ELDS: Agriculture and Food Industry

elates to chemical compounds with biologically ac
culture for reducing the negative impact of oxidativ
ies, for antioxidant protection and diminishing the c
ts.

omplex preparation, according to the invention, (NO3)2·4H2O, potassium salicylate, [Co(DmgH)2)3]NO3·3H2O, Mn(CH3COO)2·4H2O, [Co(Dmg)6Mo7O24·4H2O, (HOC6H4COO)2Cu·4H2O.

idants on the antioxidant protective capacity of plants of ycine max (L.) Merr., variety Enigma

Control	Thiourea		Polyel	
M ± m	M ± m	Δ, %M	M ± m	Δ, %M
77 ± 0,7	18,72 ± 0,5	-27,36	17,27 ± 0,5	-33,0
,33 ± 3,5	137,63 ± 4,1	18,31	166,05 ± 5,0	42,69
62 ± 0,1	3,99 ± 0,1	10,22	4,74 ± 0,14	30,94
1 ± 0,09	4,19 ± 0,1	34,73	4,78 ± 0,5	53,70
58 ± 1,6	60,58 ± 1,8	15,21	68,01 ± 1,8	29,34
04 ± 0,9	50,52 ± 1,5	62,75	56,4 ± 1,7	81,81
,89 ± 3,1	124,01 ± 3,7	18,23	131,24 ± 3,9	25,12

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The result of the invention consists in reduci

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THE FUNGICIDE AND BACTERICIDE PROPERTIES OF THE NEW ZINC COORDINATION POLYMER WITH THE 5,5'-RDA-RDA LIGAND

ı Vitiu[1,2], Diana Chisca[1,2], E. Gorincioi[1,3], Eduard Coropceanu[1,3], Polina Bourosh[1,2]

[1]"Ion Creanga" State Pedagogical University of Chisinau , Chisinau, R. Moldova
[2]Institute of Applied Physics, Chisinau, R. Moldova;
[3]Institute of Chemistry, Chisinau, R. Moldova

INTRODUCTION

Treatment of bacterial infections remains a challenging therapeutic problem because of the increasing number of multidrug-resistant bacteria. There is still a need for some new antibacterial agents, especially those with unique structural features that can influence by different mechanisms of action. Heterocyclic compounds have often been used in medicinal chemistry as drugs or as pharmacophore moieties for producing the new potential drugs. In the group of heterocycles there are molecules containing the rhodanine (Rda) ring, which includes the five-membered thiazolidine with exocyclic sulfur and oxygen atoms (Fig. 1, a). The rhodanine-3-acetic acid (2-(4-oxo-2-thioxothiazolidin-3-yl)acetic acid) (HRda), (Fig. 1, b) has become an interesting heterocycle that in addition to the hetero-donor atoms: N, O and S of Rda contains the carboxyl group ligand.

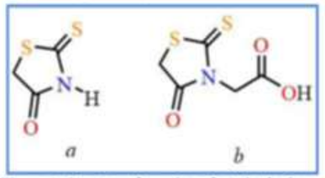
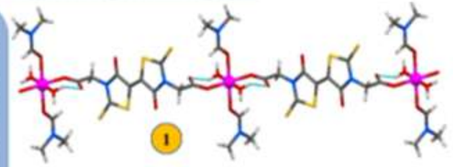


Figure 1. Structure formulae of: a) rhodanine and b) rhodanine-3-acetic acid.

In this work, we have studied the impact of the presence of the ring hetero-atoms in ligand upon the structure of complexes. Thus, combination of Zn(II) metal ion and (HRda) resulted in coordination compound $[Zn(5,5'\text{-Rda-Rda})(dmf)_2(H_2O)_2]_n$ (**1**), its structure being characterized by single-crystal X-ray diffraction, IR-, and RMN-spectra. X-ray structural analysis of the metal assemblies reveal polymeric structure that could be obtained based on the used organic ligand. In compound **1** the bridge ligand (*E*)-2,2'-(4,4'-dioxo-2,2'-dithioxo-2H,2'H-[5,5'-bithiazolylidene]-3,3'(4H,4'H)diyl) diacetic acid $(5,5'\text{-Rda-Rda})^{2-}$ was obtained as a result of the autocondensation of HRda.

SINGLE-CRYSTAL X-RAY DIFFRACTION AND IR CHARACTERIZATIONS

Compound **1** was obtained as a result of an unusual condensation of HRda, which occurred in reaction with zinc tetrafluoroborate hydrate in methanolic solution in the presence of dimethylformamide. Analysis of the structure of the foregoing compound determined that the central metal coordination coordinate takes the form of an octahedron consisting of the set of O_6 donor atoms, two oxygen atoms belonging to the two anions $5,5'\text{-Rda-Rda}^{2-}$ and the other four oxygen atoms belonging to the two dmf molecules and the two water molecules.



$[Zn(5,5'\text{-Rda-Rda})(dmf)_2(H_2O)_2]_n$ (1)

NMR SPECTRUM

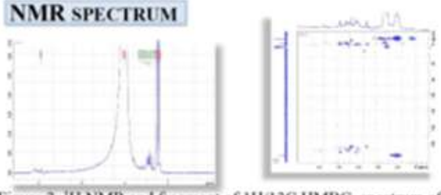


Figure 2. ^1H NMR and fragment of 1H/13C HMBC spectrum of complex **1**

^1H NMR (400.13 MHz, DMSO-d_6, δ, ppm): 7.95 (s, dmf), 2.89 (s, dmf), 2.73 (s, dmf), 2.40 (2H, s, HC-CH), 2.53 (s, 4H, N-CH_2). ^{13}C NMR (100.61 MHz, DMSO-d_6, δ, ppm): 174.63 (C=O), 163.30 (dmf), 35.70 (dmf), 34.91 (N-CH_2), 31.30 (dmf), 29.38 (HC-CH) (the atoms in the C = S and COO groups were not detected.

THE BIOLOGICAL PROPERTIES

Two bacterial strains and one yeast strain were obtained from the American Type Culture Collection (ATCC). Reference strains included the Gram positive bacteria *Staphylococcus aureus* (ATCC 6538), the Gram negative bacteria *Escherichia coli* (ATCC 25922), and one yeast strain, *Candida albicans* (ATCC 10231). The study of antibacterial and antifungal activity showed that compound $[Zn(5,5'\text{-Rda-Rda})(dmf)_2(H_2O)_2]_n$ (**1**) presented antifungal activity in the range of all the studied concentrations, the MIC being 1.2 μg/mL (dilution 1:1024) and antibacterial in the case of 1:8 dilutions towards *E. coli* and 1:16 dilutions towards *S. aureus*. The results of microbiological studies revealed significant activity of compound **1** over *Candida albicans*, *E. coli* and *S. aureus* cultures, indicating its possible use as an antifungal and antimicrobial preparation.