NOVATEUR PUBLICATIONS
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY
[IJIERT] ISSN : 2394-3696 Website: ijiert.org
VOLUME 8, ISSUE 10, Oct. -2021

STUDY OF THE EFFECT OF LOCAL RAW MATERIALS ON THE PHYSICAL AND MECHANICAL PERFORMANCE OF KNITTED FABRICS

Dadamirzayeva Shaxlo Maxamadali Qizi
Teacher, Namangan Institute of Engineering and Technology, Namangan, Uzbekistan, 160115
E-mail: shahlodadamirzayeva11@gmail.com, Phone: +998936744953

Oxunov Rustamjon Nematovich
Namangan Institute of engineering and technology teacher. Uzbekistan
E-mail: Охуноврустамжон64@gmail.com , Phone: +998941760412

Kholikov Kurbonali Madaminovich
D.Sc., prof. Namangan Institute of engineering and technology
qurbonalixoliqov@gmail.com+998944620173

ANNOTATION
In this article, using the capabilities of flat double-needle knitting machines, the share of local raw material, ie spun cotton yarn in the knitted composition, was introduced step by step, and the production technology was developed and the physical and mechanical performance was studied. 3 samples of knitted fabric were taken, their technological parameters and physical and mechanical properties were studied experimentally, presented in the table and analyzed. On the LONG-XING LXA 252 12G (China) flat needle machine, experimental samples of knitted fabric were developed and graphic notation was provided.

Keywords: knitwear, spun cotton yarn, knitted knitwear, double-layered knitwear, hoop, yarn, flat, dimensional lightness, hoop height, surface density, pattern, density, hoop length**.**

INTRODUCTION
The production of knitted products with high hygienic properties, effective use of local raw materials in the production of knitwear, is one of the current problems. As the living standards of the world's population improve, so does the demand for consumer goods and textiles with high hygienic properties. Therefore, the knitting industry is today the most important branch of the textile industry. Knitted products are characterized by modernity, practicality and affordability. The knitting industry has the following specific advantages:

- In the field of product range expansion, there is a wide range of opportunities to obtain a variety of mixed fabrics that provide different properties and appearance of knitted fabrics;
- High consumer resistance to repeated deformation, complex physical and mechanical properties such as friction, wrinkling, high hygienic properties (hygroscopicity, air permeability and a number of comfort conditions), a unique consumer property of knitted fabric, which characterizes the complex aesthetic performance;
- Availability of a wide range of technological capabilities for the production of products in a regular and semi-regular manner.

Development of new types of knitted fabrics, increase the share of local raw materials in the composition of knitted products, expand the range of knitted fabrics, as well as expand the technological capabilities of LONG-XING LXA 252 12G (China) flat double-needle machine 3 samples were developed by changing the type and proportion of raw materials in the output. The developed patterns of knitted fabric differ from each other by the proportion of raw material in the fabric composition. Technological parameters and physical-mechanical properties of knitted fabric were determined by the experimental method in the laboratory of the

Namangan Institute of Engineering Technology, the measurement results are given in the table. As a result of practical research, the texture structure, physical and mechanical properties and appearance, which characterize the quality indicators of knitted products, were identified.

Indicators characterizing the structure of knitted fabric are: surface and volume density, density in width and length (number of rings per unit length), length of loop thread, angle of intersection of loop rows and loop columns, thickness of knitted fabric. A graphic representation of the newly produced two-layer knitted fabric is shown in the figure.

The raw material was 20 tex x 4 spun cotton yarn, 35 tex x 2 polyacryl nitrile 17 tex x 4 polyester yarn.

