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FIBER QUALITY INDICATORS AND SEED OIL CONTENT OF ORGANIC COTTON

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Abstract
The use of mineral fertilizers, fungicides, herbicides, pesticides, and other chemical agents in cotton cultivation worldwide is polluting the soil and environment, leading to ecological problems. As a result, soil degradation, climate change, and water scarcity are causing a decline in both yield and quality. Ensuring high and sustainable cotton yields, developing modern resource-efficient agronomic practices, and promoting organic cotton production have become urgent challenges today.

Keywords. Boms, stimulant, cotton, seed germination, plant height, yield branch, bud, flower, pod, leaf surface, dry mass, cotton yield.

Introduction

In Uzbekistan, the development of production systems that comply with international Organic and Global G.A.P. standards, along with proper regulation and coordination, plays a crucial role. Improving the quality and safety indicators of agricultural products, expanding export geography, and fully utilizing the country's potential for organic production are among the key priorities. Expanding the production of environmentally friendly products, enhancing the export capacity of the agricultural sector, and in particular, strengthening seed germination, improving resistance to diseases, and supporting the growth and development of cotton through the application of biological preparations are of great importance for obtaining high yields and superior fiber quality in organic cotton cultivation.

At present, the population of our republic is steadily increasing, which in turn leads to a rising demand for agricultural products. However, the area of irrigated farmland is limited, while climate change, water scarcity, increasing soil salinity, and unfavorable weather conditions create significant challenges in obtaining high and quality yields from agricultural crops. It is well known that under any soil and climatic conditions, producing cotton varieties that are resistant to external factors, tolerant to diseases and pests, early-maturing, high-yielding, and of superior quality has become a priority task.

Currently, in global practice, the use of biologically active substances is expanding with the aim of enhancing soil fertility, improving the efficiency of nitrogen and phosphorus fertilizers, and stimulating plant growth and development. One such preparation is *Tevevit Boms*, whose mechanism of action is associated with improving metabolic processes in plants and activating the functions of natural growth regulators—auxins and cytokinin phytohormones.

B. Khaitov, Sh. Abdualimov, Kh. Allanov et al. [5] reported that when the *Sila* silicon stimulator, developed on the basis of nano-silicon, was applied at rates of 100 ml/t to cotton seeds, 150 ml/ha during the budding stage, and 210 ml/ha during the flowering stage, cotton

growth and development accelerated, yield increased by 5.0 c/ha, and higher-quality fiber was obtained.

Sh. Abdualimov et al. [3; 4], F. Abdullaev [6], and Sh. Karimov [7] found that the use of the *Boms* microbiological preparation in cotton had a positive effect on plant growth, development, and productivity. The *Lebozol* stimulators, which contain various microelements, contributed to an increase in cotton dry mass and the intensification of physiological processes. Likewise, the application of humic-based stimulators and *Biodux* also enhanced cotton growth, development, yield, and fiber quality indicators.

F. R. Shamsitdinov [8] emphasized that physiologically active growth regulators positively influence plant metabolism, including photosynthesis, respiration, enzyme activity, biosynthesis of amino acids, nucleic acids, and proteins, phytohormone movement and metabolism, accumulation and distribution of nutrients, growth and development processes, formation of reproductive organs, crop productivity, and its quality. He noted that these factors ensure the production of abundant and high-quality yields in agricultural crops.

B. A. Sulaymonov, B. S. Boltaev et al. [9] noted that the use of stimulants in cotton cultivation, along with the application of various chemical agents for plant protection against harmful organisms, is highly effective. In particular, when stimulants such as T-86, Tj-85, Nitrolin, Vitovax-200 FF, Oxyhumate, Unum, Gumimax, Uzgumi, Fitovak, and others were applied to cotton seeds before sowing, seedling emergence accelerated by 10–15%, while the incidence of root rot, gummosis, and wilt diseases decreased by 1.5–2 times.

