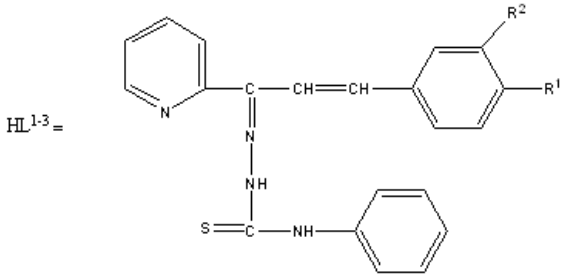
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SYNTHESIS AND BIOLOGICAL ACTIVITY OF COPPER, NICKEL, AND COBALT COORDINATION COMPOUNDS OF CONDENSATION PRODUCTS OF SOME CHALCONES WITH 4-PHENYLTHIOSEMICARBAZIDE

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The aim of this work is the synthesis, determination of the composition, structure, antioxidant properties of copper, nickel, and cobalt coordination compounds of condensation products of 3-(3,4-dimethoxyphenyl)-1-(pyridin-2-yl)prop-2-en-1-one, 3-(4-(dimethylamino)phenyl)-1-(pyridin-2-yl)prop-2-en-1-one, and 3-(4-methoxyphenyl)-1-(pyridin-2-yl)prop-2-en-1-one with 4-phenylthiosemicarbazide.



L^1: $R^1 = OCH_3$; $R^2 = H$;
L^2: $R^1 = N(CH_3)_2$; $R^2 = H$;
L^3: $R^1 = R^2 = OCH_3$.

Coordination compounds were synthesized by template reactions between chalcones and 4-phenylthiosemicarbazide in presence of copper, nickel, cobalt chlorides and nitates. The composition of these compounds was determined using elemental analysis: $[Cu(L^{1-3})X]\cdot nH_2O$ (X = Cl^-, NO_3^-, n = 0 - 2); $[Ni(L^{1-3})_2]\cdot nH_2O$ (X = Cl^-, NO_3^-, n = 0 - 2); $[Co(L^{1-3})_2]X\cdot nH_2O$ (X = Cl^-, NO_3^-, n = 0 - 2).

The magnetochemical research showed that synthesized coordination compounds of copper have polynuclear structure. The nickel and cobalt complexes have octahedral structures.

The study of biological properties showed that complex CuL^1Cl inhibits growth and reproduction of melanoma MeW-164 cells in the range of concentration 10^{-5} -10^{-7}mol/L. At the concentration 10^{-5} mol/L it inhibits 90%, at the 10^{-6} mol/L - 60% and at 10^{-7} mol / L - 6% of tumor cells. The calculated IC_{50} value is 0,4 μmol/L.

At the same time this compound doesn't have so much influence on the healthy cells. The IC_{50} value for Aw-4 fibroblasts is 4,9 μmol/L. On this basis it is presupposed that this substance has lower cytotoxic effect on healthy cells of human organism.

It was determined that initial chalcones doesn't manifest antioxidant activity except 3-(4-(dimethylamino)phenyl)-1-(pyridin-2-yl)prop-2-en-1-one. On the other hand, all synthesized coordination compounds manifest antioxidant activity at the concentration 10^{-6}mol/L. Antioxidant activity depends on the nature of the anion that is part of the complex. Coordination compounds that were obtained from copper chloride possess generally more pronounced antioxidant activity than complexes obtained from copper nitrate. antioxidant activity also depends on the nature of substituents in the phenylic ring of the chalcones. Introduction of the second methoxy group and substitution of the methoxy group by a dimethylamino group lead to an enhancement of the antioxidant activity.

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