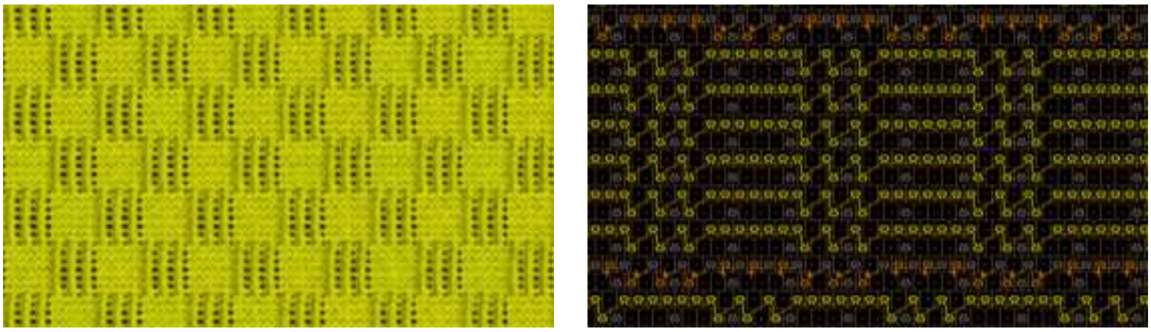


Figure 1. Graphic inscription of knitted fabric in a new structure

In the production of knitted products on the LONG-XING LXA 252 12G flat double-needle knitting machine, the change of the location of the rings, densities, the length of the ring strip and a number of other indicators is done automatically. This makes it easy to get a variety of knitted fabrics. In order to improve the air permeability of the sample, patterns were created using the front and rear needles. The result is a knitted fabric with a unique pattern on the outside, improved shape retention and air permeability. (Figure 1)

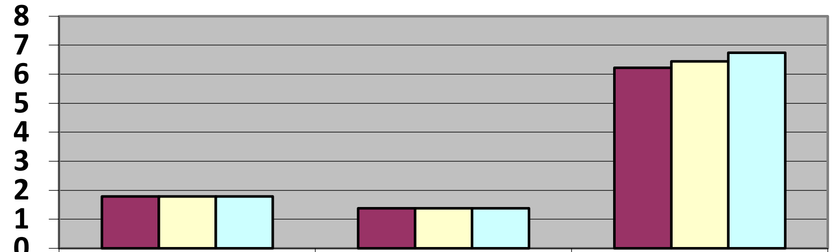
It was found that the volume density index of knitted knitwear in all samples changed significantly compared to the base fabric due to the change in the proportion of local raw material in the composition of knitted fabric. The volume density of knitwear is one of the main among the technological indicators, which shows the amount of raw material consumption in the knitted fabric.

Table 1 Technological parameters of knitted fabric

Indicators		**Samples**		
		1	**2**	**3**
Thread type and linear densities		**Polyacrylonitrile 35 tex x2**	**Cotton 20 tex x4**	**Cotton 20 tex x4**
		Polyacrylonitrile 35 tex x2	**Polyacrylonitrile 35 tex x2**	**Cotton 20 tex x4**
Ring step A (mm)		1.79	1.79	1,79
Row height B (mm)		1.38	1.38	1,38
Horizontal density R_h		28	28	28
Vertical density R_v		43	43	43
Ring strip length L (mm)		6.22	6.44	6,74
Knitted surface density Ms (gr/m^2)		362	473	543
Knitting thickness T (mm)		2.41	2.52	2.61
Volume density δ (mg/sm^3)		150.2	181.5	226.4
Air permeability		43.052	39.32	28.68
Breaking force	height	489	543	548
	width	264	403	432

Elongation at break (mm)	height	158,6	98,1	100,7
	width	234,4	239,3	231
Stretching to break (%)	height	79,3	45,35	48,35
	width	117,2	106,15	110,5
Consumption energy at break (J)	height	23,8	20	24,2
	width	17,7	29	30,2
Revensible deformation , $\varepsilon_{н}$, %	height	23,5	20,7	21,8
	width	34,3	31,5	28
Irrevensible deformation, ε_{o}, %	height	76,5	79,3	78,2
	width	65,7	68,5	72

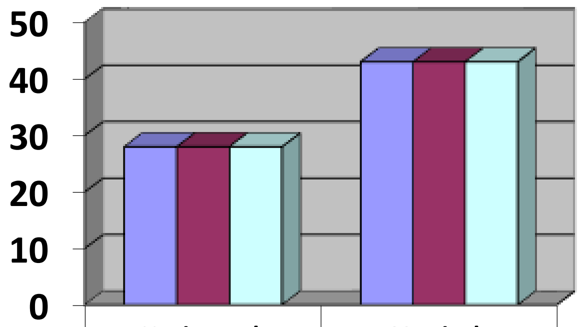
Due to the fact that the structure of the knitted fabric and the linear density of the yarns are close to each other, a number of technological parameters have been improved due to changes in the raw material in the fabric.



