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The Effect of Biologically Active Additives on the Duration of the Larval Period and Vitality Indicators of the Mulberry Silkworm

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Annotation: In this article, 0.5%, 1.0%, and 3.0% solutions of Stevioside, prepared from the Stevia plant, were added to the mulberry silkworm feed as biologically active additives, and the duration of the larval period of silkworms maintained in ordinary drinking water and traditional worm feeding methods. and their viability indicators are compared, and the results of the study on the effect of biologically active additives on the silkworm are given.

Keywords: silkworm, mulberry leaf, cocoon, silkworm seed, stevia plant, food, dietary supplement.

Despite the progress made in the field of cocooning in our country, the yield of cocoons obtained from mulberry silkworms and the quality of silk products obtained from them in some regions of our republic are below the level of world demand. The average yield from one box of a single mulberry silkworm is 55-60 kg, and in some of our regions, this figure is lower than ten. However, as a result of scientific research, the potential yield of silkworm breeds created by our breeding scientists is not less than 70-75 kg under production conditions. Of course, in order for the breeds and hybrids of silkworms created by our scientists to have productivity at the level of their potential, high-level agrotechnical rules must be followed. However, in recent years, problems such as lack of substances have arisen in living organisms, which have a direct impact on their growth and development [1], [2], [3].

In addition to the correct agrotechnical rules, the productivity of the mulberry silkworm is also directly related to the nutritional level of the mulberry tree leaf from which it is fed. It is considered necessary to carry out agrotechnical measures on time in the feeding mulberry groves in order to complete the content of organic and inorganic substances, vitamins and minerals in the mulberry leaf, which are necessary for the mulberry silkworm. But since 75% of the feeder mulberries are on roadsides and on the borders of crop rotation fields, such mulberry rows are hardly subjected to agrotechnical measures. As a result, insufficient amount of nutrient elements accumulate in the leaves of this nutrient-giving mulberry tree, which directly affects the nutritional quality of the leaf. We can see this in the results of research conducted by scientists [4], [5].

In order to positively solve this problem, the nutritional elements that are important in the development of mulberry silkworms on the mulberry tree leaf were studied, and 0.5%, 1.0% and 3.0% solutions of Stevioside substance in water, which is used as a biologically active additive, as well as simple drinking water (0.0%) was also prepared, and the worms were fed by sprinkling this prepared drinking water and solutions on the leaf feed in a special sprayer (Fig. 4.1.1).

Figure 4.1.1. Aqueous solutions of stevioside from the stevia plant.

A normal worm feeding method was used as a control group. Table 4.1.1 shows the effect of Stevioside substance in different concentrations on the length of the larval period of mulberry silkworm.

Table 4.1.1 The duration of the larval period of silkworms treated with biologically active substance (stivioside) (2019-2023)

Name of breed and systems	Solution, %	Duration of silkworm young, hours					Time in total worm period, hours
		1 year old	2 year old	3 year old	4 year old	5 year old	
Guzal	0.0	92	103	115	144	160	**614**
	0,5	88	96	108	132	151	**575**
	1,0	84	92	105	129	148	**558**
	3,0	96	106	117	141	158	**618**
	Қиёс.	95	102	116	144	162	**619**
Marvarid	0.0	90	94	112	142	158	**596**
	0,5	84	91	104	129	148	**556**
	1,0	82	88	102	126	144	**542**
	3,0	97	109	120	140	154	**620**

	Қиёс.	92	95	115	146	160	**608**
L-27	0.0	88	92	114	140	151	**585**
	0,5	84	90	102	126	149	**551**
	1,0	82	86	100	125	146	**539**
	3,0	95	104	115	135	149	**598**
	Қиёс.	90	97	117	140	164	**608**
L-28	0.0	91	92	112	139	155	**589**
	0,5	86	90	104	124	150	**554**
	1,0	84	87	104	122	140	**537**
	3,0	97	107	110	132	153	**599**
	Қиёс.	89	100	112	145	165	**611**

The data presented in Table 1 showed that the length of the worm period when mulberry silkworms were treated with a biologically active additive varied depending on the concentration of the stevioside solution. In particular, the time spent from the first instar to the emergence of silkworms in 0.5% solution was 575 hours, 558 hours in 1.0% solution, and 618 hours in 3.0% solution, while in normal drinking water (0.0%) showed that this figure was 614 hours in silkworms maintained with feed. In the case of silkworms cared for in the control group, this indicator was 619 hours. This condition was also reflected in other breeds and systems in the experimental group (Pearl breed, L-27, L-28 system) (Fig. 1).

