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INCREASING THE PRODUCTIVITY AND QUALITY OF VEGETABLE SOYBEANS IN USING VARIOUS GROWTH STIMULANTS IN UZBEKISTAN

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ABSTRACT
For the developing of physiologically active substances, necessary to treat the seeds with humates, plant growth regulators that have a positive effect on the yield and quality of vegetable soybean seeds. They increase the adaptability of the culture to water, temperature and other stressful conditions.
Studies have established that the lock of seeds of vegetable soybean variety Emerald in various growth stimulants significantly influenced the germination of seeds, growth and development, productivity and biochemical composition of beans. Options "B" - "C" and "D" - are the most effective in comparison with the control option "A" -seed locks in water and contributes to higher yields and high-quality beans.

KEYWORDS: vegetable soybeans, “Izumrud” (Emerald) variety, growth stimulants, yield, biochemical composition of beans.

INTRODUCTION
During pre-sowing seed treatment, the most effective method of protecting plants from soil pathogens and pests is seed dressing with an insecticidal and fungicidal dressing agent. It should be noted that during the pre-sowing treatment of seeds, especially with disinfectants, it is necessary to preserve their germination energy and germination capacity, since the drug applied to the surface of the seed toxicizes the pericarp, then the awakened embryo, and then the plant. And since a young plant does not always have time to develop physiologically active substances necessary for normal growth and development, it is necessary to treat the seeds with humates [8].
To ensuring high field germination of seeds, resistance of plants against unfavorable living conditions, accelerate ripening and increase productivity, the seeds are prepared before sowing: calibrated, dried, heated, hardened, soaked in water, in chemicals and coated [3, 6].
According to numerous literature data, growth regulators mobilize the immune system of the plant, stimulate the development of a powerful root system, and increase the absorption of nutrients by plants, which ultimately leads to an increase in yield and an increase in the quality of soybeans. It has already been proven that humic preparations stimulate the activity of all types of microorganisms. Thus, the pre-sowing treatment of soybean seeds helps to increase the germination and viability of the seed [1, 7].
Therefore, a prerequisite for increasing the efficiency of soybean cultivation is the inclusion of humic preparations in the protection system of this crop. It is especially important to emphasize the positive effect of humic substances and plant growth stimulants under unfavorable environmental conditions: low and high temperatures, lack of moisture, salinity, accumulation of toxic chemicals and the presence of radionuclides. They change the permeability of cell membranes, increase the activity of enzymes, and stimulate the processes of respiration, synthesis of proteins and carbohydrates. They increase the content of chlorophyll and the productivity of photosynthesis, which in turn creates the prerequisites for obtaining high quality products [2].

RESEARCH RESULTS
We conducted research (2020) to study the effect of various growth stimulants for obtaining friendly shoots in vegetable soybeans of the Emerald variety. Growth stimulants have a positive effect on the yield and quality of vegetable soybean seeds. They increase the adaptability of the culture to water, temperature and other

stressful conditions. Maximum efficiency is achieved by a combination of seed treatment and foliar dressing, with a step-by-step stimulation of the treated seeds and plants with biologically active substances of the preparations [4, 5].

In this experiment, we compared various growth stimulants that affect the harmony of seedlings of vegetable soybeans, further growth and development of plants, yield and product quality in order to recommend the production of scientifically based methods of obtaining friendly seedlings and a high-quality harvest of vegetable soy.

The seeds of vegetable soybeans of the "Izumrud" (Emerald) variety were clipped in the following variants:

Option A. Soak the seeds in water for 12 hours (control);

Option B. Soak the seeds in a sodium humate solution for 12 hours;

Option C. Locking the seeds in a solution of succinic acid for 12 hours;

Option D. Soak the seeds in a gibberellin solution for 12 hours;

In our experiments, we used seeds of category 1 with a mass of 1000 pcs. Seeds equal to 680 g.

Since the main indicator of seed quality is germination, we studied the laboratory and field germination of vegetable soybean variety "Izumrud" (Emerald) (Fig. 1). Laboratory seed germination was high and in all variants was 98%.

