



Synthesis of Chelates of Nickel (II)-Nitrate Salt with Organic Substances

Obloyorov Aziz Ulfat o'g'li¹, Nasimov Hasan Murodovich², Aronbaev Sergey Dmitrievich³,
Saitkulov Foziljon Ergashevich⁴

¹ Student of Samarkand State University

^{2,3} Samarkand State University

⁴ Tashkent State Agrarian University

Abstract: The aim of the work was to obtain a coordination compound of quinazolin-4-one with nickel-(II) nitrate hexahydrate. The synthesis of quinazolin-4-one by the Nimentowski reaction proceeds by heating anthranilic acid with an excess of formamide with the elimination of two water molecules.

Keywords: coordination compound, quinazolin-4-one, nickel-(II) nitrate hexahydrate, anthranilic acid, Nimentowski, anthranilic acid.

Introduction

Nickel occupies a special position among heavy metals, since it belongs to the trace elements necessary for the normal development of living organisms [2]. Unlike Cd, Pb, Hg, Ag, and a number of other heavy metals, which are not included in the active centers of enzymes with enzymatic activity, Ni is a component of the urease enzyme and is absolutely necessary in small amounts for the metabolism of plants of some systematic groups [6]. From this position, it cannot be replaced by any other element. At the same time, nickel is able to relatively easily penetrate into the plant and accumulate in the cytoplasm or vacuoles [4], which contributes to some increase in water uptake by the plant [1].

On the other hand, wind erosion of soils and rocks, as well as the functioning of a number of chemical industry enterprises, lead to an increase in the concentration of nickel in the upper soil layer of a number of regions of the country and the world [3–15], which causes its potential toxicity to animals and humans.

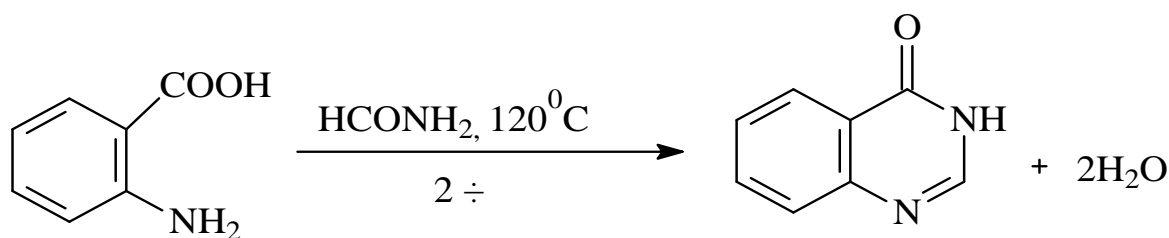
Trace elements are common in the earth's crust in concentrations not exceeding 0.1%, and in living matter they are found in an amount of 10^{-3} – 10^{-12} %. The group of trace elements includes metals, non-metals, halogens. Their only common feature is their low content in living tissues.

Trace elements take an active part in many life processes occurring in plants at the molecular level. By acting on the enzyme system or in direct connection with plant biopolymers, they stimulate or inhibit the flow of physiological processes in tissues.

Stabilizers, which are an important task today obtaining and their growth and development of plants we aimed to study its effect.

Methods and results

The aim of the work was to obtain a coordination compound of quinazolin-4-one with nickel-(II) nitrate hexahydrate. The synthesis of quinazolin-4-one by the Nimentowski reaction proceeds by heating anthranilic acid with an excess of formamide with the elimination of two water molecules. An attempt was made to explain the low yield in this reaction by decarboxylation.

