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PROSPECTS FOR THE USE OF STIMULATOR BIOLOGICAL PREPARATIONS IN TOMATO PRODUCTION IN THE CONDITIONS OF THE REPUBLIC OF KARAKALPAKSTAN

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ANNOTATION

The article presents information on determining the effectiveness of the use of local biological preparations based on local resobacteria in the production of tomato in the degraded soils of the Republic of Karakalpakstan. According to the results of the study, preparation increased the weight of the fruit of TMK-22 variety of tomatoes by an average of 9.3 grams compared to the standard, and the Volgograd 5/95 variety - by 19.8 grams.

KEYWORDS: *complex biological preparations, rhizobacteria, osmoprotector, tomato, substrate carrier, salinity, soil degradation, marketability, productivity*

INTRODUCTION

In the world agricultural practice, the use of complex biological preparations has been proven to increase the yield of vegetable crops, have an effective influence in the prevention of plant diseases, especially fusarium wilt, and is one of the most ecological free and cost-effective means.

On April 12, 2016, the President of the Republic of Uzbekistan adopted Resolution No. PQ-2520 "On improving the system of procurement and use of fruits, vegetables, potatoes and cucurbits crops." In this, the goal is to increase the production of fruits, vegetables and cucurbits crops every year, resulting the production of in a total of 84,900 tons of fruits, vegetables and cucurbits crops in order to increase exports.

The content of this decree is to meet the demand of processing enterprises and our people for potatoes and vegetables and prevent further indebtedness, improve the living conditions of farmers.

Soil salinity, which is one of the abiotic factors in the cultivation of edible fruits of the tomato plant, is causing great damage. For plants, the presence of more than 0.1% of salts in the soil or more than

0.25% of the dry residue in saline conditions is considered to be toxic [2].

One of the main problems in the soils of the Republic of Karakalpakstan is the production of tomato products resistant to such salts, mainly in the form of chloride-sulfate and sulfate-chloride salinity.

Vegetable crops in the open areas of the Republic of Karakalpakstan are 5060 ha (1420 ha of vegetables are tomatoes). The average yield of this crop is 2.1-2.6 times lower than the average in Uzbekistan.

At present, the scale of scientific and practical research aimed at obtaining high quality tomatoes from saline soils of the Republic of Karakalpakstan is not comprehensive.

The purpose of the research is to increase soil fertility and plant productivity using stimulator microbial preparations as a new innovative development for tomato growing technology in the saline soils of the Republic of Karakalpakstan.

THE OBJECT AND METHODS OF RESEARCH

The object of research was the tomato varieties TMK-22 and Volgograd 5/95 and the



microbial composition “Zamin-M”. Experiments were conducted on the basis of methodological recommendations of B.J. Azimov and B.B. Azimov's “Methods of conducting experiments in vegetable, melon and potato growing” (2002). B.J. Azimov and B.B. Azimov “Statistical analysis of experimental results” (2006). “Methods of field experiments in vegetable growing and horticulture” (1997) [3,4,5,6].

RESULTS OF THE RESEARCH AND THEIR DISCUSSION

It is known from the scientific literature that there are many mechanisms that help to stimulate metabolic processes in stress-tolerant plants and limit the effects of stress factors.

According to the literature, there is an increase in the amount of osmoprotectants in saline-resistant microorganisms, and on their basis developed technologies for the preparation of bacterial preparations in the dry state resistant to NaCl [7,8,9].

It should be noted that so far in the agricultural practice of the country monoculture of microorganisms has been used in the production of vegetable crops, and in the research it was planned to use complex cultures in the project and testing their effectiveness in the various saline soils of the Republic of Karakalpakstan.

On the basis of several years of screening, strains resistant to chloride and sulfate salinity (up to 200 mM) were selected from the cotton rhizosphere and identified as *Bacillus subtilis*, *Bacillus megaterium* and *Pseudomonas stutzeri* species and biotechnological basis was formed for making complex biological preparation “Zamin-M”. Local strains included in the biological preparation “Zamin-M” were found to show a high level of indole acetic acid (IAA) synthesis even under stress (pH -9). In particular, for *Pseudomonas stutzeri* SKB-308, *Bacillus subtilis* SKB-309 and *Bacillus megaterium* SKB-310 strains, the indicator was 19.4 ± 0.79 , respectively; 20.7 ± 1.01 ; 17.74 ± 0.85 $\mu\text{g/ml}$. According to the mass spectrometry analysis of the main stimulant phytohormone - indolyl acetic acid synthesis of the strains that make up the preparation, the release of *1-bromine-2-phthalimidetan* as an intermediate compound, which has a strong antagonistic activity based on the scientific literature. found to be a compound.

