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EFFECT OF NEW COMPOSITION MICROBIOLOGICAL BIO PREPARATION ON MUNG BEAN PLANT PRODUCTIVITY

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ANNOTATION

This article examines the effect of a new generation biopreparation (BtmsTr -biopreparati) based on metabolites of the fungus Trichodermaharzianum and the bacterium Bacillus thuringiensis on mung bean plant productivity. According to the results obtained, the melanin-synthesizing mutant strain of the bacterium Bacillus thuringiensisvar.thuringiensis and the ISK-synthesizing Trichodermaharzianumsp. BtmsTr-biopreparation prepared in a 1: 1 ratio from the culture fluids of strain 76 ,the productivity of mung bean was shown to be 77.4% higher than the control variant (Btnmsbiopreparation) or 61.4% higher than the template variant.Researches have shown that the production of this mungbean plant is caused by various aphids, beetles, caterpillars, moths, leaf-eating beetles and fungi that cause fusarium wilt, as well as microbiological objects that cause bacterial blight. Therefore, this biopreparation is recommended for use in increasing crop yields and combating various diseases and pests.

Key words:Bacillus thuringiensis, Trichodermaharzianum, biostimulator, insecticide, melanin, indole acetic acid, spore-crystal, δ- endotoxin.

INTRODUCTION

During the cultivation of agricultural products in our country, as a consequence of various pests and microbiological diseases, 20-30% of crops are lost. Practical experience demonstrates that the yield of agricultural crops is lost from 10% to 50% as a result of the development of some highly harmful microorganisms. Practical research also shows that the productivity of agricultural crops is achieved by increasing the use of mineral fertilizers and various chemicals, which in turn leads to a sharp increase in environmental pollution.

At the same time, the main focus of scientists is on the creation of biotechnologically environmentally friendly, plant growth-stimulating stimulants and their widespread introduction into practice. [Avetisyan S.V. et al. 2013, Abdel-Razek A.S. et al. 2013].

The main purpose of this study is to study the effect of a new generation biopreparation (BtmsTr -biopreparati) on mung bean yields (productivity), created on the basis of TICHT, scientific laboratory of the Department of Biotechnology using metabolites of the fungus Trichodermaharzianum and Bacillus thuringiensis.

Trichoderma fungi are widespread in nature and are noted as microbiological objects that are easy to separate cleanly, produce biomass very quickly, and have a high level of biological activity against phytopathogenic fungi without harming the plant.*[I.Grondona et al., 1997]*.

This fungus is recognized by scientists as an excellent biological object in controlling the growth and development of phytopathogenic fungi. Therefore, BtmsTr-biopreparation, prepared as a new generation biopreparation, is intended to show biological activity against phytopathogenic microorganisms found in moss plant, as Trichoderma fungus contains a culture fluid.

In addition to the fact that 50% of the biopreparation is a culture fluid of the mutant strain of the bacterium Bacillus thuringiesis, which synthesizes melanin, this biopreparation not only has a positive effect on plant growth, but also contains at least two spore-crystalline toxins with insecticidal activity against some pests. indicates that it has a sphere of influence. *[Ya.A.Korobov.,Kamenek L.K. 2010, A.Reyes-Ramírez et al. 2004]*.

Moreover, as frequently noted in scientific sources, the presence of antifungal and antibacterial activity activity of Bacillus thuringiesisentomopathogenic bacterial strains against various fungal and bacterial diseases in plants may also lead to the recognition of this bacterial fluid as one of the promising agents. *[JE.Barboza-Corona et al., 1999, B.Raymond et al. 2010, E.Armada et al. 2015, A.Kassogué et al. 2015, Adounigna Kassogué1 et al. 2016]*.

SOURCES AND METHODS USED

Bacillus thuringiensis var.thuringiensis-M1th [*Khojamshukurov et al., 2006]* and Bacillus thuringiensisvar.thuringiensis-Btms mutant strains and Trichodermaharzianum sp.76 strain were used in the research in the collection of the scientific laboratory of the Department of Biotechnology, Tashkent Institute of Chemical Technology. Trichodermaharzianum sp.76 strain was grown in a modified Mendels nutrient medium, in a non-standard nutrient medium recommended for the production of Bacillus thuringiensis strains. *[N.Khujamshukurov et al. 2001]*.

The new biopreparation was based on the following scheme: 1- *Btnms - Bacillus thuringiensis var.thuringiensis-M*^{1th} - a strain that does not synthesize melanin (grown for 72 hours, unprocessed, accepted as a control variant); 2- Btms - *Bacillus thuringiensisvar.thuringiensis-Btms melanin*-synthesizing mutant strain culture fluid (grown for 72 hours, accepted as a variant of BtmsTr-biopreparation); 3- *BtmsTr - Bacillus thuringiensis var.thuringiensis* -Btms melanin-synthesizing mutant strain culture fluid and ISC-synthesizing strain Trichoderma harzianumsp.76 culture fluid (grown at 72 hours, 1: 1 ratio).

