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Change of Physical-Mechanical Properties of Fabrics Obtained From the Mixture of Fiber and Secondary Material Resources of Different Composition

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Abstract: in this article, 66.4% cotton fiber with 27.0% viscose fiber+6.6% nitrone fiber secondary material resources for hemp yarn, 66.4% cotton fiber with 27.0% lavsan fiber+6.6% nitrone fiber secondary material resources, 66.4% cotton fiber with 27.0% nitron fiber+6.6% cotton fiber secondary material resources, 66.4% cotton fiber with 27.0% lavsan fiber+6.6% viscose fiber secondary material resources . 100% cotton fibers were used as a thread to produce sari weaves and their physical and mechanical properties were determined.

Keywords: air permeability and water permeability, fabrics with different amounts of secondary material resources have the ability to pass air, water, gas, steam, dust, smoke, liquids, radioactive particles, abrasion resistance, wrinkle resistance and uniformity of the fabric.

I. INTRODUCTION

Secondary material resources of textile production are the secondary material resources of technological processes for the production of fibers, yarns, fabrics and garments.

Currently, textile, chemical and light industries have accumulated large reserves of fiber production waste, which can be used for good purposes. As a result, the effective use of textile waste significantly reduces the negative impact on the environment associated with the production of fiber raw materials and waste disposal.

Currently, there are many ways to use textile waste, from which panels are made for the furniture and construction industry. Panels, blocks are used in construction and automobile industry, road construction and furniture industry, as well as for heat insulation.

In the last decade, technical textiles, including the production of non-woven fabrics for the needs of various sectors of the national economy, have developed rapidly in the world. The reduction of the cost of raw materials in the use of waste in the production of textile products-non-woven fabrics, which require a lot of materials that are not sensitive to the quality of raw materials, is especially noteworthy.

Polyamide, polyester, polyolefin waste is used in the production of films, non-woven fabrics and brushes.

The development of scientific and technical progress and the increase in the production of various types of materials lead to an increase in the amount of consumer waste, and sometimes in production, and therefore the processing of secondary material resources is important in the national economy of the country. At the same time, the need for raw materials and the creation of new low-waste technologies are also increasing significantly.

First of all, this problem needs to be solved in the most material-intensive sectors, in particular, in the textile industry. The use of such raw materials in the production of consumer goods leads to a decrease in the cost of finished products, helps the rhythmic operation of the enterprise and more rational use of fiber raw materials.

Cotton waste is generated in cotton processing enterprises, as well as in spinning, weaving, finishing and cotton wool production enterprises. The waste of the wool production enterprise is the waste generated during the primary processing of wool, wool yarn, and the preparation of wool gauze, which is used as secondary raw materials.

Knitting industry waste is generated in the process of thread processing, as well as in the production of knitted fabrics, various products from it, as a result of the production of gloves and socks. Almost all waste from the knitting industry is then used as secondary raw materials.

Currently, the fabrics produced in the textile industry are diverse. They differ from each other in terms of their structure, purpose of use, fiber content and properties.

One of the main properties of fabrics with different amounts of secondary material resources is air permeability, tensile strength, abrasion resistance, etc.

For example, tissues with different amounts of secondary material resources have the ability to pass air, water, gas, steam, dust, smoke, liquids, and radioactive particles. Air permeability is the ability of the sample to pass air through it, which is estimated by the coefficient of air permeability. The coefficient of air permeability indicates the volume of air that passes through a surface of 1 square meter in one second under conditions of a known difference in air pressures on both sides of the sample.

The higher the density of fabrics with different amount of turns in the direction of the body and the back, the lower the coefficient of air permeability. For this reason, any returns are made seasonally in the production of fabrics with varying amounts.

II. METHODOLOGY

Another characteristic of tissues is their water permeability. Water permeability of tissues is the ability of water to pass through itself under the influence of a certain level of pressure. This property is evaluated by the coefficient of water permeability. The coefficient of water permeability indicates the volume of water passing through the tissue surface equal to one square meter for one second: to determine it, the time spent when 0.5 dm^3 of water passes through the tissue under a pressure equal to $5 \cdot 10^3$Pa is measured.

The water permeability of the fabric also depends on its fiber composition and finish. This fabric obtained for workers must first be specially finished so that it has high air permeability and less water absorption on rainy days.

Research work was carried out to determine the physical properties of tissues, that is, air permeability and water permeability were studied. The obtained test results are presented in Table 1.