	Ring step A (mm)	Row height B (mm)	Ring strip length L (mm)
Poliacrilnitril/Poliacrilnitril	1.79	1.38	6.22
Poliacrilnitril/cotton	1.79	1.38	6.44
Cotton/ Cotton	1.79	1.38	6.74

Figure 2. Histogram of loop pitch, loop row height and loop strand length of knitted knitwear

In all samples, the ring pitch was 1.79 mm and the ring row height was 1.38 mm. We can see that the length of the loop strip has changed slightly due to the change in the raw material composition of the knitted fabric. (Figure3)



	Horizontal density Rh	Vertical density Rv
Poliacrilnitril/Poliacrilnitril	28	43
Poliacrilnitril/cotton	28	43
Cotton/ Cotton	28	43

Figure 3. Histogram of densities on the horizontal and vertical of the knitted fabric

The horizontal and vertical densities are the same in all samples, ie the number of rings with a length of 50 mm is 28 and 43, respectively.(Figure 3)

The lowest air permeability was observed in pattern III of knitted fabrics, and its volume was 28.68 sm^3 / sm^2*sec. The highest air permeability was observed in sample I of the knitted fabric samples, and its volume was 43,052 sm^3/sm^2*sec,which is 43.4% more than in the fabric (variant III). (Figure4)

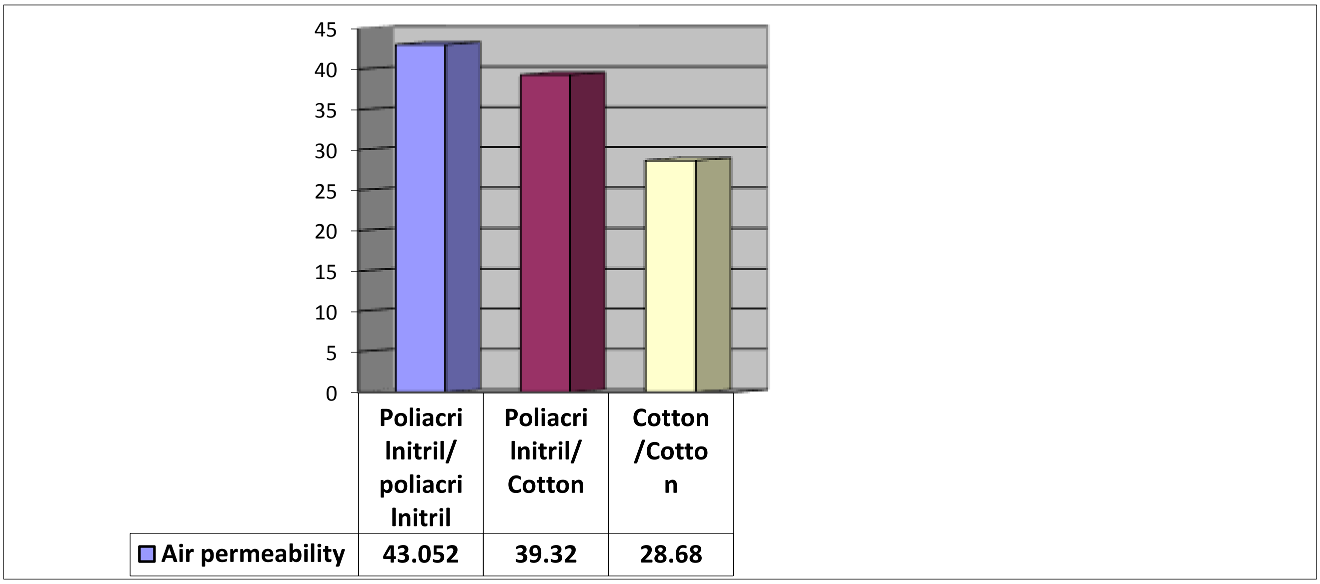


Figure 4. Air permeability histogram of knitted fabric

The description of the cut is an acceptable key indicator for assessing the quality of knitted fabrics. All GOST and TSh applicable to knitted fabrics include normative indicators on elongation and tensile strength**.** Breaking force is the force required to break a specimen at a given size and speed. The breaking force is expressed in Newton (N) units. The tensile strength of the submitted samples was determined using the standard method YG-026T dynamometer**.**

Tissue toughness, i.e., tensile strength analysis, showed that the most mature tissue in height, sample III, had an index of 548 N and had a toughness of 11.8% higher than sample I (Table 1, Figure 5). Tissue width stiffness was also observed in sample III, with a tissue tensile strength of 432 N, which is 39% higher than in sample I tissue.

