



# The Use of the Biostimulant Uchkun in the Cultivation of Pumpkin Variety Spanish 73

**Khidirova Nazira Kudratovna<sup>a#</sup>**  
**and Kosimova Shoira Mirzakhmitovna<sup>b†</sup>**

<sup>a</sup> *Institute of Chemistry of Plant Substances, Acad. S. Yu. Yunusova ANRUz Tashkent, Uzbekistan.*

<sup>b</sup> *Department of Medicinal and Spice Plants, Andijan Institute of Agriculture and Agrotechnologies, Andijan, Uzbekistan.*

## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

This article discusses the results of studies obtained with the use of biostimulants on the growth and development of the Spanish 73 pumpkin variety in order to increase productivity and disease resistance, as well as a positive effect on the biochemical parameters of the plant.

**Keywords:** *Biostimulant; uchkun; verva; pumpkin; germination; productivity; polyphenols; Spanish 73.*

<sup>#</sup> Senior Lecturer;

<sup>†</sup> Candidate of Chemical Sciences, Senior Researcher;

\*Corresponding author: E-mail: [egamberdiyevoybek60@gmail.com](mailto:egamberdiyevoybek60@gmail.com);

## 1. INTRODUCTION

Today, when significant measures are being taken in the world to grow environmentally friendly products, growing products without chemicals, using inexpensive, highly effective biostimulants, is considered one of the tasks that cannot be postponed. An important role in solving problems in this direction is played by the search for new biologically active substances that have the ability to increase plant productivity, and their selective use.

Along with all natural vegetables and polycultures, there is an increased interest in pumpkin as a dietary and medicinal food product. Much attention is paid to the issues of expanding the range of cultivated pumpkins, and improving the quality of marketable products. The demand for it is constantly growing, especially for table varieties with high palatability [1].

Pumpkin surpasses many vegetables in the amount of carbohydrates, vitamins and mineral salts. Pumpkin can delay the aging process, and has a beneficial effect on the condition of the skin and hair, in addition to the pumpkin pulp, pumpkin seeds are very useful as a prophylactic against helminths, and pumpkin juice is involved in hematopoiesis.

Pumpkin seed oil contains from 19.97 to 23.54% of saturated fatty acids (palmitin, stearic, etc.), and large-fruited pumpkin seeds contain unsaturated fatty acids necessary for human health (oleic, linoleic, etc.), the content of which varies depending on from the pumpkin variety [2].

### 1.1 The Purpose of this Work is to Study

The purpose of this work is to study the effect of the Uchkun biostimulator on the growth and development of the Spanish 73 pumpkin variety in comparison with the Verva biostimulants in the Andijan region.

Andijan is located in the eastern part of the Ferghana Valley at an altitude of 490 m above sea level, on the ancient deposits of the Andijansay River. The climatic features of the region are high summer temperatures and dry air, sharp fluctuations in daily and seasonal temperatures. The soil of the Andijan region is characterized by the presence of a gley horizon in the lower part of the profile, and is often saline, with well-developed humus horizons [3].

The use of environmentally friendly technologies in the cultivation of pumpkin is a promising direction. Such technologies include the use of biostimulants, which significantly increase the adaptive properties and immunity of agricultural plants, increasing their yield and product quality [4,5].

## 2. METHODOLOGY

The studies were carried out in 2018-2020 on the site of the Andijan branch of the Tashkent Agrarian State University with an area of 2.5 hectares.

The experimental scheme included presowing treatment pumpkin seeds in the control variant by water treatment, and then biostimulants at concentrations of 0.01% Uchkun and 0.05% Verva.

In particular, the experiments were carried out on the basis of the recommendations of the Research Institute of Vegetable Growing, Polyculture and Potato, on the basis of the recommendations of agricultural technology for growing crops in 3 ways: soaking seeds before sowing; spraying during the growing season (before flowering) and a mixed method, including soaking and spraying [6,7].

The method of soaking seeds with the Uchkun biostimulator is carried out at a consumption rate of 1 liter per 1 ton of seeds. For what, a working solution is prepared as follows: 1 liter of a 0.01% solution of Uchkun is diluted in 200 liters of water and the seeds are soaked for 12 hours. In the spraying method, 1 liter of each biostimulator is diluted in 300 liters of water and the leaves are sprayed on the 6-7th week of vegetation.

With the mixed method, soaking and spraying the leaves at the 6th-7th week of the growing season are carried out, as described above. In the mixed method, encrustation and spray methods were used at the doses indicated above [8].

## 3. RESULTS AND DISCUSSION

Research results and discussion In continuation of the research, a positive effect of biostimulants on the germination and growth energy of pumpkin seeds was established.

Seed germination is the most important indicator of their quality. Pre-sowing treatment of seeds with biostimulants helps to reduce the period of

emergence of seedlings, enhance growth processes [9].

During presowing treatment of seeds by soaking on April 20, 2022. seed germination was determined, 9 days in control, 7 days in Uchkun and Verva variants.

During phenological observations of the experimental samples, a significant difference was observed in 10% and 75% percent variants of the germination of pumpkin seeds of the Spanish 73 variety. These indicators were 15 and 18 days in the control variant, 13 and 16 days in the Uchkun variant and 14 and 17 days in Verva's variant, respectively. (see Table 1).

It was established that the total germination of seeds in the control was 80%, in the Uchkun variant 95% and Verva 94%. As a result, during the pre-sowing treatment of seeds with biostimulants, it was found that in the early stages of plant growth and development, the indicators of the Uchkun preparation are higher than the control and are not inferior to the reference preparation Verva.

