



APPLICATION OF MICROALGAE TO INCREASE THE NUTRITION OF MULBERRY LEAF DURING THE FEEDING PROCESS OF MULBERRY SILKWORM

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Article history:	Abstract:
Received: 6 th February 2023 Accepted: 6 th March 2023 Published: 7 th April 2023	When using microalgae in the field of sericulture, i.e., adding the biologically active substance Chlorella microalgae to the feed of mulberry silkworms, the disease resistance, viability and high productivity of mulberry silkworms can be increased, the recommendations of research scientists and the results obtained from experiments are presented.
Keywords: chlorella, spirulina, tutovy silkworm, Ipakchi-1, Ipakchi-2, hybrid, microhydrogen, experiment, control, variant.	

RELEVANCE AND NECESSITY OF THE SUBJECT: increasing the income of peasants and farmers by at least 2 times through the intensive development of agriculture on a scientific basis in the decree of the President of the Republic of Uzbekistan "On the development strategy of New Uzbekistan for 2022-2026", to bring the annual growth of agriculture to at least 5 percent. Specialization of regions in the cultivation of a specific type of product.

Growing exportable products and developing fruit and vegetable farming, increasing the area of intensive gardens by 3 times and greenhouses by 2 times, increasing the export potential to another 1 billion US dollars.

Deepening the integration of science and practice in the agricultural sector. Expanding the livestock feed base and increasing the production volume by 1.5-2 times. Increase the volume of production of livestock products by 1.5-2 times. Strengthening the livestock feed base.

In order to implement these issues, the decision of the President of the Republic of Uzbekistan dated 12.01.2018 No. PQ-3616 "On Additional Measures", dated 08.20.2018 PQ-3910 "On Measures for More Effective Use of Existing Opportunities in the Coir Industry in the Republic" - dated 04.12.2018 "On additional measures to support the rapid development of the cocoon industry in the Republic" No. PQ-4047 dated 31.07.2019 "In the cocoon industry Decision No. PQ-4411 of 02.09.2020 "On additional measures for the development of deep processing", "Organization of the Committee for the Development of Silk and Wool Industry of the Republic of Uzbekistan" PQ-4817, dated July 8, 2021, PQ-5178- and decree No. PF-6059 dated September 2, 2020 "On measures to further develop cocoon and cattle breeding in the Republic of Uzbekistan", decree No. PF-6259 dated July 8, 2021.

LEVEL OF STUDY OF THE PROBLEM. Chlorella, found in both fresh and salt water, is a single-celled green microalgae ranging in size from 2 to 10 microns in regions where spirulina occurs. Interest in chlorella and spirulina has been widely studied by scientists in various fields.

Chlorella was discovered in 1890 by the Dutch biologist Beyerinkom. Its unique rapid reproduction ability has attracted the interest of scientists and politicians, and the main thing is its richness in nutrients (proteins, vitamins, minerals, amino acids and chlorophyll).

In 1948, the Stanford Research Institute (USA) demonstrated that chlorella could be produced in large quantities. The researchers found that chlorella was difficult to grow and that beneficial nutrients were depleted when processed.

Chlorella has high nutritional value. 100 grams of meat contains 6 g of protein, 50 g in chlorella, 12% in wheat, and more than 50% in chlorella.

THE PURPOSE OF THE STUDY. Determining whether the use of biologically active substances, i.e., microalgae, in the field of sericulture leads to higher efficiency and increased productivity.

TASKS OF RESEARCH. In the process of mulberry silkworm care, in order to increase the nutrition of mulberry leaves, to study the nutrition of the microalgae suspension when sprinkled on the leaves and to determine the effect of the silkworm on the worm period.

Silkworms are very susceptible to diseases. As a result, the number of cocoons decreases and the quality decreases. In order to overcome these shortcomings, the disease resistance and viability of silkworms were studied when biologically active substance microalgae were added to the silkworm feed.

THE OBJECT OF THE STUDY. At Tashkent State Agrarian University "Silk and Tobacco" department scientific research work was carried out according to options. During the research, Ipakchi-1 x Ipakchi-2 hybrids were selected. From mulberry varieties, Uzbek, Pioner, Tajik seedless mulberry and hybrid mixed mulberry leaves were used. Chlorella microalgae was used in the experiment. Microalgae are very resistant to the external environment. Organisms that can quickly multiply and create large biomass and store the largest amount of protein in their bodies were taken into account. In addition, it was selected for its ability to store macro and micro elements needed during life.

Favorable natural climatic conditions in our country allow us to properly continue the rich cultural and historical heritage in the field of silk production and further develop cocooning in the territory of our republic. Today, more than 450,000 boxes of silkworms are taken care of and 26,000 tons of cocoons are grown annually due to existing 80 million rows of mulberry trees, 51,000 hectares of mulberry orchards.

MICRO ELEMENTS IN CHLORELLA

Ca(kaltsiy)-49,5 mg
Fe(temir)-102.0 mg
I(yod)-0.9 mg
Mn(marganets)-4,26 mg
K(kaliy)-688,0 mg
Na(natriy)-54,55 mg
Mg(magniy)-10,36 mg
Zn(sink)-2,3 mg
Se(selen)-0,01 mg
Xlorofill-1,98 mg



The demand for microalgae began to increase from the 60s of the 20th century. Developed countries are beginning to study this object in depth, however, microalgae are currently one of the least studied objects of biotechnology.

