SYNTHESIS AND SPECTROSCOPIC CHARACTERIZATION OF MONONUCLEAR AND BINUCLEAR END-ON BIS(μ- ACETATO) BRIDGED COPPER(II) COMPLEXES WITH N-METHYLIMIDAZOLE. BIOMEMITIC SOD AND OXIDASE CATALYTIC ACTIVITIES

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Copper plays an important role in a variety of enzyme-catalyzed reactions. Copper containing enzymes have mononuclear and binuclear structures. Over the years we have prepared and studied several mononuclear and binuclear Cu(II) carboxylate complexes with several nitrogen based ligands as biomimetics for copper containing enzymes[1,2]. Our studies of these complexes revealed that one of the factors which influences the formation of mononuclear structure over the binuclear structure is an increase in the basicity of the nitrogen ligand. Other studies showed that the nature of the solvent, especially water or water-organic solvent mixture plays an important role in the formation of either molecular copper (II) carboxylate structures. The water plays a role through its coordination as a ligand or through its hydrogen bondings as lattice molecule. Herein, we report two complexes, mononuclear Cu $(CH_3COO)_2(L)_2$ (**1**) (L= N-methylimidazole) and binuclear $[Cu_2(\mu\text{-}CH_3COO)_4(L)_4].6H_2O$ (**2**), which are obtained from the interaction of anhydrous copper(II) acetate and N-methylimidazole, and copper(II) acetate monohydrate and N-methylimidazole, respectively, and studied their spectroscopic properties, especially, their ESR spectroscopy. The obtained spectral data are consistent with their previously determined X-ray structures for the two complexes [3,4]. Complex **(1**) has the familiar mononuclear Cu(II) carboxylate complexes with N-ligands which contain $CuO_2N_2+O_2$ chromophore. Complex (**2**) contains dimeric core generated by two mono-atomic bridging carboxylate ligands with one terminal carboxylate and two *trans* situated N-methlylimidazole molecules at each copper atom complete the coordination environment of the five-coordinate copper(II) centers.

Superoxide dismutase (SOD) activity of these complexes has been measured using alkaline DMSO as a source of superoxide radical (O_2^-) and nitro blue tetrazolium chloride (NBT) as O_2^- scavenger. The obtained values are compared with those previously reported for other biomimetic Cu(II) complexes under similar conditions. In addition, the biomimetic oxidase catalytic activities of the complexes for the oxidation of 3,5-di-tert-butylcatechol (DTBC) to the corresponding *o*-quinone (DTBQ) and for the oxidative coupling of two molecules of 2-aminophenol (OAP) to 2-aminophenoxazin-3-one (APX) , are also reported

References

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