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Raw Materials for a New Range of Silk Bandages

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Abstract: This article presents the current state of production silk fabrics. The results of theoretical and practical research, physical and mechanical properties of raw materials for the production of a new range of natural silk bandages are shown in the figures and tables. The dependence of the twisting of twisted threads on the twist coefficient and linear density has been studied. The components of deformation that appear during torsion are studied, and the number of twist is recommended in accordance with the purpose. The composition of the raw material for the new fabric has been developed.

Keywords: raw materials, raw silk, tex, thread, twist, wrapping, bandage.

Introduction. The range of silk fabrics is very diverse in terms of the type of raw materials used, weaving, finishing and purpose. They are obtained from natural silk, artificial and synthetic fibers and threads. In the production of these fabrics, linen, twill, satin, finely patterned, jacquard and complex weaves are used.

The purpose of the research is to improve the methods and technologies of raw material preparation for the production of medical bandages, as a result of their introduction, by taking high-quality raw silk and twisting them by twisting them, the production of competitive ready-made silk bandages and expanding the range of silk products.

An atmospheric pressure plasma method is presented to improve the characteristics of inkjet printing based on the pigment of silk fabrics. Inkjet experiments were carried out to study the effect of measured changes on the upstream properties and color intensity of processed and original samples. This study investigates an efficient approach for atmospheric pressure plasma that can provide significant use in improving the surface properties and performance of inkjet printing of textiles. [1].

The assortment of woven yarns is different, they are made from chemical yarns and silk raw materials. The main types of silk weaving products are as follows: wefts, warps, grenadine, muslin, crepe-thin fabric, moscrepe, crepegranite, fashion-style woven threads, sewing thread, surgical and technical threads, insulating threads, textured threads, various lace-drawing threads. All these yarns are given different twists and the direction of the twists is also different. It is important to increase the types of woven yarns when creating a new assortment of consumer goods [2-4].

Raw silk (fibroin) contains all of the more than 20 amino acids found in the human body. The fact that silk has antiseptic and bacteriostatic properties prevents the appearance of microbes on the surface of the wound and has a positive effect on speeding up healing. For this reason, it is desirable to create new types of surgical threads from natural silk and to widely use them in practice [5-7].

The main textile raw materials of the Republic of Uzbekistan are cotton fiber and raw silk. The latter consists of 70% fibroin fiber and 30% sericin adhesive, which makes it difficult to use raw silk in knitwear technology [8].

In order to widely use raw silk in the production of knitwear, we have developed a method for preparing raw materials, as well as studied in detail the properties and deformation states of complex twisted silk threads [9, 10].

In the cited work, the classification of sewing thread assortments is based on the following characteristics: the purpose of the thread, raw material composition, finishing method, as well as structural indicators such as the number of joints, the direction of twists, linear density (thickness), etc. [11]. In the production of natural silk spun surgical thread, it was found that the number of twists (tw/m) varied by even 10-20% compared to the given number of turns (tw/m) as the threads of the old brand of splicing machines that used multi-process technology were used to move through the belt [12, 13].

One of the main factors to improve the socio-economic situation in our republic is to improve the raw material preparation technology, increase the efficiency of processing, and establish the production of high-quality finished goods in a system of mutually complex networks [14, 15].

Юқоридаги адабиётларда келтирилган маълумотлар таҳлили бўйича табиий ипакдан экологик хавфсиз тиббиёт бинтини ишлаб чиқариш учун хом ашё тайёрлаш йўналишида тадқиқотлар етарлича эмаслиги аниқланди.

Research part. The purpose of the study is to study some of the characteristics of raw materials for the development of a new range of silk bandages. Geometric dimensions, mechanical properties and uniformity of threads, components of deformation and the ability of twisted silk threads to withstand multiple stresses of various types largely depend on the amount of twist. We have carried out studies that have made it possible to establish patterns that characterize the effect of twist on the change in the basic properties of natural silk threads.

When twisting a complex thread, its constituent elementary threads are arranged along helical lines. The length of the complex thread after torsion decreases. The change in the length of the thread during torsion is determined by the amount of twisting expressed in%,

$$U = \frac{l_1 - l_2}{l_1} 100 \qquad (1)$$

where l_1 - is the length of the thread before twisting;

l_2 - thread length after twisting.

It is known that the amount of twist is influenced by the amount of twist and the linear density of the threads. The twisting of the thread does not depend on the absolute value of the twist, but on the ratio of the twist and the radius of the thread, which are expressed as the product of these indicators.