Table 1. Physical properties of fabrics obtained from a mixture of fiber and secondary material resources with different composition change in properties

p/p	The fiber of the fabric composition	Air permeability, dm^3/sm^2 sek	Water permeability, mm.suv.ust
1.	Secondary material resources for based yarn is 100% cotton fiber and 66.4% cotton fiber with 27.0% viscose fiber + 6.6% nitron fiber for duck yarn	22,67	165
2.	Secondary material resources for based yarn is 100% cotton fiber and 66.4% cotton fiber with 27.0% lavsan fiber + 6.6% nitron fiber for duck yarn	28,50	140
3.	Secondary material resources for based yarn is 100% cotton fiber and 66.4% cotton fiber with 27.0% nitron fiber + 6.6% cotton fiber for duck yarn	23,34	177
4.	Secondary material resources for based yarn are 100% cotton fiber and 27.0% lavsan fiber + 6.6% viscose fiber with 66.4% cotton fiber for duck yarn	25,60	160
5.	Secondary material resources for based yarn are 100% cotton fiber and 66.4% cotton fiber with 27.0% viscose fiber + 6.6% lavsan fiber for duck yarn	24,45	168
6.	Secondary material resources for based yarn are 100% cotton fiber and 66.4% cotton fiber with 27.0% cotton fiber + 6.6% viscose fiber for duck yarn	23,34	172

Based on the results of the research, the changes in the air permeability and water permeability of tissues with different secondary material resources are shown graphically in Figure 1.

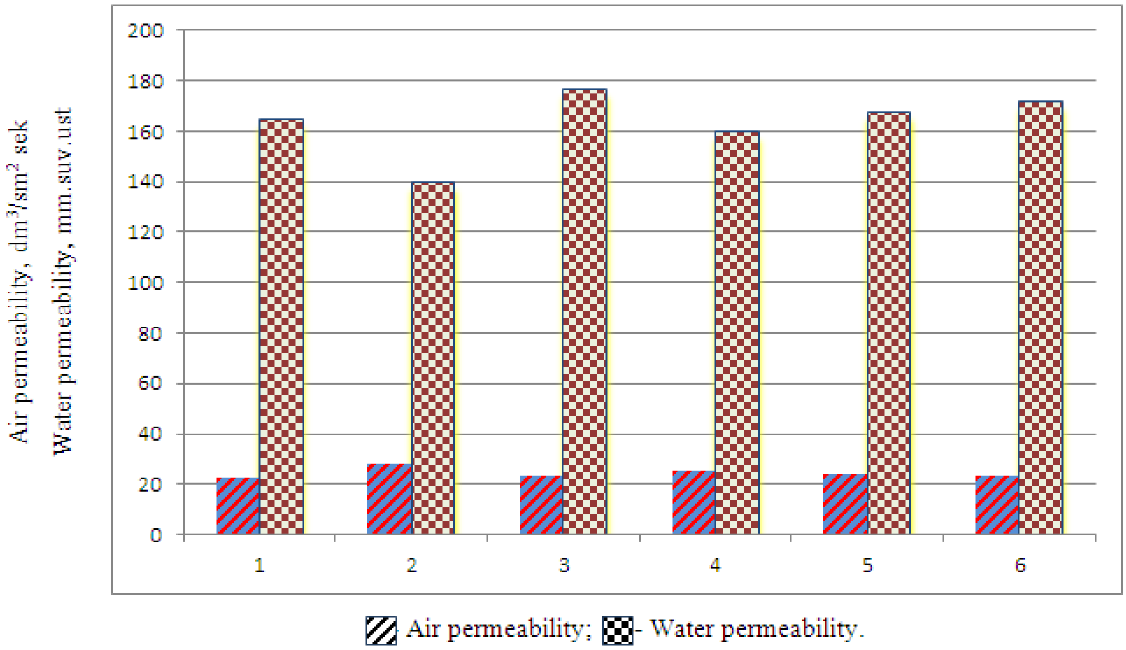


Figure 1. Changes in air permeability and water permeability of fabrics obtained from a mixture of fiber and secondary material resources with different composition.

