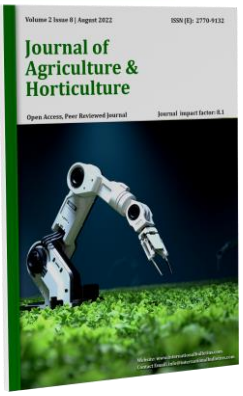

INFLUENCE OF PLANT GROWTH STIMULANTS ON TOMATO PRODUCTIVITY IN THE CONDITIONS OF THE TASHKENT OASIS.

Sagdiev Mirkasim Takhirovich
Associate Professor of the Department of Ecology and Botany
Tashkent State Agrarian University.
Omonlikov Alisher Urazalievich
Assistant at Tashkent State Agrarian University
https://orcid.org/0000-0002-2334-4098
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Annotation: In the conditions of growth, the importance of environmental protection is necessary to study the use of growth regulators in the cultivation of vegetable crops, their scientifically based use. For the effective use of growth stimulants, select the optimal consumption rates of the working fluid.

Their use is primarily aimed at increasing the yield and quality of the products obtained. In our research, we studied the high yield of tomato variety “Dawn of Tashkent”, which is a promising variety for open ground. For study selected growth regulators for use on tomatoes. Potassium gummate, heteroauxin, phytosporin. Seeds and adult plants were treated with these preparations by spraying. The duration of soaking the seeds is 2 hours. For plant nutrition, a working liquid was used - 500 l/ha. Soaking seeds in solutions of stimulants showed efficiency in comparison with the control, but the maximum increase was achieved when seed treatment was combined with fertilizing with stimulants during the growing season.

Carrying out a comparative analysis of the obtained yield data, we can conclude that growth stimulants have a positive effect on the productivity of tomatoes. As a result of a two-year study, the most effective growth stimulator was the preparation “Fitosparin”, the highest average weight in 1 fetus was noted in the hybrid “Senator”, and “Dawn of Tashkent” The experiments were carried out for 2 years (2020-2021) in the Kibray district of the Tashkent region at the educational facility of TashGAU.

Key words: tomato, plant growth regulators, potassium gummate, heteroauxin, phytosporin, plant growth phase, biomass of aboveground organs, dry weight of plants.

Introduction: One of the most pressing issues regarding the increase in agricultural production is the regulation of the growth and development of vegetable crops with the help of biologically active substances. A significant achievement of modern science is the allocation of the role of biologically active substances in improving the growth processes of plants and increasing plant immunity to adverse conditions [9,10,16,17].

The use of growth regulators makes production the most cost-effective and profitable. Every year, new preparations are released on the market for the effective cultivation of crops. The release of new drugs is aimed at improving the characteristics of old samples and their safe use. Plant growth regulators should be aimed at increasing the yield and quality of the products obtained [4,5,12,13,14,15].

Materials and research methods. The purpose of this work is to study growth regulators and the possibility of their inclusion in the agricultural technology of growing vegetable crops in Uzbekistan.

The object of the study was a high-yielding tomato variety “Dawn of Tashkent”, which is one of the most promising varieties for open ground.

For the study, we chose promising growth regulators recommended by manufacturers for use on vegetable crops in concentrations of working solutions: potassium gummate - 0.1%, heteroauxin - 0.01%, phytosporin 0.005%. Seeds were treated with these preparations by soaking for 2 hours and adult plants during the growing season by spraying with a working solution of 500 l/ha.

The experiment was carried out in accordance with generally accepted methods [6,7,8].

The experiment was planted according to the following scheme: Control (seeds were soaked in distilled water). In experimental variants, the seeds were soaked in working solutions, for top dressing, during the growing season, the above growth stimulants recommended by the manufacturer of the drug were used in accordance with the instructions.

The research was carried out in the Kibray district of the Tashkent region in the educational farm of the Tashkent State Agrarian University.

The seeds were soaked according to the regulations. Processing of tomato with working solutions during the growing season was carried out with a sprayer brand "Comfort-15" in the flowering phase.

Research results: The test preparations had a beneficial effect on plant growth. Plant height in the bud formation phase in the control variant was 23.0 cm, with the use of growth regulators, this figure was 23.9 to 25.7 cm. The same picture was observed for the rest of the growth and development phases of tomatoes. So, in the flowering phase, the difference between the variants was already significant - 41.4 cm in the control, 47.3 cm, the maximum value in the variant with Potassium Hummate, due to the fact that the drug has a more active effect on plants, which helps to stimulate growth processes.

