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DETERMINING THE INFLUENCE ON THE QUALITY INDICATOR OF COTTON FIBER DURING THE CLEANING PROCESS OF COTTON RAW MATERIALS IN A UHK INSTALLATION

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Abstract
In this article, we have studied to what extent cotton fiber affects quality indicators in the process of cleaning cotton at the UHK unit with large impurities. At the same time, tables and graphs were formed on the UHK unit to what extent they affect the quality indicators and the fiber quality indicators of these samples were identified in the HVI system, taken for a sample after cleaning raw cotton.

Keywords: cotton raw materials, large impurities, cleaning, UHK unit, cotton fiber, HVI system, quality indicators, fine impurities.

INTRODUCTION

Our country is implementing comprehensive measures to develop the cotton industry, modernize cotton ginning enterprises and technical re-equipment, increase the profitability of production and processing of cotton raw materials, as well as the competitiveness of manufactured products, including: Resolution No. PF-60 of the President of the Republic of Uzbekistan dated January 28, 2022 “ On the new development strategy of Uzbekistan for 2022-2026", including "...ensuring the stability of the national economy and continuing industrial policy in a new domestic product, at cotton ginning enterprises is one of the important issues, aimed at increasing the volume of industrial production by 1.4 times, with an increase in production volumes of the textile industry by 2 times..., including effective cleaning without damaging seeds and fibers during the primary processing of cotton.

THE MAIN PART

Damage to fibers due to impact forces applied to cotton raw materials and forces arising from friction of cotton at cotton ginning enterprises included in cotton textile clusters is one of the largest problems in primary cotton processing. To eliminate these problems, a lot of work is being done in our country and researchers are conducting scientific work. But this is not enough.

With this in mind, this article examines fiber damage during cleaning, one of the largest processes causing fiber damage. During the study, before and after purification of cotton by UHK in a cleaning unit from small and large impurities, raw cotton fiber was assessed in the HVI system according to fiber length, length uniformity, maturity, elongation at elongation, fiber fineness and ripeness, color and contamination indicators. Experiments have been carried out. Experiments were carried out at the enterprise "To'raqo'rg'on paxta tozalash" LLC "Namangan To'qimachi cluster" with humidity 13.4%, pollution 16.8%, selection type Bukhara-102, 3rd grade, 1st The type of cotton raw material and the properties of the fiber of samples taken before and after cleaning in the UHK unit were determined 9 times in the HVI system and average results were obtained. Based on the results, the following tables were generated.

Samples taken before cleaning in the UHK installation

Table 1.1

№	Mic	Str	Len	Unf	SFI	Elg	Cnt	Area	Rd	+b
1	4.2	33.4	1.18	86.1	5.4	6.9	62	4.5	64.7	8.9
2	4.3	35.9	1.22	87.1	<3.5	6.6	64	3.8	66.9	7.5
3	4.2	34.3	1.21	88.3	<3.5	6.2	64	3.5	66.9	7.3
4	4.2	33.9	1.19	87.8	<3.5	6.4	51	3.5	67.1	6.8
5	4.3	33.0	1.19	87.2	5.3	6.2	48	1.9	68.4	9.0
6	4.2	33.5	1.21	87.5	<3.5	6.6	49	1.9	65.7	8.7
7	4.2	32.8	1.18	87.9	4.5	6.8	44	1.8	68.3	9.2
8	4.2	36.7	1.22	86.0	<3.5	7.0	70	3.0	62.6	9.2
9	4.2	35.7	1.20	87.6	<3.5	6.5	68	3.1	61.8	9.9

From Table 1.1 it can be seen that the highest Microneura index (Mic) from samples taken before the UHK unit was 4.3, and the lowest index was 4.2. We see that the relative longitudinal strength (Str) is the highest at 36.7 gf/tex, the lowest is 32.8 gf/tex, and the upper average length (Len) is between 1.18 and 1.22 inches. We found that the length uniformity index (Unf) ranged from 86.0 to 88.3 percent, the short fiber index (SFI) was the highest at 5.4 percent, and the lowest was less than 3.5 percent. We see that the elongation at break (Elg) is from 6.2% to 7.0%, the number of impurities (Cnt) is from 44 to 70, the area of impurities (Area) is from 1.8% to 4.5%. We observed that the amount of light reflected from the surface of the cotton fiber sample tested by light reflectance (Rd) was the highest 68.4 and the lowest 61.8, and we saw that the degree of yellowness (+b) was between 6. 8. up to 9.9.

We calculated everything from the above table 1.1 and got the average, after which the following table 1.1 was created.

