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Change Of Cotton Fiber Quality Indicators Under Technological Processes

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ABSTRACT

In this article, the quality indicators of fiber under the influence of various technological processes of Sultan selection cotton were determined and the optimal variant of the technological process for production was recommended.

Basic expressions tangled fiber, cortical fiber, knot, staple mass length, specific tensile strength, fiber maturity.

KEYWORDS

Flagella, skin with fiber, nodules, staple mass length, relative breaking load, fiber maturity.

INTRODUCTION

Cotton entering the primary processing plant consists of impurities and mineral defects. Pollution includes flowers, leaves, twigs, stones, sand, etc. [1].

The amount of contamination is divided into large and small defects. If the size of the defects is greater than 8 mm, they are considered large defects. These impurities are located on the surface and inner layers of the seed cotton, as well as have adhesive strength with different fibers. If there are impurities on

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the surface of the seed cotton, the adhesion strength to the fiber will be low [1].

The effectiveness of cleaning cotton from impurities depends on selection variety, moisture, variety, fiber length, the nature of impurities and other indicators [2-4].

The amount of contaminants in the cotton is cleaned using ginning equipment at ginneries. The impact efficiency of the cleaning equipment workpieces, in turn, depends on several factors, namely the cleaning efficiency, the speed of movement of the workpieces, the design of the workpieces, the repetition of cleaning and the degree of airflow cleaning [5].

Moisture is very important during cotton cleaning. This is because the more moisture there is, the more difficult it is to separate the defects, leading to an increase in the number of seeds that are hit or injured. Therefore, the moisture content of cotton received at ginneries and ginning plants should not exceed 11% for grade I and 13% for sub-varieties. If the moisture content of the gin equipment is in the range of 7-8%, the quality of cotton fiber is maintained [6-7].

Cotton with high moisture content has a large amount of defects and waste, the cleaning rate of cotton is low, leading to a deterioration in fiber quality. As a result, the quality of the finished product obtained from the fiber will be negatively affected. In addition, the cotton gets stuck between the working parts of the machine, and the seeds that are hit or injured cause an increase in the amount of fibrous fiber in the shell [8].

During the initial processing of cotton, the amount of defects and waste in the composition of cotton fiber increases under the influence of high humidity and technological processes above the standard requirements. If the moisture content of the seed cotton is higher than the standard values, the amount of fiber, complex twisted fiber, contaminants in the fiber content will increase, and the amount of husk fiber, beaten or injured seeds will decrease. In addition, the more technological processes the seed cotton undergoes, the better it is to be cleaned of contaminants, leading to an increase in the amount of some beaten or injured seeds, tangled and complex tangled fiber, husk fiber. At the same time, due to the low moisture content leads to an increase in the total amount of waste and waste in the composition of cotton fiber due to an increase in the amount of bark fibers and nodules, beaten or injured seeds. In addition, some selection varieties have a low degree of purification and do not meet the demand. It follows that not all varieties created may meet the demand [9].

Defects and wastes in cotton fiber were determined in different technological process sequences, and the test results are given in Table 1.

One of the main quality indicators of cotton fiber is the change in the composition of the defect and the amount of waste under the influence of moisture. When the amount of defects and waste in the composition of cotton fiber is higher than the standard values, the quality of the fiber deteriorates, and the physical and mechanical properties of the yarn obtained from it are negatively affected. According to the state standard, cotton fiber is divided into a number of classes, that is, higher, good, medium, dirty and bad, depending on the amount of pollution, and the price varies according to these classes [1].

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The impact of different selection varieties of cotton on technological processes, which are initially processed in ginneries, varies. While some selection varieties are well cleaned of contaminants, some are the opposite. Therefore, it is necessary to create optimal conditions for each variety grown in our country. In addition, the seeds of some selection varieties are brittle, and there is a possibility of injury under the influence of technological processes [2].

Defects in cotton fiber and changes in the amount of waste in the sequence of different technological processes

Table 1.

т/р	Defect in fiber content and amount of waste,%	Options		
		1	2	3
Before the technological process				
1.	Common shortcomings	2,80	3,00	2,51
2.	A handful of uncooked fiber	0,14	0,16	0,12
3.	Fiddly fiber	-	-	-
4.	Complex tangled fiber	-	-	-
5.	Shell fiber	0,34	0,38	0,28
6.	Beaten or injured seeds	0,50	0,54	0,43
7.	Knots	0,10	0,08	0,08
8.	Dirt	1,62	1,84	1,50
After the technological process				
1.	Common shortcomings	2,42	2,60	2,00
2.	A handful of uncooked fiber	0,12	0,15	0,11
3.	Fiddly fiber	-	0,02	-
4.	Complex tangled fiber	-	-	-
5.	Shell fiber	0,74	0,69	0,60
6.	Beaten or injured seeds	0,62	0,72	0,50
7.	Knots	0,20	0,18	0,12
8.	Dirt	0,74	0,84	0,67

