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Analysis of Natural Mixed Fibers

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ABSTRACT: The raw material base of textile production is the main direction of development of the chemical industry and is in line with world traditions. Demand for all types of chemical fibers in the world is constantly growing. Accordingly, this article presents the problems and solutions of natural blended fiber analysis and describes the procedure for evaluating fiber blends such as cotton, silk, linen, wool, hemp, viscose, acetate, diacetate, Capron, lyre, polyamide, polyester, lavender, synthetic. According to it, the quality of yarns from cotton fiber and Rogoz plant is 40 % cotton 60 % rogoz mixed fibers with a specific breaking strength of 18.2 %, elongation at break 23%, fiber elongation 6.25 %, average fiber length 8.3 %, fiber yellowness was found to be 32.8 % higher, and fiber impurity was found to be 28.6 % lower.

KEYWORDS: Rogoz, rogoz aquatic plant, cotton, silk, linen, wool, hemp, viscose, specific breaking strength, elongation at break.

I. INTRODUCTION

The properties of textile materials, prepared from a mixture of fibers, vary depending on the nature of the fibers. The goal of cross-mixing different fibers is to increase the quality indicators of the final product on the account of ensuring that the mixed texture indicators of the strands are the same. Currently, the work of a number of scientists on the production of mixed materials is known [1], which can be divided into 4 types of fibers:

1. Natural + natural (cotton, silk, linen, wool, hemp);
2. Natural + artificial (viscose, acetate, diacetate);
3. Natural + synthetic (Capron, Lycra, polyamide, Poly, lavsan);
4. Natural + artificial + synthetic;

As can be seen from the analysis of works devoted to the production of mixed-fiber fibers, most of them are mainly aimed at the joint application of natural and chemical fibers.

Different artificial and synthetic polymer materials for their production and chemical fibers, in which various methods of their processing are used, are distinguished by a wide range of changes in their physical and chemical properties, in contrast to natural fibers. On the basis of various start-up products, it is possible from chemical fibers with functional and technical characteristics requiring advanced technology to obtaining thin threads designed for the production of high-quality textile products from highly viscous cord yarn [2].

Chemicalization of the raw material base of textile production is the main direction of the development of the industry and is consistent with world traditions. In the world, the demand for all types of chemical fibers is growing steadily: in 2019, it amounted to 94 million US dollars.t., In 2020-105 million.t., In 2021-116 million.t. Bunda's annual growth rate is 3,7% [8-10; 37-38-b]. The share of synthetic fibers in the world balance of fiber materials by 2021 reaches 64% [11-12; 186-142-b], while the share of natural fibers, including cotton – 26,7%, cellulose – 5,7%, wool – 3,0%, silk – 0,14% and the rest (linen, hemp, jute, Rami, etc.) reaches 0,56%.

Currently, in the world textile industry, polyester fibers occupy a dominant position among synthetic fibers. Implementation of radical changes in the economy of our country, consistent transition of the Republic's economy from the raw material direction to the production path of competitive products, the country's export potential is growing; each sector of production sets new tasks. In particular, the development of the textile industry, providing our people with high-quality products are among the important tasks facing the staff of the textile industry. The aim of the project is to

increase the volume of production of textile products in our country, to meet the requirements of the population for yarn, textile, to create a new type of tissue, a new composition of natural fibers compound for the expansion of production types, to introduce advanced technologies entering into the development of textile network, to create new design projects in It should be noted that for the creation of any new assortment, the properties of raw materials, which are first applied, require the study and the selection of the process in accordance with it [4, 5]. Therefore, in the preparation of a new compound of raw materials, using fibers of plants growing in the conditions of the Republic of Uzbekistan, in particular rogoz plant fiber, obtaining yarn by mixing the cotton with new natural rogoz fiber, – unconditionally ensures the production of high-quality products and leads to improvement of yarn properties, an increase in the quality of fabrics and

II. ANALYSIS OF EXISTING FILTERING MATERIALS AND RESEARCH RESULTS

In our republic, measures are being implemented aimed at improving the quality of textile products, as well as improving the quality of yarns, complex processing of raw materials to the state of finished products. It is important to carry out this task, including the effective use of local raw materials, cotton and rogoz plant fibers, obtaining natural mixed yarns, improving their physical and mechanical properties, in order to ensure the production of quality for export products with a new compound content. In order to split the rogoz fiber into cotton fibers, information was first collected about rogoz.