From the data of tables 1-2 it can be seen that the preparations significantly affect the growth of the aerial organs of tomatoes. Seed treatment and plant nutrition with growth regulators during the growing season stimulated the process of biomass growth in comparison with a single seed treatment.

Table 1

Influence of seed treatment with growth regulators on the dynamics of growth of tomato biomass g/plant.

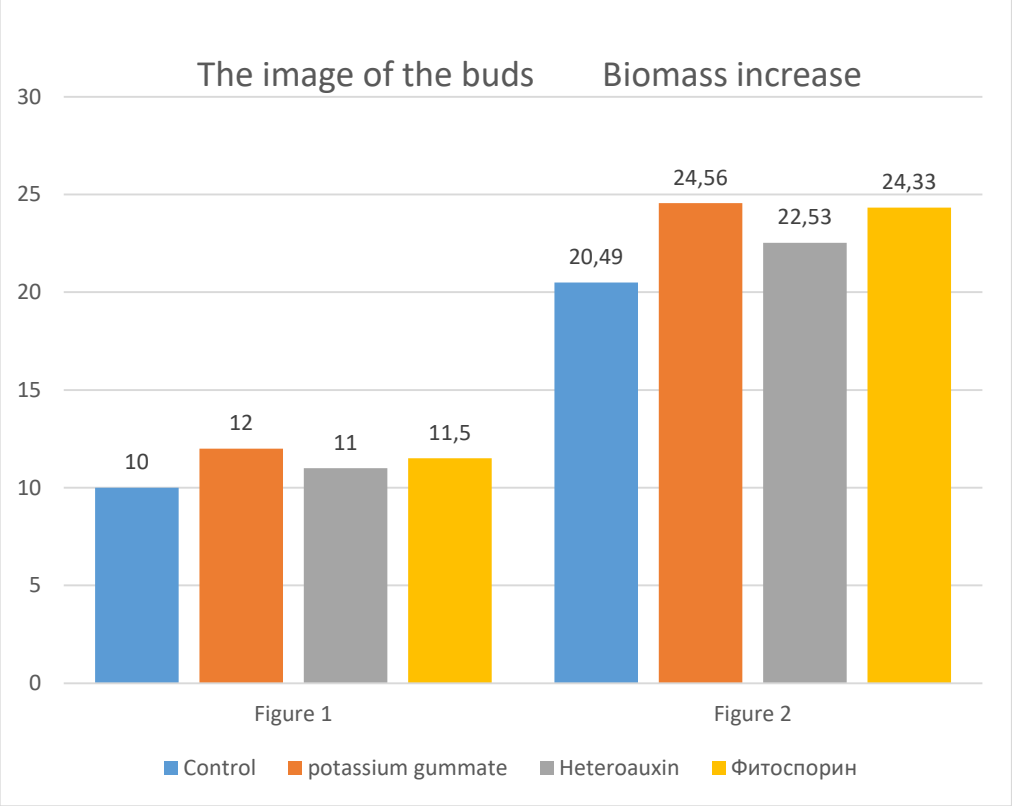
Options	Bud formation			Beginning of flowering		
	stems	leaves		stems	leaves	
Control	17,85	37,69	55,54	35,81	75,13	110,94
potassium gummate	2313	48,58	71,71	42,35	90,24	132,59
Heteroauxin	19,61	40,43	60,04	37,78	78,92	116,66
Fitosporin	20,58	43,31	63,89	39,23	81,55	120,78
HCP_{05}	0,65	1,51	2,35	1,28	2,85	3,98

Table 2

Influence of seed treatment with growth regulators on the dynamics of increase in dry weight of tomato g/plant.