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The results of the study showed that compared to the fiber obtained before the technological process sequence in Option 1, the total amount of defect or waste in the fiber obtained after the technological process sequence decreased by 13.6%, the amount of cortical fiber 54.1%, the amount of crushed or injured seeds increased by 19.4%, the number of nodules increased by 50.0%, the amount of contaminants decreased by 54.3%, compared to the fiber obtained before the sequence of the technological process in option 2 Thus, after the sequence of the technological process, the total amount of defects or waste in the fiber content decreased by 13.3%, the amount of cortical fiber by 44.9%, the amount of crushed or injured seeds by 25.0%, the amount of knots by 55.6%. contaminants, the amount of impurities decreased by 54.3%, compared with the performance of the fiber obtained before the sequence of the technological process in option 3, the technological the total amount of defect or waste in the fiber content obtained after the sequence of the process decreased by 20.3%, the amount of cortical fiber increased by 53.3%, the amount of crushed or injured seeds increased by 14.0%, the amount of nodules increased by 33.3%, impurities the amount decreased by 53.3%.

The high performance and quality of sewing products are inextricably linked with the body and back yarns in the fabric that make it up. One of the main indicators of raw materials - textile fabrics in the production of garments is the hardness or softness of the fabric. Applying the abrasion resistance of a garment to a part of the fabric knowing the virginity level of the fabric will result in a longer shelf life and an increase in the quality index [10].

Quality indicators of suit fabrics with different fiber content increase the chances of producing a quality product if the fibers in the study are used for the products studied [11].

Based on the results of the study, histograms of changes in fiber properties under the influence of technological processes were constructed in Figures 1-3

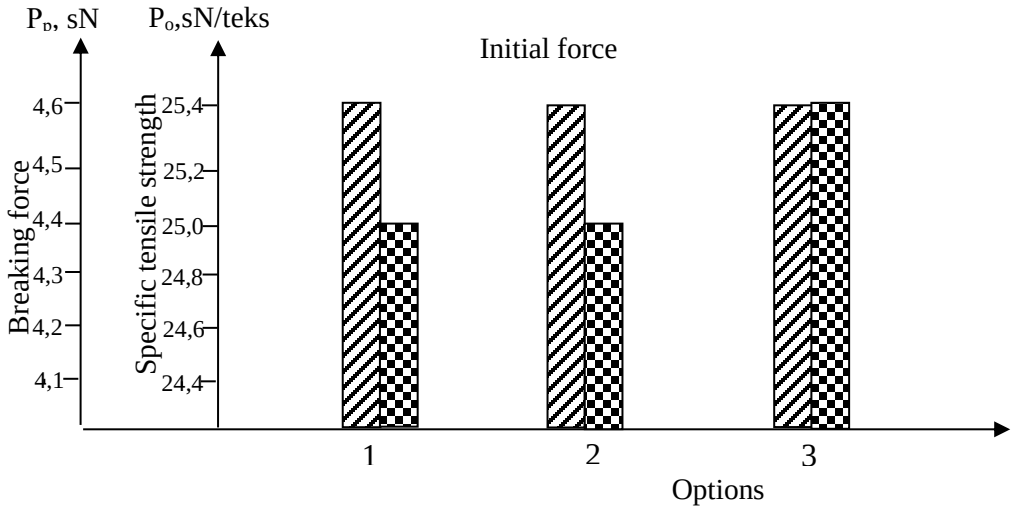

Figure 1. Influence of technological processes on fiber tensile strength and specific tensile strength.

- breaking force;
-specific tensile strength.

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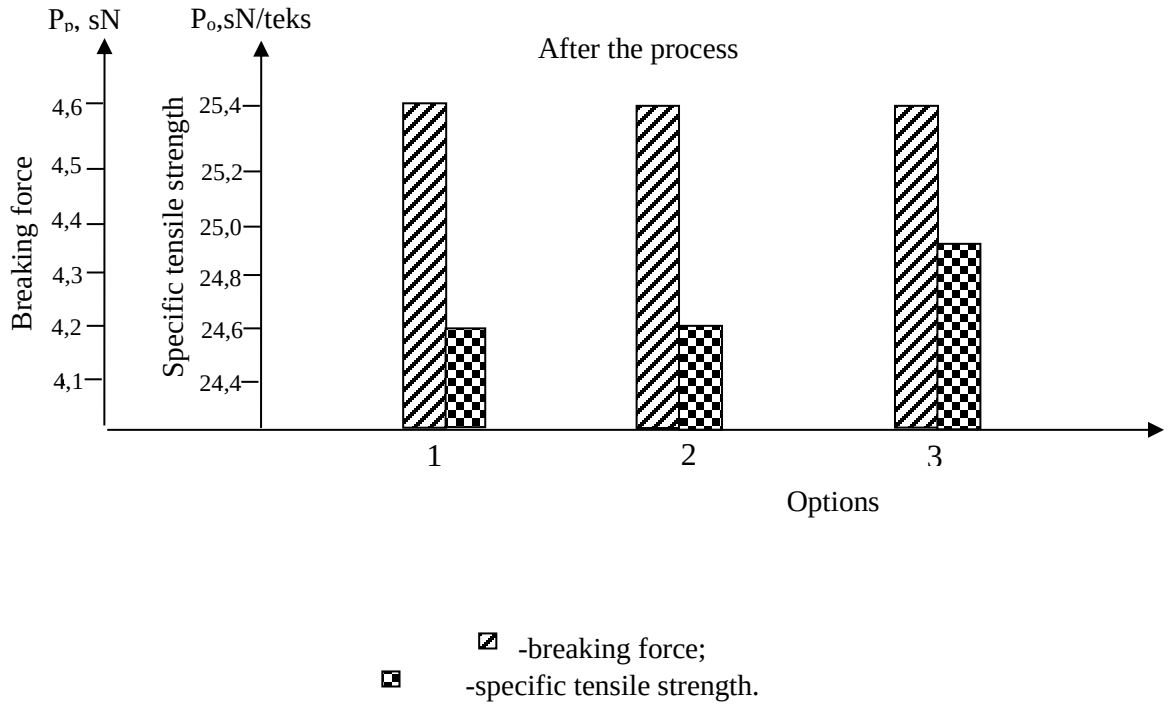

