

Study of Physical and Mechanical Properties of Different Types of Varieties

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ABSTRACT: In this article, samples of hard-to-clean Hampor, Sultan, Jarkurgan and well-cleaned Beshkahramon selection varieties were taken at the Shurchi ginnery in Surkhandarya region, and the quality indicators of cotton fiber were determined.

KEY WORDS: Strength and specific tensile strength, physico-mechanical and geometric properties, staple mass length.

I. INTRODUCTION

One of the main parameters of cotton fiber is the specific tensile strength and staple mass length. If the staple mass length of cotton fiber decreases, the amount of short fiber increases, the strength and specific tensile strength decrease. As a result, the quality of yarns obtained from fibers is negatively affected.

Even if the length of the fiber is reduced by 0.5 mm, the quality of the yarn obtained from it deteriorates. It also causes an increase in the amount of waste during the spinning process.

Under the influence of various factors, improper reception of cotton in the ginnery, long-term and high-density storage of cotton drying at high temperatures drying, cleaning and ginning, the physical-mechanical and geometric properties of fiber change, picking, ginning, storage, drying, cleaning, grinding, fiber cleaning and pressing processes. Therefore, the optimal conditions for each process are determined in ginneries.

At present, a number of selection varieties have been created by our selection scientists in different regions of the country, and technological processes have a different impact on the change of their quality indicators. In addition, the zoning of varieties is also important. Because the varieties created by our scientists are planted and tested in the districts of different regions, on farms. However, promising varieties created by our breeders were excluded from cultivation because they did not bear fruit less than a year later [1, 2, 3].

II. ANALYSIS OF EXISTING FILTERING MATERIALS AND RESEARCH RESULTS

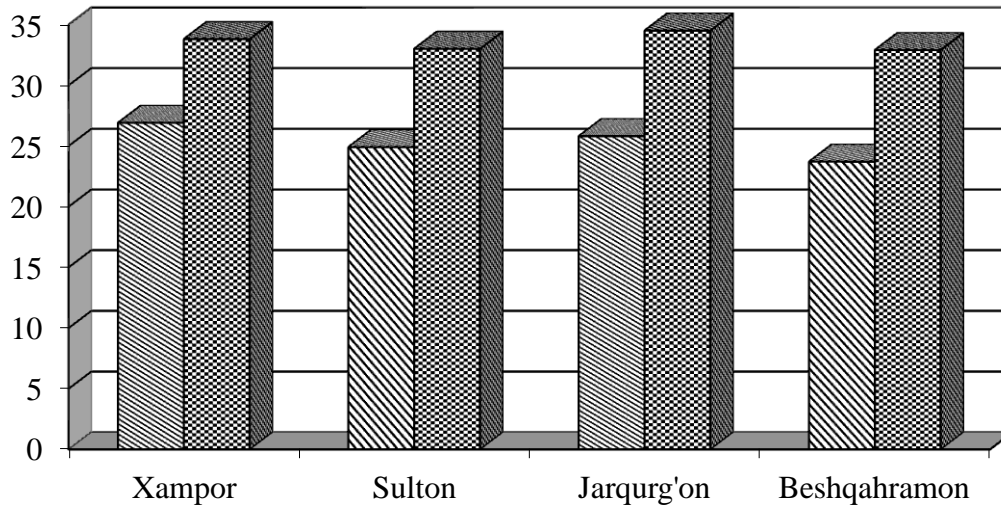
Changes in fiber quality indicators for different selection varieties were studied in the laboratory.

The results of the research are presented in Table 1.

