**ABSTRACT**

New osmium complexes of 4-methyl-2-(salicylidenehydrazino) quinoline H2L1 and 4, 6-dimethyl-2-(salicylidenehydrazino) quinoline H2L2 were synthesised and characterised by spectroscopic method and TGA analysis. Quantum chemical calculations of ligand was performed using the DFT B3LYP method in the 6-31G (d, p) basis. The calculated results are well agreement with the experimental data. The calculated HOMO and LUMO energies show the chemical activity of the molecule. Nonlinear optical behavior of the ligand was analyzed by using first hyperpolarizability. The calculated first hyperpolarisability shows that the ligand is an attractive molecule for future application in nonlinear optics. Based on the theoretical and spectroscopic studies, it has been confirmed that the ligands H2L1 and H2L2 coordinated through phenolate oxygen, ‘N’ of quinoline ring and NH group of hydrazine moiety towards the osmium (III) ion exhibiting octahedral geometry. Antimicrobial result suggests that the complexes having good antimicrobial activity