As it can be seen from the results of the research, if we compare with the parameters of the tissue obtained according to the 1st option, the air permeability of the tissue obtained according to the 2nd option increased by 20.5%, the water permeability decreased by 15.2%, the air permeability of the tissue obtained according to the 3rd option was 2, 9%, the water permeability increased by 7.8%, the air permeability of the tissue obtained according to the 4th option increased by 11.4%, the water permeability decreased by 3.1%, the air permeability of the tissue obtained according to the 5th option increased by 7.3% , the water permeability increased by 1.8%, and the air permeability of the tissue obtained according to option 6 increased by 2.9%, and the water permeability increased by 4.0%. From the results of the test, it was seen that the air permeability of the fabric is high in the obtained fabric obtained from the secondary material resources of tan yarn 100% cotton fiber and jute yarn 50% lavsan fiber + 50% viscose fiber.

It can be seen from the analysis of the research results that the air permeability of the fabric obtained from the mixture of 66.4% cotton fiber and 27.0% lavsan fiber + 6.6% nitron fiber secondary material resources is higher than the indicators of other fabrics. and it was found that the index of the fabric obtained from the mixture of secondary material resources of 66.4% cotton fiber and 27.0% viscose fiber + 6.6% lavsan fiber for linden yarn from 100% cotton fiber is lower compared to the indicators of other fabrics.

One of the other properties of fabrics produced on the basis of resource-saving technology is its resistance to friction and creasing.

Wrinkling of tissues with different amounts of secondary material resources is one of their negative properties. It spoils the appearance of the item.

Fabrics that crumple easily wear out quickly because there is a lot of friction in places where there are folds and creases.

It is understood that tissues with different amounts of secondary material resources do not crumple - they resist crumpling and return to their original state after crumpling.

Alternatively, one of the main indicators of fabrics with different amounts of secondary material resources is its abrasion resistance.

The abrasion resistance of fabrics depends on the fiber composition, density, thinness or thickness of threads, thickness and other indicators. For example, the more the tissue is rubbed, the structure of the tissue is destroyed, the threads in it are broken, and the breaking strength decreases. The erosion of tissues with different amounts of secondary material resources is mainly a result of friction. The abrasion resistance of fabrics with different amounts of secondary material resources depends on their fiber content and surface structure. First of all, the ends of the fibers protruding on the surface of the tissues are affected by friction.

Textile fabrics with different secondary material resources begin to erode fibers protruding into the bends of the yarns. Some areas of the fiber surface are damaged and the fibers are broken. Yarns are also broken due to individual fibers or fiber parts coming out of the yarn composition. The bent areas of the threads protruding to the surface of tissues with different amounts of secondary material resources are the first to be eroded under the influence of friction. These areas are considered the supporting surface of the tissue, that is, the larger the supporting surface of the tissue, the better its resistance to erosion.

By strengthening the supporting surface of the tissue, its resistance to erosion can be increased. For this purpose, windings with a long coating (satin, satin), friction-resistant fibers (kapron, lavsan) or finishing processes (apreting) are used.

Frictional wear of fabrics containing short fibers, especially synthetic fibers, usually begins with pilling. Soft balls-pillars are formed from tangled fibers in the most frequently rubbed areas of the product. First, the ends of the fibers protrude to the surface of the tissue. Then, they get tangled up. When tangled, some fibers are pulled out of the tissue structure. Later, the fibers in the hairs break off from the surface of the tissue. As a result, the tissue thickness decreases and it is easily absorbed.

As a result of bending and compressive deformations, tissues are wrinkled, that is, they form folds and wrinkles. Wrinkles and creases can be removed only with wet ironing.