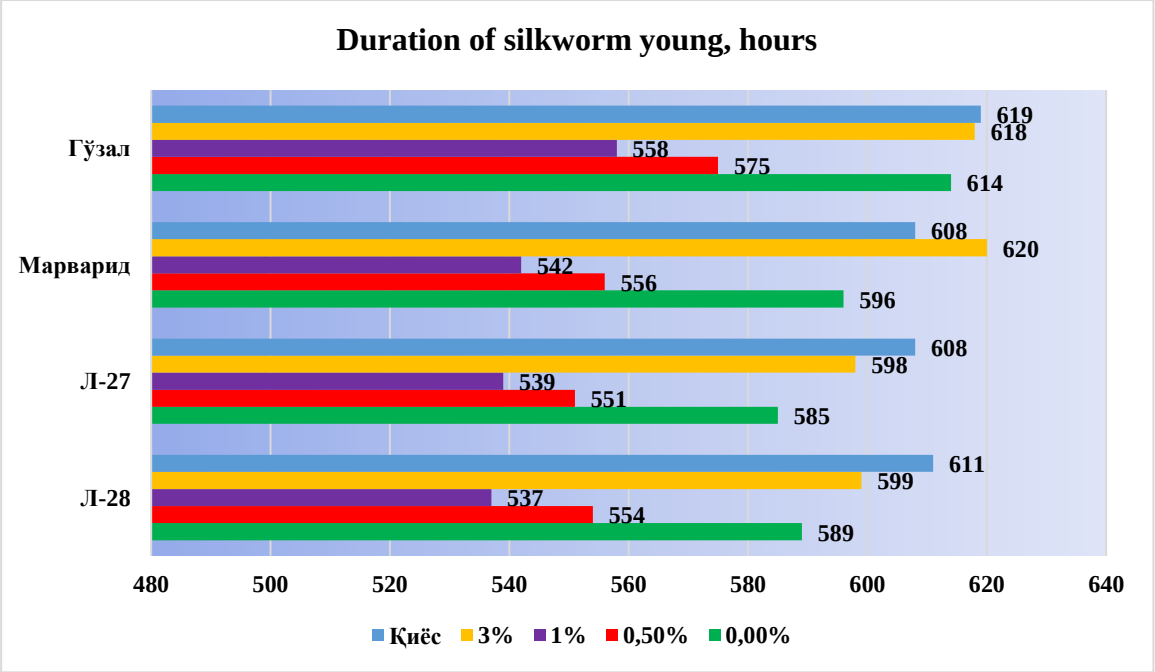

Figure 1. Duration of silkworm young, hours.

In other words, when kept in a 0.5% solution of stevozid, the time spent in the worm period was on average 23-24 days, in a 1.0% solution it was 22-23 days, in a 3.0% solution it was 25-26 days, in ordinary drinking water without BFQ (0.0 %) was 24-25 days, while this indicator was 25-26 days in silkworms cared for in the control option.


Figure 4.1.2. The process of spraying "Stevioside" BFQ on mulberry leaves, which are given as food for large and small silkworm larvae.

From the above information, it can be concluded that when caring for mulberry silkworms with biologically active additives, it is necessary to pay serious attention to its amount dissolved in water, that is, the concentration of the solution in water. Otherwise, a solution with a higher concentration than the norm will not affect the viability of mulberry silkworms, but it will cause their developmental activity to be impaired. This situation indicates that the concentration of stevioside solution in water added to the feed of mulberry silkworm should not exceed 1-2%. Because if the amount of stevioside in the solution is more than 3%, the mulberry silkworms will not feed with appetite due to the specific taste of this solution. The fact that this condition can be observed in all breeds and systems of our experimental options has been proven in the data of the table above.

The mulberry silkworm organism, like any other living organism, depends on the quality of the food it receives in its diet for its vitality and viability. The higher the quality of food, the more necessary reserves of substances are accumulated in the body, and the activity of the immune system in the body depends on the product of this quality food. In our research in this regard, it was studied on the basis of in-depth studies to what extent it affects the vitality indicators and morbidity of silkworms when fed to mulberry leaves with various concentrations of Stevioside, selected as a biologically active additive. It should be noted that the level of morbidity of mulberry silkworms was determined based on the amount of deaf cocoons obtained from experimental variants. We present these data in Table 4.1.2 below.