The experience of introduction of production was taken on the example of moung bean planted as a second crop in the territory of Jizzakh region, Zarbdor district, Bakht SIU, *"ShabbodaShamoli"* farm. Areas with a total area of 6 hectares were selected for the experiments.The culture fluids were applied by soaking the seeds for 4 hours before sowing mung bean. Also, after germination, the seeds were sown with the help of a tractor with a sprayer OVH-600 at a rate of 200 liters per hectare with two leaves. A sowing tractor was used for sowingmung bean, which was used originally for sowing wheat.

RESULTS OBTAINED AND THEIR DISCUSSION

The results obtained on the basis of Btnms (non-melanin-synthesizing) biopreparation are shown in Table 1. The average number of leaves of a mosquito plant under the influence of Btnms-biopreparation (culture fluid) is 52. The average width of these leaves is 5.0 cm, and the average length is 6.0 cm. The average length of the root was 11.1 cm, and the average length of the formed thresholds was 7.9 cm. The number of thresholds per

plant was 33.7, while the number of immature thresholds was 9.8 or 29.0%. The weight of ripe grains was 11.6 grams.

In general, the effect of Btms (melanin-synthesizing) biopreparation on the development of moss is shown in Table 2. According to the results, the number of leaves averaged 117.3, which is 65 (55.52%) more than the Btnms (non-melanin-synthesizing) biopreparation.

The average width of the leaves was 6.54 cm and the length was 7.55 cm. This shows that the leaves are 1.54 cm wider and 1.55 cm longer than the Btnms (non-melanin-synthesizing) biopreparation.

Table 1
Effect of Btnmsbiopreparation on the growth and development of mung bean plant

Sourcesofmeasurement	Experimental options (on the example of 10 seedlings taken every 10 meters in the style of chess)										Avarage
	Btnms -1	Btnms -2	Btnms -3	Btnms -4	Btnms -5	Btnms -6	Btnms -7	Btnms -8	Btnms -9	Btnms-10	
Numberofleaves, pieces	42	54	30	81	54	59	69	39	37	46	52,1
Leafwidth, cm	4,7	5,8	4,7	5,1	4,28	5,6	6,1	5,2	4	4,55	5,0
Leaflength, cm	5,6	6,6	6,1	6,5	5,8	6,03	7,05	7,1	3,9	5,52	6,0
Rootlength, cm	10,1	8,5	17	8,7	10,8	10,5	10,5	12,3	8,8	13,7	11,1
Thresholdlength, cm	6,9	8,8	7,39	7,6	9,6	8,7	6,8	7,8	7,57	7,7	7,9
Numberofthresholds, pieces	16	28	38	55	44	39	22	38	19	38	33,7
Numberofimmaturethresholds	0	9	16	10,8	19	13	9	21			9,8
Grainweight, ingrams	8,07	14,05	8,17	10,8	12,19	15,02	15,02	12,02	7,99	12,96	11,6

Table 2
Effect of Btmsbiopreparation on the growth and development of mung bean plant

Sourcesofmeasurement	Experimental options (on the example of 10 seedlings taken every 10 meters in the style of chess)								Avarage
	Btms-1-1	Btms-1-2	Btms-1-3	Btms-1-4	Btms-2-1	Btms-2-2	Btms-2-3	Btms-2-4	
Numberofleaves, pieces	124	78	93	81	129	156	135	142,0	117,3
Leafwidth, cm	5,6	6,6	6,8	6,5	6	6,8	6,8	7,20	6,54
Leaflength, cm	7,5	7,6	8,1	8,3	7,4	7,5	6,8	7,20	7,55
Rootlength, cm	11,1	8,2	12,5	13,2	21,7	33,6	19,82	22,45	17,82
Thresholdlength, cm	8,3	10,5	9,1	10,5	10,2	7,7	12,5	10,80	9,95
Numberofthresholds, pieces	51	46	70	55	63	106	76	96,00	70,38
Numberofimmaturethresholds	8	33	17	17	27	12	14	18	18,25
Grainweight, ingrams	18,35	8,02	20,26	19,21	10,12	35,76	18,9	27,8	19,80

In addition, the number of thresholds in Btmsbiopreparation was 70.38, which is 36.6 more than in Btnms, and the thresholds were 2.05 cm longer. These parameters of Btms-biopreparation have a significant impact on the productivity of the machine. Experiments have shown that the grain weight under the influence of Btms-biopreparation is 8.2 g more than Btnms-biopreparation. This small difference can be explained by the

number of immature thresholds in both options. For example, the average number of undeveloped thresholds in Btnms is 9.8, while in Btms it is 18.25.

Based on this indicator, the biological effectiveness and productivity of Btms-biopreparation can be overestimated. Bacillus thuringiensisvar.thuringiensis - Btms melanin-synthesizing mutant strain culture fluid and ISC-synthesizing Trichoderma fungus sp. The results obtained on the basis of BtmsTr-biopreparation prepared in a 1: 1 ratio from the culture fluids of 76 strains are shown in Table 3. According to the results, the average number of leaves of moss treated with BtmsTr was 151.5, which is 65.6% (99.4) more than Btnms and 22.5% (34.2) more than BtmsTr. The average width of the leaves was 8.0 cm and the length was 9.0 cm.