Sh. Nurmatov, R. Nazarov et al. [11], and M. Ashirbekov [12] recommended that under different soil and climatic conditions, in order to obtain high and quality yields from medium-fiber cotton varieties, physiological active substances such as Oxyhumate, Sodium Humate, Silk, and Bioazot should be applied to seeds and during the cotton growing season, along with the timely and high-quality implementation of other agrotechnical measures.

E. Ochilova [13], in her research conducted under the conditions of typical gray soils of Tashkent region, found that when cotton was grown without mineral fertilizers but treated with stimulants containing macro- and microelements such as Uzgumi, Naturkare, Aminol Forte, and others, plant growth and development were harmonized, and the dry mass increased by 22.9–29.4 g.

Globally, in the context of climate change, with sharp rises in temperature, prolonged droughts, or rainy and cool weather conditions, the role of stimulants in improving plant resilience to external stresses is of great significance. Seeds treated with physiologically active substances show improved germination, enhanced growth and development, and greater resistance to drought, salinity, and diseases. In addition, the efficiency of mineral fertilizer use increases, ensuring higher and better-quality yields.

Materials and Methods

Field experiments were carried out in accordance with the guidelines *"Methods of Conducting Field Experiments"* [1]. The data obtained were subjected to mathematical analysis using the method of B. A. Dospekhov [2].

The research was conducted under the conditions of typical gray soils of the Tashkent region using the medium-fiber cotton variety *Andijan-37*. Each experimental plot measured 25 m in length, 2.4 m in width, with an accounting area of 60 m², and was arranged in three replications. For the control treatment, cotton was cultivated following conventional agronomic practices, applying the standard annual mineral fertilizer rates of 200 kg/ha of pure nitrogen, 140 kg/ha of phosphorus, and 100 kg/ha of potassium. In the second treatment, the *Boms* preparation was applied at a rate of 600 kg/ha together with mineral fertilizers at the same rates (N-200, P-140, K-100 kg/ha). In treatments 3–5, the *Boms* organic preparation was applied at rates of 300, 600, and 1000 kg/ha, respectively, without the use of mineral fertilizers during the growing season. Crop management practices such as inter-row cultivation, irrigation, and weed control were carried out uniformly across all treatments.

The *Tevevit Boms*-based preparation is an organic fertilizer obtained through the humification of brown coal and peat compost. It is dry, black in color, and granular in form. Its composition includes humic and fulvic acids, as well as various macro- and microelements. It transforms essential soil elements such as phosphorus and potassium from insoluble forms into easily assimilable forms. The preparation restores soil fertility, increases the humus content, and improves the soil microflora. It is applied to the soil before sowing seeds on plowed land and incorporated into the soil to a depth of 8–10 cm. Application is recommended during the cool hours of the morning and evening. Its safety classification is considered low-toxicity.

Result and Discussion

In the experiments, *Tevevit Boms* was applied before sowing, and the effect on the technological quality indicators of raw cotton grown without mineral fertilizers and chemical pesticides was studied. Samples harvested in 2020–2021 were analyzed using the HVI Spinlab device to determine the key fiber quality indicators, including fiber length, micronaire, specific breaking strength, lint yield, and the weight of 1000 seeds.

According to the obtained data, fiber length in the control treatment was 1.10 inches, while under the background of mineral fertilizers with *Tevevit Boms* applied at 600 kg/ha, it reached 1.12 inches. In the treatments where *Tevevit Boms* was applied without mineral fertilizers at rates of 300–1000 kg/ha, fiber length ranged from 1.10 to 1.14 inches.

The analysis of samples from the experimental treatments showed that one of the most important indicators, fiber micronaire, was between 4.0–4.3, confirming that high-quality fiber was obtained in all treatments. Fiber uniformity in length was 84.6% in the control, while in treatments with *Tevevit Boms* at 600–1000 kg/ha, it ranged from 85.5% to 87.1%. Fiber specific breaking strength was 31.6 g/tex in the control, compared to 31.7–32.6 g/tex in treatments with *Tevevit Boms*. Lint yield in the control treatment was 40.0%, whereas with *Tevevit Boms* applied at 300–1000 kg/ha, it increased to 41.3–41.6% (Table 1).