1- table

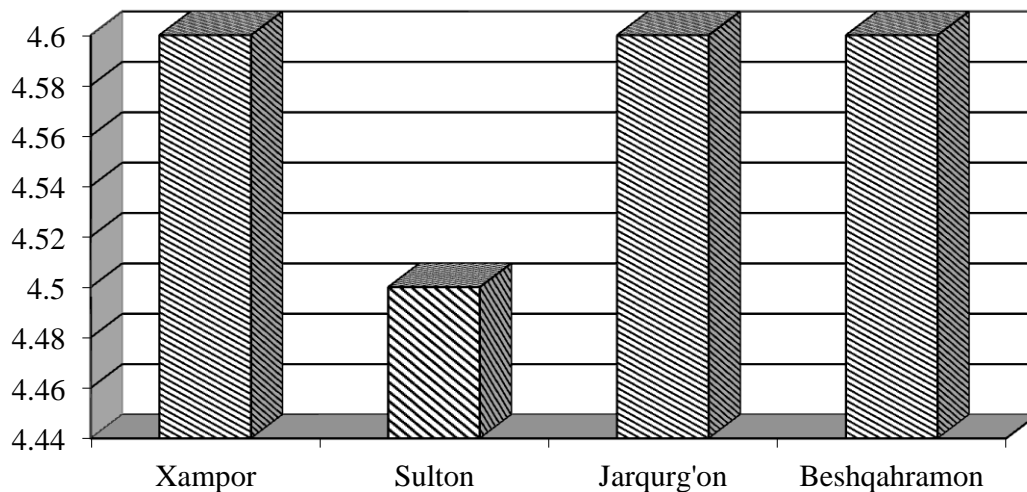
Physical and mechanical properties of different selection varieties change

t / r	Show	Selection varieties			
		Xampor	Sultan	Jarqorgon	Beshqahramon
1.	Linear density of fiber, mtex	171	181	178	194
2.	Fiber strength, sN	4,6	4,5	4,6	4,6
3.	Specific tensile strength of fiber, sN / tex	26,9	24,9	25,8	23,7
4.	Fiber length, mm including:				
	modal mass	30,5	30,1	30,8	30,8
	staple mass	33,8	33,0	34,5	32,9
	average	24,8	24,0	25,0	26,3



Selection varieties

Figure 1. Variation in specific tensile strength and staple length of cotton fiber by different selection varieties.
- specific tensile strength; - staple length.



Selection varieties

Figure 2. Different selection of tensile strength of cotton fiber variation by varieties.

Comparing the test results obtained from the determination of physical and mechanical properties of cotton fiber, the tensile strength of cotton fiber of the Humpor selection variety is 4.6 sN, specific tensile strength is 26.9 sN / tex, staple mass length is 33.8 mm, Sultan breaking strength of selection cotton fiber 4.5 sN, specific breaking strength 24.9 sN / tex, staple mass length 33.0 mm, breaking strength of Jarkurgan selection cotton fiber 4.6 sN, specific breaking strength 25, 8 sN / tex, staple mass length 34.5 mm, tensile strength of Beshkahramon selection cotton fiber 4.6 sN, specific tensile strength 23.7 sN / tex, staple mass length 32.9 mm.

Comparing the results of the study with the performance of Hampor selection fiber, the tensile strength of Sultan selection cotton fiber decreased by 2.2%, specific tensile strength decreased by 7.4%, staple mass length decreased by 2.2%, the breaking strength of Jarkurgan selection cotton fiber did not change. , specific tensile strength

decreased by 4.1%, staple mass length increased by 2.1%, Beshkahramon selection varietal tensile strength did not change, specific tensile strength decreased by 11.9%, staple mass length decreased by 2.7%.

In addition, fiber quality indicators are studied on the basis of the modern type US HVI 900 SA system. Cotton fiber is divided into varieties according to color, appearance, maturity and is sold on cotton exchanges on the basis of these indicators [3, 4, 5].

III. EXPERIMENTAL RESULTS

Quality indicators of cotton fiber include linear density, specific tensile strength, color by type, appearance, degree of yellowing, length, short fiber index and the amount of defects in the composition.

The linear density of cotton fiber is expressed in tex or millitex units and is estimated depending on the fiber length and type. If the fiber exceeds the limit in terms of linear density or length, then it passes into subtypes, resulting in reduced yarn spinning capacity and the production of poor quality finished products [6,7].

