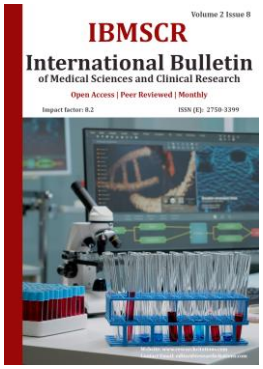

DETERMINATION OF THE QUANTITATIVE COMPOSITION OF THE COMPLEX FORMED BY COPPER (II) WITH ACYCLOVIR BY THE SEM-EDT ANALYSIS METHOD.

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Abstract
In this article, the quantitative composition of the complex formed by copper(II) with acyclovir was studied by the SEM-EDT analysis method.
Keywords:Copper, ligand, complex compound, SEM-EDT analysis methods.

Enter.Today, the sharp increase in the number of the world's population puts important and specific tasks before coordination chemistry, which occupies an important place in the pharmaceutical industry. One of them is the synthesis of medicinal complex compounds based on intermediate metals and their salts from physiologically active ligands containing nitrogen and oxygen in the molecular composition. Based on this, in this study, the quantitative composition of the [Cu(L)2] complex formed by acyclovir with Cu(II) was studied using the SEM-EDT method.

Analysis of literature on the topic.One of the important directions of modern coordination chemistry is the synthesis and study of complex combinations of intermediate metals with biologically active ligands. Creation of new highly effective biologically active drugs is one of the problems of modern medicine and agriculture. Targeted synthesis of coordination compounds of biometals with physiologically active organic compounds can greatly help in solving this problem[1-2].

It is known that the inclusion of biologically important metals in the composition not only reduces their harmfulness, but also in many cases increases the biological activity of the drug, and often new biological properties are discovered [3-4].

Acyclovir is a 2-deoxyguanosine analog and is a potent acyclic nucleoside with intense activity against several herpes viruses, particularly HSV-1 and HSV-2[5].

Several studies have shown that the antiviral effect of acyclovir involves its enzymatic conversion to acycloguanosine triphosphate[6].

The complex compound of aciclovir with Cu(II) was synthesized [7], in this study, the quantitative composition of this complex compound was studied by SEM-EDT method.

Experimental part.To study the complexation of Cu(II) with aciclovir, 0.001M CuSO4, pH = 6 and 0.002M, 0.004M, 0.006M and 0.008 molar ethanol solution of 200S of aciclovir were used.

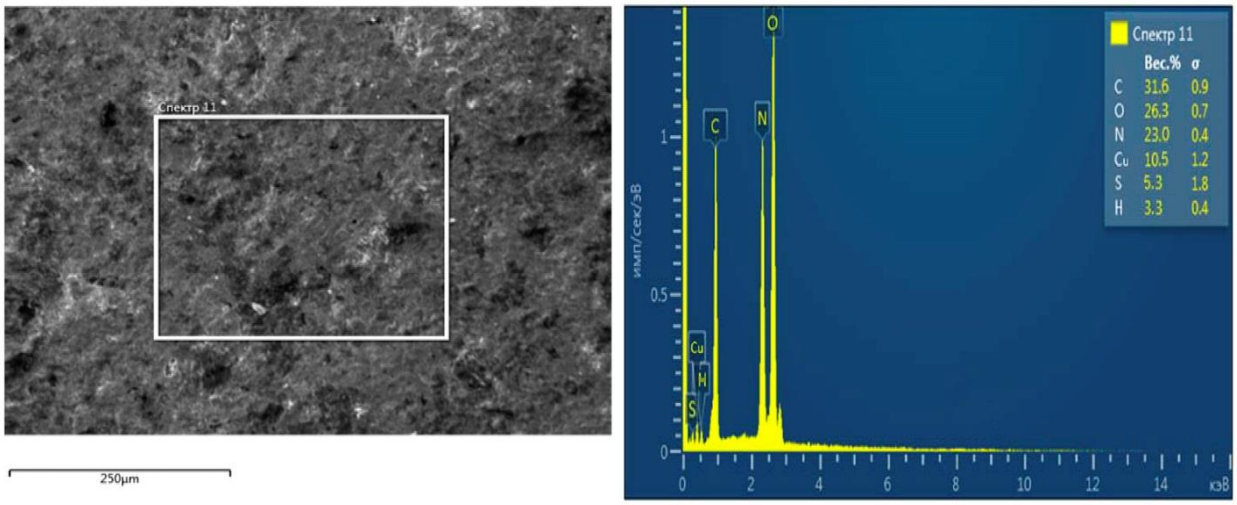
A series of ligand solutions were exposed to 0.001M CuSO4 solutions one at a time on a magnetic stirrer.