This showed that the leaves were 2.1 cm wider and 2.5 cm longer than the Btnms-based biopreparation. These figures are 0.86 cm wider and 0.95 cm longer than Btms-biopreparation.

Table 3
Effect of BtmsTrbiopreparation on the growth and development of mung bean plant

Sourcesofmeasurement	Experimental options (on the example of 10 seedlings taken every 10 meters in the style of chess)				Avarage
	BtmsTr-1	BtmsTr-2	BtmsTr-3	BtmsTr-4	
Numberofleaves, pieces	152	168	132	154	151,5
Leafwidth, cm	7,6	7,1	7,8	7	7,4
Leaflength, cm	8,1	7,5	8,8	9,7	8,5
Rootlength, cm	26,3	20,1	22,3	19,8	22,1
Thresholdlength, cm	12,9	11,1	12,9	10,3	11,8
Numberofthresholds, pieces	164	97	133	69	115,8
Numberofimmaturethresholds	28	17	39	34	29,5
Grainweight, ingrams	80,1	45,1	50,3	30,25	51,4

Moreover, the study found that the number of thresholds in BtmsTr-biopreparation was 115.8, which is 82.1 more than in Btnms, and 45.42 more than in Btms. The average length of the thresholds in plants treated with BtmsTr-biopreparation was 11.8 cm, which was 3.9 cm longer than Btnms and 1.85 cm longer than Btms. As mentioned above, these indicators, of course, affect the productivity of the plant.

In the analysis of the data in tables 1-3, the average grain weight in plant variants treated with BtmsTr-biopreparation was 51.4 grams, which is 39.8 grams more than Btnms and 31.6 grams more than Btms. If we analyze the number of immature thresholds, in the plant variants treated with BtmsTr-biopreparation there were 29.5 immature thresholds, in Btnmsbiopreparation - 9.8, and in Btmsbiopreparation - 18.25.Due to the fact that the number and weight of unripe thresholds were not measured during the study, it is theoretically possible that BtmsTr-biopreparation had a positive effect on mosquito productivity.Based on these experiments, the melanin-producing mutant strain of the bacterium Bacillus thuringiensisvar.thuringiensis as well as the sp. BtmsTr-biopreparation prepared from 76 strains of culture fluids in a 1: 1 ratio was shown to yield 77.4.0% more than the control variant (Btnmsbiopreparation) or 61.4% more than the template variant. Comparing theseinformations, obtained on the basis of development experiments, with data from internationally published

scientific sources, it can be seen that they correspond to the results recognized by several scientists. [V.Coyne and L.Al-Harthi, 1992, S.Hoti and K.Balaraman, 1993, van de Sande et al. 2007, F.Liu et al. 2013, E.Sansinenea and A.Ortiz, 2015].These results showed that the results obtained at the farm *"Jurabek"* in Zarbdor district, Bakht SIU, differed significantly from the results obtained. In particular, the results of the survey conducted on the farm "Jurabek" on the basis of the above scheme are as follows:

- It was noted that the melanin-synthesizing mutant strain of the bacterium Bacillus thuringiensisvar.thuringiensis as well as BtmsTr-biopreparation which synthesizes ISK, prepared in a 1: 1 ratio from 76 strains of culture fluids yielded 82.0% more than the control variant (Btnmsbiopreparation) or 60.4% more than the template variant. Studies in the same scheme in two regions showed that the yield of BtmsTr-biopreparation differed by 4.6% compared to the control variant (Btnmsbiopreparation) or by 1.0% compared to the template variant.

Given that the results obtained are both theoretically and practically reproducible, the melanin-producing mutant strain of the bacterium Bacillus thuringiensisvar.thuringiensis and the spic Trichoderma fungus, which synthesizes ISK. BtmsTr-biopreparation, prepared in a 1: 1 ratio from the culture fluids of 76 strains, is recognized as an environmentally friendly, inexpensive and easy-to-use biological product that demonstrates plant growth control.

CONCLUSION

Bacillus thuringiensisvar.thuringiensis bacterium melanin-synthesizing Btms mutant strain and ISC-synthesizing fungus Trichoderma sp. BtmsTr-biopreparation prepared in a 1: 1 ratio from the culture fluids of 76 strains allowed to produce 77.4% more than the control variant (Btnmsbiopreparation) or 61.4% more than the template variant (Btmsbiopreparation). Therefore, we recommend the use of this biological product to increase the productivity of agricultural crops and control various diseases and pests. Researches have shown that the production of this mung bean plant is caused by various aphids, beetles, caterpillars, moths, leaf-eating beetles and fungi that cause fusarium wilt, as well as microbiological objects that cause bacterial blight. Treatment with BtmsTr-microbiological biopreparation should be carried out even when plants are exposed to pests. Therefore, we believe that this will further increase the potential of BtmsTr-microbiological biopreparation in agricultural operations.

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