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Synthesis of biological active complex compounds and their application

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ABSTRACT

Today, food security is an important priority in all countries, as the world's population growth leads to a further increase in demand for food. The widespread use of stimulants in plants in world practice is one of the fastest growing areas. Stimulants allow to improve the productivity and quality of agricultural crops at no additional cost. Stimulants have a positive effect on physiologically active substances in increasing the germination and germination capacity of seeds of agricultural crops, accelerating the ripening of the crop, increasing the plant's resistance to drought, salt, disease and pests. These include the complex compounds we offer.

Key words: *stimulant, complex compounds, seeds, cotton.*

1.0 Introduction

Research work of the Plant Protection Organization on the implementation of measures to combat crop diseases that meet modern requirements should ensure that the crop is not destroyed, and product quality is improved at minimal material costs. This goal can be achieved through the integration of rational methods and means of protection that ensure the eradication of various fungal, bacterial and viral diseases.

In recent years, Uzbek scientists have synthesized stimulants in the form of stable complex compounds that retain trace elements against various diseases [1-5]. They play an important role in increasing seed germination, early ripening and yield of plant fruits, and have also been considered potent pesticides. Based on a number of scientific studies in this area, it was found that the stimulating properties of coordination compounds depend on the nature of the metal, the method of coordination of the ligand, as well as the chemical composition and geometric structure of complexes [3-5]. The wide range of action and high biological activity of derivatives of β-dicarbonyl compounds increase the interest in them. Due to the various metal ions and bioactive elements in these compounds, they make plants resistant to certain diseases [3-6].

We have shown that the interaction of Ni (II), Zn (II) and Cu (II) acetates with an aqueous solution of ammonia in an equimolar ratio of alcohol solutions of ligands H_2L^1-H_2L^5 ML • A (M^{2+} = Ni, Zn and Cu; A = NH_3, Py) (Metal complex compounds containing L-double deprotonated ligand residue) were synthesized. Elemental analysis, according to the obtained IR- and YaMR-^{1}H spectroscopy parameters of the compounds, as well as RSA data, we can write in a flat-square polyhedral structure [8-10]:

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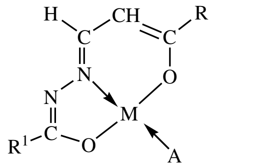
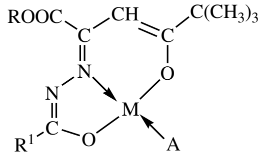


R=n-$CH_3OC_6H_5$, R^1=*o*-OHC_6H_5, ($NiL^1 \cdot NH_3$); КА-1 preparation.
R=R^1=C_6H_5, ($ZnL^2 \cdot NH_3$); КА-2 preparation.
R=R^1=C_6H_5,($CuL^2 \cdot NH_3$); КА-3 preparation.



R=C_2H_5, R^1=C_6H_4X-*n*, X=NO_2 ($NiL^3 \cdot 3Py$; КЭ-1 preparation.
R=CH_3, R^1=C_6H_5 ($ZnL^4 \bullet NH_3$); КЭ-2 preparation.
R=C_2H_5, R^1=C_6H_4X-*n*, X=OCH_3 ($CuL^5 \cdot NH_3$); КЭ-3 preparation.

Ammonia complex compounds are well soluble in water in poor organic solvents. A complex compound containing NiL^3 • 3Py was obtained from ammonia complex compounds of nickel (II) when NiL^3 • NH_3 was dissolved in pyridine in minimal amounts [10-13].

Today in our country such drugs as Г-13, ТЖ-85, Т-86, П-4 are widely used as stimulants for the growth and development of cotton. As a result of their application, the plant increases its resistance to fungal, bacterial and viral diseases, as well as accelerates the ripening of the crop at the same time, improves fiber quality and increases productivity [6-7].

It should be noted that some derivatives of ketoaldehydes and keto ethers exhibit fungicidal properties. We studied some complexes of metals with acylhydrazones as plant stimulants. We synthesized KA-1 (NiL^1 • NH_3), KA-2 (ZnL^2 • Py), KA-3 (CuL^2 • NH_3), KE-1 (NiL^3 • 3Py), KE-2 (ZnL^4 • NH_3) and KE. Solutions of -3 (CuL^5 • NH_3) drugs were found to exhibit biological activity.

In order to determine the biological activity of the synthesized drugs, experiments were conducted in the fields of the farm "Khaticha buvi Jondoriy" Jondor district.

The same agro-technical measures were carried out in the control and experimental areas. According to the results of the observations, when analyzing the germination of cotton seeds, it was noted that the germination of cotton seeds treated with drugs (Table 1) was higher than the germination of cotton seeds in the control area and areas treated with the standard П-4.

Table 1.