Features of the rogoz aquatic plant: rogoz is tall, has a large stem. On the upper parts of its stem, beautiful inflorescences of brown color-crusts are formed. Its leaves are long and smooth, grow to 2 m, have no central veins. Generative shoots and roots develop at a depth of 60-90 CM, so they do not appear on the water. Although it tolerates Frost well and can grow on sandy shores, prefers slightly though ponds. There are 20 different species of rogoz plant, divided into narrow-leaved and broad-leaved species. The fibers in the narrow leaf are up to 10-20 mm thick, the length of the fibers in the wide leaf is up to 20-30 mm [6].

A perennial plant blooming in June. First, at the ends of the stems appear FIR-like heads, thickening in the form of a tassel, and then the flower buds begin to grow and thicken, grow in size and acquire a bright yellow hue due to the skis contained in them. As the seeds develop and grow, the yellow Horn becomes dark brown, and by autumn it becomes soft and velvety fiber. From each seed, at least 10-20 turns out a very delicate fiber.



1-picture. Formation of fibers of the rogoz plant

As a result of the expansion of the area of vegetables and fruits around the world, the reduction of the cotton crop area has a serious impact on the development of the textile industry. This will reduce the use of natural raw materials in the textile industry and make extensive use of chemical fibers. It also requires re-equipment at the enterprises of production of textile products with a chemical compound content. To solve this problem, according to the results of the research conducted by scientists of the Department of "Textile Materials Science" of the Tashkent Institute of textile and light industry and scientists of the Department of textile and knitted fabrics, it was based on the possibility of producing a new



resource saving compound yarn and fabric by separating it with cotton fibers from the rogoz plant The fiber of the rogoose plant is close to the fine-fiber cotton fiber with all its indicators and resembles silk fiber in terms of yellowing, smoothness, refinement. It is inevitable that the preparation of threads with such a mixed composition - will ensure the production of a high-quality product. Threads improve the parameters of the structure; improve the quality of fabrics and the profitability of the product. Studies show that [7,8], in enterprises, only cotton-fiber yarn is mixed with chemical fibers in order to produce fabrics or save cotton fiber, while yarn and chemical-blended fabrics made from them can be harmful to human health. To prevent such cases, the use of rogoose fiber, which grows in the conditions of the Republic of Uzbekistan, is considered appropriate and allows the creation of new assortment.

III. EXPERIMENTAL RESULTS

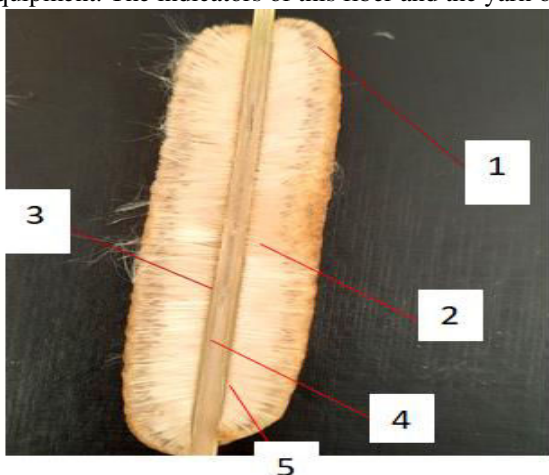
Taking into account this, in 2019-2020 a number of studies were conducted by scientists of the Tashkent Institute of textile and light industry. The researchers achieved the production of new fiber-containing yarn and special undressed tissue from the rogoz plant, which grows under conditions of Uzbekistan [9].

The advantage of obtaining a new natural mixed yarn and fabric is that it does not require the import of raw materials from the outside or the installation of a new equipment. This determines all-round comfort, efficiency and handiness in production. Since there is no GOST for determining the properties of rogoose fiber, the properties of the removed rogoose fiber were analyzed by the cluster method Table 1 shows the indices of rogoose and cotton fibers. The work done by the manual method is reflected in Figure 1. According to the results of Table 1, it was made sure that the indicators of the rogoose fiber are close to the cotton fiber, referring to the conclusion that it is possible to mix these two natural fibers and get from it a yarn and fabric with a new compound content.

