

NOTE**Synthesis and Characterization of Zinc(II) and Cadmium(II) Complexes of with Piperidinomethylmaleic Hydrazide**

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In the present study, zinc(II) and cadmium(II) complexes of Mannich base piperidinomethylmaleic hydrazide (PMMH) were synthesized.

Key Words: Piperidinomethylmaleic hydrazide, Cadmium(II), Zinc(II), Complexes.

Mannich N-bases are pharmacologically more active than maleic hydrazide^{1,2}. Derivatives of maleic hydrazide can act as purine or pyrimidine analog forming base pair with uracil and thymine by nucleoside forming through 'O' or with adenine through 'N'. About 20 Mannich bases were prepared by treating cyclic imides and hydrazides with formaldehyde and secondary amine³. Keeping the above in view, a derivative of maleic hydrazide has been synthesized by incorporating aminomethyl groups. Recently some review articles have appeared in which several applications of Mannich bases in the pharmaceutical field⁴⁻⁶.

Synthesis of zinc(II) and cadmium(II) complexes of piperidinomethylmaleic hydrazide (PMMH): The metal ion complexes are isolated from non-aqueous media. Both complexes were prepared by mixing in 1:1 mol ratio, the 2-propanol solutions of the respective salt and the ligand. The colourless solid obtained in each case was filtered washed with 2-propanol and dried in an air oven at 110-120 °C. Both the complexes are stable in solid state. The complexes are mostly insoluble in common organic solvents.

The results of the quantitative analysis (Table-1) of zinc(II) complex and cadmium(II) complexes are in good agreement with the proposed composition as ZnCl₂. PMMH and CdCl₂. PMMH. The molar conductances of 10⁻³ M solutions of these complexes in DMF lie in the range 14-43 n⁻¹ (m² mol⁻¹), which are quite below that expected for non-electrolytic nature.

The important IR frequencies of zinc(II) and cadmium(II) are given in Table-2. A comparison of the IR absorption bands of the ligand and Zn(II) chloro complexes show that the $\nu(\text{C}=\text{O})$ is decreased from 1663 to 1509 and $\delta(\text{OH})$ from 1491 to 1465.

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TABLE-1
ANALYTICAL AND CONDUCTANCE DATA OF PMMH
COMPLEXES OF Zn(II) AND Cd(II)

Compound	Quantitative analysis (%)		ΛM*
	Metal obs. (calcd.)	Anion obs. (calcd.)	
ZnCl ₂ ·PMMH	28.798 (28.933)	20.443 (20.534)	08.08
CdCl ₂ ·PMMH	28.520 (28.650)	18.02 (18.07)	34.8

PMMH = Piperidinomethylmaleichydrazide

*Λ min⁻¹ cm² mol⁻¹ for the 10⁻³ m complex in DMF.

TABLE-2
KEY IR ABSORPTION BAND (cm⁻¹) OF PMMH
COMPLEX OF ZINC(II), CADMIUM(II)

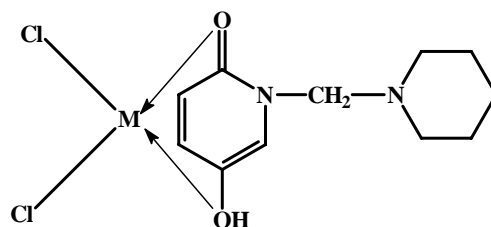
Compound	v(OH), v(CH)	v(C=O)	δ(OH)	v(CNC)
PMMH	3441, 2934	1663	1491	1118
ZnCl ₂	3437	1509	1464	1116
CdCl ₂	3467	1633	1458	1116

The ¹H NMR spectra of M(II) chloro complex shows electron drift from CNC group, the >N-CH₂-N< and -N(CH₃)₂ signals suffer downfield shift on complexation of the ligand with the metal atom (Table-3).

TABLE-3
¹H NMR RESONANCE SIGNALS FOR PMMH AND IN
ZINC(II) AND CADMIUM(II) COMPLEXES

Compound	Types of protons				
	CH=CH	C-OH	-N-CH ₂ -N-	-N(CH ₂) ₂	(CH ₂) ₃
PMMH	6.871	3.51	3.028	2.595	1.457
ZnCl ₂	6.869	3.456	2.972	2.972	1.578
CdCl ₂	6.832	4.338	2.958	-	1.562

Based on the analytical, conductivity IR and NMR spectral study, tetra coordinate structures are assigned to the Zn(II) and Cd(II) chloro complexes, respectively as shown below:



M = Zn(II) or Cd(II)

REFERENCES

1. P. Calabresi and R.E. Jr. Parks, in eds.: L.S. Goodman and A. Gilman, *The Pharmacological Basis of Therapeutics*, MacMillan, New York, edn. 5, p. 1256 (1975) and references cited therein.
2. C. Dorgham, B. Richard, M. Richard and M. Lenzi, *Bull. Soc. Chim. (France)*, 414 (1991).
3. J. Strumillo, *Acta Pol. Pharm.*, **32**, 287 (1975).
4. T.R. Sweeney and R.O. Pick, *Handbook Exp., Pharmacol.*, Vol. 68, p. 363 (1984).
5. H. Bundgaard, *Methods Enzymol.*, **112**, 347 (1985).
6. A.J. Riera de Narvaez and E.I. Ferrerira, *Quim. Nova Rio de Janeiro*, 38 (1985); *Chem. Abstr.*, **107**, 198116 (1987).

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