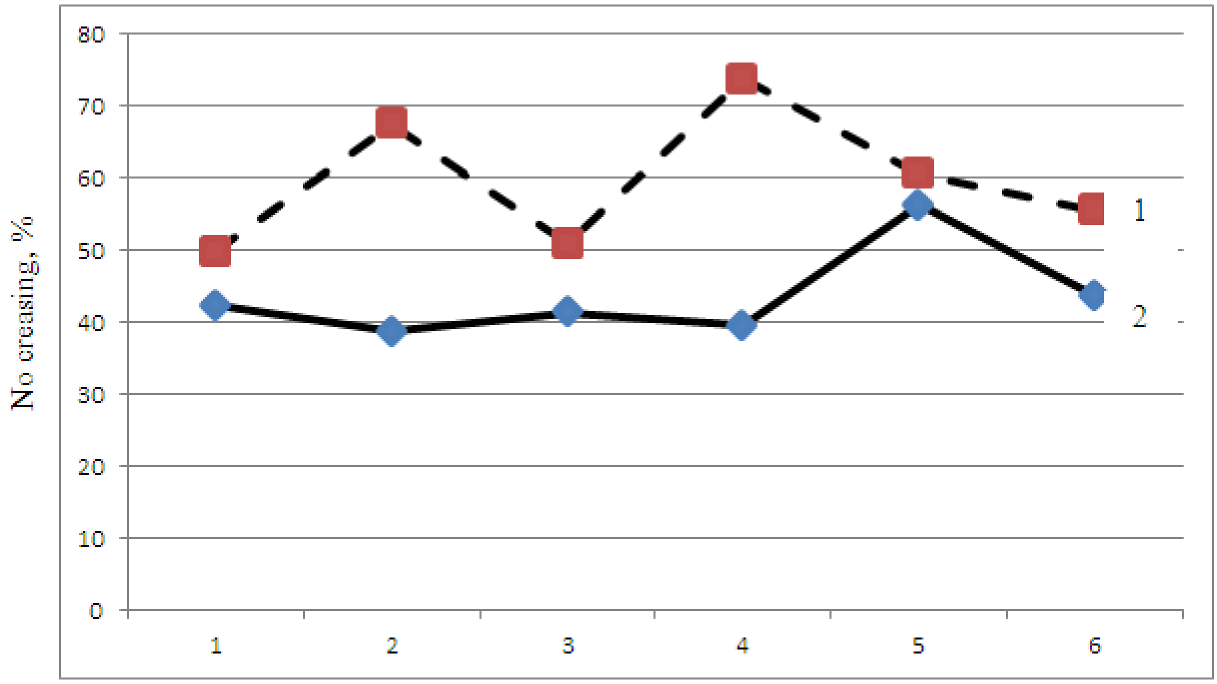
Wrinkling of fabrics depends on their fiber composition, the thickness of the threads used in their construction, the type of cutting and finishing, and their density. Wrinkling of tissues is one of their negative properties. It spoils the appearance of the item. Fabrics that crumple easily wear out quickly because there is a lot of friction in places where there are folds and creases. Non-creasing of tissues means that they resist creasing and return to their original state after creasing.

In order to determine the abrasion resistance, wrinkle resistance and uniformity of the fabric with different amounts of fiber and secondary material resources, research work was carried out and the test results obtained are presented in Table 2.

Table 2. Changes in abrasion resistance and wrinkle resistance of fabrics obtained from a mixture of fiber and secondary material resources with different composition

p/p	The fiber of the fabric composition	Abrasion resistance, number of cycles	No creasing, %	
			based on	by duck
1.	Secondary material resources for based yarn is 100% cotton fiber and 66.4% cotton fiber with 27.0% viscose fiber + 6.6% nitron fiber for duck yarn	16200	42,4	49,8
2.	Secondary material resources for based yarn is 100% cotton fiber and 66.4% cotton fiber with 27.0% lavsan fiber + 6.6% nitron fiber for duck yarn	19000	40,2	73,4
3.	Secondary material resources for based yarn is 100% cotton fiber and 66.4% cotton fiber with 27.0% nitron fiber + 6.6% cotton fiber for duck yarn	15000	41,4	51,0
4.	Secondary material resources for based yarn are 100% cotton fiber and 27.0% lavsan fiber + 6.6% viscose fiber with 66.4% cotton fiber for duck yarn	17500	39,8	70,4
5.	Secondary material resources for based yarn are 100% cotton fiber and 66.4% cotton fiber with 27.0% viscose fiber + 6.6% lavsan fiber for duck yarn	14600	42,3	60,5
6.	Secondary material resources for based yarn are 100% cotton fiber and 66.4% cotton fiber with 27.0% cotton fiber + 6.6% viscose fiber for duck yarn	15500	43,8	55,5

Based on the results of the research, the density of tissues with different amounts of secondary material resources on the body and the back, changes in surface densities are presented in the form of graphs in Figures 2 and 3.



1- based on; 2- by duck.

Figure 2. Variations in warp and weft resistance of fabrics obtained from a mixture of fiber and secondary material resources with different composition.

