The synthesis and characterization of $[\text{Cu}_2(\text{L}_1)(3,5\text{ prz})]$ ($\text{L}_1=1,3\text{-Bis}(2\text{-hydroxy}-3,5\text{-chlorosalicylideneamino})\text{propan-2-ol}$) 1 and of $[\text{Cu}_2(\text{L}_2)(3,5\text{ prz})]$ ($\text{L}_2=1,3\text{-Bis}(2\text{-hydroxy}-3,5\text{-bromosalicylideneamino})\text{propan-2-ol}$) 2 are reported. The compounds were studied by elemental analysis, infrared and electronic spectra. The structure of the $[\text{Cu}_2(\text{L}_1)(3,5\text{ prz})]$ complex was determined by x-ray diffraction. The magnetochemical characteristics of these compounds were determined by temperature-dependent magnetic susceptibility measurements, revealing their antiferromagnetic coupling. The superexchange coupling constants are 210 cm$^{-1}$ for 1 and 440 cm$^{-1}$ for 2. The difference in the magnitude of the coupling constants was explained by the metal-ligand orbital overlaps and confirmed by ab-initio restricted Hartree-Fock (RHF) calculations. In order to determine the nature of the frontier orbitals, Extended Hückel Molecular Orbital (EHMO) calculations are also reported.

**Key words:** Dinuclear Copper(II) Complex; Antiferromagnetic Coupling; Overlap Interaction; Countercomplementary Effect; ab-initio Restricted Hartree-Fock Molecular Orbital Calculation.