

Synthesis, Characterisation and Anti Tumor-Activity Evaluation Palladium Metal Complexes with substituted Imidazoles

Dr. Anshu Srivastava^{1,a)}

Department of Applied Science and Humanities, Kanpur Institute of Technology, Kanpur-208001

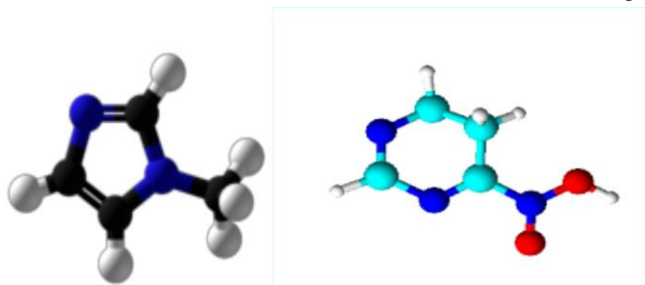
Abstract: Pd(II) complexes with imidazole and substituted imidazoles derivatives were obtained by reacting substituted imidazoles with PdCl₂. The complexes were characterized by elemental analyses, FT-IR, and ¹H NMR etc.. All synthesized compounds having antitumor activities. The Pd(II) complexes were transmitted for their antibacterial and cytotoxic activities .. Several palladium complexes of the type [Pd(im)₂Cl₂], [Pd(im)₃Cl]Cl, and [Pd(im)₄]Cl₂ (im = imidazole **2**, 1-methylimidazole **4**, 1,2-dimethylimidazole **5**, 1-butylimidazole **7**, **4a**, 1-phenylimidazole **8**, 1-phenylimidazoline **9**, and 1-methylimidazoline **11**) were prepared and structurally characterized. The resulted compound have great anti tumour properties it were proven by several experimental and physical methods.

Keywords: Palladium metal, substituted imidazoles, Cancer

Introduction: Metal complexes have great characteristics of enhancing act as antitumor agents. The metal attached with ligand to form complexes which behave as antitumor agents [5,6]. Synthesis, structure elucidation and anticancer activity of Palladium complexes In order to understand palladium imidazoles interactions and anticancer activity, several palladium complexes of substituted imidazoles derivatives were prepared. We also define the imidazole chemistry and its derivatives explaining their methods of preparation and act as potential anti tumour agents. It is also going to explain that it has considerable interest of heterocyclic compounds and its anti tumour activity. The magnetic values of the synthesized complexes sustained at normal temperature.

Experimental

(a) Materials Substituted uracils were procured from Aldrich Chemical Company, U.S.A. and used as such. PdCl₂, Substituted imidazoles were taken from from Sigma



Chemicals Co. (USA .) All the reactions happen in distilled water only.

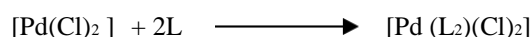
(b)- Preparation of the substituted Imidazoles:

Palladium (II) complex with Substituted imidazoles is obtained by mixing 0.2 N HCl solution of metal

chloride mix with methanol and Imidazole(0.114mol) and on quick heating the mixture was fused for 2 hours in water bath . The complexes will be precipitated out .

:

CH₃OH



H₂O

Where L = Substituted imidazoles

FIG 1-Substituted imidazoles

III.Spectroscopic analysis:

The IR spectrum of uracil and ligands shows three strong bands at 1735, and 1620 cm⁻¹. These are indicating the presence of ketonic and enolic forms of C=O group, respectively [31]. In the resulted metal complex the C=O stretching band is seen at 1520 cm⁻¹, indicating that the presence of ketonic group is present in this complex [38, 39]. While, the bright and dark band at 1393 cm⁻¹ in the spectrum of the Pd(II) complex with substituted imidazoles is available. [38].

Table –I Viscosity of benzene solution of Imidazole and substituted imidazoles

ligands (temp; °C)	Molality	Specific viscosity
Imidazole(30°C).....	0.036	0.0106
	0.073	0.0248
	0.146	0.0549
Imidazole(50°C)...	0.146	0.0410
	0.461	0.1500

4 (or 5) Methyl imidazole(30 ⁰ C).....	0.463	0.1686
	0.040	0.0071
	0.080	0.0354
	0.242	0.1187
	0.249	0.1277
	0.475	0.2925
		0.3262
	0.493	0.4113
	0.607	0.7801
	1.075	0.991
(or 5) Methyl imidazole(50 ⁰ C).....	1.362	1.6524
	2.068	2.3138
	2.848	3.1560
	3.738	0.0910
	0.242	
	0.249	0.0930
	0.475	0.2140
0.493	0.2370	

Table –II Dipole Moment in Debye Units of some imidazoles in Different solvents

Compound	Naphthalene	Benzene	Dioxane	Carbon tetra chloride
Imidazole.....	5.7(9 ⁰)	6.2(70 ⁰)	4.8(30 ⁰)	
4 (or 5)- Methyl.....	-	6.2(70 ⁰)	5.1(20 ⁰)	5.8(18 ⁰)
1-Methyl.....	-	3.6(20 ⁰)	3.8(20 ⁰)	

Table –III Variation (with concentration) of the Dipole Moment of Imidazole in Benzene

Mole fraction of solute	Dipole moment, Debye unit
0.005951	5.62
0.001140	4.42
0.000233	3.93

Table –IV Surface Tension of Imidazole and substituted imidazoles

Compound	Temperature(⁰ C)	Surface Tension ,dynes/cm
Imidazole	110.0	36.82
	150.0	33.85
	205.0	30.05
4 (or5) Methyl imidazole	20.0	38.70
	56.0	36.21
	110.0	32.36
	153.0	29.28

Table –V Heat of melting and solution in benzene at Varying Concentration of substituted imidazole

Molality	Heat of solution,cal/mole (21 ⁰ C)	Heat of Fusion cal/mole
0.15	-3218	-2838
0.23	-2175	-

Table -VI Melting point of a number of Imidazole salts

Salts	M.P., °C
Nitrate	118
Chloroaurate	dec.190
Chloroplatinate	dec.200
Dimolibdate	208-212
Picrate	224-226
Diluturate	232,252,225
	202
	99

Conclusion

Thus, It is found that the resulted. Palladium metal imidazole complexes is useful antitumor agent. Further, the most important gist can be showing that. Palladium complexes are the very useful tool for anti tumour activities. These complexes are widely used for the treatment of different types of tumours. They were tested and applied on mice and monkeys in CDRI Lucknow and we found that it behaves as potential antitumor agent.

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