

SYNTHESIS, STRUCTURE, AND ANTIOXIDANT ACTIVITY OF SOME BIOMETAL COORDINATION COMPOUNDS OF PENTANE-2,4-DIONE BIS-(4-(PYRID-2-YL)THIOSEMICARBAZONE)

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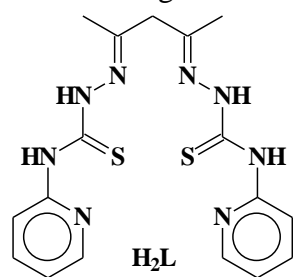
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Thiosemicarbazones of different aromatic aldehydes and ketones contain a wide range of donor atoms and form with transitional metal ions coordination compounds with various composition, structure, and properties. Many of these coordination compounds are biologically active substances. They possess antimicrobial, antifungal, antitumor, antioxidative activities. Their biological activity depends on nature of the central atom, stereochemistry of the coordination compound, composition and structure of the ligand, nature and position of the substituents in the aromatic ring. [1-2].

In order to determine the influence of the substituents' nature in the aromatic ring on the composition, structure, and properties of the coordination compounds, it was synthesized 4-(pyrid-2-yl)thiosemicarbazide. Its structure was confirmed by NMR spectroscopy (^1H and ^{13}C).

The experiments showed that hydrates of copper, nickel, manganese, cobalt, chromium, and iron salts react with acetylacetone and 4-(pyrid-2-yl)thiosemicarbazide in 1:1:2 molar ratio forming coloured coordination compounds. The composition of these compounds was determined using elemental analysis: $\text{M}(\text{H}_2\text{L})\text{X}_2 \cdot n\text{H}_2\text{O}$, ($\text{M} = \text{Cu}^{2+}$, Ni^{2+} ; $\text{X} = \text{Cl}^-$, NO_3^- , Br^- , ClO_4^- , $n = 0,1$); $\text{M}(\text{L}) \cdot 2\text{H}_2\text{O}$, ($\text{M} = \text{Cu}^{2+}$, Ni^{2+} , Mn^{2+}); and $\text{M}(\text{L})(\text{H}_2\text{O})\text{Cl}$ ($\text{M} = \text{Co}^{3+}$, Cr^{3+} , Fe^{3+}), where H_2L – pentane-2,4-dione bis-(4-(pyrid-2-yl)thiosemicarbazone).



The magnetochemical research showed that the synthesized coordination compounds have monomeric structure. Coordination compounds of nickel and cobalt are diamagnetic. Other synthesized coordination compounds are paramagnetic. Azomethine H_2L in these coordination compounds behaves as neutral or doubly deprotonated tetradentate ligand that coordinates to the central atom by azomethinic nitrogen atoms and sulfur atoms forming two five-membered and one six-membered metallacycles.

The synthesized compounds possess antioxidative activity at the concentration 10^{-6} mol/L. It was found that the nature of the central atom and the anion influences on the antioxidative activity of the coordination compounds. For the homotypic complexes antioxidative activity changes in the following way: $\text{Cu} \approx \text{Ni} > \text{Co} > \text{Cr}$ and $\text{NO}_3^- > \text{Cl}^- > \text{Br}^- > \text{ClO}_4^-$.

This work showed that the search of new antioxidants among biometal coordination compounds of ligands derived from pentane-2,4-dionebis-(4-(pyrid-2-yl)thiosemicarbazone) has prospects.

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References:

1. Leovac V.M., Jovanovic L.S., Divjakovic V., et all // Polyhedron. 2007. V. 26. P. 49.
2. Chumakov Yu. M., Petrenko P. A., Codita T. B., Tsapkov V. I., Poirier D., Gulea A. P. // Crystallography Reports. 2014. Vol. 59. No 2. pp. 207-212.