The air color of the metal sulfate solution was colored green under the influence of acyclovir solutions. The compound was filtered, washed with ethanol, recrystallized and dried in a desiccator.

Results and their analysis.A complex compound containing [Cu(L)2] was synthesized in a 2:1 ratio of aciclovir L1 and CuSO4 salt in an ethanol solution. The amount of elements (oxygen, carbon, nitrogen, sulfur, hydrogen and copper elements) in the synthesized ligand and complex compound was analyzed using scanning electron microscore and energy dispersion (SEM-EDT) analysis method [8].

Quantitative analysis of the elements in the synthesized complex compound was carried out using energy-dispersive spectra (EDT) obtained in an X-ray detector connected to a scanning electron microscope (SEM). According to the results of EDT, a large number of peaks typical for metal ions were recorded due to the complex formation of acyclovir, an organic ligand, with metal ions and the change of the microstructure of the ligands (Fig. 1).

Based on the data obtained as a result of the analysis, the percentage concentrations of the elements in the complex compound are S-31.6%, O-26.3%, N-23.0%, Cu-10.5%, S-5.3 % and showed that H-3.3% amounts. This results in a Gross formula of [(C8H10N5O3)2Cu]. Based on the given formula, the composition of the complex [Cu(L)2SO4•H2O] can be expressed by the formula [9].



a) b)

a) [Cu(L)2SO4•H2O]- the microstructure of the complex compound.

b) EDT results.

Conclusions.In summary, the results of the scanning electron microscope-energy dispersion analysis of the synthesized complex of aciclovir with Cu(II) in the ratio of 2:1 were used. Based on the data obtained from the analysis, the gross formula of the synthesized complex compound was proposed as [(C8H10N5O3)2Cu)].

References:

1.Samadov S.J., Nazarov F.S., Beknazarov E.M., Nazarov F.F. Biologicheskaya activitity synthezirovannyx soedineniy proizvodnyx N,N-polymethylene bis [(non-aromatylcycloalkanoloyl) carbamates]. Universum: technical science. "Technicheskie nauki" 2021 3(84).

2.Samadov S.J., Nazarov F.S., Beknazarov E.M., Nazarov F.F. Mathematical description of technological processes and apparatus. Universum: technical science. "Technicheskie nauki" 2021 5(86).

3.Nazarov F.F., Nazarov F.S., Shabarova U.N., Faizullaev N.I. Par-carbonate conversion of methane. Universum: technical science. "Technicheskie nauki" 2021 6(87).
4.Nazarov. FF, Nazarov. FS, Akhmedova FU, Faizullayev. NI /Carbonate conversion of methane / ACADEMICIA: An International Multidisciplinary Research Journal 11(5), 937-940.
5.HJ Schaeffer, L. Beauchamp, P. de Miranda, GB Elion, DJ Bauer and P. Collins, Nature, 1978, 272, 583.
6.JA Fure, PM Keller, PA Furman, RL Miller and GB Elion, J. Biol. Chem., 1978, 253, 8721; GB Elion, J. Antimicrob. Chemother., 1983, 12, Suppl. B, 9.
7.MB Abdukodirovich, KH Turayev, UI Amonovich. Study of the Cu(II) complex with acyclovir (2-amino-9-((2-hydrohyethoxy methyl)-1,9-dihydro-6H-purine-6-OH) //International Bulletin of engineering and technology. 2022. V.2. No. 10. With. 103-108.
8.Zeer G. M., Fomenko O. Yu., Ledyaeva O. N. Application of scanning electron microscopy and the solution of the actual problem of material science // Jurnal of the Siberian Federal University. 2009-T. 2-#4. S. 278-293.
9.Kalmykov K. B., Dmitrieva N. E. Scanning electron microscopy and X-ray spectral analysis of inorganic materials and methods. Moscow, 2017. S. 54..