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STUDYING THE REACTION OF BAP WITH SUCCINIC ACID AND ITS EFFECT ON THE ROOTING OF THE SEEDLING OF THE VARIETY "BUKHARA-102"

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Abstract

In our previous study, we demonstrated methods for the synthesis of the coordination compound 6-benzylaminopurine with hexahydrate cobalt-II nitrate. Continuing our research, we studied the influence of the resulting coordination connection on the shipping of the Bukhara-102 cottons.

Keywords: *6-benzylaminopurine, Bukhara-102 cotton, hexsahydrate cobalt-II nitrate, coordination compounds, chelating ligands*

Introduction

L.A. Chugaev's scientific works relate to various fields of chemistry: he studied the analytical and biological activity of organic compounds, developed a method for converting alcohols into hydrocarbons by thermal decomposition of methylxanthogenates, discovered an anomalous rotational dispersion of organic molecules with two asymmetric centers with opposite signs of rotation. His works on the chemistry of complex compounds have received worldwide recognition. So, in 1906, he established a rule according to which the most stable complex compounds contain five- or six-membered cycles (Sapaev, J., 2020; Gulbakhar Baymuratova, Khasan Nasimov and Foziljon Saitkulov, 2023; Saitkulov, F.E., Tashniyazov, A.A., Mamadrahimov, A.A., & Shakhidoyatov, K.M., 2014; Sapaev, B., Saitkulov, F.E., Tashniyazov, A.A., & Normurodov, O.U., 2021).

The chemistry of heterocycles is one of the most fascinating and important areas of organic chemistry. Suffice it to say that of the most well-known and widely used medicines of natural and synthetic origin, more than 60% are heterocyclic compounds. The presence of a heteroatom in the cycle brings a unique originality to the chemical properties and determines the specifics of synthesis methods. The variety of heterocyclic compounds is due to the possibilities of variations: the number and nature

of heteroatoms in the molecule, the size of the cycle, the degree of unsaturation, which determines the presence or absence of aromaticity, the possibility of the existence of condensed structures. The main attention in the methodological development is paid to the most common methods of synthesis and chemical properties of the main classes of aromatic heterocyclic structures. This choice is due to the fact that it is aromatic heterocycles that exhibit specific chemical properties inherent only in these classes of compounds, whereas the properties of saturated structures or unsaturated non-aromatic heterocycles, as a rule, are similar to their acyclic analogues. Information about the presence of heterocyclic compounds in natural objects, about medicines containing heterocycles and other "secondary" information, in our opinion, is highlighted in small print and is intended for the development of general erudition, and not for memorization and learning (Sapaev, B., Sapaev, I. B., Saitkulov, F. E., Tashniyazov, A. A., & Nazaraliev, D. 2022; Baymuratova, G., Nasimov, K., & Saitkulov, F., 2023; Khatamov, K., Saitqulov, F., Ashurov, J., & Shakhidoyatov, K., 2012; Foziljon Saitkulov, Bairamdurdi Sapaev, Khasan Nasimov, Dilorom Kurbanova and Nargiza Tursunova, 2023; Bairamdurdi Sapaev, Foziljon Saitkulov, Muattar Mamedova, Shahlo Saydaliyeva and Dilafruz Makhmudova. 2023; Саиткулов, Ф.Э., Элмурадов, Б.Ж., & Гиясов, К., 2023; Saitkulov, F., Qilichyeva, N., Abdullayev, B., Anvarov, A., & Ergasheva, M., 2022; Saitkulov, F., Farhodov, O., Olisheva, M., Saparboyeva, S., & Azimova, U., 2022; Boymuratova, G. O., Saitkulov, F. E., Nasimov, K. M., & Tugalov, M., 2022; Murodillayevich, K. M., Shoyimovich, K. G., & Ergashevich, S. F., 2022; Саиткулов, Ф.Э., 2022; Saitkulov, F., Begimqulov, I., O'ralova, N., Gulimmatova, R., & Rahmonqulova, D., 2022; Saitkulov, F., Elmuradov, B., O'lmasova, K., & Alijonova, A., 2023; Bairamdurdi Sapaev, Foziljon Saitkulov, Muattar Mamedova, Shahlo Saydaliyeva and Dilafruz Makhmudova, 2023).