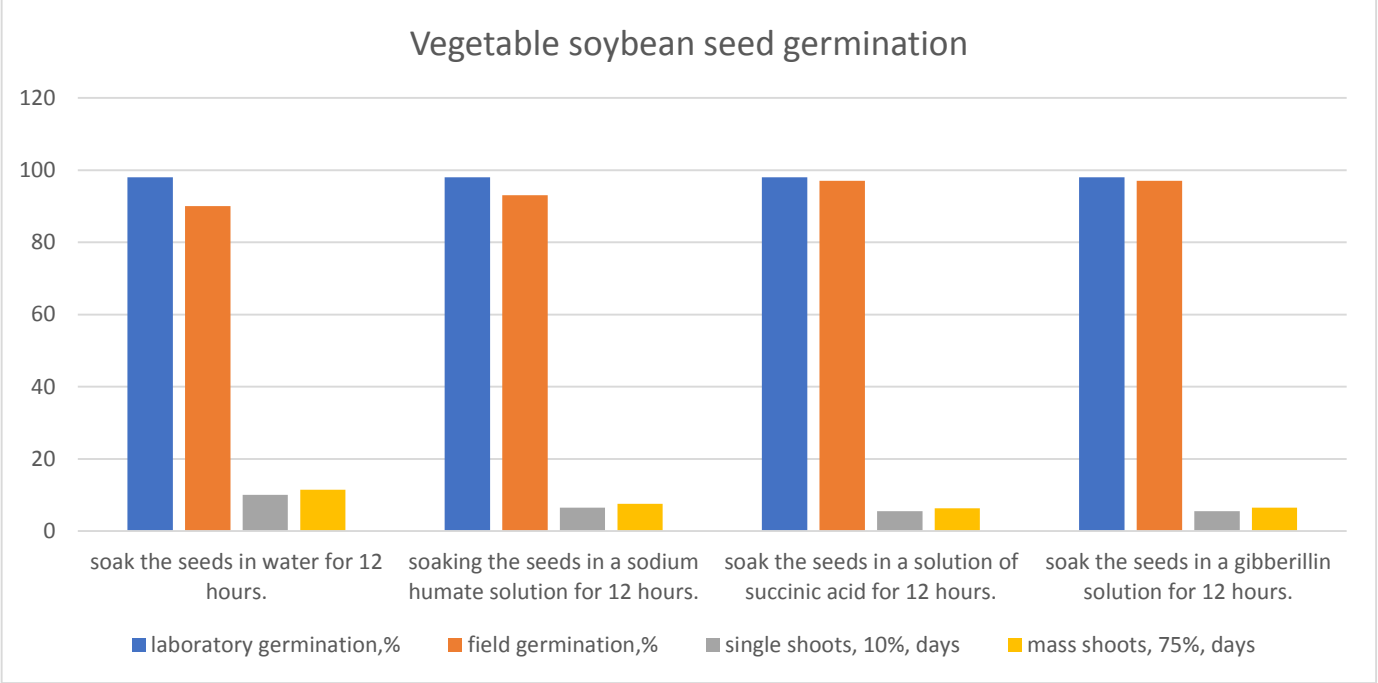

Fig 1. Influence of various growth stimulants on the germination of seeds of vegetable soybean variety "Izumrud" (Emerald)

Figure 1 indicates that the studied vegetable soybean variety Emerald had seeds with high germination energy and high germination capacity. The sowing quality of the seeds corresponded to the first category, the first year of storage. The best indicators of field germination -96% were noted in option "C" when seeds were soaked in succinic acid for 12 hours. In the control variant, the field germination rate was the lowest -90%. At the same time, the highest field germination was observed in option "D" with a lock in gibberellin for 12 hours 97%.

Observations of interphase periods showed that earlier emergence of seedlings was noted in variants "C" and "D" - on 6.3 and 6.5 days from mass seedlings. Later emergence of seedlings was noted in the control option "A" - on day 11.4, in option "B" - on day 7.5. During the period "shoots - the formation of the first leaf", variant "C" stood out, in which shoots appeared on 5.0 days, and when sown with seeds soaked in water - on 6.6 days. During the period "shoots - flowering" - the best option was "C" - at 31.6 days, and the worst option "A" - at 34.3 days. In the period "seedling - setting the beans", respectively, the best option was "C" and "D" - at 41.6 days and 42.6 days, respectively.

A later setting of beans was observed when sowing seeds in water - on day 45, and when seeds were soaked in sodium humate - on days 43.3. The same pattern was observed with technical ripeness (green beans),

respectively, the best option was "C" and "D" - at 70.1 days, and the worst sowing "A" - at 76.6 days from mass shoots.

An important indicator characterizing the variety is the growth of the vegetative organs of plants and, first of all, the height of the plant stem. Biometric measurements of vegetable soybean plants sown with seeds pre-locked in growth stimulants showed that the plants differed markedly in height.