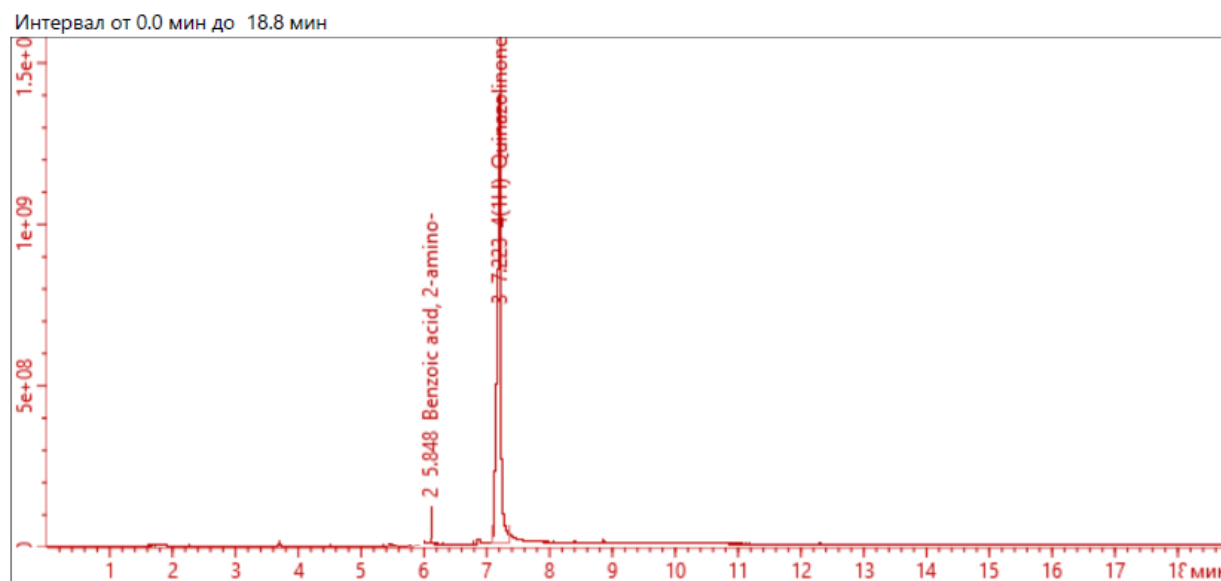


Depending on the reaction conditions, we increased the yield of quinazolin-4-one to 96%.

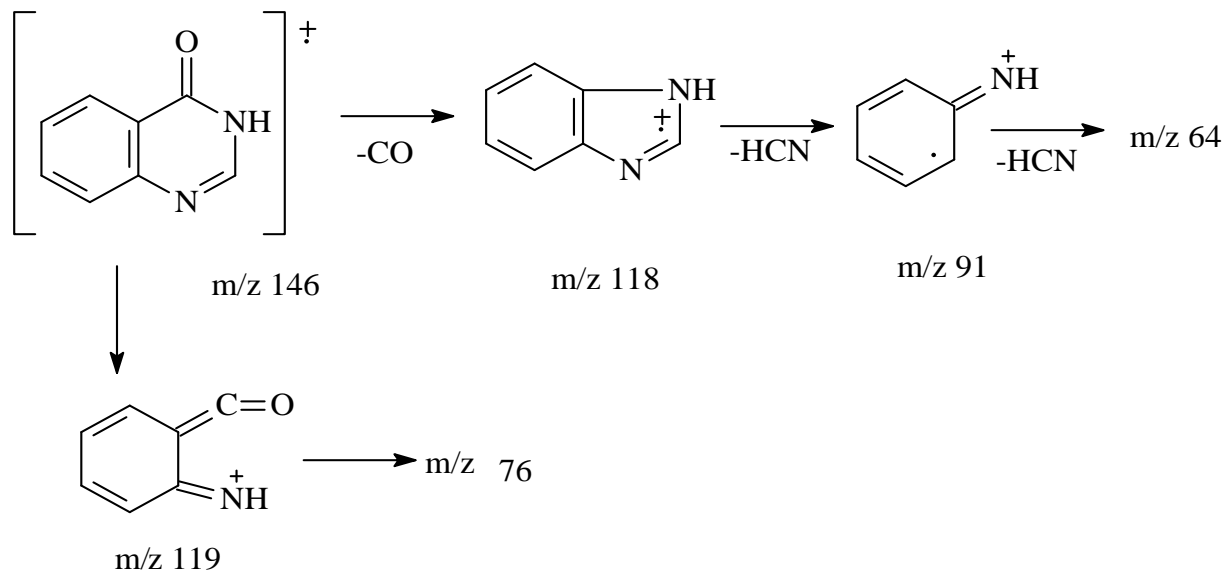
A mixture of anthranilic acid and formamide in a ratio of 1:4 was heated in Wood alloy at 130-135°C for 2. The yield of quinazolin-4-one was 96%. Thus, heating plays an important role in the reaction output.

The purity of the product and the course of the reaction were controlled by TLC, Silufol UV-254. (benzene system:acetone 5:3). The melting point of quinazolin-4-one was determined on the heating table "BOETIUS (Germany)".

The mass spectrum of quinazolin-4-one was removed by chromatek Crystal with the Chromatek-Crystal 5000 mass spectrometric detector, fully confirm the structure of quinazolin-4-one (Fig-1,2).

