Copper(II) complexes of 1,3-dimethyl-5-(4′/3′-pyridylazo)-6-aminouracil: structures, redox, magnetic and protein binding properties

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Two new monomeric copper(II) complexes based on 1,3-dimethyl-5-(4′/3′-pyridylazo)-6-aminouracil (HL1: 4′-pyridylazo, complex 1: *cis*-$Cu^{II}L1_2$.MeOH; HL2: 3′-pyridylazo, complex 2 : *cis*-$Cu^{II}L1_2.H_2O$) were synthesized, characterized and investigated for redox, magnetic and protein-binding properties. The complex **1** is in monoclinic space group C2/c, Z = 4 whereas the complex **2** is in triclinic space group P-1, Z = 2. The complexes hold similar structure in solid and solution state as could be infered from the EPR spectra of **1** having well-resolved hyperfine features, $g_{||} > g_{\perp} > g_e$ ($g_{||}$ =2.20 and $g_{\perp}$ =2.05). The $E_{½}$ values for oxidative response of Cu(III)/Cu(II) couple are 1.030 V (ΔE = 133 mV) for **1** and 0.982 V (ΔE = 128 mV) for **2**, indicating high redox stability of Cu(II) ions in the complex environment. Direct current (DC) variable-temperature magnetic susceptibility measurements on polycrystalline sample of **1** were carried out in the temperature range 1.8-300 K. The magnetic behavior indicates a weak antiferromagnetic interaction between Cu(II) ions in the crystal lattice below 25 K. The study of Bovin Serum Albumin (BSA)-complex interactions reveals that the BSA binds the complexes through the sites of tryptophan residues in 1:1 manner (n = 0.9007 & K_A = 1.482 × $10^4 M^{-1}$ for **1** and 0.7433 & K_A =2.394×$10^3 M^{-1}$ for **2**). Thus, the developed complexes could be treated as muti-functional materials.

Słowa kluczowe

6-Aminoazouracil, Mononuclear copper(II), Weak antiferromagnetic coupling, Protein-complex interactions

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