Based on the results obtained, it was determined that biostimulants have a positive effect on the germination and growth rate of plant seeds.

Previously, scientists have found that the biostimulator Uchkun stimulates the growth, development, productivity of the plant and increases its resistance to diseases [10].

The reason that the process of photosynthesis proceeds mainly in leaves and partially in young

branches is the presence of chloroplasts in them. Based on the fact that the synthesis and destruction of chlorophyll occurs as a result of a complex metabolic process in living cells, the content of chlorophyll in pumpkin leaves treated with the mixed method of Uchkun biostimulant was determined spectrophotometrically in comparison with the reference Verva (Table 2).

In the variants treated with biostimulants according to the mixed method, the content of chlorophyll "a" in the control variant was 1.54 mg, in Verva 1.68 mg and in Uchkun 2.16 mg. At the same time, the total amount of chlorophylls differed from Uchkun with a reading of 43.3 mg%. The data obtained showed that all biostimulants have a positive effect on the content of leaf pigments, which contributes to the early growth and productivity of the plant.

When using the drug "Uchkun" in the cultivation of pumpkin plants, an increase in yield and increase was observed. In this case, polyprenols can be considered as one of the main active substances contained in biostimulants. It is noted that when cotton seeds are treated with the Uchkun preparation before sowing seeds of wheat and multicolor crops, all phases of growth and development are accelerated, and productivity increases. It has been observed that cottonseed increases the amount of nuclear protein biosynthesis from primary processing and, as a result, increases its drought tolerance [11].

**Table 1. Germination energy and field germination of pumpkin seeds varieties Spanish 73**

Options Spanish 73	Number of seeds. PCS.	Sowing	Germination	10%	75%	Germination
Control (water)	120	20,04	29,04	05,05	08,05	80
Uchkun	120	20,04	27,04	03,05	06,05	95
Verva	120	20,04	27,04	04,05	07,05	94

**Table 2. Effects of biostimulants on the content of chlorophyll in pumpkin leaves treated with a mixed method**

Samples	Solution volume ml	HI. a, mg/g	HI. b, mg/g	Quantity hl(a+b) mg/%	Amount of carotenoids mg/%
<b>Spanish 73</b>					
Control	50,0	1,54	0,40	1,96(100)	0,71(100)
Uchkun 1l/t	50,0	2,16	0,64	2,80(143,3)	0,74(104,2)
Verva 5 l/t	50,0	1,68	0,48	2,14(109,3)	0,73(102,5)

**Table 3. Influence on the growth and development of pumpkin varieties with mixed treatment with biostimulants (2020)**

Options	Height, cm	Number of seeds (PCS.)	Average fruit weight (kg)	Number of seeds (pcs.)	Weight of 1000 seeds	Infected plants (pcs.)
<b>Spanish 73</b>						
Control	106±0,13	3,9±0,11	3,0±0,16	146±0, 15	335,3±0,11	5
Uchkun 1 l/t	117±0,15	4,9±0,17	3,6±0,13	1155±0,17	383,9±0,16	0
Verva 5 l/t	104±0,11	4,3±0,15	3,2±0,18	150±0,15	345,6±0,18	1

**Table 4. The effect of biostimulants on the average yield of pumpkin varieties when processed in a mixed way**

Options	Yield	Yield increase	
	(t/ha)	(t/ha)	%
<b>Spanish 73</b>			
Control	18,6	-	100
Uchkun 1 l/t	30,3	11,7	162,9
Verva 5l/t	29,5	10,9	158,6

A comparison of the above results shows that polyphenols in Uchkun 1l/t exhibit immunomodulatory properties and have synergistic properties and have a positive effect on plant growth, development, and productivity [12].

As a result of the experiments, the positive effect of the Uchkun preparation on the increase in the sympodial branches of plants and the formation of generative organs was determined (Table 3).

The data given in the tables show that under the influence of the Uchkun biostimulator in two varieties, an increase in the number and weight of fruits, as well as the weight of seeds, was observed.

The best result was obtained under the influence of the drug Uchkun, where the number and weight of fetuses were 25.6% and 20.0% higher compared to the control, compared to the reference (standard) drug Verva by 13.9% and 12.5% respectively in Spanish 73 variety (Table 4).

Based on the data obtained from field tests, the optimal consumption rates of the Uchkun preparation and methods of processing to increase the yield of pumpkin varieties Spanish 73 in the conditions of moderately saline soils of the Andijan region were determined. The best results were observed with a mixed method of processing (encrustation+spraying in the vegetation phase) at a consumption of 1 l/t of the Uchkun biostimulant in all variants (Table 4).

At the same time, the yield of pumpkin variety Spanish 73, the yield was 30.3 t/ha, and the yield increase was 11.7 t/ha.

#### 4. CONCLUSIONS

1. For the first time, the biostimulant "Uchkun", created on the basis of polyisoprenoids, was used as an effective biostimulant in the cultivation of Spanish 73 pumpkin varieties in the conditions of the Andijan region, and it was proved that the growth and resistance of plants to diseases were accelerated as a result of the complete assimilation of minerals during the germination of pumpkin seeds under the influence of polyphenols, contained in the biostimulator "Uchkun".
2. For the first time it was determined that with mixed treatment: soaking of seeds and spraying of leaves during the growing season with the Uchkun preparation, the yield of Spanish 73 variety, the yield was 30.3 t/ha, and the yield increase was 11.7 t/ha. These indicators serve as the basis for recommending the biostimulant Uchkun for its use in melon growing.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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