Figure 2. Influence of technological processes on fiber tensile strength and specific tensile strength

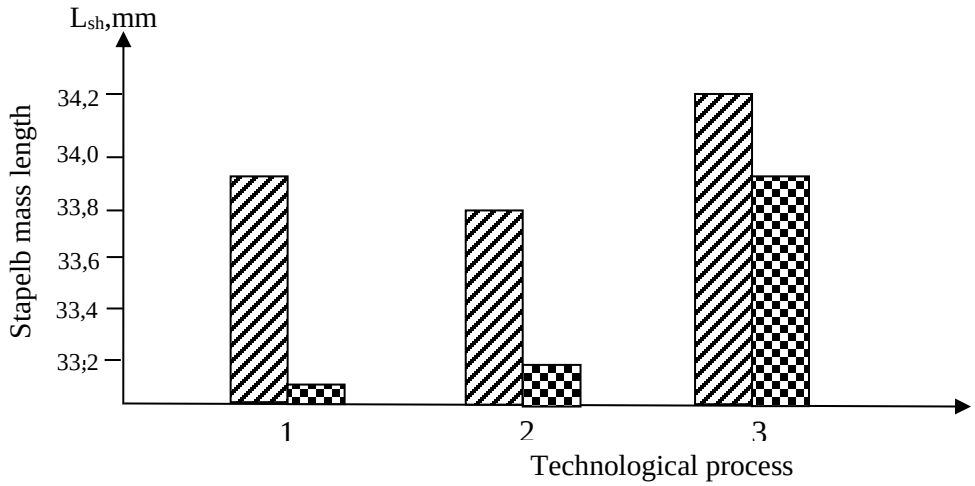

Figure 3. The effect of technological processes on the staple mass length of the fiber.

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Analyzing the research work, the tensile strength of the fiber obtained under the variant 1 before the technological process was 4.6 sN, the specific tensile strength was 25.0 sN / tex, the staple mass length was 33.9 mm. The tensile strength of the obtained fiber is 4.6 sN, the specific tensile strength is 24.6 sN / tex, the staple mass length is 32.5 mm, the tensile strength of the fiber obtained under option 2 before the technological process is 4.6 sN, specific tensile strength 25.1 sN / tex, staple mass length 33.8 mm, the tensile strength of the fiber obtained from the technological process according to option 2 is 4.6 sN, specific tensile strength 24.6 sN / tex, staple mass length 32.8 mm, the tensile strength of the fiber obtained according to option 3 before the technological process is 4.6 sN, the specific tensile strength is 25.4 sN / tex, the staple mass length is 34.2 mm, the technological process 3 The breaking strength of the obtained fiber is 4.6 sN, the specific breaking strength is 24.9 sN./tex, the staple mass length was 33.9 mm.

The analysis of the results shows that the more technological processes cotton is processed in, the lower the specific tensile strength and staple mass length of the fiber.

The results of the analysis showed that due to the reduction of the sequence of the technological process, the total amount of defect or waste in the fiber content decreased from 13.6% to 20.3%, the amount of hull fiber from 54.1% to 53.3%, the amount of crushed or injured seeds From 14.0% to 19.4%, the amount of nodules increased from 33.3% to 50.0%, the amount of impurities decreased from 54.3% to 53.3%.

CONCLUSION

Analyzing the test results obtained on the physical and mechanical properties of the fiber, the specific tensile strength of the fiber obtained before the technological process for option 1 is 0.4 sN/tex, and the length of the staple mass is 1.4 mm, before the technological process for option 2 the specific tensile strength of the obtained fiber is 0.5 sN/tex and the staple mass length is 1.0 mm, the specific tensile strength of the fiber obtained before the technological process according to option 3 is 0.5 sN/tex, and the staple mass length is 0.3. decreased by mm.

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