Table 1.2

№	Unit indicator	Measure	Allowable system error, maximum	Mean square difference, greater
1	Micronaire indicator (Mic)	4.2	0.04	1.04
2	Relative strength of length (Str)	34.4	1.41	4.09
3	High average length (Len)	1.20	0.02	1.32
4	Longitudinal homogeneity index (Unf)	87.3	0.78	0.90
5	Short fiber index (SFI)	3.6	1.14	31.56
6	Elongation at break (Elg)	6.6	0.29	4.35
7	Amount of impurities (Cnt)	58	9.73	16.84
8	Area of various impurities (Area)	3.0	0.95	31.75
9	Light reflectance (Rd)	65.8	2.36	3.59
10	Yellowing degree (+b)	8.5	1.04	12.28

In Table 1.2 above we have obtained the average of the results (Table 1.1) tested 9 times in the HVI system by manually separating the cotton fiber from the seeds before removing impurities in the UHK unit.
Then, at the UHK installation, the tested cotton of the 3rd grade, 1st grade, Bukhara - 102 selected grades was cleaned. It is determined that the quality of ginned cotton raw material is also displayed in the HVI system, in this case the fiber was separated from the seed manually and checked 9 times, and the following table 1.3 was compiled.

Samples taken after cleaning at the UHK installation

Table 1.3

№	Mic	Str	Len	Unf	SFI	Elg	Cnt	Area	Rd	+b
1	4.1	37.5	1.22	87.6	4.4	6.9	20	0.9	66.9	9.6
2	4.2	34.9	1.19	88.2	<3.5	6.6	19	0.6	67.7	9.1
3	4.3	37.7	1.20	86.5	<3.5	6.8	30	1.2	65.4	6.7
4	4.2	36.0	1.22	88.4	<3.5	6.3	26	1.7	66.0	8.8
5	4.1	35.6	1.16	86.5	5.3	7.0	26	1.7	66.0	8.7
6	4.2	38.0	1.19	84.9	4.0	7.5	26	1.7	69.1	8.3
7	4.2	33.5	1.20	83.9	5.2	6.6	30	2.0	71.4	8.3
8	4.2	35.8	1.22	86.4	<3.5	6.5	31	2.1	69.7	8.5
9	4.3	35.2	1.20	87.4	<3.5	6.7	24	1.0	66.2	10.1

As a result of testing purified cotton fibers after the above UHK unit in the HVI system, it was found that the Micronaire index (Mic) of fiber fineness and maturity was the highest 4.3, and the lowest indicator was 4.1, and the specific longitudinal strength. We observed the highest cotton fiber maturity (Str) at 38.0 gs/tex and the lowest at 33.5 gs/tex. We see that the upper average length (Len) ranged from 1.16 inches to 1.22 inches. We found that the length uniformity index (Unf) ranged from 83.9 to 88.4 percent, the short fiber index (SFI) was the highest at 5.3 percent, and the lowest was less than 3.5 percent. On the instrumentation dynamometer we see that the elongation at break (Elg) of the fiber, expressed as a percentage, is from 6.3% to 7.5%, the number of impurities (Cnt) is from 19 to 30, and the area of impurities (Area) is from 0.6% to 2.1%. We observed that the highest amount of light reflected from the surface of a cotton fiber sample tested

for light reflectance (Rd) was 71.4 and the least was 65.4, and we saw that the degree of yellowness (+b) was between 6. 7–10.1.

We analyzed Table 1.3 and calculated the average of our samples conducted 9 times to form Table 1.4.

Table 1.4

№	Unit indicator	Measure	Allowable system error, maximum	Mean square difference, greater
1	Micronaire indicator (Mic)	4.2	0.07	1.68
2	Relative strength of length (Str)	36.0	1.48	4.10
3	High average length (Len)	1.20	0.02	1.61
4	Longitudinal homogeneity index (Unf)	86.6	1.49	1.71
5	Short fiber index (SFI)	3.8	1.03	27.00
6	Elongation at break (Elg)	6.8	0.35	5.12
7	Amount of impurities (Cnt)	26	4.27	16.55
8	Area of various impurities (Area)	1.4	0.52	36.59
9	Light reflectance (Rd)	67.6	2.05	3.03
10	Yellowing degree (+b)	8.7	0.95	11.00

Table 1.2 shows the average values of the results determined according to the HVI fiber quality indicator system before cotton cleaning in the UHK installation. Next, in Table 1.4, the average cost of cotton fiber purified in a UHK unit was determined by determining quality indicators in the HVI system. From Table 1.2 and Table 1.4, we found out how the quality of cotton fiber is affected by the cleaning process in the UHK installation, and based on this, the graphs in Figures 1 and 2 were constructed.

