

The Effect of Drying Temperature on the Cleaning Efficiency of Cotton

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ABSTRACT: This article examines the effectiveness of cleaning cotton from small and large contaminants by drying Beshkahrmon selection varieties regionalized in Kupaysin, Navruz and Surkhandarya regions of Syrdarya region at a temperature of 120^oC, 140^oS and 160^oS and a humidity of 8-9%.

KEYWORDS: cleaning efficiency from small and large contaminants, selection, temperature, strength of adhesion of fiber to defects

I. INTRODUCTION

The cleaning process is also important to maintain the quality of the cotton. Because the fiber or seed can be damaged in the cleaning process, as a result, the number of accidents in the subsequent processes will increase spontaneously; the quality of the fiber will deteriorate. Therefore, organizing the cleaning process on the basis of a defined chain allows you to improve the quality of the product [1].

In the drying and cleaning shops of cotton processing enterprises, the initial moisture content of I-III grade cotton should not exceed 11%, and the lower grade should not exceed 13%. This is because the presence of the specified norm leads to the deterioration or burning of fiber quality indicators during the storage of cotton [4].

In some research works, S-4880, 175-F and White-Gold grades were dried at 160^oS, 200^oS and 240^oS to 8-9% to apply the set temperature and humidity in ginning plants, and the amount of fiber defects and waste increased with increasing temperature, or the degree of purification of seed cotton has been shown to have increased [5].

A decrease in defects or an increase in the degree of purification of the seed cotton resulted in a decrease in the adhesive strength of the fiber to the defects and the twisting of the fiber [1].

Varieties S-4727, Tosh-1 and 8763-I were used to clean small defects in the cotton, and the degree of cleaning of cotton was increased from 20% to 98% by increasing the number of drums using different types of cleaning equipment. That is, the cotton cleaning rate in the four-drum cleaning equipment was higher than in the OXB-10M equipment. If we increase the number of drums to 8, then the seed defects increased from 0.06% to 0.80%, in addition to the seeds that were hit or injured, the amount of complex twisted fiber was less [2].

Installation of six-drum cleaning equipment at ginneries increased the purification rate of S-4727 cotton by 16% compared to 6A-12M and by 8763-I cotton OXB-10 by 30%. After cleaning the cotton, the seed defects were less formed, the amount of fiber defects and waste was 0.3-0.5% due to the reduction of the tangled and complex tangled fiber [3-6].

Moisture content is important in ginneries. When the humidity of the cotton is higher than the standard values, the cleaning efficiency from small and large contaminants decreases. Conversely, if the moisture content meets the standard requirements, the cleaning efficiency of cotton will increase, the quality of yarn and finished fabrics will improve [7-8].

At present, as a result of drying different selection varieties at the same temperature in the processing of cotton gins, their cleaning efficiency also varies. On the contrary, it is desirable to have an optimal drying temperature and humidity for each selection variety [1].

II. METHODOLOGY

Therefore, in order to study the optimal options for the processing of different selection varieties in ginning enterprises, as their drying temperature and humidity are different, research work was carried out.

Test results on the effectiveness of cleaning cotton from small and large contaminants as a result of drying of different selection varieties at different temperatures and humidity are given in Tables 1-3.

Table 1
Influence of the drying process on the cleaning efficiency of Navruz selection cotton

t / r	Indicators	Drying temperature of cotton, °C			
		Cotton in the pile	120	140	160
1.	Moisture cotton in the riot, %	11,2			
	The amount of total contaminants, % including:	8,8			
	the amount of fine impurities, %	6,4			
	the amount of large contaminants, %	2,4			
2.	Moisture content of cotton after drying, %		8,6	8,2	8,0
	The amount of total contaminants, % including:		6,0	5,5	5,2
	the amount of fine impurities, %		4,2	3,9	3,6
	the amount of large contaminants, %		1,8	1,6	1,6
3.	Тозалаш жараёнидан кейинги пахтанинг намлиги, %		8,1	8,0	8,0
	The amount of total contaminants, % including:		0,67	0,64	0,60
	the amount of fine impurities, %		0,43	0,39	0,35
	the amount of large contaminants, %		0,24	0,25	0,25

Table 2
The effect of the drying process on the cleaning efficiency of Ko'paysin selection cotton

t / r	Indicators	Drying temperature of cotton, °C			
		Cotton in the pile	120	140	160
1.	Moisture cotton in the riot, %	11,9			
	The amount of total contaminants, % including:	8,2			
	the amount of fine impurities, %	5,7			
	the amount of large contaminants, %	2,5			
2.	Moisture content of cotton after drying, %		8,8	8,2	8,1
	The amount of total contaminants, % including:		6,2	5,4	4,6
	the amount of fine impurities, %		4,1	3,6	3,1
	the amount of large contaminants, %		2,1	1,8	1,5
3.	Тозалаш жараёнидан кейинги пахтанинг намлиги, %		8,3	8,0	8,0
	The amount of total contaminants, %		0,83	0,78	0,70

	including: the amount of fine impurities, % the amount of large contaminants, %		0,55 0,28	0,50 0,28	0,44 0,26
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Table 3
Influence of the drying process on the cleaning efficiency of cotton of Beshqahramon selection

