

Physio-Chemical Studies of the complexes of Triazole with Mn(II) at different pH

¹SATYENDRA NARAYAN, ²VIJAY KUMAR, ³GAURAV KUMAR NARAYAN,
and ⁴ANIL KUMAR

¹Asso Prof PG Deptt. of Chemistry College of Commerce Patna (INDIA)

²Asso Prof PG Deptt. of Chemistry, S.S. College, Jehanabad (INDIA)

³Amitu University Lucknow (INDIA)

⁴Asso Prof. Magadh Eng. College Gaya (INDIA)

(Acceptance Date 27th August, 2012)

Abstract

The Mn (II) with 5-mercapto-4-Amino-3-methyl, 1, 2, 4, Triazole complexes has been prepared. The Structural assessments of the complexes have been formed on the basis of result of IR Studies.

The Triazoles are of great biological¹⁻⁵ significance. It is also power full fungicide. The present communication reports the results of the spectrophotometric studies of the complexes of Mn (II) with 5-mercapto-4-Amino-3-methyl 1, 2, 4 Triazole prepared⁶⁻⁸.

Isolation of the Complexes :

A mixture of hot aqueous solution of MnCl₂ and ligand were taken in the 1:2 ratio. By adding NaOH the pH of the mixture 3, 7 and 9 adjusted. The mixtures were refluxed till complexes were precipitated. The complexes obtained were further treated with ethanolic solution, then ether, and were filtered by sucction, washed with ethanol and ether, dried at 100⁰C in the electric oven for several hours. The complexes were found insoluble in most of the organic solvents. The magnetic susceptibility

of the complexes were measured by Gouy's method using Hg [Co(SCN)₄] as celebrant. IR spectra of the complexes were recorded.

IR. Spectra of the Complexes :

A comparison of IR. spectra of ligand and Mn(II) complexes indicates following facts⁹⁻¹².

In all Mn (II) complexes strong bands at 3180 and 3060cm⁻¹ in the spectrum of the ligand are not present in the spectrum of the complex which shows that there is coordination between N-atom of NH₂ group of the ligand and Mn (II) ion.

The 3120 cm⁻¹ band of the ligand assigned as λ aNH₂ get shifted to 3080cm⁻¹ in the spectrum of the complex this further confirm.

Table 1. Analytical and physical data of legend and complexes

Compounds	Colour	Analytical found/calculated				
		N	C	H	S	M	B.M.
Ligand 5-Mecrepto -4- amino-3-methyle 1-2-4-Triazole	Faint Yellow	43.07	27.49	4.61	24.61	-	-
		42.82	27.69	4.28	24.38		
[Mn(L ₂)] Cl ₂	Faint Pink	23.01	18.65	2.59	20.60	14.24	2
		29.00	18.64	2.57	20.50	14.25	
[Mn(L ₂)] Cl ₂ .H ₂ O	Pink	27.73	17.82	2.47	17.31	13.6	2.5
		27.70	17.80	2.45	17.30	13.5	
[Mn(L ₂)] Cl ₂ .2H ₂ O	Deep Pink	26.54	17.06	2.36	16.27	13.03	1.9
		26.55	17.05	2.30	16.25	13.01	

NH₂ group of the ligand coordinated with Mn (II).

The 2515 cm⁻¹ weak band in the spectrum of the ligand is due to ν S-H made of vibration this band disappeared in the spectrum of complexes so this form of the ligand in coordinated to Mn(II) ion in the complex; or the Hydrogen atom of the SH group has been replaced by Mn(II) ion.

The medium band at 1290 cm⁻¹ in the spectrum of the ligand is due to ν C=S, this band get red shifted to 1225 cm⁻¹ in the spectrum of the complex. This further supports coordination of the ligand to its S-atom.

The ν C=S is observed at 980cm⁻¹ in the spectrum of the ligand. This band red shifted to 960 cm⁻¹ in the spectrum of the

complex which confirms coordination of the ligand to the Mn (II) Ion through Sulphur.

In the far IR spectrum of the complexes¹³⁻¹⁵ a new band observed at 525cm⁻¹ due to plane mode of vibration of lattice water.

In the IR spectrum of the complexes new bands at 500, 260, 230 and 210cm⁻¹ assigned as a Mn-N, 260 cm⁻¹ ν a Mn-N and 230 & 210 cm⁻¹ assigned as ν a Mn-S.

On the basis of above discussion the tetrahedral structures of the complexes assigned.

The author wish to express this sincere thanks to CDRI, Lucknow for recording spectrum and authority of college of commerce

for providing facilities.

References

1. W. Zang C. Kung, Yang, *Synthesis*, 28.03.87 (2010).
2. Y. Jiang, C. Kuang, A. Yang, *Synlett*, 3163-3166 (2009).
3. B.C. Boren, S.Narayan, *et al.*, *J. Am. Chem. Soc.*, 130-8923-8930 (2008).
4. L. Ackermann, H.K. Patukuchi *et al. Org. Lett.* 10.3081-3084 (2008).
5. A.D. Moorhoure, J.E. Mosses *Synlett* 2089-2092 (2008).
6. S. Kamijo, T. Jin *et al.*, *J.Am. Chem. Soc.* 125 7786-7787 (2003).
7. D. Amantini. F.Fringulli *et al. J. Org. Chem.* 70.6526-6529 (2005).
8. Stayendra Narayan, Anil Kumar *Ultra Chemistry* Vol. 6(3), 381-383 (2010).
9. F.A. Cotton and S. Wilkinson, *Advence in organic chemistry* Wiley Estern Ltd. PP. 640-41 (1976).
10. C.J. Ballhausen *J. Indian Chem. Soc.* (1993).
11. Satyendra Narayan, Anil Kumar *et al.*, *Ultra Chemistry*. Vol. 6, 381-383 (2010).
12. Satyendra Narayan *et al.*, *Ultra Chemistry* Vol. 4(1), 23-26 (2008).
13. Satyendra Narayan, Anil Kumar, *Ultra Chemistry*, Vol. 6(1), 79-82-2010
14. Satyendra Narayan *Int. 7 Mendal* Vol. 17 (1-2) 37.28 (2000).
15. Satyendra Narayan *et al. Int. J. Mendal.* Vol. 24-(1-2) 31-32 (2007).