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Table 1. Effect of *Tevevit Boms* preparation on technological fiber quality indicators and weight of 1000 seeds in cotton (variety Andijan-37), average for 2020–2021

№	Experimental treatments	Application rate of *Tevevit Boms*, kg/ha	Fiber length, inch	Micronaire	Fiber uniformity, %	Specific breaking strength, g/tex	Lint yield, %	1000-seed weight, g
1	Control (NPK)	–	1.10	4.1	84.6	31.6	40.0	98.0
2	*Tevevit Boms* + NPK	600	1.12	4.0	83.8	30.8	42.2	100.2
3	*Tevevit Boms*	300	1.10	4.3	85.5	31.7	41.6	99.4
4	*Tevevit Boms*	600	1.12	4.2	86.9	32.2	41.3	100.8
5	*Tevevit Boms*	1000	1.14	4.1	87.1	32.6	41.3	99.4

In general, when cotton was cultivated without mineral fertilizers and treated with the *Tevevit Boms* microbiological preparation, not only was a higher yield obtained, but fiber quality also improved. Fiber length increased by 0.02–0.04 inches, micronaire values, specific breaking strength by 0.6–1.0 g/tex, and lint yield by 1.3–1.6% compared to the control, resulting in the production of higher-quality cotton fiber.

Additionally, the weight of 1000 seeds was measured. In the control treatment, it was 98.0 g, whereas in the treatment with *Tevevit Boms* 600 kg/ha under mineral fertilizer background it was 100.2 g. Without mineral fertilizers, at rates of 300, 600, and 1000 kg/ha, seed weight was 99.4 g, 100.8 g, and 99.4 g, respectively. This shows an increase of 1.4–2.8 g compared to the control.

Thus, when *Tevevit Boms* was applied at rates of 300–1000 kg/ha without mineral fertilizers, not only did fiber quality improve, but the weight of 1000 seeds also increased by 1.4–2.8 g compared to the control.

In the experiment, the effect of *Tevevit Boms* on seed oil content in cotton cultivated without mineral fertilizers was also studied. According to the results, seed oil content across the treatments ranged from 14–15% (Table 2).

Table 2. Effect of *Tevevit Boms* microbiological preparation on seed oil content of cotton (variety Andijan-37), 2019–2021

№	Experimental treatments	Application rate of *Tevevit Boms*, kg/ha	Seed oil content, % (2019)	Difference from control	Seed oil content, % (2020)	Difference from control	Seed oil content, % (2021)	Difference from control
1	Control (N-200, P-140, K-100 kg/ha)	–	15.51	–	15.05	–	15.09	–
2	*Tevevit Boms* + NPK	600	14.90	-0.61	15.06	+0.01	15.11	+0.02
3	*Tevevit Boms*	300	15.02	-0.49	14.67	-0.39	15.02	-0.07
4	*Tevevit Boms*	600	15.08	-0.43	14.42	-0.63	16.20	+1.11
5	*Tevevit Boms*	1000	14.71	-0.80	15.57	+0.52	15.20	+0.11

In the 2019 and 2020 experiments, seed oil content in the treatments with *Tevevit Boms* applied without mineral fertilizers was 0.43–0.80% and 0.39–0.63% lower than the control, respectively. However, in 2021, oil content in the same treatments increased by 0.11–1.11% compared to the control. In the control treatment, seed oil content was 15.09%, while in the treatment with *Tevevit Boms* 600 kg/ha under mineral fertilizers it was 15.11%. Without mineral fertilizers, *Tevevit Boms* applied at 300, 600, and 1000 kg/ha resulted in seed oil content of 15.02%, 16.20%, and 15.20%, respectively. This outcome can be explained by the fact that the application of *Tevevit Boms* without mineral fertilizers improved soil microflora and increased the number of beneficial microorganisms, thereby creating favorable conditions for plant growth, development, and yield formation.

