



The Effect of the Immunostimulatory "Fitovak" on the Growth and Development of the Root System of Mung Bean

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ABSTRACT

This article examines the effect of the immunostimulator "Fitovak" on mung bean root system. Three different standards of the immunostimulator "Fitovak" were obtained. From here, the development and formation of the root system was observed on the variant of applying 500 ml/t before pre-sowing and 500 ml/ha using different periods (2–4 true leaves, shading, flowering).

Keywords:

"Fitovak", immunostimulator, mung bean, root system, 2–4 true leaves, shading, flowering

Currently, one of the main tasks of the agricultural industry is to provide food to the progressively growing population of the globe. For this reason, various types of corn, mung bean, soybeans, rice, millet, fodder crops, potatoes, etc. are sown annually in fields exempt from corn and grain crops. In order to improve the morphophysiological processes of such crops [1] and increase their yield [2] [3], stimulants and immunostimulants are used.

Mung bean grain contains 24-28% protein, 8% lysine, 7% arginine, amino acids, B vitamins, PP, macro- and microelements such as magnesium, calcium, sulfur, sodium, iron, manganese, copper, boron, nickel and iodine. [4]. It was also found that mung bean contains an average of 15% protein [5].

A characteristic feature of the mung bean plant is that even when growing this plant in any soil conditions, nodule bacteria naturally form in its roots, absorbing free nitrogen from the air.

In our study, the effect of the immunostimulator Phytovac in different doses on the formation and development of the root system of moss plants was studied. The

research was carried out in the farm "Jamila Aya" of the Peshko district. Therefore, phenological observations were carried out at the beginning of each month [6].

During the studies, three different doses of the immunostimulator "Fitovak" (200 ml /t, 300 ml / t; 500 ml / t) before sowing and during the growing season (2–4 true leaves, shading, flowering) 200 ml/ha, 300 ml/ha, processed by the automax machine with norms of 500 ml/ha. At the same time, the control variant was treated with water, and the experimental ones were treated with an immunostimulator Fitovak. The experimental system was carried out in four variants (Table 1).

Table 1
Research experiment system

No	Variants	Pre-sowing	2-4 true leaves	Shading	Flowering
1	Control	Water	Water	Water	water
2	Fitovak 200 ml/t; ml/g	200 ml/t	200 ml/ha	200 ml/ha	200 ml/ha
3	Fitovak 300 ml/t; ml/g	300 ml/t	300 ml/ha	300 ml/ha	300 ml/ha
4	Fitovak 500 ml/t; ml/ha	500 ml/t	500 ml/ha	500 ml/ha	500 ml/ha

According to the results of the research, it was found that mung bean of the Joy variety, whose seeds were treated with the immunostimulator Fitovak and seeds, the formation and development of hypocotyl and epicotyl occurs earlier than in the control variant.

Table 2

The effect of the immunostimulator Fitovak on the growth and development of the root system of mung bean

No	Variants	Root system length (cm)			
		2-4 true leaves	Shading	Flowering	Ripening
1	control	9.4	22,6	42,6	62,6
2	Fitovak 200 ml/t; ml/ha	9.8	32,6	52,5	72,5
3	Fitovak	11.5	38,5	58,4	78,8

	300 ml/t; ml/ha				
4	Fitovak 500 ml/t; ml/ha	15,8	45,6	65,6	87,8

When analyzing the length of the main and lateral roots in the hypocotyl formed from the embryo, it was found by the variants that there is a difference between them. The most positive result was observed on 2-3 variants. Also, when the analyses were carried out during the 4-year period of the mung bean plant, in variants 1-2-3-4, the length of the root system was 9.4 cm, 9.8 cm, 11.5 cm and 15.8 cm, respectively. The most positive result in the 4-leaf sowing period of mung bean was observed on the variants of applying 300 ml/t and 500 ml/t before sowing Phytovac seeds and 300 ml/ha and 500 ml/ha during the growing season (4 leaves) and compared with the control variant were longer by 2.1 cm and 6.4 cm.

When analyzing the root system of mung bean during the budding period, it was found that in the control variant it is 22.6 cm, in the second - 32.6 cm, in the third - 38.5 cm, in the fourth - 48.6 cm. The highest results were noted in variants 3-4, and it was determined that they were 15.9 cm higher than the control variant by 26.0 cm. As a result, it was noted that the development of the root system was better in variants 3-4 compared to the other variants, and it was found that these variants were 15.9 cm, which is 26.0 cm more than the control variant. Also, when analyzing the root system during the flowering period, it was found that the length of the root system was 42.6 cm, 52.5 cm, 58.4 cm and 65.6 cm according to the experimental system. As a result, it was found that the root length was 9.9 cm, 15.8 and 23.0 cm longer in 2-3-4 variants compared to the control variant.

When determining the development of the root system of the braga variety Joy over the last growing season, the most positive result among the variants was noted on the

fourth variant, which was 83.8 cm, and in experiments it was found that it was 25.2 cm. cm larger than the control variant.

In conclusion, the study applied various norms (200 ml/t, ml/ha; 300 ml/ t, ml/ha; 500 ml/t, ml/ha) of the immunostimulator Phytovac to the root system of moshi (*Phaseolus aureus*) analyzed the effect of the plant on growth and development. Among the variants, the most positive result was observed in the fourth variant, where 500 ml /ha of Phytovac solution was used before planting mung bean seeds and 500 ml/ha during the growing season (4 leaves, tillering, flowering). be more than 25.2 cm .

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