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THE EFFECT OF THE AMOUNT OF BASIC AMINO ACIDS CONTAINED IN THE SILK LIQUID SYNTHESIZED IN THE SILK GLAND OF THE MULBERRY SILKWORM ON THE PROPERTIES OF SILK FIBER

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Abstract
It is known that the production of silk from the important physiological and biochemical processes in the body of the mulberry silkworm and its synthesis and release is an extremely important stage of the process of protein metabolism in mulberry silkworms. In this case, by the time the silkworm is 5 years old, after the silkworm is fully formed, it spends a lot of protein and a lot of energy in the silkworm's body to produce silk fibers. In order to create hygrothermic conditions as a protective shell for the umbilical period, the larva performs the task of secreting a special silk fluid in the cocoon, relying on the biological indicators of the silk gland..

Keywords: Mulberry silkworm, breed, hybrid, fertile, nutritious mulberry leaf, body parameters, silk gland weight, size, larval age 5, silk gland, silk gland activity, fluid bladder, lion's gland, squeezing apparatus, silk liquid, fibroin, sericin, silk fiber, chemical elements, amino acids, amount, fiber length, warp, metric number.

In response to this, we focused our next research on how the parameters of the silk gland, an organ that produces silk fluid in the body of the worm, changes depending on the age of the larvae.

In fact, the silk gland is the second pair of salivary glands that have changed in shape. It is a double tubular organ, almost clear, swollen, very light amber (pale yellow), sometimes more green in color (Fig. 1). This gland is located on either side of the worm's body cavity and just below the midgut. Each part of the gland begins with a secretory section, followed by fluid

ducts from the fluid bladder, which join the secretory tube located on the lower lip of the oral apparatus.

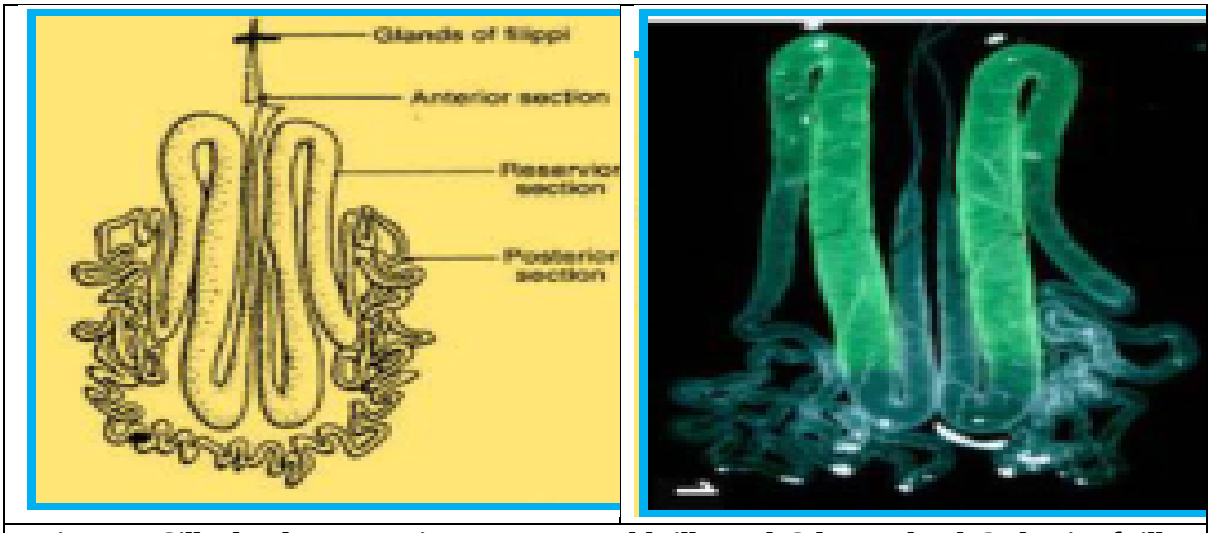

Figure 1. Silk gland: 1-squeezing apparatus odd silk road; 2-lyone gland; 3rd pair of silk roads; 4-liquid bubble (reservoir).