Options	Bud formation			Beginning of flowering		
	stems	leaves		stems	leaves	
control	3,85	6,25	10,10	7,43	13,06	20,49
potassium gummate	4,28	7,23	11,51	9,12	15,44	24,56
Heteroauxin	3,88	6,47	10,35	8,29	14,24	22,53
Fitosporin	4,22	7,18	11,29	9,15	15,18	24,33
HCP_{05}	0,14	0,25	0,38	0,28	0,49	0,78

With an increase in plant height, as a result, biomass also increases, especially with the use of the studied preparations. In the treatment of seeds and plants, the results of the increase in biomass are more significant than in the treatment of seeds. This means that the preparations have a beneficial effect on adult plants, stimulating its growth and development. The highest increase in tomato biomass was noted in the variant with potassium gummate in all phases of the growing season (Fig. 1).



Compared with the control, the variants with the use of drugs were better in terms of biomass growth. Thus, the use of growth regulators did not inhibit plants, but, on the contrary, stimulated their growth and development. In our experiments, in the phases of formation and ripening of fruits, the biomass increased more, but when the fruits ripened, its decrease was observed. Thus, the increase in biomass in the budding phase ranged from 3 to 30% with maturation up to 15%. This phenomenon is due to the fact that during ripening there is an outflow of organic substances from the leaves into the fruits of tomatoes. At the same time,

the processes of aging and death of leaves in the variant with potassium humates proceed more slowly (9), therefore, the increase in biomass in the phase of fruit ripening is maximum among other studied preparations.

Table 3

Influence of double treatment with growth regulators on the dynamics of growth of tomato biomass. g/height.

Options	The beginning of the formation of the fetus			Beginning of maturation		
	Stems	leaves	∑	Stems	leaves	∑
control	53,16	112,85	166,01	57,34	121,66	179,00
potassium gummate	63,72	134,42	198,14	65,88	139,44	206,3
Heteroauxin	53,15	112,41	165,56	57,63	121,64	179,27
Fitosporin	56,81	119,43	176,24	59,77	126,43	186,20
HCP $_{05}$	2,07	4,37	5,26	2,17	4,55	6,38

Table 4

Influence of double treatment with growth regulators on the dynamics of tomato dry mass accumulation. g/height.

Options	The beginning of the formation of the fetus			Beginning of maturation		
	Stems	leaves	∑	Stems	leaves	∑
Control	13,81	22,46	36,47	17,45	28,62	46,15
potassium gummate	16,72	28,42	45,14	19,85	33,88	53,70
Heteroauxin	14,85	25,29	40,14	18,28	31,06	49,34
Fitosporin	16,21	27,55	43,76	19,45	33,92	52,37
HCP $_{05}$	0,51	0,88	1,38	0,63	1,05	1,74

With an increase in the age of tomato plants, the activity of phytohormones in the leaves decreases, respiration slows down, the activity of abscisic acid increases, thereby reducing the plants.

The "tipping point" of metabolism in leaves is the phase of plant budding. In general, the same regularity is observed in the change in physiological and biochemical processes in leaves, both in connection with their age and the general age of plants" [4,5].

Plant productivity is determined by the accumulation of dry matter in the aboveground organs. According to the results of the experiments, it can be seen that the use of growth regulators enhances the process of accumulation of dry matter and, ultimately, the yield.

Analysis of the data from the above tables shows that the maximum accumulation of dry matter in plants was noted in the variant where seeds and plants were treated with potassium gummate. According to these indicators, the indications of the drug phytosporin were slightly inferior. The lowest efficiency in all variants of experiments showed the drug heteroauxin [1,2,3].

The process of growth and development proceeds most actively with the use of potassium humate, which is consistent with the data of other authors, that the humic substances contained in it significantly improve the mineral nutrition regime [11,12].

The applied preparations stimulated the process of accumulation of dry matter by the aerial organs of plants. In all experimental variants, compared with the control, when using a growth regulator, the accumulation of dry matter increased, depending on the growth vase, from 16 to 29%. The fact remains that preparations of potassium gummate and phytosporin most actively stimulated the growth of plant biomass, in terms of the percentage of dry matter in them they were significantly inferior to the variant with heteroauxin, in the variant of which the values of biomass and dry weight were the lowest.

Conclusions: Based on this, we can conclude that, to a greater extent, the formation of fruits and the intensity of their ripening depends on the rate of formation of dry matter by the aerial organs of plants, and not on their number.