Thus, reagents for gravimetric determination should form sufficiently insoluble crystalline precipitates with the substances to be determined, but at the same time they themselves dissolve well in water, and also have a large molar mass. The solubility of organic reagents is determined by the number of functional groups available for hydration: $-S0_3H$,$-COOH$,$-OH$,$-NH_2$. Chelates of such reagents can be poorly soluble in water, since during the formation of complexes, hydrating groupings are completely blocked. For example, the sodium salt of anthracitic acid it is well soluble in water. However, the complexes of this substance with most divalent metals are poorly soluble in water, since both hydrophilic centers in the reaction product are blocked.

Reagents for photometric determination must have an intense color – or the color must appear when they interact with the substances being determined. If the photometric determination is carried out in an aqueous solution, then the resulting chelate should be well soluble in water. The solubility increase, as already noted above, is facilitated by the presence of hydrophilic functional groups in the reagent molecule. For example, alizarin is practically insoluble in water, while its sulfonic derivative, alizarin-3-sulfoxide– lot, is soluble in water (Bairamdurdi Sapaev, Foziljon Saitkulov, Muattar Mamedova, Shahlo Saydaliyeva and Dilafruz Makhmudova. 2023; Саиткулов, Ф.Э., Элмурадов, Б.Ж., & Гиясов, К., 2023; Saitkulov, F., Qilichyeva, N., Abdullayev, B., Anvarov, A., & Ergasheva, M., 2022; Saitkulov, F., Farhodov, O., Olisheva, M., Saparboyeva, S., & Azimova, U., 2022; Boymuratova, G. O., Saitkulov, F. E., Nasimov, K. M., & Tugalov, M., 2022; Murodillayevich, K. M., Shoyimovich, K. G., & Ergashevich, S. F., 2022; Саиткулов, Ф.Э., 2022; Saitkulov, F., Begimqulov, I., O'ralova, N., Gulimmatova, R., & Rahmonqulova, D., 2022; Saitkulov, F., Elmuradov, B., O'lmasova, K., & Alijonova, A., 2023; Bairamdurdi Sapaev, Foziljon Saitkulov, Muattar Mamedova, Shahlo Saydaliyeva and Dilafruz Makhmudova, 2023).

Metallochromic indicators should form soluble complex compounds with metal cations, the color of which differs from the color of the free indicator. Metal complexes with a titrant should be more stable than complexes with an indicator.

The use of organic reagents in analytical chemistry is not limited to complexation reactions: some reagents form poorly soluble simple salts with the ions being determined, for example, the K+ cation forms a poorly soluble salt with the tetraphenylborate ion, and the sulfate ion forms with the benzidine dication.

Organic reagents are known to take part in redox reactions. Such reagents are used in qualitative analysis, to mask interfering ions (ascorbic acid) or as redox indicators.

Sometimes, when an organic reagent interacts with the ions being determined, new organic substances with characteristic chemical-analytical properties are formed: for example, when nitrite ions interact in an acidic medium with primary aromatic amines, diazonium salts are formed, which then react with phenols or aromatic amines to form azo dyes.

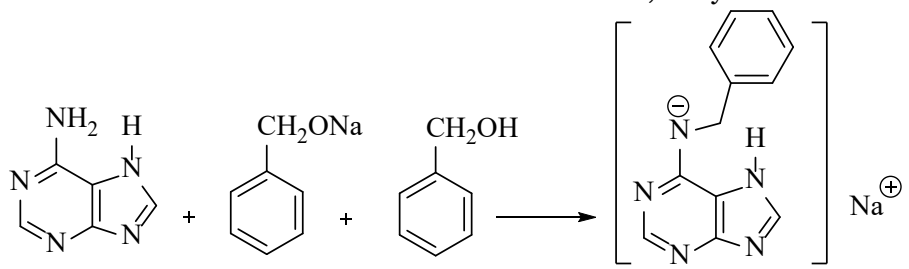
Some organic reagents are involved in catalytic reactions. In particular, when luminol (3-aminophthalic acid hydrazide) is oxidized with hydrogen peroxide at pH > 8.5, chemiluminescence occurs. This process is catalyzed by micro quantities of some metals, for example Cu^{2+}. Luminol is used for chemiluminescent determination of metal cations.

Currently, the number of beneficial microorganisms living in the soil is decreasing, as well as endemic bacteria that affect the processes of plant growth from the air.

