Original Article

DETERMINATION OF THE QUALITY INDICATORS OF BUKHARA-102 AND ANDIJAN-35 FIRST-GRADE COTTON FIBER

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DOI: 10.47750/pnr.2022.13.S06.487

Abstract

In this article, the quality indicators of Bukhara-102 and Andijan-35 first-grade cotton fiber in the HVI system were studied in the laboratory of the Namangan Center "Quality". Samples of storage and production processes at the Turakurgan ginnery were taken and fiber quality indicators were studied.

Keywords: fiber, seed, cotton, lint, separator, stone holder, pipe, gin, saw, drum, pipe.

Introduction

The cotton ginning industry carries out multifaceted activities such as receiving, storing, processing, and sending the produced product to appropriate places, as well as processing the seed and preparing it for planting.

In the technological process of cotton processing, scientific research works were carried out to study the operation of pneumatic vehicles carrying raw materials and products derived from them, and to improve their main elements and structures.

Today, in the cotton ginning enterprises of all regions of the republic, the production of the technological processes of the initial processing of cotton raw materials in the cluster method has been established. Cotton raw material fully meets international standards with color, fiber length, hardness, and micronaire parameters. This is one of the main indicators that ensure its purchase in the world fiber market.

The goal of forming clusters is to align the enterprises of the same industry located within the city, district, and region and the educational, scientific, engineering, consulting, standardization, certification, and other services in a single technological chain with them - to direct the creation of competitive goods based on the organization of innovative production...
One of the enterprises that started working in the direction of the cluster is the NT cluster LLC enterprise "Toraqorgan Cotton Cleaning Plant" located in Turakorgan district of Namangan region.
Checking the quality of cotton raw materials and finished products in cotton factories is the responsibility of the technical control department, which combines the technological laboratories of the factory and cotton processing centers. One of the main tasks of the technical control department is to check the correct organization of receiving seeded cotton, dividing it into batches and storing it at the factory and preparation points, checking the quality of the seeded board received from the farmer at the cotton preparation point and coming from the preparation point at the factory; checking the operation of drying-cleaning shops and the quality of seed cotton

processed in them; checking the quality of the products produced in the cotton factory, checking the correct processing and correct marking of bales of cotton fiber, lint, and fiber waste; it will consist of checking the implementation of all measures to improve the quality of seed cotton and finished products at the factory and preparation points, checking the implementation of measures related to the implementation of new standards and technical conditions, and determining the reasons for the release of low-quality products.

Materials and Methods

The length of the cotton fiber is important in the process of yarn production in spinning plants, and as a result of every 1 mm reduction in the length of the fiber, the elongation at the break of the yarn decreases. Alternatively, the longer the cotton fiber, the smoother, finer, and crisper the threads are. As a result of the decrease in the length of the cotton fiber in spinning enterprises, the number of short fibers and waste increases, the strength of the fiber decreases, and the structure deteriorates. As a result, the quality indicators of the fiber are disturbed, and the quality of yarn and yarn obtained from it deteriorates. In addition, long-term storage of seeded cotton at high density during the initial processing of cotton, as well as due to various biological and various technological effects, damages the fiber, breaks the fiber structure, and leads to a decrease in the length index.

Fiber toughness is one of the key statistical properties that evaluate the fiber's distance to failure. The fibers are mainly cut off from the damaged area first. [1].

According to international standards, the quality of cotton fiber is evaluated by measuring methods in the classifier and HVI system based on UzDst 604-2016. Cotton fiber is divided into varieties according to color, appearance, and ripeness and is sold in cotton exchanges based on these indicators. According to international standards, the quality of cotton fiber is evaluated by measuring methods in the classifier and HVI system based on UzDst 604-2016 [2].

Results and Discussion

To study the damage properties of cotton fiber, samples were taken from the gin and the initial cotton production process at the Toragorgan cotton ginning enterprise, and its quality indicators were determined in the HVI system at the "Sifat" center in Namangan. Samples of Bukhara-102 first-grade cotton variety from the NT cluster LLC enterprise "Toragorgon Cotton Refinery Plant" were separated from the cotton seed with the help of rollers.

