



Abstract

Coordination Compounds of Cu(II) and Ni(II) with 1-(Morpholin-4-yl)propane-1,2-dione 4-allylthiosemicarbazone: A Protection from Free Radical Damage[†]

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Abstract: Free radicals are highly reactive and unstable particles that are produced in the body during normal metabolic functions or by exposure to toxins in the environment, such as tobacco smoke and ultraviolet light. Free radicals have a lifespan of only a fraction of a second, but during that time can damage DNA, sometimes resulting in mutations that can lead to various diseases, including heart disease and cancer. The antioxidants can neutralize unstable particles, reducing the risk of damage. So the design of new substances as a potent antioxidant is an actual problem in the modern world. For this purpose, it was synthesized coordination compounds of Cu(II) and Ni(II) with 1-(morpholin-4-yl)propane-1,2-dione 4-allylthiosemicarbazone (HL). HL was obtained by the condensation reaction between 1-(morpholin-4-yl)propane-1,2-dione and 4-allylthiosemicarbazide in an ethanol solution. Its structure and purity were proven using ¹H and ¹³C NMR spectroscopy. The coordination compounds were synthesized by the interaction of HL with metal salts in a 1:1 and 1:2 molar ratio. The composition of these compounds was determined using elemental analysis: Cu(L)X (X=Cl⁻, Br⁻, NO₃⁻), Ni(HL)₂(NO₃)₂, Ni(L)Cl. These complexes were studied by molar conductivity, IR spectra, and X-ray diffraction. The study of antioxidant activity by the ABTS^{•+} method showed that the most active compound is Ni(HL)₂(NO₃)₂. Its IC₅₀ value toward ABTS^{•+} is 19.6 μM, so it is 1.7 times more active than Trolox, a water-soluble antioxidant, which is used in medicine.

Keywords: antioxidants; coordination compounds; ABTS cation radicals

Supplementary Materials: The poster can be downloaded at: <https://www.mdpi.com/article/10.3390/ECMC2022-13252/s1>.

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