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COORDINATION COMPOUNDS OF COPPER(II) AND ZINC With 2-AMINOQUINAZOLONE-4.

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ABSTRACT

4 new complexes of copper(II) and zinc with 2-aminoquinazolone-4 have been synthesized. The structure of synthesized complexes has been identified by ESR-, IR- and electronic spectroscopy.

Keywords: *copper, zinc, 2-aminoquinazolone-4, ESR- and IR-spectra.*

АННОТАЦИЯ

Синтезированы 4 новых комплексных соединений меди(II) и цинка с 2-аминохиназолоном-4. Проведена их идентификация. На основании химического анализа, ЭПР-, ИК- и электронной спектроскопии установлено их строение в твёрдом состоянии и в растворе.

Ключевые слова: *медь, цинк, 2-аминохиназолон-4, ЭПР- и ИК-спектры.*

INTRODUCTION

One of the important areas of modern coordination chemistry is the synthesis and study of complex compounds of transition metals with biologically active ligands. The creation of new highly effective biologically active drugs is one of the problems of modern medicine and agriculture. The purposeful synthesis of coordination compounds of biometals with physiologically active organic compounds can provide significant assistance in solving this problem.

DISCUSSION AND RESULTS

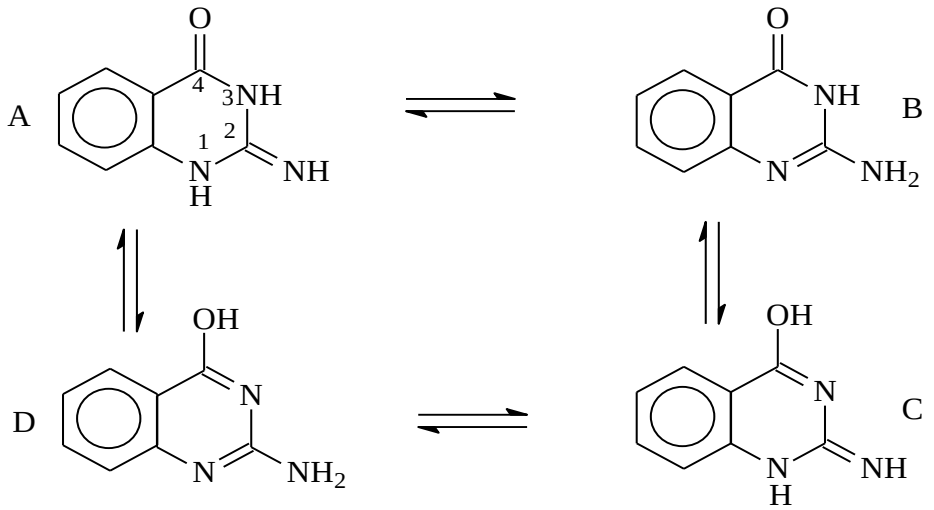
It is known that the introduction of vital biometals into the composition of biologically active preparations not only reduces their harmfulness, but also in most cases sharply increases the biological activity of the preparation and new biological properties are often found. In coordination chemistry, there are a large number of various ligands that differ greatly in properties and structure. One of the important classes are quinazolone-4 and its derivatives. Quinazolon-4 and its derivatives are widely distributed in plant and biological objects. Among quinazolones and its derivatives, drugs with herbicidal, fungicidal, growth-regulating, pharmacological, and other properties have been identified.

2-Aminoquinazolone-4 (AHZ) contains three nitrogen atoms and carbonyl oxygen and is a potential complexing ligand. Therefore, the synthesis and study of its complex formation with transition metals are of particular interest. In addition, drugs with fungicidal, bactericidal, and other properties were found in the AHz series [1, 2].

2-Aminoquinazolone-4 can exist in several toutomeric forms: amidoimino (A), amidoamine (B), enoliminoimino (C), and enoliminoamine (D). Shakhidoyatov Kh.M. and collaborators suggest [2] that in salt 2-aminoquinazolone-4 is a polydente anion and its electron density is delocalized between five (fragment O4¨–¨C4¨–¨N3¨–¨C2¨–¨N2) or three (fragment N1¨– ¨C2¨–¨N2) atoms. In the potassium salt, aminoquinazolone coordinates with the metal through oxygen, as evidenced by the disappearance of the intense absorption band ν(C=O) at 1695 cm-1 in the IR spectrum.

Zinc salts reacted with 2-aminoquinazolone-4 potassium salt in methanol to obtain complex compounds ZnClAHz.2H2O and ZnNO3AHz.2H2O. complexes with two molecules of aminoquinazolone are not formed[10-11].

In the IR spectra of the complexes, as in the case of the potassium salt, the ν(C=O) AHz band at 1695 cm-1 disappears. In the range of ν(NH) stretching vibrations (3200–3400 cm–1), a significant decrease in the width of the absorption bands is observed, which may be due to the absence of intramolecular hydrogen bonds involving NH groups. The disappearance of the ν(C=O) band can be explained by the migration of the hydrogen of nitrogen 3 to oxygen, which is split off during complex formation. Therefore, AHz must be coordinated through the carbon oxygen in position 4. In the spectra of the complexes in the region of 3340–3330 cm–1, a band corresponding to ν(OH) of coordinated water molecules is observed [9].



In the IR spectrum of 2-aminoquinazolone-4, several absorption bands of different intensity and width are observed in the ν(NH) region. So, the band at 3400 cm-1, in accordance with the spectrum of quinazolone-4, corresponds to ν(NH) with the participation of nitrogen 1[8]. The second band ν(NH) with the participation of nitrogen 3 appears at 3060 cm-1. In this region, two absorption bands remain at 3190 and 3300 cm-1. They correspond to the NH2 group (νs(NH2) νas(NH2) respectively). In addition, a broad band centered at 2760 cm-1 is observed. It refers to ν(NH) or ν(OH) of other tautomeric forms C and D, and the width of this band indicates the presence of an intramolecular hydrogen bond. Therefore, only by analyzing the IR spectrum of 2-aminoquinazolone-4 it is impossible to speak unambiguously about one or another tautomeric form. Probably in the solid state, 2-aminoquinazolone-4 is present in several tautomeric forms [7]. This assumption is confirmed by the analysis of absorption bands in the region of stretching vibrations of double bonds. Thus, a clear band ν(C=O), ν(C=N) is not observed, which may be in the case of a mixture of tautomeric forms of aminoquinazolone. However, the bands at 1695 and the shoulder at 1715 cm-1 can be attributed to ν(C=O) of the tautomeric form A and B. Smearing of the absorption bands is also observed for the absorption bands ν(C=N) in the region of 1640-1690 cm-1. Thus, 2-aminoquinazolone-4 in the solid state exists simultaneously in several tautomeric forms[6].

Acedoligands (NO3-, Cl-), according to the electrical conductivity of the complexes in a DMSO solution (4-6 ohm-1.cm2.mol-1), are coordinated with the metal. This fact is also confirmed by the presence of absorption bands at 1470 and 830 cm-1 in the ZnNO3AHz.2H2O spectrum, corresponding to the ν3 and ν2 vibrations of the coordinated nitrate ion [3]. These bands are absent in the spectrum of the ZnClAHz.2H2O complex.

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