t / r	Indicators	Drying temperature of cotton, °C			
		Cotton in the pile	120	140	160
1.	Moisture cotton in the riot, %	12,5			
	The amount of total contaminants, %	8,8			
	including: the amount of fine impurities, %	6,0			
	the amount of large contaminants, %	2,8			
2.	Moisture content of cotton after drying, %		8,6	8,5	8,3
	The amount of total contaminants, %		5,9	5,2	4,7
	including: the amount of fine impurities, %		4,4	4,0	3,8
	the amount of large contaminants, %		1,5	1,2	1,9
			8,2	8,1	8,0
3.	Тозалаш жараёнидан кейинги пахтанинг намлиги, %		0,88	0,84	0,78
	The amount of total contaminants, %		0,57	0,54	0,50
	including: the amount of fine impurities, %		0,21	0,30	0,28
	the amount of large contaminants, %				

Based on the results of the study, in Figures 1-6, histograms of changes in the efficiency of cleaning of small and large contaminants of different selection varieties at drying temperature and humidity were constructed..

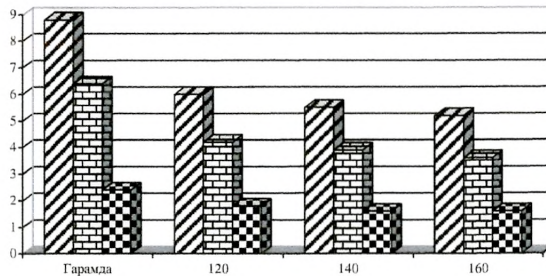





Figure 1. Changes in the cleaning efficiency after the drying process of Navruz selection cotton.
Drying temperature, °C
 - general pollution;
 - minor pollution;
 - major pollution.

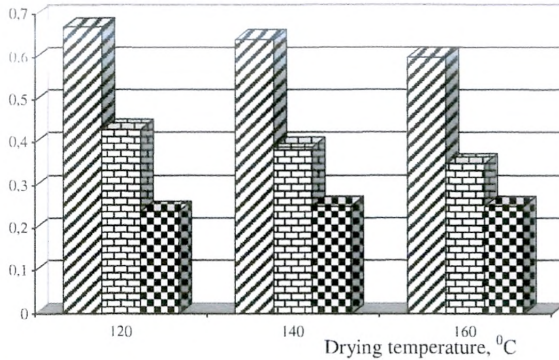





Figure 2. Changes in cleaning efficiency after the process of cleaning cotton of Navruz selection variety.

 - general pollution;
 - minor pollution;
 - major pollution.

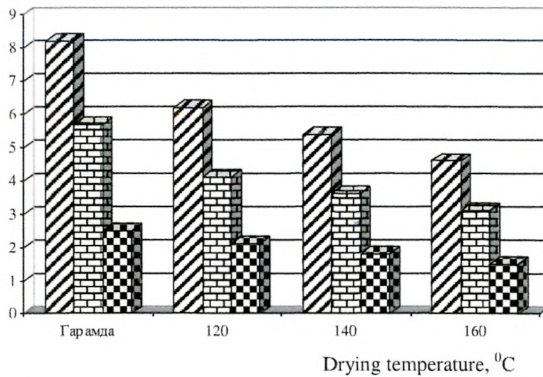





Figure 3. Changes in cleaning efficiency after the drying process of Ko'paysin selection cotton.

 - general pollution;
 - minor pollution;
 - major pollution.

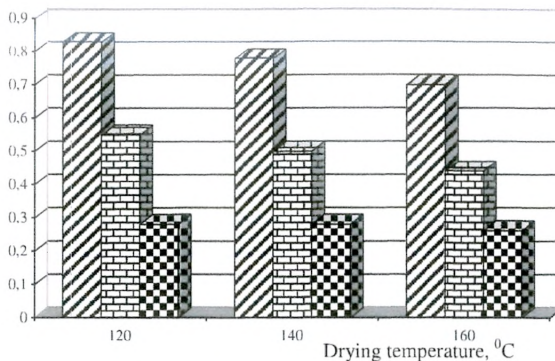





Figure 4. Changes in cleaning efficiency after the process of cleaning cotton Ko'paysin selection cotton.

-  - general pollution;
-  - minor pollution;
-  - major pollution.

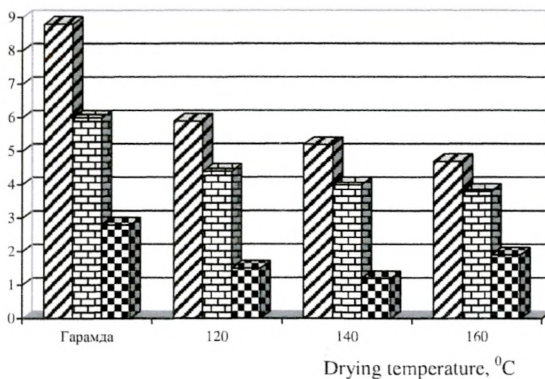





Figure 5. Changes in cleaning efficiency after the drying process of Beshqahramon selection cotton.

