



e-ISSN: 2319-8753 | p-ISSN: 2320-6710

IJIRSET

International Journal of Innovative Research in
SCIENCE | ENGINEERING | TECHNOLOGY

INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

Volume 10, Issue 5, May 2021

ISSN INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.512

9940 572 462

6381 907 438

ijirset@gmail.com

www.ijirset.com

Technology for the Production of Insulation Yarns from Natural Silk

Islambekova Nigora Murtozaevna, Muxiddinov Nuridin Muxiddin o'g'li

Tashkent Institute of Textile and Light Industry Doctor of Technical Sciences Professor Department of Silk Technology Uzbekistan Tashkent City Yakkasaray district Shohjahon 5, Uzbekistan

E-mail: islambekova1968@mail.ru

Is a basic doctoral student of the Tashkent Institute of Textile and Light Industry Department of Silk Technology. Uzbekistan Tashkent City Yakkasaray district Shohjahon 5, Uzbekistan

ABSTRACT: The article examines the technology of obtaining 2.56 tex raw silk for the production of insulation yarn, and found that the linear density of small-caliber cocoon yarn is 0.29 tex, medium-caliber 0.32 tex, large-caliber 0.34 tex. For the insulation strip, the spinning speed was set, a growth plan was developed for the production of 2.56x4 textile insulation yarn from raw silk, and machines were selected. According to the growth plan, the insulation yarn was produced and the yarn quality was compared with the state standard.

KEYWORDS: Silk yarn, insulation yarn, cocoon yarn properties, spinning speed, raw silk, number of breaks.

I. INTRODUCTION

Currently, a lot of work is being done to modernize and develop silk production in Uzbekistan, the introduction of new techniques and technologies based on the use of domestic and world experience, expanding the range of high quality products that meet international standards.

Natural silk is superior to other natural and artificial fibers in durability, elongation, durability, elegance, lightness and elegance, air permeability. Therefore, natural silk is widely used in various sectors of the economy, including medicine, radio engineering, aerospace, aviation, communications, textiles and others. There are many types of silk products produced in the country, especially silk yarns. Silk yarns by application: recyclable in knitting and weaving; technical purposes - used for cords, insulating yarns, sieves; It is intended for wide use - it is divided into groups used in popcorn, embroidery, perfumery [1,2].

The role of insulating wires used for technical purposes is invaluable. Various fibrous materials of plant origin for insulation of electrical machines and apparatus - paper, cardboard, cotton and silk fibers, fabrics and tapes, as well as some synthetic textile materials obtained by chemical processing of certain substances - artificial silk, synthetic fibers - kapron, nylon, polystyrene, polyvinyl chloride, polyamide materials and triacetate films are widely used. Organic fiber insulation materials are characterized by low heat resistance. Their disadvantage is that they have high hygroscopicity.

Natural silk, by its very nature, does not conduct electricity. Insulation yarns are produced using this feature. Insulation yarns from natural silk are mainly produced by adding a few strands of raw silk with a linear density of 1.89 tex, 2.56 tex, given a small twist and boiled, dyed, and then re-wrapped on the reel.

In recent years, based on the requirements of the world silk market, new Navruz-1, Navruz-2, Oltin vodiya-1, Oltin vodiya -2, Zarafshan, Gulshan x Nafis, Nafis x Gulshan which can compete with foreign hybrids in terms of technological indicators of silkworm cocoons and silk fiber industrial hybrids were created and included in the State Register.

These hybrids have several advantages over foreign hybrids that are currently entering the country. First, the yield of



cocoons from 1 box of worms when maintained under optimal agro-technical conditions - 65-75 kg, the yield of raw silk from cocoons - 44-46%, the total length of fiber - 1200-1500 meters and the metric number (thinness) of fiber - 3200-3400 m / g . Another important feature of these hybrids is that the amount of dry cocoon consumed to obtain 1 kg of raw silk is 2.5-2.7 kg, is formed. At present, this figure in cocoon processing enterprises is 3.2-3.5 kg [3].

II. METHODOLOGY

In determining the variety of cocoon, according to the state standard, according to the characteristics of the shell were divided into two varieties, varietal and non-standard. The first type of cocoons includes cocoons with undamaged shell, spot 5mm, pile trace or smooth spot length up to 10 mm. The second type of cocoons includes slightly deformed cocoons, which cover 25% of the surface of the spotted shell, slightly crushed, with a stalk trace or smooth glossy surface up to 15 mm in length. Varietyless cocoons include perforated, hardened, thin-shelled, double-spotted cocoons if the length of the spot and stalk mark or smooth glossy area exceeds 4/1 of the shell surface. Non-standard cocoons are second grade in terms of shell characteristics but have a silk yield of less than 23% and include deaf cocoons. When sorting the cocoons by size, the cocoon was determined by the caliper according to the largest of the shear diameters: up to 16 mm small, 18-19 mm medium and 21-22 mm large caliber. The linear density of the cocoon yarn was determined by separating the yarn using the single spinning method. On the basis of the formation of raw silk by spinning cocoons, a continuous spinning length was found for cocoon varieties. By increasing the speed of the cocoon spinning machine, the breakage of the raw silk was detected. A growth plan was developed for the production of 10.24 tex insulation yarn, according to which raw silk was manually sorted, soaked in a bath at 40 °C for 60 min to increase the elasticity of the yarn, then squeezed, straightened, dried at 45 °C for 60 min and rested for 8 hours. . The raw silk in the sung yarn was rewrapped on a spool and given 120 br / m on a spinning machine. The twisted yarns were rewound into yarn at a speed of 200 m / min and rested in a room with standard conditions. The yarns were then boiled and dyed at a temperature of 98-100 °C and dried at a temperature of 45 °C. The dried insulation yarn was re-wrapped in a consumer package.

