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Improvement of the Method for Unloading Cocoons

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ABSTRACT: The article studies the production of surfactants from secondary resources for controlling the wettability of the cocoon shell. The concentration of surfactants was chosen to improve the permeability and swelling of cocoons. The use of the substance during unwinding has been revealed, which leads to an increase in the yield of raw silk and a decrease in the specific consumption of cocoons.

KEY WORDS: cocoon, raw silk, wetting, water permeability, surface-active substance, unwinding, secondary waste.

I.INTRODUCTION

One of the main challenges facing silk production is the rational use of cocoon raw materials. For this purpose, it is necessary to improve methods for separating a larger volume of raw silk from cocoons, thereby reducing the yield of waste. This problem cannot be solved without the use of high molecular weight chemical compounds. The correct choice of surfactants facilitates technological processes, increases labor productivity, reduces the consumption of raw materials and improves the physical and mechanical properties of silk.

Many modern wetting control methods are based on the use of surface-active substances (surfactants) corresponding to various technological processes. The use of surfactants to protect against various factors and improve the permeability of the cocoon shell, that is, to soften the adhesion of the fibers give good results [1,2]. These substances are used as micro additives in the processes of unwinding and storing cocoons. But they are not fully understood on a scientific or practical basis.

II. SIGNIFICANCE OF THE SYSTEM

In order to obtain surfactants based on the waste of the biochemical plant of the stillage fraction, the IR spectrum and its characteristic frequencies were analyzed. It was revealed that the bard contains carboxyl, hydroxyl and amino groups. In order to improve the processing of cocoons and create a waste-free technological process, a substance was synthesized from the waste fraction of the residual stillage of the hydrolysis plant.

IR spectroscopic analysis determined that the substance contains hydroxyl, carboxyl groups, which indicates that surfactants can be obtained from vinasse and used in the processing of cocoons. In the study of physicochemical properties, the determination of surface tension plays an important role, since the surface activity of surfactants is characterized in this way. The dependence of the surface tension of surfactant solutions on the concentration and temperature was studied.

The results of the study showed that with an increase in its concentration, the surface tension of water decreases, and good results are observed for a 1.6% solution of BG. When studying the physicochemical properties of surfactants, it was revealed that the temperature has a great influence, the surface tension of the liquid decreases with increasing temperature.

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The effect of the new surfactant on the wettability of the cocoon shell was investigated. In this case, various concentrations of surfactants were used. A study of the wettability of the cocoon shell showed that when using control water, the wettability angle was 1200, and when treated with a 1.6% solution of BG, it was 64^0 (Fig. 1.).

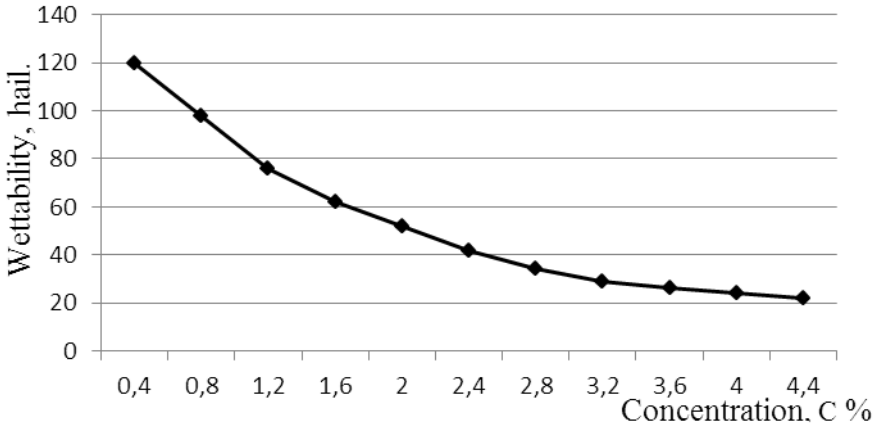

Fig 1. The effect of surfactant concentrations on the wettability of the cocoon shell

The experimental curves characterizing the dependence of wettability on concentration are approximated by the following equations:

$$y=6,935\ x^2 -55,741\ x+137,558$$

where: y-wettability; x concentration

III. LITERATURE SURVEY

From the results obtained, the following conclusions can be drawn: an improvement in the degree of wettability of the cocoons facilitates their unwinding, increases the yield of silk, does not adversely affect its quality.
The permeability of the shell is a major factor in the unwinding process. Water permeability is influenced by thickness, density, thickness of the shell and the temperature of the medium [3].

Due to the unevenness in the thickness and zones of the cocoon shell under ordinary technological conditions, the yield of raw silk is less than expected. To solve this problem, the effect of synthesized substances on the water permeability of cocoons was studied.
(table 1.).

As a result, the water permeability of cocoons improves with increasing concentration. The effect of a 2.4% solution of BG is practically no different from a 1.6% solution. Thus, for further experiments it is advisable to choose its 1.6% solution.

As noted above, for good wettability, water permeability and parking time plays an important role.

