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# Study of Seritsin Protein Release Depending on the Characteristics of Cocoons

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**ABSTRACT:** Saracen yield was studied depending on the color of the cocoon and the method of unwinding, and it was found that the yield of saracen was 22.28% from white cocoons, 24.20% from yellow cocoons, 16.91% by floating method, 16.79% by submerged way. The release of saracen in parts of the shell of cocoons differed from each other and took place by 31.03% from the upper part, 20.08% from the middle part and 19.32% from the inner part. A method for extracting saracen from the shell of cocoons has been developed and recommended for their use in perfumery.

**KEYWORDS:** Cocoon, Saracen, Ipakchi-1x Ipakchi-2, Mechenniy-2 x Mechenniy-1, Uzbekistan-6.

## I. INTRODUCTION

All aspects of the silk production and processing industry produce fibrous and non-fibrous wastes along with raw silk. Types of fibrous wastes include loose, cocoon husks, seed cocoons, unwashed and unripe cocoon shells, which are the raw materials for silk spinning. Fiber-free wastes include invisible wastes and sponges dissolved in water.

Currently, the use of silk products in the world market not only in textiles and machinery, but also in medicine, food and perfumery, and their demand is growing. At the national level, the isolation of proteins and fats from cocoons and their use in the production of medicines, increasing the color of food, in the production of perfumes have been little studied.

The development of methods for the extraction of sericin from cocoons or their wastes and the expansion of the range of silk products through the provision of recommendations for their use in medicine, food and perfumery is a topical issue. The research work is to develop a method of separating sericin from cocoons in the production of raw silk and to expand the range of silk products by providing recommendations on the use of the obtained sericin. The task was to develop a method for the separation of sericin from cocoons.

## II. ANALYSIS OF EXISTING FILTERING MATERIALS AND RESEARCH RESULTS

To determine the swelling of the cocoon shell, the samples taken are weighed and immersed in the prepared water or solution. After the sample is removed from the liquid at a specified time interval and lightly pressed with printing paper, the added weight is determined.

Samples are made from cocoon shells of known breed and hybrid. The slight solubility of sericin is determined by the amount of substances released by boiling the shell in water for 7.5 min. The water permeability of the cocoon shell is determined by the time constantly observed for the passage of a given volume of liquid over the sample taken.

The sample taken is cut from the cocoons and separated from the sponge. The cocoon shell is then boiled at 100°C for 2 hours. The fibrous part is separated and the aqueous part is evaporated. The dehydrated sericin crystal is pulverized into a powder.

### III. EXPERIMENTAL RESULTS

Saracen is a high-molecular-weight protein compound that exhibits a heterogeneous and unstructured mass, with large amounts of small globular and small amounts of febrile molecules. The globular structure is not the same. Saracen is not a stable compound. Its physic-mechanical and chemical properties, storage conditions depend on the initial and subsequent processing.

Sericin is insoluble in alcohol, ether, acetone, gasoline, and similar solvents, but is soluble in water, aqueous solutions of alkalis and acids.

Water enters the sericin, causing it to swell and dissolve. The dissolution of sericin is explained by the abundance of polar groups in its chain. Sericin does not have a critical melting point, it is conditioned by polydispers molecules.

The shorter and longer sericin molecules are more abundant in the upper layers of the shell, so the sericin in the upper layers of the cocoon begins to melt at a temperature of 70<sup>0</sup>C. The inner layers melt at temperatures of 80<sup>0</sup>C and above. The uniform distribution of the polar groups in the elemental chain of sericin significantly facilitates hydration and breakage of individual parts of the chains. The slight solubility of sericin was determined by the amount of substances separated from the shell layers by boiling in water. In the study, the release of sericin on the cocoon shell parts was studied. The cocoon shell was cut into three parts and the sericin output was checked by boiling in water.

Table 1  
Output of sericin on cocoon shell parts

Shell parts	Amount,%
High	31,03
Medium	20,08
Internal	19,32

The results showed that the upper layer differed from the middle and inner layer, the content of sericin in the upper layer was 11.7% higher than in the inner layer.

The cocoons are white in color and have different color tones. The colors in the cocoon are present in the sericin layer. The presence of different colors in the cocoon depends on their breed and hybrids. In the study, the effect of color reflections on the cocoon to sericin output was determined.

Table 2  
The release of sericin on the color tones in the cocoon

Types of cocoons	Saracen content,%
White cocoon	22,28
Raw silk from white cocoon	22,01
Yellow cocoon	24,20
Raw silk from yellow cocoon	23,13

From the results obtained, we can see that the yield of sericin from white cocoon is 1.92% lower than that of yellow cocoon. However, we can see that the sericin output also differs in cocoon shell and raw silk. The lack of sericin in raw silk is explained by the fact that it is treated with water and a certain part is dissolved in water.