The twisting of complex silk threads connected and twisted at several ends, using our experimental data, was determined by the empirical formula proposed by S.A. Anuchin [2].

$$U = 2{,}5k^2\sqrt{n}T/10^7 \qquad (2)$$

where k - is the number of twists per 1 m, n - is the number of connected complex threads, T - is the linear density of the connected threads.

According to the results of the study, the obtained curves characterizing the dependence of the twisting of silk threads on the twist coefficient and linear density are shown in fig.

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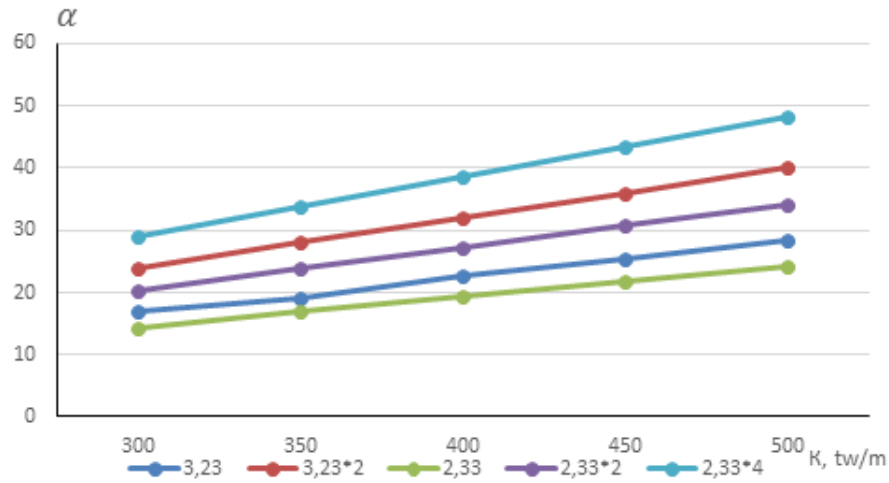

Fig.1. Curves characterizing the dependence of the twisting of silk threads on the twist coefficient and linear density (at 500 tw/m)

The graph shows that the twist coefficient is related to torsion according to the law of a straight line.

The results of the study and those calculated by formula (1) and (2) practically coincided.

1-3,23; 2-3,23x2; 3-2,33; 4-2,33x2; 5-2,33x4 tex

It can be concluded from the figure that, in the process of twisting, the twisting of complex yarns is directly proportional to the twist coefficient and linear density.

The constant value of the product of twist by the square root of the linear density of the thread in kilotex is called the twist coefficient and is denoted by α.

$$\alpha = K\sqrt{T} \qquad (3)$$

When expressing the linear density of the thread in tex, the formula will take the form

$$\alpha = \frac{K\sqrt{T}}{31,6} \qquad (4)$$

Based on the study, the established relationship between the twist coefficient and the angle of twist is given in Table 1., and the change in the twist of silk threads depending on the number of twist in Table 2.

The analysis shows that when preparing a twisted thread for a new range of fabrics, it is possible, taking into account the indicators of Table. 1 and 2 to select raw silk of the appropriate linear density and twist.

Table 1. Relationship between twist factor and twist angle of silk threads

Assortment of twisted threads, tex	Twist coefficient, at		Torsion angle, at	
	300 tw/m	350 tw/m	400 tw/m	500 tw/m
2,33 x 2	68	205	9	34
2,33 x 3	83	250	13	39
2,33 x 4	96	290	14	43
3,23 x 2	80	242	12	39
3,23 x 3	98	295	14	43
3,23 x 4	114	341	19	44

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Table 2. Changing the wrapping of silk threads depending on the number of twists

Linear density, tex	Torsion number, tw/m	Wrapping, %
2,33 x 2	300 400 500	0,4 0,5 0,6
2,33 x 4	300 400 500	0,5 0,7 0,8
3,23 x 2	300 400 500	0,5 0,6 0,7
3,23 x 4	300 400 500	0,6 0,8 0,9

For example, at present, but in terms of twist coefficients and the twist angle of raw silk 2,33 x 2 tex are almost the same, or 2,33 x 3 tex and 3.23 x 2 tex are also close.

Taking into account some characteristics of the twisted thread, we have developed a method for preparing raw materials for the production of a new range of crepe silk fabrics, which consists in the fact that raw silk with a linear density of 2.33 or 3.23 tex in order to relax the gluing force of sericin is first treated with a steam-air medium, then they are rewound and by adding each thread of linear density by two, three, four threads give twists of the left (S) and right (Z) directions of 300 tw / m, fixing the twist in a vacuum steamer.

The purpose of fixing the twist of the threads is to relieve the stress resulting from tensile deformation, while the more twist, the greater the slope of the helical lines and the more the thread deforms the twisted threads tend to unwind. The process of water-thermal treatment accelerates the fastening of the twist. A new range of twisted threads for medical fabrics has been developed.