The color of cotton fiber is divided by the American standard into two indicators, namely the level of light reflection and yellowing. Therefore, the color of cotton fiber is of high demand. As a result, ginneries in the country receive cotton mainly during the day, which is determined by qualified laboratory technicians by comparison with special reference samples using the cluster method.

Another indicator of cotton fiber is its linear density. It is more difficult to determine the linear density measurement of a fiber with sufficient accuracy. Therefore, instead of the concept of linear density in the American fiber certification system, the micronaire indicator was introduced. In this method, it is determined by the loss of airflow passing through a group of parallel fibers. The air resistance is proportional to the cross-section of the fiber, and the resistance of the fiber depends on its velocity as a cross-sectional function.

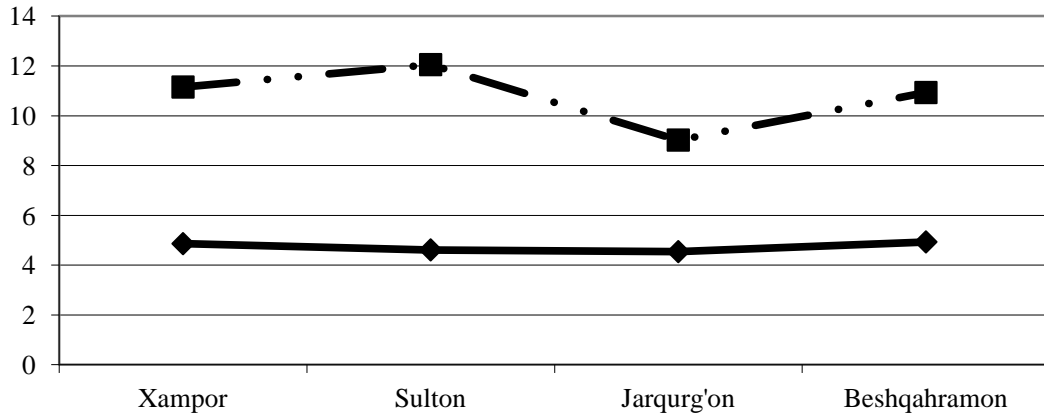
The quality of cotton fiber was assessed in accordance with international standards UzDst 604-2016 by measuring methods in the class and HVI system, and the test results are presented in Table 2.

2- table

Different selection varieties of cotton fiber quality indicators change in

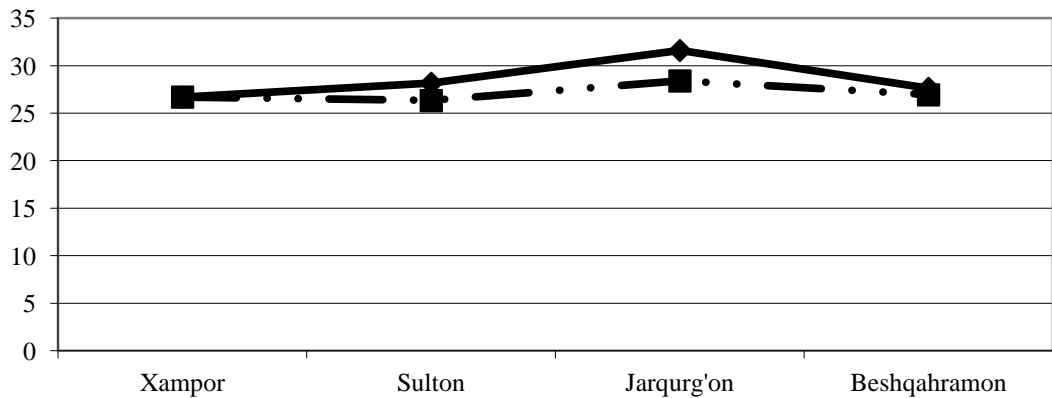
t / r	Show	Selection varieties			
		Xampor	Sultan	Jarqorgon	Beshqahramon
1.	Micron microns	4,86	4,61	4,54	4,93
2.	Str- specific tensile strength, gk / tex	26,69	28,16	31,60	27,62
3.	UHM- high average length	26,70	26,33	28,40	26,94
4.	Unf- uniformity in length, %	50,91	49,06	50,63	50,24
5.	SFI- short fiber index	11,15	12,05	9,02	10,93
6.	Emax- elongation at break, %	20,54	21,52	29,55	22,85
7.	Rd- light reflection coefficient	63,50	71,43	68,98	63,00
8.	+b- degree of yellowing	8,30	8,48	8,25	8,40