Vegetable soybean plants of the “Izumrud” (Emerald) variety, sown with seeds soaked in gibberellin, differed in the highest height on days 30, 60 and 90 from mass seedlings, respectively: 22.3 cm; 35.3 cm and 52.6 cm. A slightly smaller plant growth was noted when the seeds were soaked in a solution of succinic acid, respectively: on the 30th day - 22.1 cm; on day 60 - 34.3 cm and day 90 - 51.1 cm. The smallest plant growth was noted when sowing a seed lock in water (control), where the stem growth indices were equal: 18.1 cm, 29.9 cm and 44 , 3 cm. When the seeds were soaked in sodium humate, the plant height was average and amounted to 19.3 cm on day 30; on day 60 - 31.6 cm and day 90 - 46.6 cm.

Various growth stimulants had a definite effect on the change in the diameter of the stem of vegetable soybean plants. So, the largest diameter of the stem was noted in options "C" and "D", respectively: on day 30 - 0.5 cm; on day 60 - 0.8 cm and on day 90 - 1.0 cm. The smallest stem diameter was noted in the control variant "A" - by 0.4 cm, 0.6 cm and 0.8 cm, then in the variant “B ", respectively: 0.4 cm, 0.7 cm and 0.9 cm.

Observations have shown that the best conditions for the growth and development of soybeans

Vegetable varieties “Izumrud” (Emerald) were used when sowing seeds soaked in gibberellin. These plants had an increase in the number of leaves: on day 30 - 13 pieces, on day 60 - 33.3 pieces. And on day 90 from mass shoots - 42.6 pcs. Slightly fewer leaves were formed in the variant with the seed lock in succinic acid: on day 30 - 13 pieces, on day 60 - 32.3 pieces. And on day 90 - 41.6 pcs. Then in option "B" - 12; 30 and 39 leaves. The smallest number of leaves was in the control variant "A" - 12, 29 and 38 leaves per plant.

The greatest number of beans on 60 and 90 days from mass shoots was noted in option "D", respectively, 28.1 and 44.6 pcs / plant. Slightly less quantity was noted in the variant "C" -26.6 and 43.4 pcs / plant, as well as in the variant B -24 and 40.1 pcs / plant. The smallest number of them was noted on the control option "A", respectively, 22 and 38.3 pcs / plant.

The same pattern was obtained for the size of the bean. The largest bean size on the 90th day from mass shoots was in options "C" and "D", where the pod length was 4.2 cm, the pod width was 1.3 cm, and the smallest bean was in the control option "A" and variant "B", where the pod length was 3.7–3.9 cm, and the width was 1.0–1.2 cm, respectively.

This indicates that different growth stimulants contribute to the formation of different numbers of beans, which determines the productivity of plants.

The final and defining indicator in evaluating various methods of pre-sowing preparation of vegetable soybean seeds is yield (Fig. 2.).

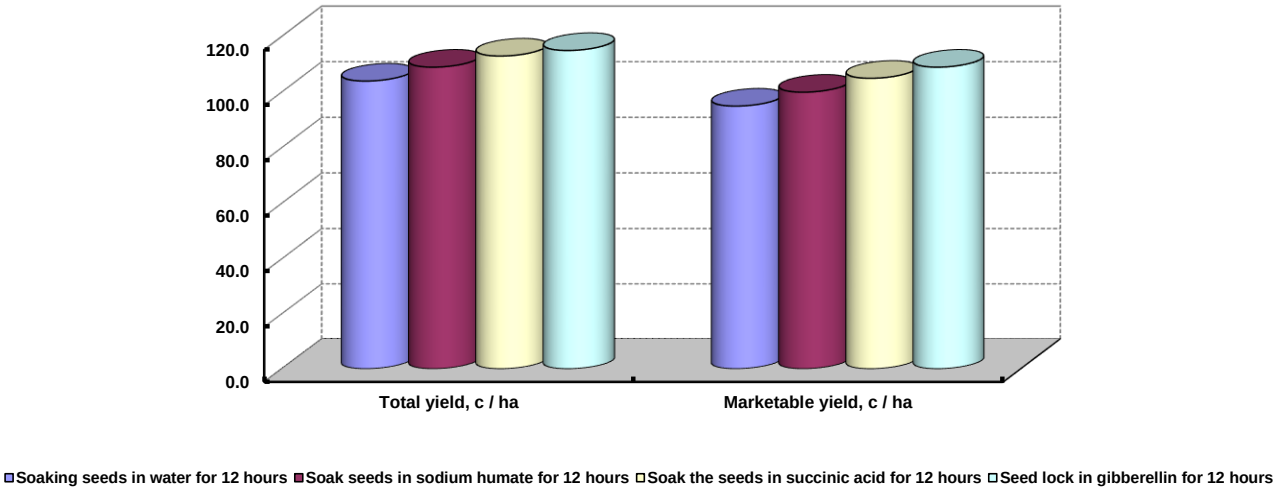

Fig. 2. The total and marketable yield of vegetable soybeans of the “Izumrud” (Emerald) variety

The data shown in Fig. 2. show that the highest total yield was obtained when sowing seeds of option "D" - 115.0 c/ha (111.0% to control), slightly less - in option "C" - 113.0 c/ha (109, 0% to the control), then in the variant "B", the seed locks in water - 109.0 c/ha (105.0% to the control) The smallest total yield was noted in the control option "A" -104.0 c/ha.