However, from the moment the silkworm larva hatches, its development is linked to the larva, as its body grows, and its weight and size increases from year to year. These indicators of the silk gland are mainly at the age of five, increasing dramatically and synthesizing silk fluid (Table 1).

Table 1 Increasing silk gland parameters during the fifth instar larva

Days of larval age	Still meringue			
	weight, mg		volume, sm^3	
	Ipakchi-1 zoti	Ipakchi-2 zoti	Ipakchi-1 zoti	Ipakchi-2 zoti
1st day	100	102	0,102	0,104
2nd day	220	230	0,200	0,210
3rd day	430	452	0,360	0,400
4th day	500	550	0,630	0,670
5th day	730	735	0,970	1,010
6th day	810	845	1,135	1,180
7th day	1040	1080	1,220	1,260
Before wrapping the cocoon	1450	1500	1,470	1,520

In these experiments, the worms were kept under the same conditions, i.e., air temperature, humidity, feeding area, amount of food, and light were in moderation. After the worms reached the fifth age, 10 worms from each breed were taken, the silk gland was removed from their body, and its biological indicators were determined.

The data in Table 1 show that the weight and size of silkworms of 5-year-old worms increases day by day. For example, on the first day of the 5th year, the weight of the silk gland was 100-

102 mg, and the volume was 0.102-0.104 cm3, on the 3rd day, the weight was 430-452 mg, the volume was 0.360-0.400 cm3, 5 on the first day, the weight is 730-765 mg, the volume is 0.970-1.010 cm3, and finally, before cocooning, the weight is 1450-1500 mg, and the volume is 1.470-1.520 cm3, compared to the first day, the weight is 1350- 1400 mg, it was found that the volume increased to 1.368-1.416 cm3. When the obtained data were compared, it was found that the indicators of the silk gland were the highest before cocoon wrapping (filling with silk liquid), that is, compared to the first day of the fifth year, its weight was 14.5- The size f 14.7 was determined to increase 14.4-14.6 times.

Figure 2. The process of separating the silk gland from the body of a 5-year-old larva.

As mentioned above, the silkworm grows larger every time it eats a leaf during the 5th year. In this case, the daily growth of the larva's body was studied in the fifth year, and the weight and size of the silk gland increased during the fifth year compared to the index on the first day. given in the table.

Table 2 Increase of silk gland indicators during the 5th year compared to the first day (how many times)

Indicators of the silk gland	Days of the fifth larval instar						
	2nd day	3rd day	4th day	5th day	6th day	7th day	Before wrapping the cocoon
Ipakchi-1 zotida							
Weight	2,20	4,30	5,10	7,30	8,10	10,40	14,50
Volume	1,96	3,53	6,18	9,51	11,13	11,96	14,41
Ipakchi-2 zotida							
Weight	2,30	4,40	5,40	7,50	8,20	10,60	14,70
Volume	2,02	3,85	6,44	9,71	11,35	12,12	14,62

Figure 3. The process of measuring the weight and size of the silkworm according to the days of the 5th year of the silkworm.

In fact, silkworms have been found to develop extremely rapidly during their fifth instar. On the second day of the fifth year, the weight of the silk diaper is 2.20-2.30 times, the volume is 1.96-2.02 times, on the third day, the weight is 4.30-4.40, the volume is 3.53-4 ,40 times, on the fourth day weight 5.10-5.40, volume 6.18-6.44 times, on the fifth day weight 7.30-7.50, volume 9.51-9.71 times, on the sixth day the weight is 8.10-8.20 times, the size is 11.13-11.35 times, on the seventh day the weight is 10.40-10.60 times, the size is 11.96-12.12 times 14.50-14.70 times weight and 14.41-14.62 times increase in volume was observed.

So, silk liquid is a thick, stretchy liquid that is synthesized based on the activity of a special silk gland. As this fluid exits the worm's body, it reacts with oxygen and takes the form of fiber. The silk glands that produce this liquid are a pair in the body of the worm, and the silk of the cocoon formed from the liquid released from them consists of two fibers, and these fibers are connected to each other evenly and very carefully.

Each silk fiber is composed of pure silk fibroin and a thin membrane surrounding it, a viscous (glue-like) substance called sericin, and 70-80% of this liquid in the silk gland is fibroin and 20-30% sericin. constitutes

Until now, almost no scientific researches have been carried out on the specific content of fibroin and sericin in silk fluid of new breeds or hybrids of mulberry silkworm.