Based on the results in the table, Figures 3-5 show graphs of changes in the micronaire index of the fiber, specific tensile strength, high average length, short fiber index and shear rate for different selection varieties.



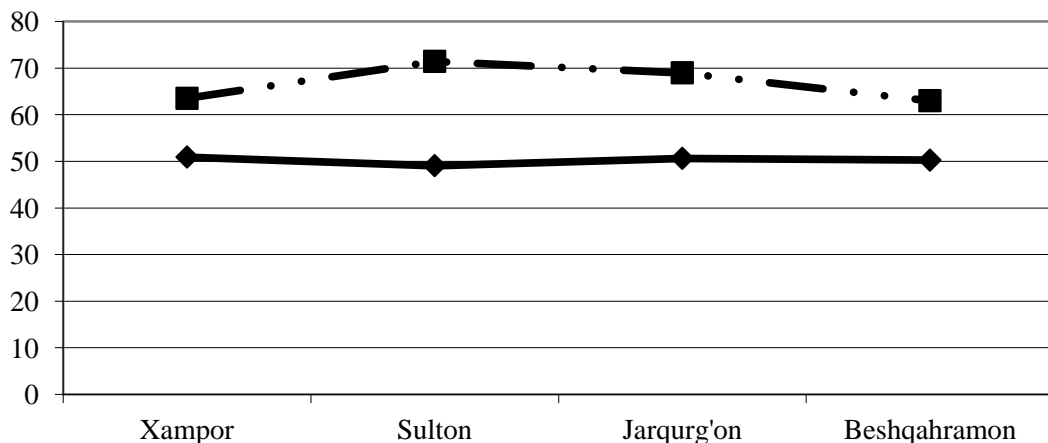
Selection varieties

Figure 3. Changes in the micraire index and short fiber index of fibers of different selection varieties.
1- short fiber index; 2- micraire indicator.



Selection varieties

Figure 4. Variation in specific breaking strength and high average length of fibers of different selection varieties.
1- specific tensile strength; 2- upper average length.



Selection varieties



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Figure 5. Homogeneity of fibers of different selection varieties in length and variation of light reflectance.
1- light reflection coefficient; 2- uniformity in length.

IV. CONCLUSION AND FUTURE WORK

Analyzing the results of the study, the micronaire index of Humpor selection fiber was 4.86, the specific tensile strength was 26.69 gk / tex, the upper average length was 26.70, the short fiber index was 11.15, and the elongation at break was 20.54. %, light reflectance coefficient 63.50 and yellowness 8.3, Sultan selection fiber micronaire index 4.61, specific breaking strength 28.16 gk / tex, high average length 26.33, short fibers index 12.05, elongation at break 21.52%, light reflection coefficient 71.43 and yellowness 8.48, micronaire index of Jarkurgan selection fiber 4.54, specific breaking strength 31.60 gk / tex. , high average length 28.40, short fiber index 9.02, break elongation 29.55%, light reflection coefficient 68.98 and yellowing rate 8.25, micronaire index of fiber of the Beshkahramon selection variety 4.93 , specific tensile strength 27.62 gk / tex, high average length 26.94, short fiber index was 63.00, the elongation at break was 22.85%, the reflection coefficient was 63.00, and the yellowing rate was 8.40.

Analysis of the results obtained in determining the quality of fiber showed that the specific tensile strength of the fiber, the high average length of the Jarqurghon selection variety was higher than in other selection varieties of cotton.

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