IV. EXPERIMENTAL RESULTS

It is implemented on a training dataset consisting of five legitimate messages and five spam message. The true rate and Upon receipt of raw silk, dry cocoons are steamed, due to which there is a swelling and dissolution of sericin. In the process of obtaining raw silk, cocoons are processed with hot water. The degree of swelling and dissolution of sericin depends on temperature, pH of the medium, the presence of various salts and additives in the liquid, and the processing medium. The best unwinding of cocoons is achieved by uniform swelling of sericin. It is known that in every physicochemical processes the role of temperature is great and its increase leads to a certain acceleration of swelling

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[4,5]. The effect of temperature on the dissolution and swelling of sericin during unwinding of raw silk from cocoons was studied. The effect of the new synthesized surfactant on the degree of swelling of cocoons in the laboratory was studied (table 2.).

Table 1.

The dependence of the permeability of cocoons on the concentration of surfactant solutions

The concentration of the solution,%	Permeability of surfactant solutions from untreated cocoons, ml / cm 2c	Square deviation σ, %	Coef. variations. C, %	Validity error, %	Permeability of water from treated cocoons, ml / cm 2c	Square Deviation σ, %	Coef. variations. C, %	Validity error, %
The control								
0,0	0,444	0,01	2,25	± 0,004	0,544	0,01	1,83	± 0,004
Substance BG								
0,4	0,737	0,020	2,70	± 0,009	0,883	0,018	2,03	± 0,009
0,8	0,966	0,021	2,17	± 0,009	1,197	0,021	1,75	± 0,009
1,6	1,001	0,024	2,39	± 0,010	1,294	0,026	2,00	± 0,010
2,4	1,007	0,021	2,58	± 0,010	1,491	0,022	1,47	± 0,010
4,0	1,094	0,022	2,01	± 0,009	1,501	0,028	1,86	± 0,009

Table 2.

Swelling of the shell in surfactant solutions not treated and in water treated surfactants

Title ,% / Environment		Mass of cocoon before swelling M_0, мg.	Cocoon mass after swelling M, мg.	Point quality swelling K, %	Square deviation σ,%	Coef. variations. C, %	Validity error, %
Water	Cocoons treated with 1.6% BG	1,700	4050	139	0,041	2,88	± 0,02
In BG solution	Unprocessed cocoons	1200	2500	108	0,061	2,91	± 0,027

Based on the results, the following conclusions can be drawn: the swelling process at temperatures between 200C and 60°C is a normal temperature, at a temperature of 60-80°C the swelling of the shell is accelerated, which leads to the complete dissolution of sericin on the outside and difficulties in finding a single thread; over time, the absorbed surfactant does not mix with the macromolecules of the cocoon shell, but is absorbed in the open between the macromolecules; it was observed that cocoons treated with surfactants swell better in water than untreated ones. The

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results obtained by studying the swelling in water of treated cocoons with a synthesized new substance are given below (Fig. 2).