The shear strength, elongation before shear, relative shear strength, and linear density deviation were determined in accordance with the state standard of the produced insulation yarns.

III. RESULTS AND DISCUSSION

In our research, we identified the properties of cocoons and cocoon yarn for the production of insulating yarns from the Oltin Vodiy-1 and Oltin Vodiy-2 cocoons grown in Uzbekistan.

Table 1
Properties of cocoon and yarn

Properties of cocoon shell	Indicators		Features of cocoon tape	Indicators	
	Oltin vodiy-1	Oltin vodiy-2		Oltin vodiy-1	Oltin vodiy-2
According to the shell, % From the first variety of cocoons From the second variety of cocoons	64 23	70 17	Silk output 1st grade cocoon 2nd grade cocoon	41,05 36,9	42.3 35.2
Non-standard No variety	3 10	3 10	The cocoon is continuous worm length, m from the first variety of cocoons The second variety is from the cocoon	830 708	980 826



Cocoon caliber			Linear density of cocoon yarn, tex		
output, %	67		Small caliber	0,29	0.28
Small caliber	23	43	Medium caliber	0,33	0.32
Medium caliber	10	47	Large caliber	0,34	0.34
Large caliber		10			

The number of cocoons was 64% and 70%, 23% and 17% of cocoons, 3% of non-standard cocoons and 10% of cocoons, respectively. . In the caliber sorting of cocoons, the small caliber was 67% and 43%, the medium caliber was 23% and 47%, and the large caliber was 10%, respectively.

The cocoons were washed on a single cocoon spinning machine to determine the amount of silk produced and the length of yarn coming out of a single cocoon. Analysis of linear density by caliber showed that the linear density of small-caliber cocoon yarn was 0.29 and 0.28 tex, respectively, medium caliber 0.33 and 0.32 tex, and large-caliber 0.34 tex. The results show that Oltin vodi-2 has a higher rate than Oltin vodi-1. For the production of Dyamak insulation yarns, it is advisable to produce raw silk from Oltin vodi-2 hybrids of medium caliber cocoons. A mechanical cocoon was used to spin the cocoons. Based on the study of the solubility, swelling and water permeability of sericin in the cocoon, the parameters of cocoon washing were set: water temperature in the evaporating boiler was 98-100 °C; the temperature of the water in the boiler to find the single end is 65-70 °C; water temperature in the boiler 40-42 °C; drying cabinet temperature 38-40 °C; curling length 12 cm. Spinning speed is one of the important factors in silk production. The study found that the number of cocoon cuts in the selected cocoon hybrid depended on the frequency (Table 2).

Table 2
Dependence of raw silk breakage on cocoon spinning speed

Cocoon washing speed, m / min	Cutting raw silk, powder. Hour	
	Oltin vodi-1	Oltin vodi-2
60	3,1±0,21	3,0±0,20
80	3,2±0,25	3,2±0,23
100	3,4±0,35	3,3±0,35
120	4,5±0,31	4,2±0,32
140	5,4±0,44	5,3±0,42
160	5,7±0,46	5,7±0,45

The results showed that the number of rings increased as the cocoon speed increased. It should be noted that the increase in the number of rings is due not only to the correct sorting, but also to the fact that the cocoon is well cleaned during the shaking process. Based on the results obtained, the cocoon spinning speed in the production of insulating yarns was set at 100 m / min. In the production of 2.56 tons of raw silk, raw silk was spun from the cocoons of medium caliber of the Oltin vodi-2 hybrid.

The range of woven products is very diverse, from which they can be used in the production of textiles and knitwear, as well as a wide range of woven products for everyday use and technical purposes. As a result of continuous yarn spinning, a certain amount of effort is made to: achieve the desired external effect on the yarn by spinning individual yarns or several yarns at different levels; improving the processing properties of yarns in the field of weaving and knitting; increase the tensile strength and tensile strength of yarns; to create consumer properties that are well used in yarns [4].

The main types of silk weaving products include arqaq, tanda, gryenadine, muslin, kryep, moskryep, sewing threads, surgical threads, technical threads, insulation threads, textured threads and various tapes. Insulation yarns made of natural silk are twisted into one or more strands (1,2,3,4) not larger than raw silk, then re-wrapped in yarn, boiled, dyed and re-rolled. produced by the rash method.

