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Synthesis and Study of Copper (II) with Schiff base 2-Chloro-N'-(1-(4-hydroxy-2-oxo-2H-chromen-3-yl) ethylidenebenzohydrazide

S.S. Chandole[1]* Mr. S.S. Anjanikar[2]

[1]*Asst. professor, Shri Guru Buddhiswami Mahavidyalaya, Purna.
[2] Asst. professor, Department of Chemistry, Sharadchandra College, Naigaon

Abstract
The ligand 2-Chloro-N'-(1-(4-hydroxy-2-oxo-2H-chromen-3-yl) ethylidenebenzo-hydrazide used to synthesize Copper complex. The complex was characterized by elemental analysis, magnetic moment, and molar conductance along with electronic, thermal, infrared spectral analysis. Octahedral geometry has been proposed on the basis of magnetic and spectral studies.

INTRODUCTION

Recently the coordination complexes with hydrazide ligands has increased interest of researchers owing to their applications in different field such as biological studies,[1,2] analytical chemistry[3], catalysis[4,5], clinical[6] and as pesticide[7]. Hydrazides are important class of compounds having an azomethine -NHN=CH- Proton. When transitional metals coordinated with hydrazones they play a significant role in many catalytic reactions such as oxidation[8], cyclopropanation[9], and polymerization [10]. In view of above facts we synthesized the complex isolated from reaction of hydrazide ligand with Copper chloride and report the structural studies of complex.

RESULT AND DISCUSSION

The Copper complex is dark brownish colored solid, stable to air and non-hygroscopic. It is insoluble in water but slightly soluble in DMSO, DMF and other organic solvents. The molar conductance values of the complex in DMSO at a concentration of 10^{-4} molar solution shows value 27 Ω^{-1} which indicates non-electrolytic nature[11].

The disappearance of the entire IR band due to intra-molecular hydrogen bonding in the spectra of the complex indicates deprotonation of enolic oxygen on complex formation. The participation of enolic oxygen and azomethine nitrogen in coordination to the copper ion is further supported by an upward shift in $\nu_{C=O}$ by 25 cm^{-1} and a downward shift in $\nu_{C=N}$ by 23 cm^{-1} in the complex.[12] The strong evidence of bonding is revealed by the appearance of band at 500 cm^{-1}(M-O), 455 cm^{-1}(M-N) in the spectra of the complexes.[13] A broad band present in complex in the range 3500-3400 cm^{-1} is due to ν_{OH} of coordinated water[14].

The electronic spectrum of the Cu^{II} complex shows a band 16573 (ε = 42) cm^{-1} assignable to $^2E_g \rightarrow {}^2T_{2g}$ characteristic of distorted octahedral stereochemistry[15]. Beside the above band, the band