The patent for the invention of the Intellectual Property Agency of the Republic of Uzbekistan (IAP 0021 2014) was obtained for this drug, which consists of the Association of Microorganisms that increase the fertility of saline soils.

The preparation “Zamin-M” is included in the “List of pesticides and agrochemicals allowed for use in agriculture of the Republic of Uzbekistan for

2015-2019” by the State Chemical Commission of the Republic of Uzbekistan (Certificate of the State Chemical Commission of the Republic of Uzbekistan №1A1005; .115.11.155; 23.01.2015).

In order to study the effect of the microbial composition “Zamin-M” on tomato on saline soils of the Republic of Karakalpakstan, our field experiments were conducted at the experimental station of the Nukus branch of the Tashkent State Agrarian University in the Republic of Karakalpakstan.

The soils of the experimental plot are light-colored, mechanically composed of meadow alluvial soils. The cotton fields of the region consist of meadow and pasture soils, and the level of humus supply is 0.71-0.90%. The amount of toxic salts in the topsoil is 1.02 t/ha, and this area is included in the chloride and sulfate saline soils.

The study of growth and development of tomato plants treated with the microbiological composition “Zamin-M” showed that it is inextricably linked with soil climatic conditions, the amount of preparation used and methods of preparation of seed material for planting, as well as biological properties of tomatoes. It should be noted that as a result of experiments conducted at the facilities listed in the section of materials and research methods, it was observed that the variants treated with “Zamin-M” differed from the control variants with slightly higher growth and development rates (Table 1).

Under the influence of Zamin-M biological preparation, the stem length increased by 23 cm in TMK 22 variety, 14 cm in Volgograd 5/95 variety, the flowering period increased by 2-5% in TMK 22 variety and 2% in Volgograd 5/95 variety. The total yield was 47.1 t/ha in TMK-22 and 50 t/ha in Volgograd 5/95, which were 3.8 and 4.7 t/ha higher than the control, respectively.

One of its most important indicators in the cultivation of any plant is the yield of the product. As a result of the experiments, the control variants of TMK-22 yielded 37.7 t/ha and the yield increased by 3.8 t/ha under the influence of biological preparations, while the yield under the control of Nutritional variety was 39.2 t/ha. 43.9 t/ha and about 4.7 t/ha more than the control.

Based on the results of the study, it was found that there were significant differences in the weight of the fruit in tomato varieties TMK-22 and Volgograd 5/95, as well as in the experimental options for which the preparation was used and not used. In particular, under the influence of the preparation TMK-22, the weight of the fruit increased by an average of 9.3 grams, Volgograd 5/95 - by 19.8 grams. Also, variants treated with **Zamin-M** biological preparation differed sharply from untreated variants in terms of seedling growth



rate. It was observed that the plants treated with biological preparation were about 1.2-1.4 times

higher than the control and differed in the intensity of vegetative development.

Table 1.
Influence of biological preparations on TMK-22, Volgograd 5/95 varieties of tomato

Variant	Height of the plant, cm (average of 10 plants)	Flourishing period, in days		Total productivity, t/ha	Eatable productivity, t/ha	Weight of the fruit, gr.
		10%	75%			
TMK-22 (control)	62	47	59	43,3	37,7	113,5
TMK-22 (preparation)	85	45	54	47,1	41,5	122,8
Volgograd 5/95 (control)	70	46	55	45,3	39,2	130,9
Volgograd 5/95 (preparation)	84	44	53	50,0	43,9	150,7

When studying the total yield, the yield of tomato TMK-22 was 4 t/ha, ie 10%, and Volgograd 5/95 was 4.7 t/ha, 10.3% higher.

Also, during the study, the microbial composition balanced variants differed sharply from the untreated variants in terms of seedling growth rate. Plants treated with a microbial composition were 1.2-1.4 times higher than the control and had a strong vegetative growth.

CONCLUSION

Based on the results, it can be concluded that the use of the biological preparation "Zamin-M" in the cultivation of tomato plants in saline soils of the experimental plot of the Nukus branch of the Tashkent State Agrarian University led to the growth and development of plants and, consequently, higher yields. The positive effect of the biological preparation on the tomato plant is explained by the synthesis of biologically active substances that improve root nutrition.

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