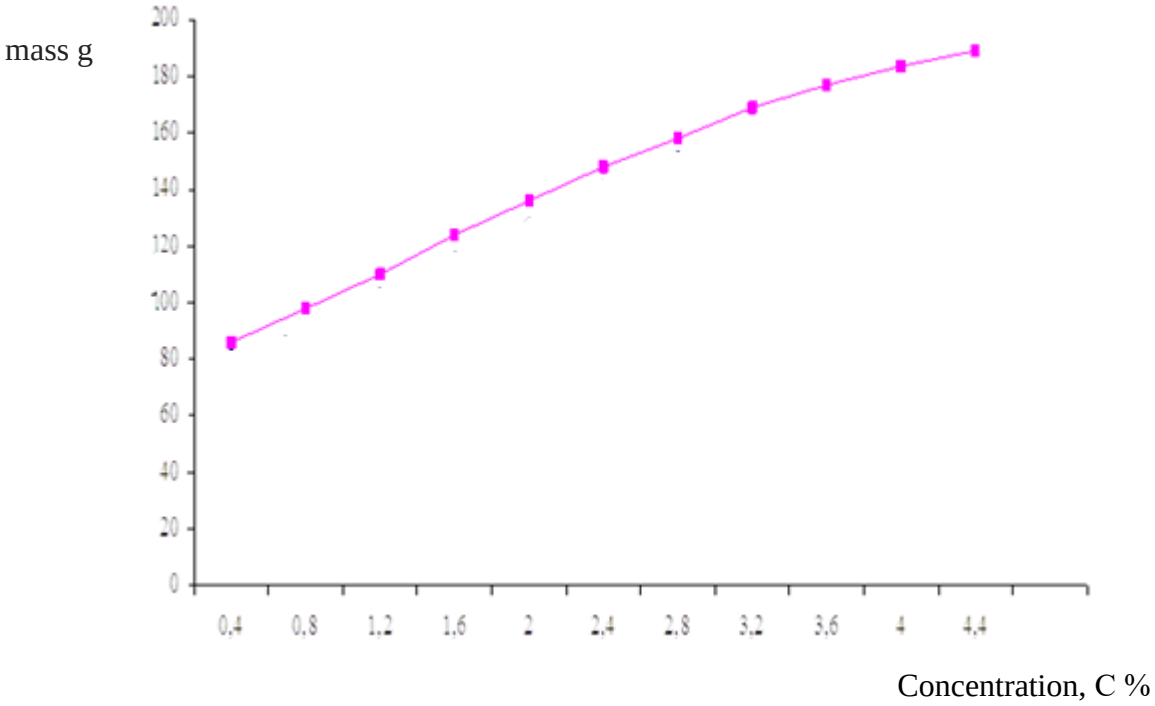

Fig. 2. Swelling of cocoons treated with BG in water

For substance BG: $y= -2,142x^2+36,143x+61,382$

Where: y-wettability; x concentration

When studying the effect of swelling of cocoons in BG solutions of different concentrations at the same temperature, it was found that in small concentrations the solution is little absorbed in free spaces.
In general, 1.6% and 2.4% solutions according to swelling showed good results, and in the solution, the swelling rate increased with high concentrations. Based on the results obtained on the swelling of cocoons of treated surfactants, the corresponding lines were drawn in water and the equations of these boundaries were found.

It was noted that the swelling of cocoons treated with surfactants is better than untreated.
The following conclusions can be drawn from this:
- when cocoons swell in a surface-active solution, temperature plays an important role;
- with an increase in the concentration of surfactants, the degree of swelling naturally also increases;
- in high concentrations of surfactants, sericin completely swells, dissolves, which leads to negative circumstances during the processing of cocoons.

When using surfactants having close groups to polar groups of silk macromolecules should not adversely affect the quality, physical and mechanical properties, hygiene requirements and other properties of raw silk. In laboratory conditions, the effect of substance BG on the yield of raw silk was investigated (Table 3.).

From the results it was found that up to 4% concentration of surfactants increases the yield of silk. With a 4% solution of the substance BG, the cocoons were steamed and, naturally, the yield of raw silk decreased, and the yield of tear increased. The influence of a 2.4% solution is almost identical to a 1.6% solution; therefore, a 1.6% solution was chosen.

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Table 3.
Raw silk output using different concentrations of surfactants in the cocoon processing process

Solution concentration %	Silk and waste output %			Silkiness, %	Specific consumption kg	Square deviation σ,%	Coef. variations. C, %	Validity error, %
	Raw Silk	Rip off	Odonons					
The control								
	28,4	9,1	10,1	47,6	3,2	0,6	2,1	± 0,39
Substance B								
0,01	31,20	9,2	9,2	49,6	3,2	0,71	2,27	± 0,46
0,4	33,60	8,6	7,5	49,7	3,0	0,78	2,32	± 0,50
0,8	35,80	7,4	6,7	49,9	2,8	0,78	2,17	± 0,50
1,6	37,20	5,8	6,7	49,7	2,7	0,63	1,69	± 0,41
4,0	35,20	7,1	7,6	49,9	2,8	0,68	1,93	± 0,44

VI. CONCLUSION AND FUTURE WORK

The use of the BG substance during unwinding led to an increase in the yield of raw silk and a decrease in the specific consumption.

If cocoons are processed with BG and then unwound, high results are obtained. This leads to an increase in the yield of raw silk due to a decrease in the yield of tear and odon. Based on the results, the use of the substance BG has led to positive results, which makes it possible non-waste technology.

REFERENCES

1. Islambekova N.M., Karimov Sh.I., Abduazimov Sh.B. Swelling and dissolution of sericin cocoon shell. / Textile problems. Tashkent. 2010. -№2.-s. 57-60.
2. Islambekova N.M. Umurzakova H.H. Improving the properties and improving the unwinding of defective cocoons. // Science and World International Scientific Journal.-Volgograd-2014, Volume 1.-No.10 (14).
3. Islambekova N.M., Azamatov U.M. The influence of water hardness on the unwinding cocoons.// The way of science. ISSN 2311-2158. -2018. -№4 (50) p.23-27.
4. Islambekova N.M. Wettability of cocoon shell modified with surfactant. // Composite materials.- Tashkent.-2010.-№4.-s-6-9.
5. Islambekova N.M., Azamatov U.N., Akhmedov J.A., Haydarov S.S., Yusupkhodjaeva G.A., Muxiddinov N. Investigation of Unwinding Speed Based on the Process of Separating the Thread from the Surface of the Cocoons. IJARSET Vol. 6, Issue 5, May 2019 9136-9142 India
6. S.U. Patxullayev, N.M. Islambekova, M.Kulmetov, T.A. Ochilov, Z.F. Valieva. Determination of the quality characteristics of fibers obtained from mulberry bark. Jurnal of recent texnology and engineering (IJRTE), ISSN: 2277-3878. Volume-8 Issue-5, Janury 2020. Page No 5 5647-5651.

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