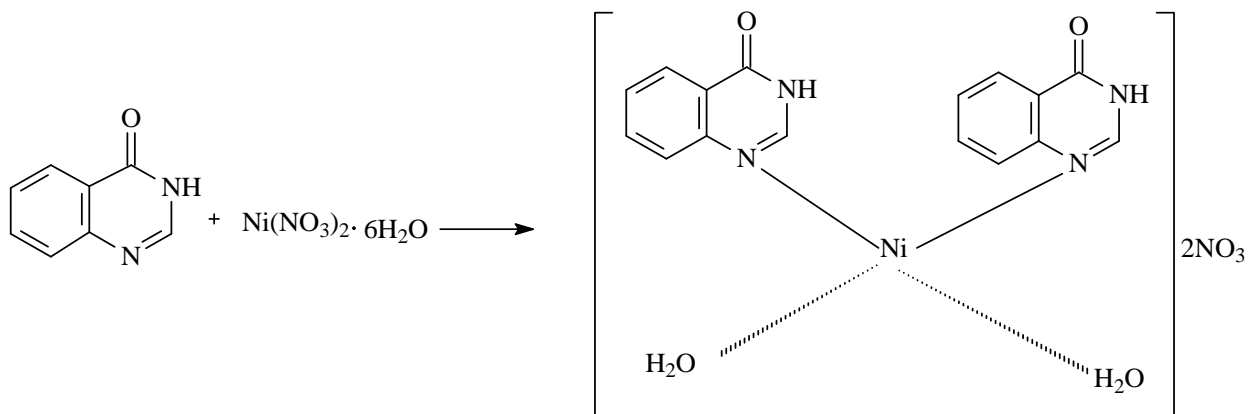


The mass spectrum of quinazolin-4-one is characterized by the presence of an intense peak of the molecular ion. The decomposition of the quinazolin-4-one molecular ion proceeds with the elimination of CO and HCN. Further fragmentation of the (M-CO)⁺ ion occurs with the release of two HCN molecules.

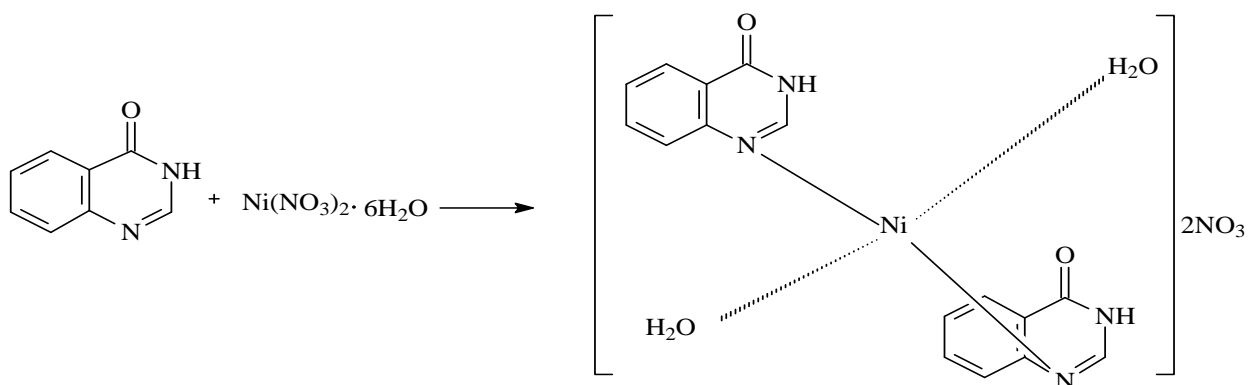


To an acetone solution of quinazolin-4-one by passing hydrogen chloride, almost quantitative yields of quinazolin-4-one hydrochloride were obtained.

In a 100 ml round-bottomed flask, 50 ml of the absolute solvent acetonitrile was added, then nickel(II)-nitrate hexahydrate and quinazolin-4-one were added. The reaction mixture in a water bath was heated at 90°C. A dark green precipitate formed and the composition of the masses was studied by chromatography.



As can be seen from the formula of the coordination compound, the substance has a geometric isomer. According to the result of the spectral analysis, it was proved that the formula of the substance is in cis and trans form.



EXPERIMENTAL PART

Syntheses quinazolin-4-one

13.7 g (0.1 mol) of anthranilic acid and 16 ml (0.4 mol) of formamide ($\rho = 1.13 \text{ g/cm}^3$) were placed in a two-necked flask equipped with a reflux condenser.

The reaction mixture was heated in a glycerol bath at 130-135°C for 2 hours. After cooling to room temperature, the reaction mixture was poured into a beaker containing crushed ice and left for 6-8 hours at room temperature. The precipitated crystals were filtered off, dried, and recrystallized in water in the presence of activated charcoal. 10.7 g (73.3%) of quinazolin-4-one were obtained.

T = 217-218°C, Rf=0.63.