New medical bandages made by weft-knitting method, 5 cm wide; 7cm; 10 cm and 14 cm of twisted silk thread 3,23x2 tex, have a surface density of 29-34 g / m2, coarse-mesh structure, breaking load of 8,8-9,8 kgf; capillarity not less than 7 cm/h; wettability rate 5 s, pH of the water extract - neutral, air permeability 417 cm3/m2sec.

The new sample of the bandage is the basis for gel and ointment dressings, compresses, immobilization of medicines and preparations.

Conclusions:

1. Based on the study of some characteristics of twisted yarns, the parameters of raw materials for a new range of fabrics are justified.
2. The parameters of wrapping for the production of twisted silk threads are substantiated.
3. A range of medical silk bandages is recommended, taking into account the linear density and degree of twist of silk twisted threads.

REFERENCES:

1. Zhang, Chunming; Wang, Libing; Yu, Miao; and other. Surface processing and ageing behavior of silk fabrics treated with atmospheric-pressure plasma for pigment-based ink-jet printing, APPLIED SURFACE SCIENCE Vol: 434, P.: 198-203.

2. Алимова Х.А., Усенко В.А. Учебник для ВУЗов «Ипакни эшиш» Ташкент. «Шарқ» НМАК. -2001. -270 с. -С.8-12.
3. Akhmedov J., Azamatov U.N., Umurzakova Kh.Kh. Usmanova Sh.A. Tolibaeva Sh. Improving technology on manufacturing sewing threads from raw silk // International Journal of Advanced Research in Science, Engineering and Technology. 2018. P. 7219-7222
4. Khabibullaev D.A., Alimova Kh.A., Akhmedov J.A., Nabidzhanova N.N. Raw Materials for Production of Polycomponent Yarn with Silky Effect. Design Engineering Issue: 4 | ISSN: 0011-9342 P.458-464.
5. Ахмедов Ж.А., Салихов А.Т. Ўрилган жарроҳлик ипи ишлаб чиқариш учун хом ашё танлаш // “Пахта тозалаш, тўқимачилик, енгил ва матбаа саноатлари иновацион ривожланишининг ва кадрлар тайёрлашнинг долзарб муаммолари” Республика илмий-амалий анжумани материаллари. 14-15 октябрь. -2009. -Б. 317-319.
6. Patent CN202036261 (U) - Medical silk suture discharger // Dan Yang; Chengwei Peng; Bo Yang // -2011.
7. Akhmedov Zh.A. A method of obtaining a new structure of braided surgical threads // J. Problems of textiles. -2008. -Vol. 4. -P. 46-48.
8. N. N. Nabidjanova, Kh. Kh. Alimova, Kh. Kh. Umurzakova, Sh. A. Usmanova, J. A. Akhmedov Dependence of the Diameter of the Thread on the Parameters of the Body Structure and the Deformability of the Knitwear. AIP Conference Proceedings 2467, 060048 (2022); https://doi.org/10.1063/5.0093701 Published Online: 22 June 2022.
9. Kh. D. Bastamkulova, Kh. A. Alimova and J. A. Akhmedov, Journal of problems of textiles, 4, 94-99, (2018).
10. Akhmedov Zh.A., Bastamkulova Kh.D., Alimova Kh., Daminov A.D. Development of yarn production technology of natural silk // European Sciences review Scientific journal № 9-10 2016 (September-October). -P. 176-179.
11. Akhmedov Zh.A., Alimova Kh., Aripdjanova D.U., Bastamkulova Kh.D. Ways and technologies for making natural silk // European Sciences review Scientific journal № 9-10 2016 (September-October). -P. 179-181.
12. Akhmedov J.A., Bastamkulova X.D., Tulanov Sh.E. Research of raw silk quality indicators used in surgical thread. // J. Textile problems. -2016. –Vol. 2. -B. 19-23.
13. Axmedov J.A. Creation of new structural sewing and embroidery thread production technology // Diss ... DSc. Tashkent. -2018. P. 220.
14. Алимова Х., Ахмедов Ж.А., Бастамкулова Х.Д., Даминов А.Д., Гуламов А.Э. Ипак ипларини олиш усули // Патент UzR. UZ IAP05447. 31.07.2017.
15. Alimova Kh., Umurzakova Kh.Kh., Khaydarov S., Nabijonova N., Aripdjanova D. New assortment of natural silk products // J. International Journal of Advanced Research in Science, Engineering and Technology. Vol. 6, Issue 3. March 2019. -B. 8568-8571