Summarizing the results of the research, we came to the conclusion that growth regulators have a beneficial effect on the intensity of tomato growth processes. When priming the growth stimulator Potassium Hummat, the maximum temperature and development of tomatoes were noted. According to the content of dry matter in the aerial parts of tomato plants, the indicators with Potassium Hummate were low compared to other preparations by 0.5-2%. As you know, the increase in the biomass of aboveground organs to certain values leads to shading of plant leaves, thereby reducing photosynthetic activity and the outflow of nutrients into the stems and leaves of plants. This leads to a decrease in the intensity of fruit formation and yield.

References:

1. Allayarov, A., Zuparov, M., Khakimov, A., & Omonlikov, A. (2021). Application of the biopreparation 'Orgamika F'against fusarium disease of cabbage and other cole vegetables. In E3S Web of Conferences (Vol. 284, p. 03011). EDP Sciences.

2.Khakimov A. A., Omonlikov A. U., Utaganov S. B. U. Current status and prospects of the use of biofungicides against plant diseases //GSC Biological and Pharmaceutical Sciences. – 2020. – Т. 13. – №. 3. – С. 119-126.

3.Khakimov, A., Salakhutdinov, I., Omolikov, A., & Utaganov, S. (2022). Traditional and current-prospective methods of agricultural plant diseases detection: A review. In IOP Conference Series: Earth and Environmental Science (Vol. 951, No. 1, p. 012002). IOP Publishing.

4.Sagdiev M. T., Amanova M. M., Omonlikov A. U. The influence of growth regulators on tomato productivity in the conditions of the Tashkent region //ISJ Theoretical & Applied Science, 11 (79). – 2019. – С. 241-244.

5.Sagdiev M. T., Amanova M. M., Omonlikov A. U. The influence of plant growth stimulators on tomato productivity in the conditions of Tashkent region. World Journal of Pharmaceutical and Life Sciences,(WJPLS //India. – 2020. – Т. 6. – №. 8. – С. 04.

6.Аминова Р.И. др. Эффекты фотостимуляции физиологических процессов растений при выращивании в пленочных теплицах. “Актуальные вопросы экологической физиологии растений в XXI – веке. Тц. Докл. Мечад. Конор. – Снктывкар, 2001, с 154 – 155.

7.Астафурова Т.П. и др. Оптимизация условий выращивания овощных культур в пленочных теплицах. Ст. тр. ТСХИ НГАУ – Томск 2001, Вып-4. С 19 – 23.

8.Доспехов Б.А. Методика полевого опыта Агро Праниздат, 1985 г. 125 с.

9.Езаов А.К., Шибзухов З.С. Опитимизация технологии выращивания томата в условиях защищенного грунта. статья в сборнике трудов конференции. Современное экологическое состояние природной среды и научно-практические аспекты рационального природопользования С.625-629. с Соленое Займище, 28 февраля 2017 года.

10.Коняева Н.Ф. Курс светокультуры растений М. Сельхозгиз., 1970.

11.Савинова Н.И. Практикум по физиологии растений. Изб-во МГУ, 1997, с 178.

12.Сагдиев М. Т., Аманова М., Омонликов А. У. Влияние регулятора роста на урожайность перца сладкого //Евразийский Союз Ученых. – 2019. – №. 4-7 (61). – С. 50-52.

13.Сагдиев М. Т., Омонликов А. У. Повышение урожайности огурца и томата в пленочных теплицах Ташкентской области //European Journal of Interdisciplinary Research and Development. – 2022. – Т. 4. – С. 113-121.

14.Сагдиев М.Т. и др. Влияние биопрепарата "Serhosil" на продуктивность томата сорта "Юбилейный" в условиях Ташкентской области //Современные тенденции развития аграрного комплекса. – 2016. – С. 506-509.

15.Сагдиев М.Т., Омонликов А.У., Аманова М.М., Действительности эмуляторов роста на урожайность и качество белокочанной капусты. Вестник Аграрной науки Узбекистана Ташкента б (83) 2020 с. 218 – 219.

16.Шибзухов З.С., Шибзухова З.С. Влияние регуляторов роста на продуктивность томата. // Изв. Кабардино-Балкарский ГАУ. 2016 г. №2. С. 27-33.

17.Шибзухов, З.С. Эффективная технология выращивания овощных культур / З.С. Шибзухов, М.И. Езиев. — Текст : электронный // NovaInfo, 2017. — № 61. — С. 144-148. — URL: https://novainfo.ru/article/11673 (дата обращения: 07.03.2023).