The highest marketable yield was noted in the following variants: "D" - 109.0 c/ha (114% to control); "C" - 105.0 c/ha (111% to control); "B" - 100.0 c/ha (105% to control). The smallest marketable yield was in the control variant "A" - 95.0 c/ha (Fig. 3).

Average statistical data on the marketable crop showed that the difference between the options and did not exceed NSR05-1.4 and was significant. The coefficient of variation of the marketable crop was low (V = 6.0-9.0%).We found that according to the marketable yield (105.0 and 109.0 c/ha), the number of beans per plant (47 and 49 pcs.), The number of seeds in beans per plant (113 and 118 pcs.), The absolute mass of beans (710-715), the best options were "C" and "D". In the control variant "A" the number of beans on one plant was 41 pieces, the number of seeds in beans was 96 pieces / plant, and the weight was 1000 pieces. Beans were 685 g.

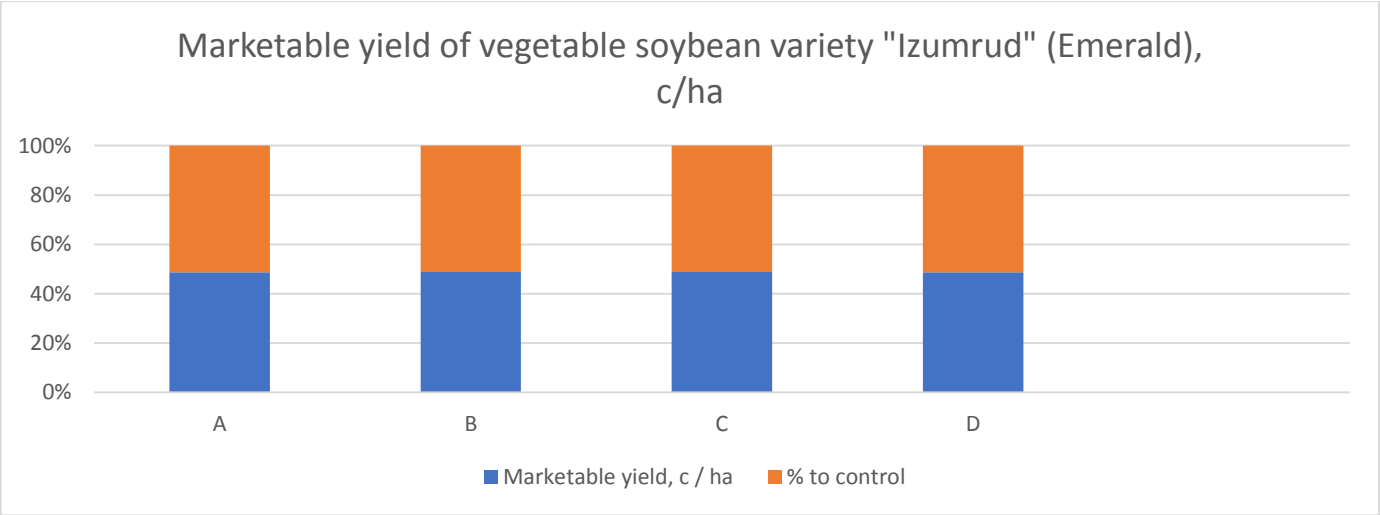

Fig. 3. Marketable yield of vegetable soybeans of the “Izumrud” Emerald variety, depending on various growth stimulants

As shown by biochemical analyzes, depending on the seed locks in various growth stimulants in the vegetable soybeans of the Emerald variety, the protein content varied from 42.3 to 44.3%, fat 19.1-19.5%, total sugars -4.8- 5.0%, vitamin C - 125-130 mg /%, starch - 2.6-2.9%, nitrate nitrogen - 90-91 mg/kg, which is significantly lower than the MPC (200 mg/kg) (Fig. 4).