At present, new machines are used in silk factories. These machines are made in China and have a high efficiency. We set up a spun yarn production chain for research work. The raw materials supplied to the silk factories are technically documented and enlarged by adding groups with the same or similar physical and mechanical

properties. Raw silk is spun, squeezed, dried, and rewrapped. The purpose of wrapping raw silk from yarn to spool is to prepare it for the next weaving and layered weaving machine. The purpose of spinning one yarn at a time is to add yarn from several yarns and twist them into a single yarn according to the growth pattern. Spinning is a technological process, which is performed to spin individual and multiple strands, in particular to increase the specific effect, thickening, flexibility and elongation. In order to strengthen the twists in the twisted silk, the internal tension created in the yarns is eliminated. This reduces the confusion that results from rewinding spun silk and the resulting breakage and fabric imperfections. A plan for the production of insulated yarns from raw silk has been developed

Table 3
Growth plan for the production of 2.56x4 threaded insulation tape

No	Technological processes	Workshop brand	Technological parameters		
1	Sort and collect	<i>manually</i>			
2	Humidification	<i>in the bathroom</i>	T=40-42 ⁰ C; t=60-120 min		
3	Squeeze	<i>Centrifuge S-120</i>	t= 15 min		
4	Adjust and correct	<i>manually</i>			
5	Drying	<i>KS-2</i>	T=40-45 ⁰ C; t=60-120 min		
6	Rest	<i>in the room</i>	T=24 ⁰ C; W=65-75 % t=3-8 soat		
7	Wrapping	<i>MT – 85</i>	V= 180 m/min		
8	Addition	<i>MT-SW (D/T)</i>	K here/m, Z	V m/min	n _u
			30	120	4000
9	Wrapping in yarn	<i>M-150</i>	V = 200 m/min		
10	Rest	<i>in the room</i>	T=24 ⁰ C; W=60-70%; t=15 hour		
11	Boil and dye	<i>in the bathroom</i>	T=98-100 ⁰ C; t=60-120 min		
12	Drying	<i>KS-2</i>	T=40-45 ⁰ C; t=60-120 min		
13	Rewrap in consumer packaging	<i>M-500</i>	V=480-320 m/min		
		<i>DM-3</i>	V=180-240 m/min		
14	Monitor and save		Warehouse		

According to the growth plan, 4 twists of 2.56 tex raw silk were added and 30 twists were given, and the quality of the insulating yarn was checked in accordance with the state standard.

Table 4
Quality indicators of raw silk 2.56x4 teeks insulation yarn

Name the indicators	State Standards	Sample readings
Linear density deviation, tex	12,4-9,1	12,0
The coefficient of variation in linear density,%, not more	10,8	10,7
Relative tensile strength, gs / tex, not less	28,0	28,1
The tensile strength, gs, is not low	210,0	212,0
Length to break,%, not less	12,0	12,3
Twist, the number of twists per 1 m	30±10	31

It was determined that the insulation thread of 10.24 sheets made of raw silk meets the specifications given by the state standards, and it was recommended to produce insulation yarn from the Oltin vodi-2 hybrid.



REFERENCES

1. N.M.Islambekova, S.S. Haydarov, S.U. Pathullayev “Determination of the amount of rings coming out of silk-spinning enterprises” Scientific-technical journal of Namangan Institute of Engineering and Technology Volume 4-№2, 2019 pp. 16-20.
2. Islambekova N.M., S.S. Khaydarov “Investigation of the quality indicators of raw silk with a high linear density” Middle European Scientific Bulletin, VOLUME 5, OCTOBER 2020. P 74-76.
3. Axmyedov J.A. New structural seams and embroidery threads creation of production technology: Diss. t.f.d. - Tashkyent. TTYeSI.-2018. -196 b. -B. 47-51.
4. N.M.Islambyekova, S.S.Haydarov, A.P.Eshmirzayev, N.M.Muxiddinov. Study of technological features of different breeds and hybrid cocoons fed in repeated seasons. Republican scientific-practical conference "Current problems of innovative technologies of cotton ginning, textile, light industry, printing industry and their solutions in the context of integration of science, education, production" May 16-17, 2019 TTYeSI. 246-248 b.
5. Islambyekova N.M., Ashurboyev A.A. Study of the change in tensile strength of raw yarn depending on the linear density of raw silk. Republican scientific-practical conference. Toshkyent-2019. TTYESI. May 16-17 B. 50-52.
6. Ermatov Sh.Q., Abrayqulov B.I., Ochildiyev B.B., Khaydarov S.S., Islambekova N.M., Khasanov J.T. Research of Prospective Ways to Grow Cocoons and Develop Silk Factory. //International Journal of Advanced Research in Science, Engineering and Technology. Vol. 7, Issue 7, July 2020. 14462-14465 r.



Impact Factor:
7.512



INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY

 9940 572 462  6381 907 438  ijirset@gmail.com



www.ijirset.com

Scan to save the contact details