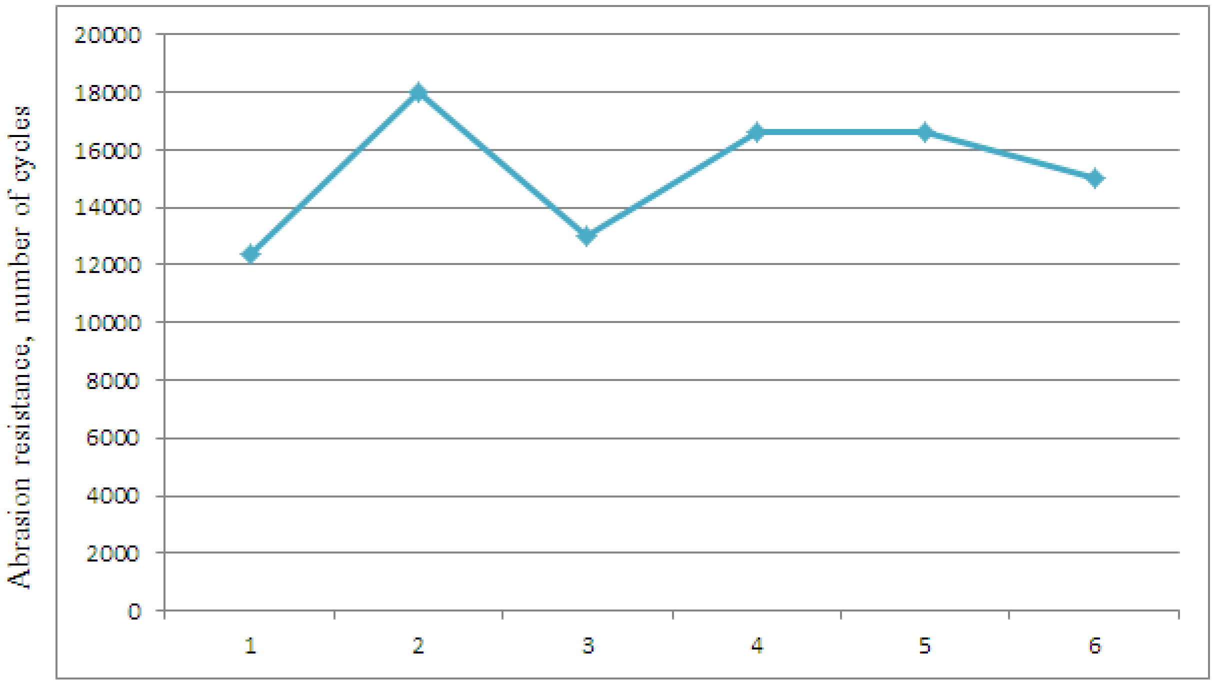


Figure 3. Changes in abrasion resistance of fabrics obtained from a mixture of fiber and secondary material resources with different composition.

III. RESULTS AND DISCUSSION

According to the results of the research, if we compare the parameters of the fabric obtained according to the 1st option, the abrasion resistance of the fabric obtained according to the 2nd option increased by 14.7%, the wrinkle resistance of the fabric decreased by 5.2%, and the wrinkle resistance of the fabric increased by 32.2%. , the abrasion resistance of the fabric obtained according to the 3rd option decreased by 7.4%, the wrinkle resistance according to the body decreased by 2.4%, the wrinkle resistance according to the wick increased by 2.4%, the abrasion resistance of the fabric obtained according to the 4th option increased by 7.4%, wrinkle resistance on the body decreased by 6.1%, wrinkle resistance on the warp increased by 29.3%, friction resistance of the fabric obtained according to option 5 decreased by 9.9%, wrinkle resistance on the body decreased by 0.2%, wrinkle resistance on the warp 17.7 % increased and abrasion resistance of the fabric obtained according to option 6 decreased by 4.3%, creasing resistance by 3.2%, and creasing resistance by 10.3% increased. It can be seen that, depending on the fiber content, the abrasion resistance of the fabric decreased from 4.3% to 9.9%, the wrinkle resistance decreased from 2.4% to 6.1%, and the wrinkle resistance decreased from 2.4% to 32.2%. was found to have increased. The analysis of the obtained results showed that the higher the amount of lavsan fiber in the fabric, the higher the abrasion resistance and wrinkle resistance of the fabric.

From the analysis of the test results, it is found that due to the presence of synthetic fibers in the composition of the fabric, it does not wrinkle, and its resistance to frictional deformation is high compared to other types of fabric.

From the analysis of the research results, it can be seen that tanda yarn is obtained from a mixture of 66.4% cotton fiber and 27.0% lavsan fiber + 6.6% nitron fiber secondary material resources for 100% cotton fiber hemp yarn, and tanda yarn is 100% cotton fiber hemp yarn. It was found that the fabrics obtained from the mixture of secondary material resources with 66.4% cotton fiber and 27.0% lavsan fiber + 6.6% viscose fiber for yarn do not wrinkle on the warp and the abrasion resistance is higher compared to the indicators of other fabrics.