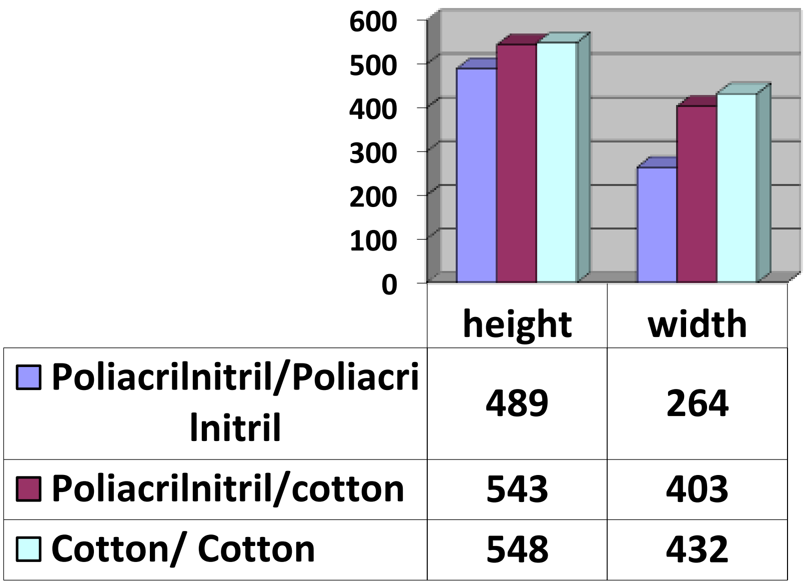
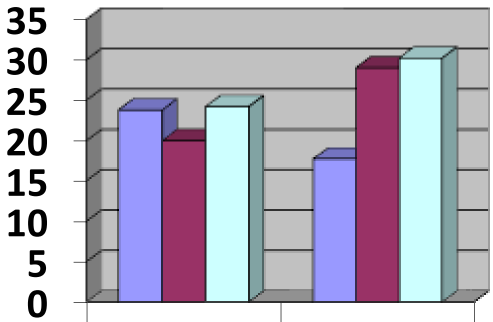


Figure 5. Histogram of tensile strength of knitted fabric

The energy dissipated in a break is the amount of energy expended to break it when the sample is stretched at a certain size and speed. The energy expended in the break is expressed in units of Joule (J). The breakdown energy of the submitted samples was determined using the standard method YG-026T dynamometer.

Tissue toughness, i.e., analysis of the amount of energy consumed at rupture, shows that the most mature tissue in height, sample III, had an energy consumption of 24.2 J at rupture, 18.4% higher than sample I (Table 1, 6). -picture).

Tissue width stiffness was also observed in Sample III, which consumed 30.2 J of energy in tear width, which is 41.39% more than in Type I tissue.



	height	width
Poliacrilnitril/Poli acrilnitril	23.8	17.7
Poliacrilnitril/cott on	20	29
Cotton/ Cotton	24.2	30.2

Figure 6. A histogram of the energy expended in the rupture of a knitted fabric

From the above analysis of the physical and mechanical properties of knitted fabrics, it became clear that the change in the proportion of raw cotton in the fabric, the positive effect of knitted fabric on air permeability, toughness and elongation properties, strengthened the shape retention of knitted fabric.

REFERENCES

1) Kholikov, K.M; Zhuraboev, A.T; Shogofurov, Sh.Sh; Abduvaliev, D.M. (2020) Comprehensive assessment of the two-layer knitwear quality. The Way of Science. 2020. № 1 (71). http://scienceway.ru/f/the_way_of_science_no_1_71_january.pdf#page=24
2) F.Kh. Sadykova, D.M. Sadykova, N.I. Kudryashova. Textile materials science and the basics of textiles production. M .: Legprombytizdat, 219-225p. (1989).
3) Sh.Ishakov. Textile chemistry. Tashkent "Uzbekistan" 1995.192 pages.
4) A.I.Koblyakov, G.N.Kukin, A.N.Solovev. Laboratory practice on textile material science
5) NRKhankhadjayeva, Theoretical bases of pattern making., Textbook. T .: “Aloqachi”, 2010, 214 pages.