

SUMMARY OF THE FINDINGS

Aroylhydrazones are a class of azomethines with the structure $\text{Ar-CO-NH-N=CR}_1\text{R}_2$. They are distinguished from other members of this family by the presence of two interlinking nitrogen atoms and are formed usually by the condensation of aroylhydrazides with ketones or aldehydes. Amido-iminol tautomerism occurs readily in hydrazones and has an important role in determining the overall charge on the ligands coordinating the metal ions. Thus coordination complexes derived from hydrazones contain either neutral amido form or deprotonated iminolate form. The coordination mode adopted by a hydrazone can be altered by the use of suitable substituents both in the carbonyl and hydrazide part. There is a growing interest in the structural studies of aroylhydrazones as they show a broad spectrum of applications in pharmaceutical and industrial fields. The aroylhydrazones show a variety of biological activities with potential uses in antibacterial, antifungal and anticancer studies. In addition, their varied coordinating behavior makes them interesting candidates for metal-based drugs. In many cases it was reported that metal chelates possess better biological activities than their corresponding ligands. Hydrazones and their metal complexes have found applications in chemical processes like nonlinear optics, sensors etc. Donor- π -Acceptor type aroylhydrazones play an important role in the second harmonic generation efficiency. The wide transparency window in the visible region makes them ideal candidates for NLO applications. The ability of aroylhydrazones to bind with transition metals is a developing area of research interest and the coordinating properties of hydrazones can be tuned by the appropriate choice of parent aldehyde or ketone and the hydrazide.

So the present work deals with synthesis, spectral characterization, crystal structure of 4-(Diethylamino) salicylaldehyde-3-methoxy benzoic hydrazone and its copper(II) complex. The organic ligand and its copper (II) complex were synthesized and characterized using physicochemical techniques like elemental analyses, FT-IR, UV-Visible spectroscopy, and single crystal X-ray diffraction studies. The synthesized complexes have similar crystal structure. The complex crystallizes in monoclinic space group $P2_1/c$. The hydrazone moiety is coordinated in the amido form as evidenced from IR spectral data. The complex adopts a distorted square planar geometry around the copper atom. It exists as a dimer bonded through phenolic oxygen atom. Intramolecular hydrogen bonding, ring...metal and $\pi\cdots\pi$ interactions stabilize the crystal structures. The bacterial activities of the ligand and the complexes were investigated. The ligand and the complex were found to exhibit activity against *E.coli*, *S.aureus* and *A.hydrophilia*.