Effects and results of the obtained drugs on cotton seed germination

Square	Dynamics of cotton seed germination						Increasing germination, %	
	8 days		10 days		12 days		With respect to the control option, %	The standard is relative to П-4, %
	PC.	%	PC.	%	PC.	%		
Control	8	15,5	31	53,4	48	82,8		
Standard П-4	15	25,9	38	65,5	51	87,9		
КА-1	17	29,3	43	74,1	54	93,2	10,4	5,3
КА-2	18	31,0	44	75,9	55	94,7	11,9	6,8
КА-3	19	32,8	46	79,3	56	96,3	13,5	8,4
КЭ-1	18	31,0	44	75,9	54	94,0	11,2	6,1
КЭ-2	19	32,8	45	77,6	55	95,1	12,3	7,2
КЭ-3	20	34,5	47	81,0	56	96,6	13,8	8,7

As a result of seed germination in the experimental field, changes in biomass, strong development of the root system, rapid growth and branching of cotton seedlings and the formation of yield elements were confirmed to be higher than in the control area (Table 1).

The minimum number of cocoons to be considered should be 20-25 days. This can be roughly compared to a normalized cocoon. The cortex is morphologically complete when it is usually 30

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days old. In the experimental field were identified germination of seeds, changes in biomass, strong development of the root system. It was observed that cotton seedlings grow rapidly, branching and the formation of yield elements is higher than that of plants in the control area.

Phenological observations in the experimental area (on average) compared to the control variant on June 9, the plant height was 2.9 cm; the number of true leaves is 0.45; On July 9, the plants grew 3.1 cm in height; the number of harvested branches is 0.85; On August 9, the height of the plants increased by 3.9 cm, the number of branches increased by 1.63, the number of pods increased by 1.15, and the number of pods increased by 1.22. At the end of the season, the results of calculations to determine the yield showed an increase of 3.6 ts / ha (Table 2).

Due to the presence of Ni^{2+}, Cu^{2+} and Zn^{2+} ions in the composition of microelements that accelerate growth, seed germination and cotton seedlings have a positive effect on the development of root and body systems and have a stimulating effect.

Table 2.

Phenological observations of cotton plants in the experimental field relative to the control option (on average)

preparation	Кунлик фенологик кузатувлар										Yield (ts / ha)
	June 9th		July 9th		August 9th			September 9th			
	Plant height, cm	Number of true leaves, pcs	Plant height, cm	The number of branches formed	Plant height, cm	The number of branches formed	Number of pieces, pcs	Number of pieces, pcs	Opening of the cocoons, pcs	Mass of cotton fiber in the bowl, g	
Control	11,8	3,2	41,1	6,7	81,8	10,3	7,1	8	4,3	6,7	31,2
П-4	13,4	3,4	43,1	7,1	84,2	10,5	7,5	8,4	4,8	6,9	32,4
КА-1	13,8	3,4	43,7	7,3	84,8	10,9	7,9	9,0	5,3	7,0	34,6
КА-2	14,6	3,7	43,9	7,4	85,7	11,8	8,2	9,13	5,5	7,0	35,1
КА-3	15,3	3,8	44,4	7,7	86,2	12,1	8,5	9,29	5,7	7,1	34,7
КЭ-1	13,9	3,5	43,8	7,5	84,9	11,9	8,3	8,98	5,4	6,9	33,8
КЭ-2	14,9	3,6	44,3	7,6	85,8	12,3	8,4	9,18	5,5	7,1	35,2
КЭ-3	15,7	3,9	44,9	7,8	86,3	12,6	8,7	9,33	5,7	7,2	35,6

The experiment was also carried out on a 1-hectare area of contour 803 where weakly saline, chronic cotton was planted and spores of wilt disease were prevalent in the soil. At the stage of cotton weeding, preparations containing Ni^{2+}, Cu^{2+} and Zn^{2+} microelements at the rate of 200 g per hectare are applied to the soil at a depth of 10-12 cm together with nitrogen fertilizers. These metal ions increase the physiological activity of the roots, enhancing the entry of nutrients into the cotton through the roots and their development. When the cotton produced 3-4 leaves and during the mating stage, a second solution of this drug was sprayed and reliable results were obtained. When nutrients were sprayed on cotton in this way, its flowering, budding accelerated and had a positive effect on the accumulation of yield elements. Observations and analyzes were carried out on the basis of the methodological manual of PITI RUz.

In the control variant, an average of 18% of cotton seedlings were infected with wilt, while in the area where the drugs were applied, seed germination was accelerated as a result of strong development of the root system, respectively: 7.8; 6.4; 4.8; 7.1; 5.9 and 4.4% (disease reduction was achieved by 10.2; 11.6; 13.2; 10.9; 12.1 and 13.6%) and productivity was 2, respectively, compared

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to the control option. 44; 2.77; 3.16; 2.41; An increase of 2.89 and 3.25 quintals per hectare was observed.

As a result, it was possible to create drugs that accelerate the germination of seeds, the growth of cotton plants and protect against fusarium wilt.

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