Only some literature mentions which elements are more abundant in fibroin and sericin. Taking this into account, we conducted scientific research work according to the plan based on the program in order to collect new information about the silk fluid and its structural structure in silkworm biology and managed to collect some information in the first years. Therefore, we will present information on the comparative analysis of the results of scientific research on the structural structure of silk liquid. .

So, the fibroin substance that forms the basis of the cocoon is composed of non-sulfur protein bodies, and its molecular structure consists of very complex amino acid residues. The amount of sericin and other substances was studied in the section of options:

Ipakchi-1
Fibroin-73-74%
Seritsin-22-23%
Mumsimon zaharli
Moddalar-2,4-2,5%
Mineral moddalar-1,2-1,3%
Pigment va boshqa moddalar-0,2-0,4%

Ipakchi-2
Fibroin-74-75%
Seritsin-21-22%
Mumsimon zaharli
moddalar-2,5-2,6%
Mineral moddalar-1,1-1,2%
Pigment va boshqa moddalar-0,2-0,4%

Taking into account the importance of the information obtained above, we determined the main types of amino acids in the silk liquid and their quantitative indicators on the third and fifth days of the 5th year of the silkworm and before cocooning (8th day). Determining the compositional structure of silk liquid was carried out at the Scientific Research Institute of the Chemistry of Plant Substances. For this purpose, on the 3rd, 5th, and 8th days of the 5th year, silkworms were taken to the laboratory of the institute, where the silk glands were surgically removed and examined.

Accordingly, during the course of the experiments, when the structure of the fibroin molecule was studied, it was found for the first time that the following elements are among the most important amino acids included in natural protein substances, and it was found that the silk liquid contains the following main amino acids (Table 3).

Table 3 The group and amount (%) of the main amino acids in silk fluid.

№	Order of amino acids	of the larva 5 years old 3rd day	of the larva 5 years old 5th day	of the larva 5 years old 8th day	Explanation
	Ipakchi-1 va Ipakchi-2 zotlarida				
1.	Asparagin	0,35	0,36	0,48	In practice, it consists of both breeds Based on the ratio of larvae from 10 pieces
2.	Treonin	0,30	0,29	0,45	
3.	Serin	0,27	0,28	0,42	
4.	Glutamin	0,37	0,36	0,58	
5.	Promin	0,19	0,27	0,35	
6.	Glitsin	0,20	0,21	0,34	
7.	Alanin	0,24	0,23	0,34	
8.	Sistein	0,21	0,22	0,72	
9.	Valin	0,33	0,33	0,42	
10.	Metionin	0,48	0,47	0,68	
11.	Izoleysin	0,45	0,43	0,63	
12.	Leysin	0,43	0,42	0,67	
13.	Tirozin	0,59	0,71	0,93	
14.	Fenilalanin	0,64	0,70	0,74	
15.	Gistidin	0,43	0,48	0,76	
16.	Lizin	0,10	0,38	0,71	
17.	Arganin	0,10	0,33	0,70	
Total:		**Ye 5,68%**	**Ye 6,47%**	**Ye 9,92%**	

As can be seen from the data in this table, there are 17 of the most important amino acids in the silk fluid, and we can see that their quantitative indicators gradually increased until the last day of the 5th year. In particular, these main substances made up 5.58% on the 3rd day of the 5th year, while before cocoon wrapping, this indicator was equal to 9.92%, which is an increase of 4.24% compared to the 3rd day. It turned out.

In fact, such a change in the composition of the silk fluid increases the softness, thinness, hardness and strength of the silk fiber, as a result, the silk fluid coming out of the worm's body quickly hardens into fiber and forms a high-quality cocoon.

In conclusion, the maintained silkworm at the end of the larval period, through the rapid development of the silk secretory gland, which synthesizes the silk liquid necessary for cocooning, and the main activity of the silkworm, at the end of the effective cocooning process, chemical properties due to the accumulated amino acids in the larval body. it is possible to grow seripak cocoons and obtain silk fiber with high technological properties.

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