



ISSN: 2350-0328

**International Journal of Advanced Research in Science,
Engineering and Technology**

Vol. 7, Issue 6, June 2020

Effect of Drying Temperature on Cotton Cleaning Efficiency and Change Class Change

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ABSTRACT: This article describes that in the laboratory of the Jarkurgan ginnery in Surkhandarya region, the most promising Surkhan-106 selection variety of cotton was dried at a temperature of 120^oS, 140^oS, 160^oS and 180^oS to 8-9% cleaned of small and large impurities, separated from fiber seeds, using AX-M analyzer cleaned of cotton fiber waste. The effectiveness of cleaning cotton dried at different temperatures from small and large contaminants in the laboratory, as well as the amount of defects and waste in the cotton fiber was determined.

KEY WORDS: small rubbish, large rubbish, total weediness, flagella, combined flagella, peel with fiber.

I. INTRODUCTION

Cotton harvested from the fields is handed over to ginners. At the existing ginneries in the country it is necessary to observe the optimal conditions for the timely receipt of cotton, storage in small batches, drying in the prescribed mode, cleaning from small and large contaminants, ginning, as well as cleaning the fiber from defects. In addition, breeders will have to pay close attention to the field of breeding. For this purpose, it is necessary to create varieties with fast ripening, high.

Raw materials harvested from the cotton fields of the country are first of all delivered to the ginning facilities at ginneries [3].

Raw materials harvested from cotton fields will need to be stored for a long time in ginneries, in order to obtain high-quality fiber and seeds.

If the humidity of the cotton is higher than the standard values, firstly, it is passed through the drying and cleaning shops, and then dried.

In the drying and cleaning shops of ginneries, 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 excess of the established norm leads to the deterioration or burning of fiber quality during the storage of seed cotton [6].

Given the processing of the drying and cleaning department at the ginnery, it is advisable to dump cotton seeds with a moisture content of up to 14% in the ginning department and cotton seeds with a moisture content of more than 14% in the ginning department. If the moisture content of seed cotton is higher than the standard values, the color of the fiber will turn yellow, the quality indicators will decrease, and in some cases even lead to signs of fire [7]. Therefore, low-grade seed cotton with higher than standard moisture content is primarily involved in processing.

The underground passages open from the lower parts of the ginned cotton. If the moisture content of cotton is higher than the standard values, it will not be well cleaned of small and large contaminants, resulting in a negative impact on the quality of fiber, yarn and products derived from it, i.e. the finished products obtained may be defective [8].

The cleaning process is also important to keep the quality of the cotton. Because the fiber or seed may suffer various injuries during the cleaning process, resulting in a spontaneous increase in the number of accidents in subsequent processes, and the quality of the fiber deteriorates [10]. Therefore, organizing the cleaning process on the basis of a defined chain allows you to improve the quality of the product.

The higher is the temperature during the drying process, the worse the quality of the fiber and the seed, on the contrary, the higher its efficiency of cleaning from small and large contaminants. Therefore, optimal conditions for drying cotton seed are developed in ginneries [8-12].

The raw materials accepted to ginneries are first determined by moisture and contamination, and if they are higher than the standard values, they are subjected to drying processes and dried to the specified humidity. Proper organization of the drying process leads to an improvement in the properties of the material. Therefore, drying technology is studied to select the optimal mode in ginning plants [3].

If the moisture content of cotton changes, the physical and mechanical properties of fiber and seeds change too. In addition, the change in the properties of the material depends not only on the drying process, but also on the impact of technological processes. For example, seed cotton can absorb moisture from the environment and lose this moisture on its own [12].

II. ANALYSIS OF EXISTING FILTERING MATERIALS AND RESEARCH RESULTS

The research work was carried out at ginneries to obtain quality raw materials. For him, the cleaning efficiency of cotton was determined under laboratory conditions by drying long-fiber cotton at different temperatures and humidity.

The test results obtained are presented in Table 1.

Table 1

Contamination of cotton in the process of drying cotton in high humidity effect on the level

τ/p	Indicators	Drying temperature, °C				
		0	120	140	160	180
1.	Moisture in cotton harvest, %	10,8	8,8	8,5	8,1	8,9
2.	The total amount of pollution,%	2,7	0,66	0,57	0,49	0,42
3.	Large amount of pollution,%	0,40	0,20	0,16	0,16	0,14
4.	Small amount of contamination, %	2,30	0,46	0,41	0,33	0,28

Based on the results in the table, Figure 1 shows a graph of the change in the cleaning efficiency of cotton under the influence of different temperatures and humidity.