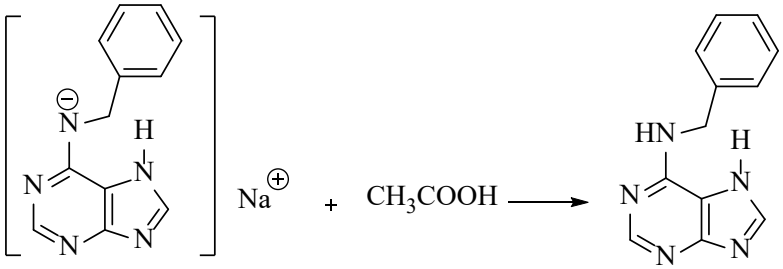
Continuing our research, we studied the influence of the resulting coordination connection on the shipping of the Bukhara–102 cotton.

Metods and results

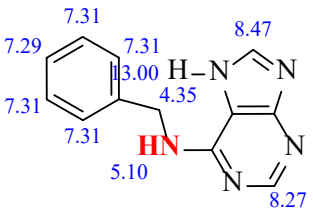
Adenine of sodium benzylate, and benzyl alcohol were added to the flask (the molar ratio of adenine, sodium benzylate, benzyl alcohol is and with stirring boiled for 2.5 hours. Cooled to room temperature, 150 ml of diethyl ether was added and the precipitate was filtered. Sodium salt of 6-benzylaminopurine was obtained, the yield was 94%.



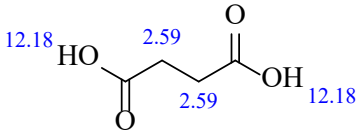
Sodium salt of 6-benzylaminopurine was dissolved in 150–200 ml of hot water, 1.3–1.5 ml of acetic acid was added to pH 6.5–7.5, cooled to room temperature and filtered, dried.



When the structure of 6-benzylaminopurine molecule was analyzed by 1H NMR spectrum, it was found that the molecular bonds are as follows.



The structure of the BAP molecule shows that the nitrogen atoms in the heterocyclic purine ring do not undergo a chemical reaction. Since the nitrogen atom in the seventh position is occupied by the benzyl radical, it also does not participate in chemical processes.



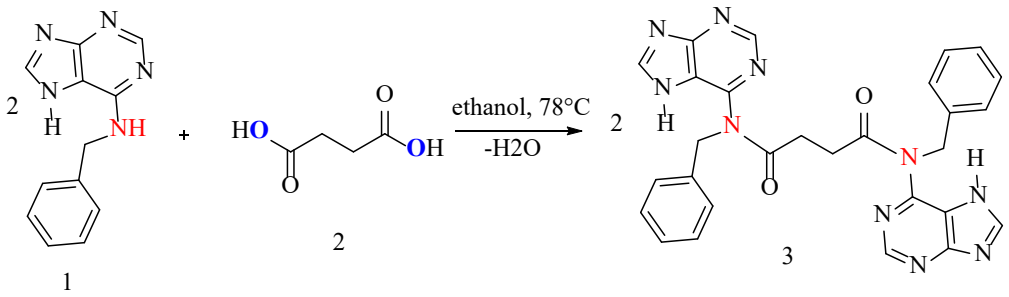
Succinic acid is a dibasic saturated aliphatic acid. It is determined that it occurs mainly in anion form in cell metabolism. In the Kerbs-Hans cycle, the intermediate product of citric acid, γ-aminobutyrates, is a product of catabolite reactions, and heme

production plays an important role in heme biosynthesis.

Due to the fact that it is not possible to express the acidic or basic properties of all compounds by means of the dissociation constant, R. Pearson proposed to divide Lewis acids and bases into hard and soft ones. Hardness and softness cannot be measured precisely; they can only be described qualitatively.

According to R. Pearson's strong soft acid bases principle, it is convenient for strong acids to react with strong bases, and soft acids with soft bases.

According to Hammond's postulate, the geometry (structure) of the transition state is similar to the geometry (structure) of substances with free energies close to it, and this state is appropriate for each stage of the reaction. The time of existence of the activated complex is equal to the vibration time of one molecule (10–13 h), so it is impossible to isolate and study it experimentally. The correctness of the transition state theory can only be proved by calculations. In multi-step reactions, there are several transition states, in which case the highest energy value is taken as the activation energy. After the transition state, new bonds are formed in the molecules, and old bonds are broken or reformed. According to the above principles and rules, we dissolved succinic acid with BAP in absolute ethyl alcohol. The solution was heated in a water bath at 78–80 °C for 6 hours under reflux. Cooled, recrystallized. Washed with alcohol. The resulting compound was analyzed spectrally.



1 2 3

Method and Methodology

The effects of compounds **(3)** of cotton Gossypium on varieties "Bukhara-102" were studied.

The expected results in our experiment consists of the following stages.

