Poster Presentation

Studies on Copper(II) complexes of N-pendant macrocyclic ligands

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Naturally occurring azamacrocyclic metal complexes such as haems, chlorophyll, vitamin B12, and the factor F430 carry pendent ring substituents and axial co-ligands that act as functional components in these important biological systems. Design of related systems with structural features related to their natural counterparts is thus a multifarious challenge. With this in mind, we have recently reported on the characterization and antimicrobial activities of tetraazacyclotetradecanes and their Ni2+ complexes. Here, we present results on modified N-pendent ligands and their Cu2+ complexes: The interaction of two isomers of 3,5,7,7,10,12,14,14-octamethyl-1,4,8,11-tetraazacyclotetradecane, LB and LC (differing in the orientation of the CH3 groups on the chiral C atoms), with CH3I resulted in the substitution of the N(4) and N(11) protons by CH3, forming the dimethyl derivatives LBZ and LCZ, when reacted with CH3I in the ratio 1:2, yielded the N(4) monomethyl derivative LCZ1. On reaction with Cu(ClO4)2.6H2O, the square-planar complexes [CuL](ClO4)2 (L= LBZ, LCZ, or LCZ1) were obtained. The complex cations [CuLBZ]+ and [CuLCZ]+ undergo axial ligand addition with the anions X = NCS-, NO2-, NO3-, Cl-, Br- and I- to form six-coordinate trans-[CuL'X2] (L'= LBZ or LCZ). The compounds have been characterized on the basis of analytical, spectroscopic, conductometric and magnetochemical data. The structure of [CuLCZ1](ClO4)2 {space group Pn, No. 2, a = 10.3581(12), b = 8.8335(10), c = 14.2584(16) Å; b = 99.917(3) (2)[°]} has been determined by X-ray crystallography. The copper centre is coordinated to an N4 donor set of LCZ1 in a square planar geometry. The antifungal and antibacterial activities of the compounds have been studied against some phyto-pathogenic fungi and bacteria. Generally, the complexes exhibit a more pronounced antimicrobial activity than the parent ligands. [1] Roy, T.G. et al. (2007), Inorg. Chem. 46, 5372-5380.

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