European Scholar Journal (ESJ)
Available Online at: https://www.scholarzest.com
Vol. 2 No. 3, March 2021,
ISSN: 2660-5562

ELEMENTS OF THE PROCESS OF COCONOMATION AFFECTING THE QUALITATIVE CHARACTERISTICS OF RAW SILK

Ochilova Dilafruz Mukhidinova - Master's student,
Asrarov Gabdurashid Gaznoevich - Candidate of Technical Sciences, Scientific Supervisor,
Narmatov Elmurod Avazovich - Doctor of philosophy in technical sciences (PhD)
(Tashkent Institute of Textile and Light Industry)
normatov-elmurod@mail.ru +998901339588

Article history:

Received: 28th February 2021
Accepted: 7th March 2021
Published: 28th March 2021

Abstract:

The article is devoted to the study of the influence of the elements of the cocooning process on the quality indicators of the produced raw silk. It was revealed that the influence of cocoon steaming, shaking and cocoon-milling machines on the characteristics of raw silk is the strongest.

Keywords: cocooning process, raw silk, cocoon-milling machines, cocoon steaming

It is known [1,2] that the production of high-quality raw silk requires not only modern cocoon-winding equipment, but also its correct operation. The specificity of the cocoon-reeling equipment is that the cocoons are unwound in water of a certain temperature therefore the raw silk wound on the reel must be dried.

The air temperature in the drying and reel cabinet should be within 55-600C. If the raw silk is not dried during the unwinding of the cocoons, there will be a threat of sticking the silk threads on the reels, especially on their edges. Such sealed silk cannot be rewound due to the high breakage and is discarded.

Each part of the cocoon-winding equipment performs a specific function, and the indicators of the produced raw silk depend on the correct adjustment, operation, maintenance of each actuator. According to the requirements of the state standard for raw silk, the main features by which the grade of raw silk is determined are:

- deviations in linear density;
- disagreement;
- cleanliness for major defects;
- cleanliness for minor defects;
- rewinding ability;
- relative breaking load;
- relative elongation at break;
- connectivity, carriage moves.

Let us consider the influence of each of the elements of cocoon-winding equipment on the main features of raw silk.

Machine for dedusting and cleaning cocoons from the accompanying stripping cotton wool. Dusting and cleaning the shell of cocoons from stripped cotton does not directly affect the quality indicators of raw silk, but contributes to the normal course of the cocooning process.

The dust content contaminates the process water, as a result of which the raw silk loses its luster and deteriorates its presentation. Fluff interferes with the separation of the cocoons, making it difficult to carry out sorting operations.

Sorting cocoons. When sorting cocoons, rejected cocoons are selected, leaky, with surface spots, twinned and cocoon unwrapped. Sorting of the above cocoons contributes to the normal performance of the cocooning process and the production of raw silk of specified linear densities.

Vacuum pump for filling the inner cavity of the cocoons with process water. This method of filling cocoons with water has been practiced in cocooning relatively recently. The essence of the method (Fig.1) consists in forcibly filling the inner cavity of the cocoons with process water when pumping out air from tank 1, where the cassette with cocoons is placed 2.

The cassette is placed on the bottom of the tank, then the cassette is filled with water so that the upper water level is 5-6 cm above the level of the installed cassette. And at that time there should be a free air zone between the upper surface of the water and the hermetically sealed cover 3. Then the vacuum pump is turned on and air is pumped out of the free air zone. As rarefaction proceeds, air begins to exit from the cocoons and water flows into the shell of the cocoons. The more rarefied the air inside the tank, the more process water flows into the cocoon.

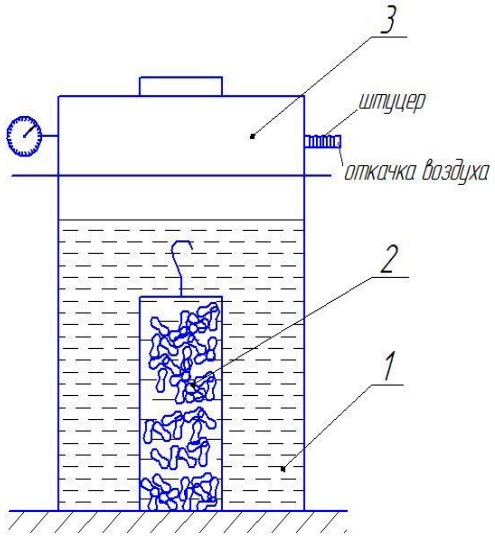

Fig.1. Device for filling the inner cavity of cocoons with process water
1-container; 2- cassette with cocoons; 3-lid.