-  - general pollution;
-  - minor pollution;
-  - major pollution.

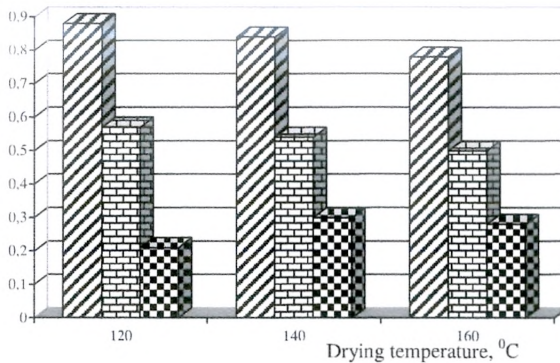





Figure 4. Changes in cleaning efficiency after the process of cleaning cotton Beshqahramon selection cotton.

-  - general pollution;
-  - minor pollution;
-  - major pollution.

III. RESULTS AND DISCUSSION

The analysis of test results on the cleaning efficiency of temperature and humidity during the drying process showed that when we compare the Navruz selection variety with the cleaning efficiency of cotton stored at different temperatures and around 8-9% humidity, when cotton was dried at 120°C, the total contamination of cotton increased by 31.8%, minor impurities by 34.6%, coarse impurities by 25.0%, the total contamination of cotton after cleaning was 92.4%, minor impurities 93.3%, the amount of coarse impurities increased by 90.0%, when we dried cotton at 140°C, the total impurities of cotton increased by 37.5%, the amount of minor impurities increased by 39.1%, the amount of coarse impurities increased by 33.3%, after the cleaning process The total contamination of cotton increased by 92.7%, small impurities by 93.0%, large impurities by 89.6%, when cotton was dried at 160°C, the total impurities of cotton increased by 41.0%, small impurities by 33.7%, the amount of coarse contaminants increased by 33.3%, the total contamination of cotton after cleaning increased by 93.2%, minor impurities increased by 94.6%, coarse contaminants increased by 89.6%.

When we dried the Ko'paysin selected variety of cotton at a temperature of 120°C in comparison with the indicators of cleaning efficiency of cotton stored in the cage, the total contamination of cotton increased by 24.4%, minor impurities by 28.1%, large impurities by 16.0%, after cleaning, the total contamination of cotton is 89.9%, minor impurities 81.4%, coarse impurities 88.8%, when we dry cotton at 140°C, the total impurities of cotton is 34.1%, fine impurities 37.8%, the amount of coarse contaminants increased by 28.0%, the total contamination of cotton after cleaning increased by 90.5%, minor impurities increased by 91.2%, coarse impurities increased by 88.8%, when we dried cotton at a temperature of 160°C the total amount of contaminants increased by 44.0%, the amount of minor impurities increased by 45.6%, the amount of large contaminants increased by 40.0%, the total contamination of cotton after cleaning increased by 91.5%, the amount of minor contaminants increased by 92.3%, the amount of major contaminants was found to be 89.6%.

In addition, the cleaning efficiency of Beshqahramon selection cotton was studied after drying and cleaning processes. The results of the study showed that the total contamination of cotton increased by 32.9%, fine contaminants by 26.7%, coarse contaminants by 46.4% when dried at 120°C, contamination by 90.0%, minor impurities by 91.5%, coarse impurities by 92.5%, when cotton is dried at 140°C, the total impurities of cotton by 41.0%, small impurities by 33.3%, coarse the amount of contaminants increased by 57.1%, the total contamination of cotton after cleaning

increased by 91.5%, minor impurities by 91.0%, large impurities by 89.3%, the total contamination of cotton when dried at 160°C 46.6%, the amount of minor impurities increased by 36.7%, the amount of major impurities increased by 32.1%, the total contamination of cotton after cleaning increased by 91.1%, the amount of minor impurities increased by 91.7%, and the amount of large contaminants is seen to have increased by 90.0%.

The analysis of the results of the study shows that the analysis of test results on the cleaning efficiency of temperature and humidity during the drying process showed that when comparing different varieties of cotton at different temperatures and humidity around 8-9% humidity, compared to the cleaning efficiency of cotton when dried at a temperature of 120°C, the total contamination of cotton increased from 25.0% to 34.6%, small impurities from 28.0% to 34.6%, large impurities from 45.6%, the total contamination of cotton after cleaning 93%. Up to 3%, the amount of small impurities up to 93.3%, the amount of large impurities up to 90.0%, when we dry cotton at 140°C, the total amount of impurities up to 41.0%, the amount of small impurities up to 39.1%, the amount of large impurities 33%. Increased to 3%, the total contamination of cotton after the cleaning process to 92.7%, the amount of minor impurities 93.0%. The total contamination of cotton when dried at 160°C increased to 41.0%, the total contamination to 33.7%, the total contamination of cotton after cleaning. It was observed that the amount of contaminants increased to 93.2%, small contaminants to 94.6%, and large contaminants to 90.0%.

IV. CONCLUSION

When we dried different selection varieties at different temperatures and humidity, it was found that the cleaning efficiency of Navruz selection cotton is higher than other selection varieties.

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