A Text Book of Quantitative Inorganic Analysis, London (1975) 589.
10. H.S. Irving and H.S. Rossotti, J. Chem. Society: 2904-2913 (1954).