The final steaming of the shell takes place in a shaker in the process of finding the ends of the cocoon thread. On modern cocoon-reeling machines, a submerged method of unwinding cocoons is adopted. This means that the filling of the inner cavity of the cocoons with process water should be at least 97% of their volume. Under these conditions, the cocoon-winding machine works stably, there is a good sorting of uncooled cocoons from odon and uncooled cocoons.

This process occurs automatically, since the unwinding cocoon is kept on the surface of the water due to the pulling force of the thread, and
underwhelmed cocoons and odonts settle at the bottom of the winding pelvis. The steaming of the cocoon shell is the most important technological operation, which determines the specific consumption of cocoons, the purity of small and large defects of the produced raw silk.

The purpose of the steaming process is to uniformly soften the casing so that the unwound cocoon thread can easily come off the casing. It has been experimentally revealed [3] that the optimal value of the force of descent of the cocoon thread from the shell should be in the range of 0.2-0.3 cN, and the force of descent should be the same both in the layers and in the thickness of the shell. The steaming of the cocoon shell is strictly not allowed, as this leads to a sharp increase in the number of large defects in the produced raw silk, and, as a consequence, to a decrease in the grade of raw silk.

Machine for finding the ends of cocoon threads. The machine is designed to automatically find the ends of cocoon yarns and shake them until a clean yarn is obtained without knots, bumps and deposits. The rhythmic operation of the machine determines such qualitative characteristics as the purity of silk for small and large defects, the specific consumption of cocoons, and the performance of the equipment.

Linear density control sensor for raw silk. The sensor for linear density control of raw silk is the main element of the cocoon-winder, on which the linear density of the produced raw silk depends. The number is determined by the tangential force of friction, which occurs when the unwound thread of raw silk passes through the slit formed by two glass plates. The width of the gap depends on the number of raw silk produced (Fig.2).

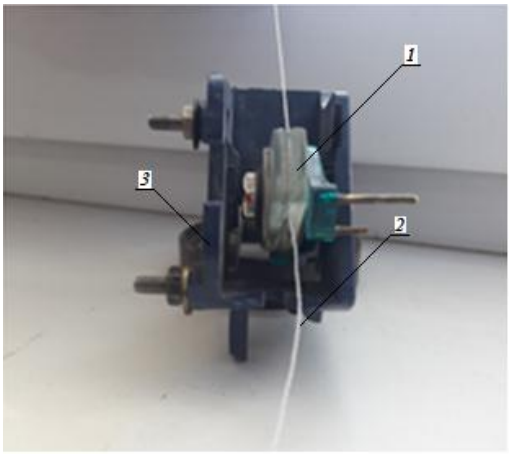

Fig.2. Control device sensor
1-glass plates; 2-thread of raw silk; 3-sensor body.

During the operation of the cocoon-winding machine, deposits of sericin fractions are observed on the surface of the glass plates, which leads to a change in the size of the slot. It was revealed that after two hours of continuous operation of the cocoon-winding machine, the thinning of the produced raw silk by 5...7% occurs, which is unacceptable [4]. To prevent this phenomenon, it is necessary to periodically remove the sensor, rinse it with running cold water, completely removing the adhered layer of sericin.

The mechanism of sorting out unwashed cocoons from odon and films. The device for sorting unwashed cocoons from films and odon is a "squirrel wheel" consisting of two cylinders of different diameters rotating in one direction. In this case, the smaller cylinder is installed strictly in the center above the larger cylinder. The size of the gap between the cylinders is selected depending on the caliber of the unwound cocoons and averages 6-9 mm.

This device does not directly affect the quality characteristics of the produced raw silk, but the specific consumption of cocoons depends on the stable and precise operation of this mechanism.

Rewinding machine. The rewinding machine rewinds raw silk from small reels with a perimeter of 0.65 m to standard reels with a perimeter of 1.5 m. In the process of rewinding, thin sections of raw silk are eliminated, the broken ends of the threads are tied and the stitching is done. The skeins of silk removed from the large reels are packed in bundles and then formed into bales. Thus, silk is brought to a marketable form and sent to the consumer.

As can be seen from the above, the production of raw silk is a very transient process, carried out on various types of actuators. And the production of high-quality raw silk ultimately depends on the normal operation of each type of mechanism.

SOURCES AND LITERATURE

1. Rubinov E.B. Silk technology. M. "Light and food industry", 1981.-392s.
2. Rubinov E.B., Mukhamedov M.M. and others. Silk materials and cocooning. M. Legprombytizdat. 1986.-312s.
3. Akhunbabaev U.O., Asrarov G.G. et al. An instrumental method for assessing the quality of steamed cocoons // Bulletin of Science and Education. M-2018. -No. 12 (48). –S.37-40
4. Grozina A.A. and others. Method of operational monitoring of the technological process of unwinding cocoons. // RZh Silk-1990.-№2.-p.23.