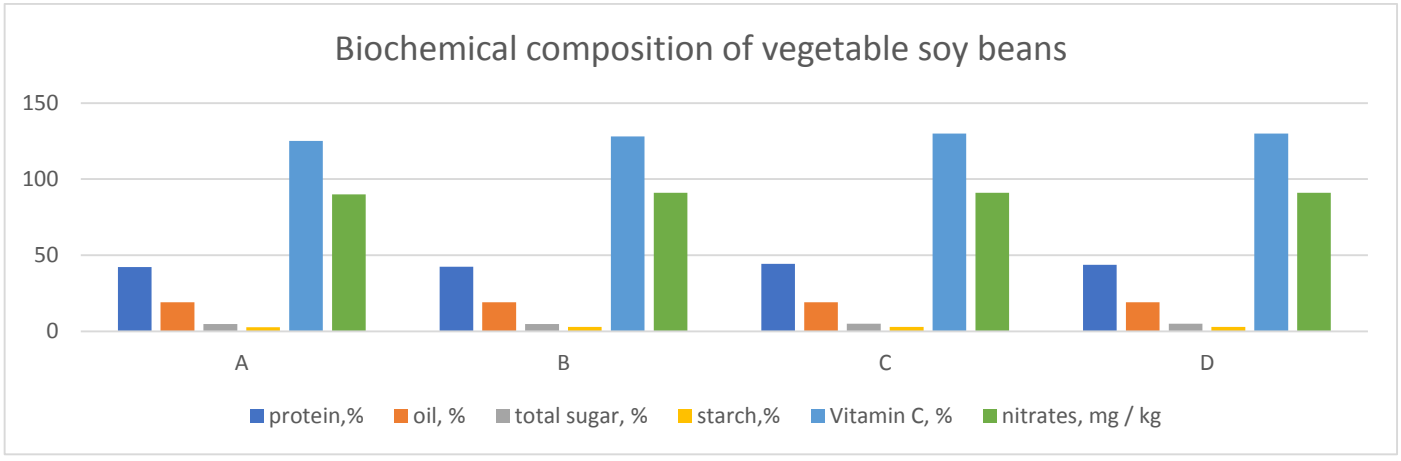

Fig 4. Biochemical composition of vegetable soybean beans of the “Izumrud” Emerald variety (green beans), depending on various growth stimulants

It was revealed that, depending on the locks in various growth stimulants in vegetable soybeans, the content of protein, fat, total sugar, vitamin C, starch and nitrates was different.

So, when sowing seeds of variant "D" and "C" in soybeans, there was a higher content of elements: protein - 44.7-44.3%; oils - 19.1-19.4%; total sugar - 5.0%; vitamin C - 130 mg /% and starch - 2.9%, nitrates - 91 mg/kg. A lower content of nutrients was observed when the seeds were soaked in water, respectively: protein - 42.3%; fat - 19.1%; sugar - 4.8%; vitamin C - 125 mg /%; starch - 2.9% and nitrates - 91 mg / c. Vegetable soybeans grown from seeds soaked in sodium humate differed slightly in the accumulation of nutrients: protein -42.4%; fat - 19.1%; sugar - 4.8%; vitamin C - 128 mg /%; starch -2.8% and nitrates - 91 mg/kg.

CONCLUSION

1) The lock of seeds of vegetable soybean variety “Izumrud” (Emerald) in various growth stimulants had a significant effect on the height of plants and the diameter of the stem at the base. Thus, plants in variant "D" were more powerful in development on days 30, 60 and 90 from mass shoots and they had a height of 22.3 cm, respectively; 35.2 cm and 52.6 cm; and the diameter is 0.5 cm; 0.8 cm and 1.0 cm. Plants in variant "C" were similar in these parameters - 22.1 cm; 34.3 cm and 51.1 cm, and they had the same stem diameter at the base.
2) By the number of beans on average per plant, variants "D" was also distinguished - 28.1 and 44.6 pcs., then "C" - 26.6 and 43.4 pcs. Fewer pods were noted in variant "B" - 24 and 40.1 pcs. And the smallest number of them was noted in variant "A" - 22 and 38.3 pcs.
3) In terms of productivity, marketable yield, options "D" stood out - 109.0 c/ha, then option "C" - 105.0 c/ha. A slightly lower yield was obtained in the variant "B" - 100.0 c/ha, and the lowest yield was obtained in the control variant "A" - 95.0 c/ha.
4) According to the content of nutrients (protein, fat, total sugar, vitamin C, starch) in vegetable soybeans, variants "C" and "D" were distinguished. These indicators were, respectively: protein - 44.3% and 43.7%, oils - 19.4% and 19.5%, total sugar - 5.0% and 5.0%, vitamin C - 128 mg /% and 130mg%, starch - 2.9% and 2.8%. The smallest content of nutrients in soybeans was noted in the control option "A", respectively 42.3%; 19.1%; 4.8%; 125 mg /% and 2.6%.

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