Table 1 Damage to Bukhara-102 first-grade cotton fiber during storage

No	Fiber quality indicators	The upper part of the bunt	Top of the bunt	The side from the bunt	Mid off the bunt	Below the bunt	After the stone head
1	Micronaire (Mic)	4.5	4.6	4.6	4.4	4.5	4.5
2	Relative breaking strength(Strength)	33.3	33.8	33.9	34.8	34.1	34.1
3	Length (Length)	1.13	1.15	1.18	1.19	1.18	1.14
4	Length uniformity index (Uniform)	86.3	86.9	86.4	87.5	87.3	66.3
5	Short Fiber Index	4.1	3.5	4.5	3.7	3.8	4.7

	(SFI)						
6	Elongation at break (Elong)	8.2	8.5	8.2	8.2	7.8	8.6
7	Amount of impurities (Count)	50	77	58	70	65	89
8	Area (Area)	3.0	4.5	4.4	5.0	4.0	4.8
9	Color stability yellowness grade (C.Grade)	51-4	51-4	41-4	51-4	51-4	52-2
10	Light reflection coefficient (Rd)	66.2	65.8	69.6	67.0	65.3	64.6
11	The degree of jaundice (b)	8.3	8.5	8.7	7.8	7.9	8.5

It can be seen from the results of scientific research that In the second table, quality indicators of cotton fiber in the HVI 900 system, samples of cotton were taken and its quality indicators were studied.

To study the influence of the production process on the quality indicators of the fiber in the cotton ginning enterprises, samples were also taken from the technological process, and the quality indicators of its fiber were determined in the HVI 900 system.

Table 2 Damage to Bukhara-102 first-grade cotton in the fiber separation process

No	**Fiber quality indicators**	**After the separator**	**Drying drum**	**After UXK 1 unit**	**UXK 2 after aggregate**	**Enter the gin**	**The wedding party**
1	Micronaire (Mic)	4.3	4.5	4.5	4.4	4.3	4.3
2	Relative breaking strength (STRENGTH)	35.9	33.8	35.7	34.2	34.8	32.6
3	Length (Length)	1.17	1.16	1.17	1.13	1.15	1.14
4	Length uniformity index (Uniform)	87.2	86.8	87.4	86.6	86.5	82.6

5	Short Fiber Index (SFI)	3.7	3.6	3.2	4.9	4.8	11.6
6	Elongation at break (Elong)	8.4	8.7	7.3	8.2	8.1	7.8
7	Amount of impurities (Count)	51	49	42	36	30	22
8	Area (Area)	3.7	3.4	2.4	2.3	1.0	0.3
9	Color stability yellowness grade (C.Grade)	51-3	51-4	42-2	41-4	41-4	31-4
10	Light reflection coefficient (Rd)	68.0	67.1	69.0	71.3	71.2	75.3
11	The degree of jaundice (+b)	7.8	7.8	9.1	8.0	8.5	8.5

HVI 900 system, fiber Micronaire index, high average length, staple length, length uniformity index, short fiber index, light reflection coefficient, yellowness level, trash code, specific breaking strength, and elongation at break indicators were determined.

It can be seen from the results of scientific research that the microneur index of cotton fiber from the upper part is 4.5, the specific breaking strength is 33.3 sN/tex, the length is 1.13, the length uniformity index is 86.3, the short fiber index is 4.1, elongation at break is 8.2%, the amount of impurities is 50, the area is 3.0, the color fastness is 51-4, the light reflection coefficient is 66.2, the yellowness is 8.3, the microneur index of the cotton fiber from the middle part of the yarn is 4.4, specific breaking strength 34.8 sN/tex, length 1.19, length uniformity index 87.5, short fiber index 3.7, elongation at break 8.2%, impurity content 70, area 5.0, color fastness degree of yellowness is 51-4, the reflection coefficient is 67.0, degree of yellowness is 7.8, it follows that in the process of cotton ginning, the quality indicators of cotton fiber decrease in the lower part of the gin, the length of fiber staple mass decreases, and the degree of yellowness increases. According to the parts of the ginned cotton fiber, especially in the middle and lower layers of the fiber quality indicators, compared to the upper part of the gin, the upper average length of the fiber decreases.