Signs and characteristics of agricultural plants and animals are manifested under the mutual influence of genetic factors and external environmental conditions. Each animal or plant requires certain conditions to grow, develop and realize its potential. External environmental factors include food, temperature, humidity, light, air exchange. These factors individually or together determine the productivity level of the organism. Microalgae, as the name suggests, have a unicellular and multicellular microscopic state, and these living organisms cannot be seen with the human eye. These organisms can only be seen with the help of a microscope. Nevertheless, these living organisms have a deep history of 3.5 billion years, and these organisms were the first on earth to convert CO₂ contained in the air into O₂ oxygen through the process of photosynthesis, creating conditions for the existence of living beings. These organisms mastered the process of photosynthesis and became the basis for the historical and future steps that mankind and all living creatures began. This has made these organisms adaptable to various conditions over a long period of time.

Since the 80s and 90s of the last century, the predictions of world scientists that "the 21st century will be the century of biotechnology" have been confirmed by many examples. The world of microorganisms, which is the source of its great achievements, is the basis of the developed, modern science of biotechnology. Therefore, let's think about what we should pay attention to for the development of small organisms.

Ipakchi 1 x Ipakchi 2 hybrid silkworm, common in the territory of the Republic of Uzbekistan, was selected as the source of the experiment. These silkworms were recommended by the scientists of the Scientific Research Institute of Silk Production of Uzbekistan. The experiment was conducted at the Silk and Tufting Department of Tashkent State Agrarian University. Since the ideal temperature for silkworms is 24-27 degrees, we set the room temperature to 26 degrees. The humidity level was kept moderate at 65-75%. During the research period, the interval between feeding silkworms was 2 hours. Chlorella microalgae was given to silkworms 30 minutes before leaf feeding, after the water had dried up a little.

On April 21 at 14:00, we started giving the first leaf to all options. The experimental and control variants were all given the same normal leaf in the first year of life in all repetitions. On April 25, from the second year of life, we started to spray the same chlorella suspension on the leaves of experimental variants 1 and 3 replicates. The worms

we chose for our experiment are Silkworm 1x Silkworm 2 hybrids. We continued the maintenance of the experimental variant to the second variant and the control variants with normal leaves.

On April 29, the third age began, when we started spraying the first and second options with the same amount of chlorella suspension.

The fourth age started on May 5, we continued to spray the 1st and 2nd options 3 times with the same amount of chlorella suspension per leaf. The control option was given a simple leaf.



ИПАКЧИ 1X ИПАКЧИ 2DURA GAYI (2 YOSHDAN BARGIGA XLORELLA SEPIB BERILGAN VARIANT) The fifth age began on May 13, we continued to spray the same chlorella suspension on the leaves of the experimental option 3 times, and on May 18, the first worms began to hatch.



The results obtained from the experiment showed that from the second age, when mulberry silkworms of Ipakchi 1 x Ipakchi 2 hybrid were sprayed with chlorella suspension, they began to emerge on the 27th day and started cocooning 3 days earlier than the control option.

The life expectancy of the researched Ipakchi 1x Ipakchi 2 hybrid, which was sprayed with chlorella on the leaf from 2 years of age, was determined.

Table 1

№ Tajriba olib borilgan duragay nomi	birinchi yosh		Uyqu kun	ikkinchi yosh		Uyqu kun	uchunchi yosh		Uyqu kun	turtinchi yosh		Uyqu kun	beshinchi yosh		Dastaga chiqqan kun
	Birinchi barg soati	Oxirgi barg soati		Birinchi barg soati	Oxirgi barg soati		Birinchi barg soati	Oxirgi barg soati		Birinchi barg soati	Oxirgi barg soati		Birinchi barg soati	Oxirgi barg soati	
Ipakchi 1x Ipakchi 2 2 yoshdan bargiga xlorella sepi berilgan	21.04. 22 14:00	23.04. 22 18:00	1	Xlor ella 25.04. 22. 12:00	28.04.2 20:00	1	29.04. 22. 18:00	3.05. 22. 10:00	1 5	5.05. 22. 16:00	11.05. 22. 06:00	2	13.05. 22. 08:00	18.05. 22. 08:00	27 kun
Ipakchi 1x Ipakchi 2 Nazorat Oddiy barg bilan boqilgan	21.04. 22. 14:00	23.04. 22. 18:00	1	25.04. 22. 12:00	28.04.2 22:00	1	29.04. 22. 18:00	3.05. 22. 10:00	1 5	5.05. 22. 16:00	12.05. 22. 06:00	2	14.05. 22. 08:00	22.05. 22. 08:00	31 kun

CONCLUSIONS

1. The results obtained from the experiment showed that from the second age, Ipakchi 1x Ipakchi 2 hybrid mulberry silkworms were sprayed with chlorella suspension on the 27th day, and started cocooning 3 days earlier than the control version.

2. When determining the viability of the researched Ipakchi 1x Ipakchi 2 hybrid during the larval period and before cocooning, it was found that it was 94% in the 1st option, 88.4% in the 2nd option, and 79.2% in the control option.

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