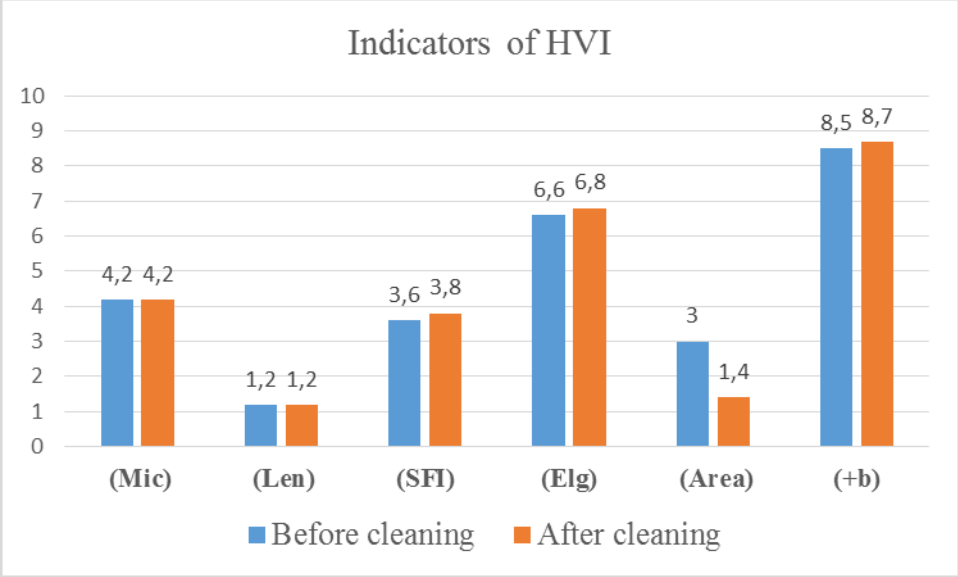

Figure 1. Graph based on results obtained in the HVI system

Figure 1 shows a graph of micronaire index, high average length, short fiber index, elongation at break, dirty joint area and yellowness level of cotton in the HVI system in the UHK plant before and after cleaning. It can be seen that before and after cleaning, the microneuron index and high average length did not affect the quality level; the result remained the same. However, as the short fiber index increased by 0.2% after

cleaning, we also saw an increase in elongation at break and yellowing levels. We found that the area of dirty joints was reduced after cleaning.

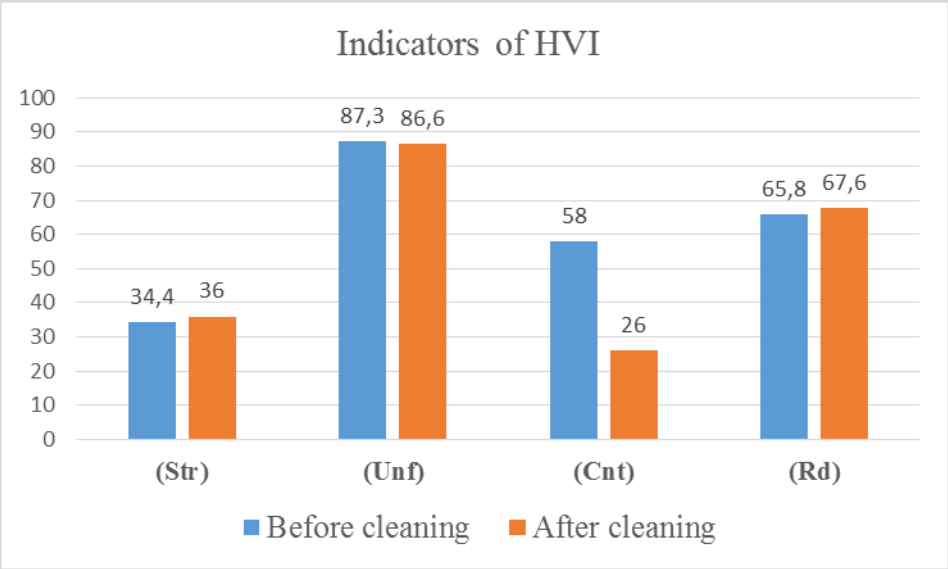

Figure 2. Graph based on the results obtained in the HVI system

On the graph in Fig. 2, the quality indicators of cotton fiber before and after cleaning in the UHK unit are determined in terms of specific strength along the length, uniformity index along the length, the amount of dirty impurities and the light reflectance coefficient in the HVI system. As can be seen in the graph, we can see that the length specific strength increased after cleaning, we found that the length uniformity index decreased after cleaning, and the amount of impurities decreased and increased.

CONCLUSION

In conclusion, it should be noted that in the process of cleaning cotton raw materials at the UHK installation, when testing cotton fiber in the HVI system, the micronaire index and high average length did not affect the quality indicators. We found that the short fiber index, elongation at break, yellowing degree, specific tensile strength and reflectance increased. Also, after cleaning in the UKS unit, we saw a decrease in the area of inhomogeneous impurities, the indicator of uniformity along the length and the number of impurities.

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