

# **Effect of Biostimulants and Microfertilizers on Growth, Yield Components, and Seed Productivity of Sunflower (*Helianthus annuus* L.) under Irrigated Soil Conditions**

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**Annotation:** biostimulants, microfertilizers and growth substances contained in the immunostimulant have been found to have a positive effect on the growth, development and formation of seeds in the basket of sunflower of the local Dilbar variety, on the weight of 1000 seeds and on the yield. The use of MERS microfertilizer made it possible to increase the productivity of one plant by 362.9-430.4 grams, the use of Fitovak immunostimulant by 288.1-388.0 grams, and the use of Biodux biostimulant by 107.7-287.7 grams.

**Keywords:** sunflower, biostimulant, standard, immunostimulant, microfertilizer, norm, yield, growth, development.

**Introduction.** Sunflower (*Helianthus annuus* L.) is one of the most important oilseed crops, and its productivity largely depends on soil fertility and the efficiency of applied agrotechnical practices. In regions characterized by irrigated but eroded soils with low organic matter content, plant growth and yield formation are often constrained by insufficient nutrient availability and weakened physiological activity of crops. Under such conditions, the use of biofertilizers, microfertilizers, and biostimulants is considered a promising approach to improve plant development and stabilize yield.

**Materials and methods.** As a repeated crop, field experiments were conducted at the Thin Fiber Cotton Research Institute. The experimental field is an irrigated grassland barren soil with a reddish color barren soil that has undergone severe erosion. Soil total nitrogen is 0.4%, phosphorus is 0.6%, potassium is up to

1.5-2%, mobile phosphorus is 15-20 mg/kg, mobile nitrogen is 3-5 mg/kg, mobile potassium is 150-200 mg. /kg around. The amount of biohumus in the soil of the studied experimental area is 0.5-0.6% in the layers and decreases towards the lower layers. Methods of conducting field experiments (UzPITI 2007y), "Metodika polevogo opyta" (B. Dospekhov, 1985y) were used in the research. Field experiments were systematically arranged as simple, 4 replicates, 8 variants. The area of the field unit taken into account is 24 m<sup>2</sup> in each option. The number of counted plants is 20. In the experiment, seeds of the Dilbar variety of sunflower were treated with "UZGUMI" biofertilizer 0.6 l/t, Fitovak 200 ml/t, Bioduks 2.0 ml/t and MERS 0.1% - 3.0 ml/t, then 7-8 leaves in the formation phase, biofertilizer "UZGUMI" was used at the rate of 0.4 l/ha, Fitovak immunostimulator 300 ml/ha, Biodux 2.0 ml/ha, and MERS 0.1% - 0.5 l/ha.

**Research results.** Several doses of microfertilizers and biostimulants were applied to the Dilbar variety of sunflower, and the effects on field germination of seeds, the transition of sunflower phases, the height of the plant, the number of leaves, the size of baskets, the number and weight of seeds were studied.

One basket develops in oilseed sunflower, in the experiment, the formed complete seeds in one basket were counted in the experimental plants and the following were found. In the control variant, the total number of complete seeds in one basket was 956.6 units. It was determined that UzGUMI produced 298.0 more seeds on average compared to the control. The variant using MERS microfertilizer at 2.0 ml/t yielded an average of 1387.0 seeds from one basket, and it was distinguished by the production of more seeds than all the variants studied in the experiment. The use of biostimulants, especially MERS microfertilizer and Fitovak immunostimulant (1344.6 units), was found to have a positive effect on the increase in the number of seeds in the basket. The amount of seeds in one basket was 430.4 more than the control, and 132.4 more than the UzGUMI standard in the case of MERS

microfertilizer 2.0 ml/t. Among the options that used biostimulants, the option that formed the least seeds was observed in the option that used Biodux biostimulant at the rate of 1.0 ml/t (1064.3 units). In this variant, compared to the control, 107.7 seeds were formed and UzGUMI formed 190.3.7 seeds less than the standard.

	Consumption rate ml,l/t (factor V)	Productivity of one plant, gram	1000 seed weight, grams
Sample	-	94,8	87.9
UZGUMI (benchmark)	0,6l/t	112,9	97.5
Microbiofertilizer MERS	2,0 l/t	144,2	107,5
	3,0 l/t	140,9	95,6
	4,0 l/t	124,9	89,4
Biostimulant Biodux	1,0 ml/t	119,6	106,3
	2,0 ml/t	119,0	104,6
	3,0 ml/t	131,0	93,8
Иммуностимулятор Фитовак	200 ml/t	143,6	99,6
	300 ml/t	126,0	100,5
	400 ml/t	126,0	91,3

**Table 1. The effect of biostimulants on the productivity of one plant and the weight of 1000 seeds.**

It was found that the productivity of one plant was positively affected by the use of biostimulants in different rates, especially when MERS microfertilizer was used from biostimulants, a high yield was achieved. This microfertilizer is applied at the rate of 2.0 ml/ton of seed and 144.2 grams, 3.0 ml/t during the growing season. 140.9 grams and 4.0 ml/t when used. 124.9 grams were obtained when used. This means an additional yield of 49.4, 46.1 and 30.1 grams per plant, respectively, compared to the control. 31.3, 28.0 and 12.0 grams of additional yield was obtained in comparison with UzGUMI standard.

**Discussion.** It was found that the growth substances contained in various biostimulants have a positive effect on the growth, development and yield of the local sunflower variety Dilbar.

It led to an increase in the number of seeds in one basket, and the application of microfertilizer, immunostimulator and biostimulants depending on the type had a positive effect on the increase in the number of seeds in the basket, compared to the control, the number of seeds in one basket increased from 42.4 to 107.7, and these seeds were distinguished by the formation of more seeds and the fact that these seeds were large and whole. stood up Based on this, it was proved that the weight of 1000 seeds is higher than 100.5-107.5 grams.

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