Table 4.1.2 Vitality indicators of mulberry silkworms treated with biologically active additives (2020-2023)

Name of breed and systems	Percentage of BAA in solution, %	Experience in variants		Pd
		vitality $\bar{X}\pm S\bar{x}$, %	getting sick $\bar{X}\pm S\bar{x}$, %	
Guzal	0.0	94,0±1,90	1,3±0,035	**0,987**
	0,5	96,8±1,48	1,03±0,30	**0,985**
	1,0	99,7±0,13	0,4±0,01	**0,971**
	3,0	98,3±0,48	0,7±0,13	**0,991**
	Қиёс.	90,2±4,34	1,0±0,48	-
Marvarid	0.0	93,6±2,84	1,6±0,20	**0,989**
	0,5	94,9±1,75	0,60±0,29	**0,987**
	1,0	96,4±0,14	0,4±0,01	**0,956**
	3,0	95,1±0,50	1,5±0,58	**0,981**
	Қиёс.	83,0±8,79	2,2±0,35	-

L-27	0.0	93,5±1,88	1,6±0,18	**0,994**
	0,5	96,5±0,35	1,3±0,57	**0,997**
	1,0	98,6±0,21	0,8±0,11	**0,954**
	3,0	93,5±2,02	1,6±0,45	**0,987**
	Қиёс.	79,0±2,14	0,9±0,47	**-**
L-28	0.0	93,5±1,88	1,6±0,18	**0,994**
	0,5	94,9±1,75	0,6±0,29	**0,976**
	1,0	98,1±1,13	0,4±0,01	**0,982**
	3,0	94,5±2,36	0,9±0,15	**0,986**
	Қиёс.	79,3±0,33	0,3±0,04	**-**

It can be seen from the data in Table 4.1.2 above that the extent to which animal hygiene rules are followed in the care of mulberry silkworms has a positive effect on their productivity during the later development period. In particular, washing mulberry leaves with normal drinking water (0.0%) and feeding silkworms with reduced humidity had such a positive effect on their viability (up to 93.5-94%). That is, it was found that the viability index can vary from 3.8-14.5% compared to the control option.

In the experimental variants maintained with biologically active supplement, this indicator was shown to be even higher. In particular, in the Gozol breed of silkworms treated with a 0.5% solution of stevioside, the viability of the worms was 96.8%, the morbidity was 1.03%, when the worms were fed with a 1.0% solution, the viability of the worms was 99.7% and the morbidity was 0.4%. When supplemented in a 3% solution, this figure showed 98.3% viability and 0.7% disease. In the control variant, this indicator recorded 90.2%, viability, and 1.0% morbidity. This situation was also observed in other breeds and systems of the experimental version, and it was proved in practice that it is possible to preserve the viability up to 9.5-19.6% compared to the control version.

In conclusion, the 1% solution of stevioside in water, which is given as a biologically active additive for mulberry silkworms, gives the opportunity to increase the larval period of mulberry silkworms to 22.3-23.2 days, and the viability index to 96.4-99.7%, according to the results of our scientific research. found the opposite.

References

1. Esfandarani, Talebi, M., Bahreini, R. Tajabadi, N. Effect of mulberry leaves moisture on some traits of the silkworm (Bombyx mori L.). Sericologia. – 2002. – 42(2): – P. 285-289
2. Mahmood, R., Jam, T. M. and Khan, M. I. Effects of food from mulberry treated with Urla “N” on larval development and cocoon weight of silkworm Bombyx mori L. Journal of Sciences 2001. – 12(2): – P. 123-129.
3. М. Зикирова, Қ.Жумағулов. Тут ипак қурти озуқасига “Стевия” ўсимлигидан тайёрланган турли концентрациядаги биологик фаол қўшимчаларни қўшиб озиқлантиришни кейинги авлод уруғларининг жонланишига таъсири. International scientific and practical conference “Application and development of smart technologies in agriculture” may 30, 2024”: - P. 603-605
4. Q.A. Jumagulov, X.E Raxmanova, N.S Soxibova. Scientific basis for the differential implementation of the incubation period of mulberry silkworm (Bombyx mori. L.) in the harsh continental climate of Central Asia.- Solid State Technology, 2020
5. K. Jumagulov, M.Jurayeva. The Importance of the Extending of Primary Reproduking Season of Living Silkworms in a Sharp Continental Climate Arias. International Journal of Science and Research. 2018. – 2: – P. 45-46.