Table 3 Damage to Andijan-35 first-grade cotton fibers during storage

No	Fiber quality indicators	Bottom of the bunt	A middle part from the bunt	Aside from the bunt	Top part from the bunt	The upper part of the bunt
1	Micronaire (Mic)	3.9	4.1	4.3	4.1	4.5
2	Relative breaking strength (Strength)	33.8	34.3	32.9	32.4	30.8
3	Length (Length)	1.18	1.15	1.16	1.14	1.17

4	Length uniformity index (Uniform)	85.8	84.3	85.5	85.0	85.3
5	Short Fiber Index (SFI)	6.3	7.8	5.7	8.0	7.3
6	Elongation at break (Elong)	9.1	8.7	8.3	8.1	8.4
7	Amount of impurities (Count)	42	73	51	73	74
8	Area (Area)	3.0	2.7	2.4	3.0	3.0
9	Color stability yellowness grade (C.Grade)	51-3	51-3	41-4	51-3	51-3
10	Light reflection coefficient (Rd)	68.3	67.2	70.1	69.4	67.9
11	The degree of jaundice (+b)	7.5	8.2	8.2	8.4	7.9

As can be seen from the tables, it was determined that the specific breaking strength, high average length, and elongation at the break of the fiber decreased under the influence of the pressure force, the short fiber index, the number of dirty impurities, the color fastness index, the reflection coefficient, and the yellowness level increased.

It can be seen from the results of scientific research that the microneur index of cotton fiber from the upper part is 4.5, the specific breaking strength is 30.8 sN/tex, the length is 1.17, the length uniformity index is 85.3, the short fiber index is 7.3, the elongation at break 8.4%, the amount of impurities is 74, the area is 3.0, the color fastness is 51-3 yellowness, the reflection coefficient is 67.9, the yellowness is 7.9, the micronaire index of the cotton fiber from the middle part of the yarn is 4.1, the specific breaking strength 34.8 sN/tex, length 1.18, length uniformity index 85.8, short fiber index 6.3, elongation at break 9.1%, impurity content 42, area 3.0, color fastness yellowness 51-3 , the reflection coefficient is 68.3 and the degree of yellowness is 7.5, it follows that during the cotton ginning process, the quality indicators of cotton fiber decrease in the lower part of the gin, the length of the fiber staple mass decreases, and the degree of yellowness increases. According to the parts of the ginned cotton fiber, especially in the middle and lower layers of the fiber quality indicators, compared to the upper part of the gin, the upper average length of the fiber decreases.

Table 4 Damage to Andijan-35 first-grade cotton in the fiber separation process

No	**Fiber quality indicators**	**After the separator**	**Drying drum**	**After the drying drum**	**After UXK 1 unit**	**UXK 2 after aggregate**	**Enter the gin**

1	Micronaire(Mic)	4.1	4.5	4.1	4.2	4.2	4.1
2	Relative breaking strength (STRENGTH)	32.0	32.5	34.0	32.7	33.4	32.4
3	Length (LENGTH)	1.17	1.15	1.17	1.14	1.15	1.14
4	Length uniformity index (UNIFORM)	85.6	84.4	85.3	84.7	85.2	84.6
5	Short Fiber Index (SFI)	6.8	8.5	7.1	8.3	8.1	8.7
6	Elongation at break (ELONG)	8.8	8.1	8.2	7.9	8.2	7.8
7	Amount of impurities (COUNT)	16	60	50	22	22	42
8	Area (AREA)	0.4	2.4	2.0	0.6	0.9	2.2
9	Color stability yellowness grade (C.GRADE)	41-3	51-3	41-4	41-3	41-3	41-3
10	Light reflection coefficient (Rd)	72.5	69.4	70.2	71.8	71.6	71.8
11	The degree of jaundice (+b)	8.4	7.5	8.3	8.8	9.2	8.6

As can be seen from the tables, comparing the cotton of the first grade of Bukhara-102 with the first grade of Andijan-35, the relative breaking strength of the fiber under the influence of the pressure force, the higher average length, the elongation at break decreased, the index of short fibers, the number of dirty impurities, the index of color stability, It was found that the coefficient of reflection and the degree of yellowness exceed the first grade of Andijan-35.

Conclusion

1. The length of the staple mass of the samples under the grain was 1.24 mm, the length of staple mass of the sample in the middle of the grain was 1.23 mm, and the length of the staple mass of the fiber above the grain was 1.27 mm. It follows that the length of the staple mass of cotton fiber decreased by 0.3 mm with the increase in yarn density.

2. It was found that during the process of separating cotton from seeds using devices in cotton factories, under the influence of pressure force, the relative breaking strength, high average length, and elongation at the break of the fiber decreases, and the index number of short fibers increases.

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