In order to determine the biological activity of the resulting compound (3), first 2.5 g of substance (3) was dissolved in 10 ml of alcohol and 5 g of substance (3) in 10 ml of alcohol, 90 ml of deionized water was added to each of the resulting solutions. The solutions were ready. After that, the following processes were carried out.

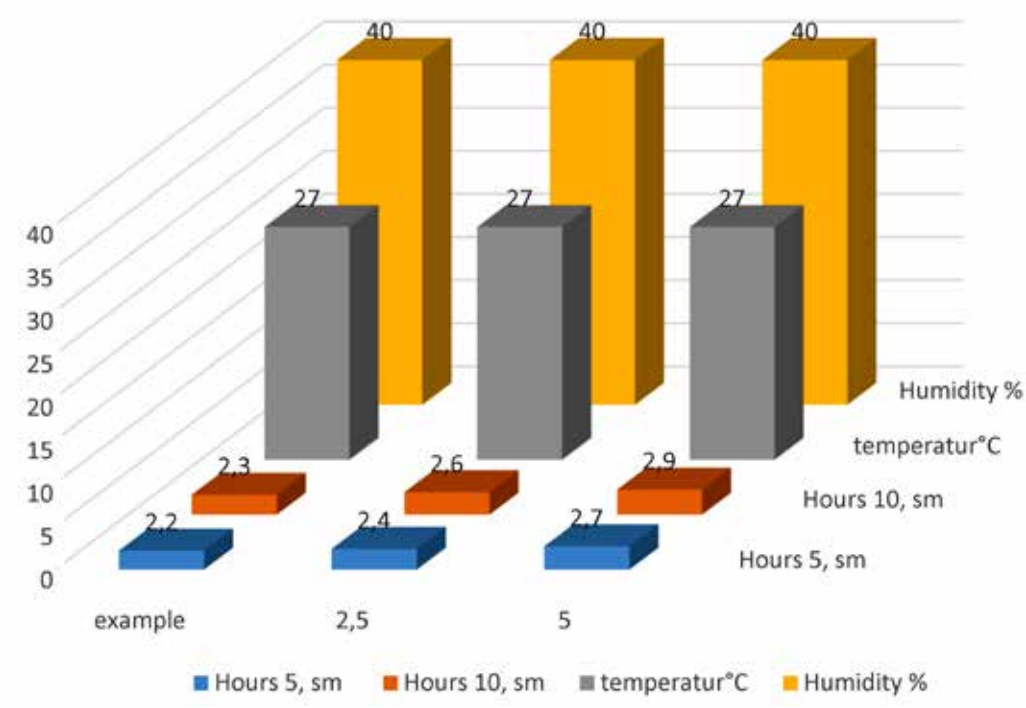
20 seeds in 2.5% solution for 5 and 10 hours, 20 seeds in 5% solution for 5 and 10 hours in solution were poured.

Effect compounds (3) on seed germination. Seeds of 4 petri dishes and 1 20 pcs at equal distances. In total, the sample was placed in a thermostat in 5 Petri dishes. The temperature is 27 °C, humidity is 40%. 2.5 and 5 hours, the seeds are soaked in a 5% solution for 10 hours. the processes of increase were observed, 5% in 5 hours the seeds were soaked in solution for 10 hours, the processes of enlargement were observed. The root growth rate is performed in the same order. For 10 hours in 5% solution as the roots grow. It is desirable to sow seeds evenly. We're counting on it.

Table 1.

№	Concentration%	Bukhara-102, Fertility			
		Hours 5, sm	Hours 10, sm	temperatur°C	Humidity%
1	example	2.2	2.3	27	40
2	2.5	2.4	2.6	27	40
3	5	2.7	2.9	27	40

Diagram 1. *"Bukhara-102" seedling root sample and 2.5% and 5% seeds are represented as follows*



Conclusion

Cobalt is necessary for plants to absorb molecular nitrogen, it is a trace element, the nodes of legumes and the formation of nodular bacteria on the leaves will give. Cobalt accumulates in the wood of the plant and accelerates growth, participates in the metabolism of oxsin, that is, an important nutrient for plant growth processes, including cell membranes, helps to lengthen. This metal ion is involved in the proliferation of leaf cells. An increase in the thickness and volume of mesophilic, columnar and cell volume in the turbid-leaf parenchyma. In addition, cobalt is a common water for plants. increases the maintenance and, consequently, the drought of crops increases the longevity. The concentration of chloroplasts and pigments in the leaves, the formation of the photosynthetic apparatus of plants and the effect of the coordination of cobalt compounds is very important.

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