



SDI Review Form 1.6

Journal Name:	International Research Journal of Pure and Applied Chemistry
Manuscript Number:	2014_IRJPAC_10977
Title of the Manuscript:	Investigations of ferrous thiamine complex by cyclic voltammetry
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



SDI Review Form 1.6

PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments		
Minor REVISION comments	I find the cyclic voltammetry of thiamine complex interesting. However There are a lot of mistakes in the Manuscript which must be corrected. Please refer to attach file of corrected manuscript.	I had corrected the mistakes which mention in attached files. Line 44-46: In alkaline medium, thiamine HCl may be converted into thiochrome (Maier, 1957). Therefore, it is stable in acidic media and fully protonated with ionizable proton at the N1 (pKa = 5) and C2 (pKa = 19) of pyrimidine and thiazolium rings respectively Line 49,50: it was considered as the key reactivity of thiamine (Hu, et al 1993; Breslow, 1958). Catalytic behaviour of thiamine was found to be attributed to 4 – amino pyrimidine ring when N1 is protonated Line 56, 57 Platinum compounds have low electrode potential for hydrogen discharging as compared to mercury electrode (Band and Faulkner, 2001). In acidic and neutral medium, reduction of thiamine is attributed to multiple adsorption peaks (pre and post adsorption and hydrogen discharge) which are observed at the mercury electrode Line 60,62 This behaviour produces more difficulties in determination of the redox properties of thiamine while platinum electrode potential window depends on the composition of solution and pH. In presence of Pt electrode, acidic solution of thiamine (pH 3.5) shows two peaks which are related to two redox processes such as reduction of H^+ and formation of $(Th)^{+2}$ ion. Line 82 Ferrous ammonium sulfate hexahydrate, sodium hydroxide, oxalic acid, hydrochloric acid, potassium chloride from are obtained from Aldrich™ AG. All solutions are prepared in double distilled and then deionized water. Line 89-90: The solutions containing complexes are run at 50, 100, 200, 300, 400 and 500mV/s.



SDI Review Form 1.6

		Line 106 -107. On further increase in scan rate than 300mv/s, there is no proper relationship is established. Line 133-136 For other mole ratio compositions, increase in current is due to the presence of free or un-complexed thiamine. Even if complexes were formed at higher molar ratio, they were extremely unstable, and therefore thiamine is released. Line 229-231 The Ipa or Ipc values of thiamine HCl were lower than Ipa or Ipc values of ferrous thiamine complexes. The Ipa and Ipc values of complexes were found to increases with the increasing concentration of thiamine HCl but it was not linear. Line 294-297 The variable concentrations of ferrous complex solutions are also prepared in different buffer solution, such as sodium acetate (pH 4), potassium hydrogen phthalate (pH 5 & 7) and sodium tetraborate (pH 8) and scanned at 100mV/s, but they are giving meaningless results except for potassium chloride at pH 6. Line 300-307 The mechanism of complexation reaction could be suggested by the assumption that one electron transfer reaction may occur in one step at fast scan rate and in two steps at slow scan rate. Literature also shows that the one electron transfer reduction process of thiamine occurs in aqueous solution (Siddiquia and Pitre, 2001). In 1:1 mole ratio complex, AFe (where A is ligand) is oxidized at Pt electrode and converts into A^+Fe, which reduces with fast scan rate and it may be converted into A^+ and Fe at slow scan rate, then A^+ was reduced into A and reacted with Fe atom and converted into AFe complex. The charge balance of complexes is not considered here, they could be balanced by some counter ions. Line 342-355 Electrochemical study for ferrous and thiamine complex are carried out by cyclic voltammetry using Pt electrode vs Ag/AgCl reference electrode. The acidified 1M KCl (pH 6) is found to be a suitable electrolyte for the complex formation as compared to different buffer
--	--	---



SDI Review Form 1.6

		solutions such as sodium acetate (pH 4), potassium hydrogen phthalate (pH 5 & 7) and sodium tetraborate (pH 8). Mole ratio of 1:2 is established between thiamine to ferrous ion in acidified 1 M KCl (pH 6) solution. Scan rate of 100mV/s is selected. The complexation reaction is found reversible and average diffusion coefficient value is observed between 400 - 500 for both I_{pa} and I_{pc} current. The equilibrium constant values are also calculated through I_{pc} values of 1:2 mole ratio complex and these values are increasing up to 300mV/s and confirmed that 1:2 mole ratio exist between the thiamine and ferrous ion in the complex. At the fast scan rate thiamine in AFe₂ complex oxidized into A⁺Fe₂. This is further converts into A⁺Fe at slow scan rate. A⁺Fe may react with another Fe ion and reduce to complex or may convert into A⁺ and Fe atom. A⁺ may reduce and reacted with two moles of Fe atoms to form complex.
<u>Optional/General</u> comments		