Conclusion

Under the conditions of typical gray soils of the Tashkent region, in order to produce environmentally friendly raw cotton, when the *Tevevit Boms* microbiological preparation was applied to the soil before sowing cotton seeds at rates of 300–1000 kg/ha without the use of mineral fertilizers and pesticides, cotton growth and development accelerated. Fiber length increased by 0.02–0.04 inches, specific breaking strength by 0.6–1.0 g/tex, lint yield by 1.3–1.6%, 1000-seed weight by 1.4–2.8 g, and seed oil content by 0.11–1.11% compared to the control, resulting in the production of high-quality organic cotton.

References

1. Methods of Conducting Field Experiments. UzPITI, Tashkent, 2007, 147 p.
2. Dospekhov, B.A. *Methodology of Field Experiments.* 5th ed., revised and supplemented. Moscow: Agropromizdat, 1985, pp. 248–256.
3. Abdualimov, S., Rakhimova, D. Efficiency of growing cotton with physiological active substance without application of mineral fertilizers in the case of Uzbekistan. *E3S Web of Conferences,* 244, 02021 (2021). EMMFT-2020. https://doi.org/10.1051/e3sconf/202124402021.
4. Abdualimov, Sh.X., Sulaymonova, Sh.N. Effect of Lebazol cytmulatorine on cotton dressing. *British Journal of Global Ecology and Sustainable Development,* Vol. 10, Nov. 2022. ISSN (E): 2754-9291. pp. 94–97.
5. Khaitov, B., Abdualimov, Sh., Allanov, Kh. et al. The efficiency of silicious nano nutrition on cotton productivity in arid regions. *Frontiers in Sustainable Food Systems.* Original Research, published 23 August 2024. DOI: 10.3389/fsufs.2024.1362369, pp. 01–08.
6. Abdullaev, F., Abdualimov, Sh., Karimov, Sh. Scientific basis of use of humin-based stimulants in cotton. *BIO Web of Conferences* 78, 05006 (2023), MTSITVW 2023. https://doi.org/10.1051/bioconf/20237805006.
7. Karimov, Sh., Abdualimov, Sh., Karabaev, I. The effect of the application of Biodux stimulator in growing high and quality cotton from cotton. *BIO Web of Conferences* 78, 02010 (2023), MTSITVW 2023. https://doi.org/10.1051/bioconf/20237802010.
8. Shamsitdinov, F.R. Studying the effect of foreign stimulators on winter wheat production. In: *Scientific foundations and prospects of applying modern innovative technologies in the*

cultivation of new varieties of cereals and legumes. Proceedings of the Republican Scientific-Practical Conference, 12 May 2023, Andijan, pp. 543–548.

9. Sulaymonov, B.A., Boltaev, B.S., Abdualimov, Sh.X. *Application of stimulants in cotton growing and integrated methods of protecting cotton from harmful organisms.* Tashkent, 2015, 22 p.
10. Karimov, Sh.A., Abdualimov, Sh.Kh., Ulugov, Ch.Kh. Effect of Zamin-M biologically active substance on seed germination. *International Journal of Multidisciplinary Research and Analysis.* ISSN [Online]: 2643-9875 | ISSN [Print]: 2643-9840, Vol. 3, Issue 09, September 2020. DOI: 10.47191/ijmra/v3-i9-02. Impact Factor: 5.522, pp. 87–89.
11. Nurmatov, Sh., Nazarov, R., Alimuhammedov, S. et al. *Factors for obtaining high cotton yields under the conditions of Kashkadarya region.* Recommendation. Karshi, 2001, 11 p.
12. Ashirbekov, M.J. *Technology of Growing Cotton and Associated Crops.* UzPITI, Tashkent, 1994, pp. 71–72.
13. Ochilova, E. Effect of cotton cultivation without mineral fertilizers on plant dry mass. In: *Innovative Development of Cotton Growing: Theoretical and Practical Principles.* Proceedings of the International Scientific-Practical Conference dedicated to World Cotton Day, 7 October 2022, Tashkent, pp. 106–107.