Synthesis of the coordination compound nickel (II)-nitrate hexahydrate

In a 100 ml round-bottomed flask, 50 ml of the absolute solvent acetonitrile was added, then 0.01 mol nickel(II)-nitrate hexahydrate and 0.02 mol quinazolin-4-one were added. The reaction mixture in a water bath was heated at 90°C. A dark green precipitate formed and the composition of the masses was studied by chromatography.

Conclusion

We synthesized the coordination compound quinazolin-4-one with nickel-(II) nitrate hexahydrate and obtained the spectra

Literature

1. Saitkulov F. E. et al. 2, 3-Dimethylquinazolin-4 (3H)-one //Acta Crystallographica Section E: Structure Reports Online. – 2014. – Т. 70. – №. 7. – С. o788-o788.
2. Ergashevich S. F. et al. Photochemical Processes Photosynthesis Pathway On House Plants Leaves" Black Prince" //Texas Journal of Agriculture and Biological Sciences. – 2022. – Т. 10. – С. 76-78.
3. Сaitкулов Ф. Э., Элмуратов Б. Ж. УФ-спектральные характеристики хиринолин-4-он и тионов //Innovative developments and research in education international scientific-online conference. pp-10-12. – 2022.
4. Saitkulov F. E., Elmuradov B. J., Sh N. Ropijonova. Methylation of quinazolin-4-one with " soft" and" hard" methylating agents //International Journal of Development and Public Policy| e-ISSN. – С. 2792-3991.
5. Saitkulov F. et al. Biochemical nutrition family plant rute-lemon leaved //Академические исследования в современной науке. – 2022. – Т. 1. – №. 17. – С. 268-273.
6. Saitkulov F. et al. STUDY OF THE EFFECT OF FERTILIZING ON GRAIN PRODUCTIVITY //Development and innovations in science. – 2022. – Т. 1. – №. 17. – С. 32-35.
7. Saitkulov F. et al. RECOMMENDATIONS FOR THE USE OF FATS //Theoretical aspects in the formation of pedagogical sciences. – 2022. – Т. 1. – №. 7. – С. 175-177.
8. Saitkulov F. et al. TITRIMETRIC ANALYSIS OF CALCIUM CATION IN" OBI NAVVOT" VARIETY OF MELON //Академические исследования в современной науке. – 2022. – Т. 1. – №. 19. – С. 302-304.
9. Saitkulov F. et al. THE ROLE IN THE PLANT AND THE FUNCTIONS OF NUTRIENTS //Иновационные исследования в науке. – 2022. – Т. 1. – №. 16. – С. 29-31.
10. Saitkulov F. et al. CHEMICAL FEEDING METHOD OF LEMON PLANT USING LEAF STOMATA //Академические исследования в современной науке. – 2022. – Т. 1. – №. 17. – С. 274-277.
11. Saitkulov F. et al. BIOCHEMICAL EFFECTS OF THE COORDINATION COMPOUND OF COBALT-II NITRATE QUINAZOLIN-4-ONE WITH 3-INDOLYL ACETIC ACID IN THE

- “AMBER” PLANTS GRADES PHASEOLUS AUREUS //Академические исследования в современной науке. – 2022. – Т. 1. – №. 17. – С. 263-267.
12. Саиткулов Ф. Э., Гиясов К., Элмурадов Б. Ж. Метилирование 2-метилхиназолин-4-она «мягкими» и «жесткими» метилирующими агентами //Universum: химия и биология. – 2022. – №. 11-2 (101). – С. 49-51.
13. Saitkulov F. et al. PREPARATION OF A MIXED COORDINATION COMPOUND COBALT-II NITRATE HEXAHYDRATE WITH QUINAZOLINE-4-ONE AND 3-INDOLYLACETIC ACID ON “AMBER” PLANTS OF THE PHASEOLUS AUREUS VARIETY //Science and innovation in the education system. – 2023. – Т. 2. – №. 1. – С. 81-87.
14. Murodillayevich K. M. et al. Chromato-Mass Methods for Detecting Simple Esters in Chromatography-Mass Spectrometry Method //INTERNATIONAL JOURNAL OF BIOLOGICAL ENGINEERING AND AGRICULTURE. – 2022. – Т. 1. – №. 6. – С. 53-56.
15. Саиткулов Ф. Э., Элмурадов Б. Ж., Гиясов К. АЛКИЛИРОВАНИЯ ХИНАЗОЛИН-4-ОНА "МЯГКИМ" И " ЖЕСТКИМ" АЛКИЛИРУЮЩИМИ АГЕНТАМИ //Universum: химия и биология: электрон. научн. журн. – 2022. – Т. 1. – №. 103. – С. 53-57.