In addition, the tissue uniformity index was determined.

The bending stiffness of tissues refers to their resistance to deformation when bent. The uniformity of the fabrics depends on the structure and properties of the fibers and threads that make them, the type of finishing, the density and weaving of the threads. in turn, the uniformity of the tissues affects the cutting process.

The results of the study are presented in the form of a histogram in Figure 4.

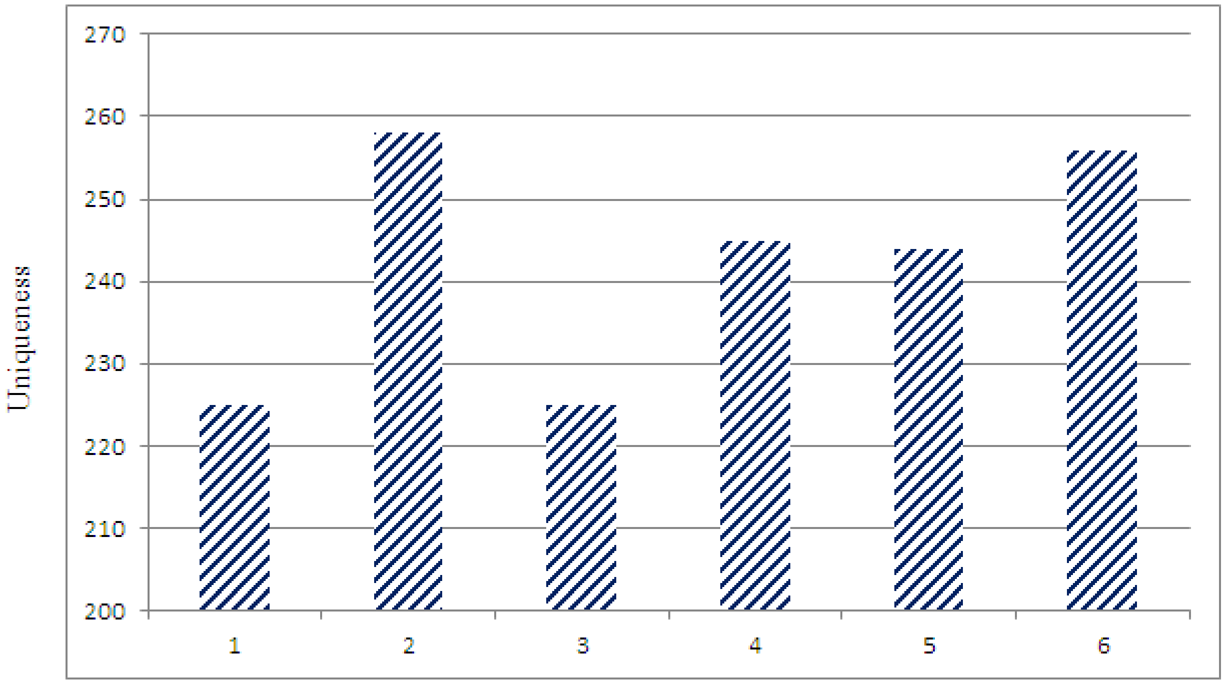


Figure 4. Changes in the uniformity indicators of fabrics obtained from a mixture of fiber and secondary material resources with different composition.

As can be seen from the results of the research, if we compare with the indicators of the tissue obtained according to the 1st option, the uniformity index of the tissue obtained according to the 2nd option increased by 9.1%, the uniformity index of the tissue obtained according to the 3rd option decreased by 3.9%, according to the 4th option the uniformity index of the obtained tissue increased by 5.3%, the uniformity index of the tissue obtained by option 5 increased by 4.1%, and the uniformity index of the tissue obtained by option 6 increased by 8.3%.

IV. CONCLUSION

From the analysis of the test results, it can be seen that the tanda yarn is obtained from the mixture of 66.4% cotton fiber and 27.0% lavsan fiber + 6.6% nitron fiber secondary material resources for 100% cotton fiber gin yarn, and the tanda yarn is 100% cotton fiber gin yarn. It was found that the uniformity indicators of the fabric obtained from the mixture of secondary material resources with 66.4% cotton fiber and 27.0% cotton fiber + 6.6% viscose fiber are higher than the indicators of the tissue obtained from secondary material resources with other compositions.

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