Table 1
Cotton and rogoose fiber texture indicators

| Display name | Cotton fiber | The fiber of the rogoe plant |
|-----------------------------|--------------|------------------------------|
| Diameter of fiber, mkm | 15-25 | 12-20 |
| Fiber linear density, mteks | 166-220 | 133-170 |
| Fiber length, mm | 25-34 | 20-30 |
| Fiber cutting power,Gs | 50-60 | 35-40 |

As a result of the conducted experiment, a mixture of 29,4% cotton and 40% rogoose fibers was prepared for 40 textured yarn intended for the production of fabric and bandage products. Then, the physical and mechanical properties of flame retardants of 100% cotton fibers and 40% cotton with 60% cotton to obtain T=29.4 textured yarn obtained from a mixture of rogoose fibers with cotton fiber were determined and comparative analysis was performed on modern equipment. The indicators of this fiber and the yarn obtained from it are presented in Table 1 [9].



The incision of the rogoose head

- 1- rogoe seed
- 2- one of the rogoe fiber
- Handful
- 3- the role of fiber in the core, maintaining a single strand of rogoose fiber
- 4- the core of the rogoose spike
- 5 - rogor fibre

Table 2

Physic-mechanical performance of fiber and compound yarn (Oster HVI 1000 sawdust and Oster TESTER-result of yarn at 5M)

| O/n | Display name | 100% cotton fiber | Mixed fiber (40% cotton i 60% " rogoz " fiber) |
|--|--|-------------------|--|
| The result of sawdust in Oster HVI 1000 | | | |
| 1 | Staple length of fiber, Lsh, mm | 35 | 15-30 |
| 2 | Fiber type | 3-4 | |
| 3 | Young | 1 | |
| 4 | Microparticle | 4,61 | 4,1 |
| 5 | Average length, mm | 28,20 | 26,03 |
| 6 | Index of thick fibers, 12-7 mm | 11,5 | 9,75 |
| 7 | Comparable cutting power of fiber, Str.g/text | 27,2 | 28,9 |
| 8 | Elongation at break,% | 5,5 | 6,89 |
| 9 | Light return coefficient, Rd | 77,9 | 81,2 |
| 10 | Paragraph, +b | 8,13 | 10,8 |
| 11 | colors gradations, CGrd | 21-1 | 12-1 |
| 12 | Pollution, Tgash Cnt | 2,8 | 2,0 |
| 13 | Number of fibers in the cross-section of the Strip, MV | 103 | 116 |
| 14 | Linear density of fiber, teks | 0,18 | 0,16 |
| Oster TESTER-result of threads at 5M | | | |
| 15 | Linear density of yarn, teks : | 29,4 | 29,4 |
| 16 | Thread cutting power, N | 432 | 509 |
| 17 | Uzay of the thread in the disconnect, % | 14 | 16 |
| 18 | Comparative tensile strength of yarn, N/teks | 14,69 | 17,31 |

According to the results of the detected visualizers of the fiber (Table 1, Figure 1 (A, b), 100% cotton compared to 60% cotton compared to 60% rogoose mixed fibers, the relative elongation strength was 18.2%, the elongation was 23%, the elongation of the fiber was 6.25%, the average length of the fiber was 8.3%, the yolk of the fiber was 32.8%, the

IV. CONCLUSION AND FUTURE WORK

According to the results of the conducted scientific research, the results of 40% cotton and 60% rogozh mixed fibers are considered to be higher than 100% cotton. This is evidenced by the fact that the separation of cotton crop fields into the cultivation of other rural area crops and reduction of the area of cotton cultivation allows to save up to 60% of the cotton fiber in percentage terms of the application of rogoz to solve the problem that affects the reduction in the production of products. Without the use of crop land for the expansion of Rogoz planting areas, the use of vacant land creates conditions for increasing the vast amount of raw materials base.

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