Different breeds and hybrids are grown and regionalized in the regions. Of course, the external environment and weather conditions affect them. Accordingly, the yield of sericin from different hybrid cocoons was determined. According to the state standard for dry cocoons are divided into 1st, 2nd grade, gradeless and non-standard cocoons depending on the quality of the shell. In the study, sericin was obtained from 2 types of 1st grade and non-grade double-mushroom cocoon shells.

Table 3  
The release of sericin on different hybrid cocoons and their varieties

Cocoon hybrids:	Saracen content,%
Ipakchi-1x Ipakchi-2	21,73
Mechenniy-2 x Mechenniy-1	22,00
Uzbekistan-6	25,69
Cocoon varieties:	Saracen content,%
1-grade cocoon	21,51
Double mushroom cocoon	25,80



The results show that the yield of sericin was 21.73% from Ipakchi-1xIpakchi-2, 22.0% from Mechenniy-2xMechenniy-1, 25.69% from Uzbekistan-6. We can see that this varies by 3.9% across hybrids. It was found that double-cocoon cocoons yield 4.29% more than cocoon cocoons. This is the information needed in the selection of raw materials for the separation of sericin. Cocoon washing technology is based on the use of water as a softener and solvent for sericin, as well as in this environment, the ends of the cocoons are searched and washed. Water is a good solvent active technological environment and responds well to demand in cocoon washing. Glubular protein - sericin is slightly soluble in water and swells.

In our study, the amount of sericin in the water extracted from the mechanical cocoon washing powder, the evaporating boiler and the evaporator for automatic cocoons was checked.

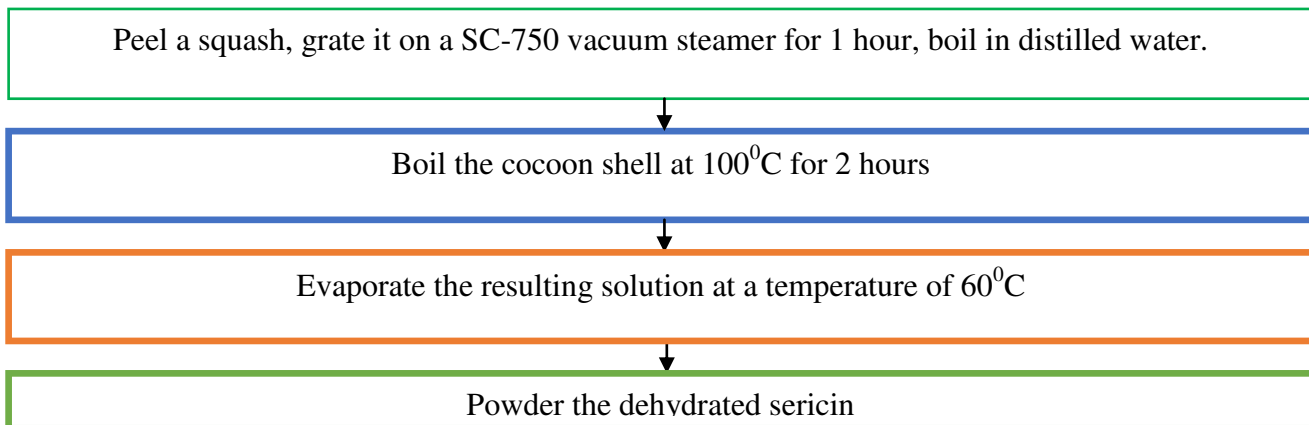
Table 4  
Release of sericin into water during cocoon washing

Where the cocoon is	Saracen content, %
Mechanical cocoon washing machine washing powder	1,51
Steam boiler	3,2
Automatic cocoon spinning machine for the production of steamed cocoons	10,2

The high content of sericin in the wastewater from the machines used to prepare steamed cocoons for the automatic cocoon washing machine causes them to be spilled once a week. We can see that the amount of sericin in the remaining wastewater is low.

In order to separate sericin from the cocoon in the study, the experimental sample cocoons were cut and cleaned from the cocoon. The cocoon shell was then boiled at 100°C for 2 h. The fibrous part was separated and the aqueous part was evaporated. The dehydrated sericin crystal was pulverized and pulverized.

Sequence of sericin separation from cocoon shell



IV. CONCLUSION AND FUTURE WORK

The resulting sericin powder dissolves well in water. Demonstrates protein reactions. When determining the content of sericin: 8.01% water; 16.19% nitrogen; 1.26% ash was found.

Sericin is characterized by high oxyamino acid production, especially serine. It is higher in the series of dicarboxylic amino acids and diamino acids than fibroin, but also contains the sulfur-containing amino acid cystine. The presence of such amino acids allows the use of sericin in various directions, especially in the direction of perfumery.

According to the research work, sericin production was studied based on the properties of cocoons and environmental conditions, a method of obtaining sericin from cocoon shell was developed and recommendations for their use in the perfumery industry were given. Of course, as a result, there will be an opportunity to expand and improve the quality of this range in the country.



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