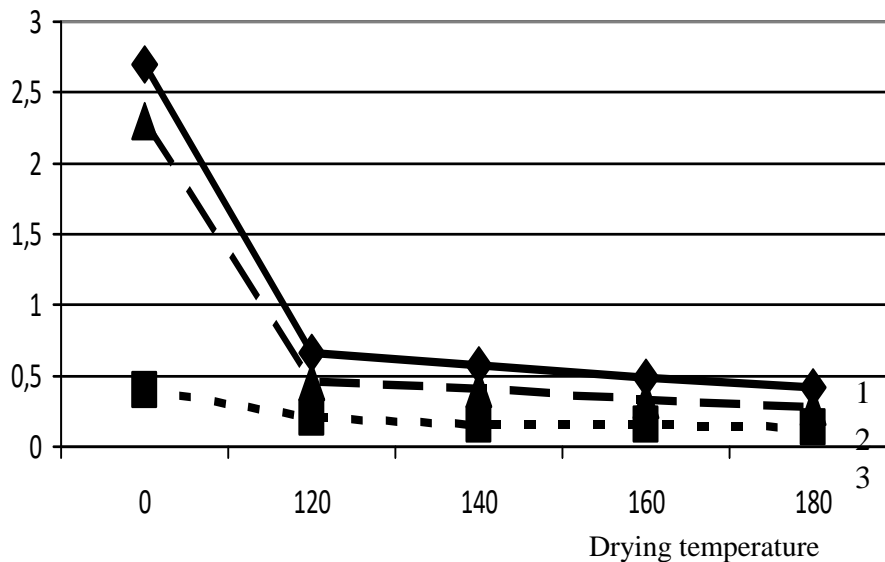


Figure 1. The effect of the drying process on the cleaning efficiency of cotton.

- 1- total contamination amount;
- 2 -small amount of contaminants;
- 3 -The amount of major contaminants

**III. LITERATURE SURVEY**

Comparing the obtained test results with the performance of cotton in the bale, the total contamination of cotton at a drying temperature of 1200C is increased by 75.6%, minor impurities are by 80.0%, large impurities are by 50.0%, total drying of cotton at a drying temperature of 1400C is 78 , 9%, small impurities are 82.2%, large impurities are 60.0%, total contamination of cotton at a drying temperature of 1600C is 81.8%, the amount of small impurities is increased by 85.7%, large impurities are by 60.0%, the total amount of impurities in cotton increased by 84.4%, small impurities are by 87.9%, large impurities are by 65.0% at a drying temperature of 1800C. The analysis of the results of the study shows that as the drying temperature of the cotton increases, the cleaning efficiency also

In cotton gins, the higher is the moisture content during the drying process, the higher is the fiber content during the fiber cleaning process.

According to the state standard, cotton fiber is divided into classes according to pollution. Therefore, the impurity index of the fiber is important.

IV. EXPERIMENTAL RESULTS

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 is negatively affected. Besides this, 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 peeled fiber. In addition, to study the dependence of the drying process on the amount of defects and waste in the cotton fiber in ginneries, the promising Surkhan-106 selection variety was dried at different temperatures to 8-9% and converted to fiber in the laboratory.

The test results are presented in Table 2.

Table 2

The effect of temperature on the change in the amount of waste and waste in the composition of cotton fiber

T/p	Indicators	Drying temperature, °C			
		120	140	160	180
1.	Total fiber content and amount of waste, %	3,55	3,50	3,25	3,39
	including:				
2.	tangled fiber	0,30	0,32	0,28	0,26
3.	Complex tangled fiber	0,08	0,10	0,07	0,06
4.	hit or injured the amount of seeds	0,10	0,08	0,03	0,05
5.	unripe fiber bunch	0,12	0,14	0,12	0,15
6.	bark fiber	0,25	0,28	0,32	0,63
7.	nodes	0,14	0,18	0,20	0,19
8.	contaminants	2,55	2,40	2,17	2,05

Based on the results in Table 2, Figures 2-3 show histograms of the temperature dependence of the defect in the cotton fiber content and the change in the amount of waste.

Moisture is very important during cotton cleaning. This is because the higher the humidity, 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 in ginneries and ginning plants should not exceed 11% for grade I and 13% for sub-varieties. If the pre-moisture content of the gin equipment is in the range of 7-8%, the quality indicators of cotton fiber will be maintained.

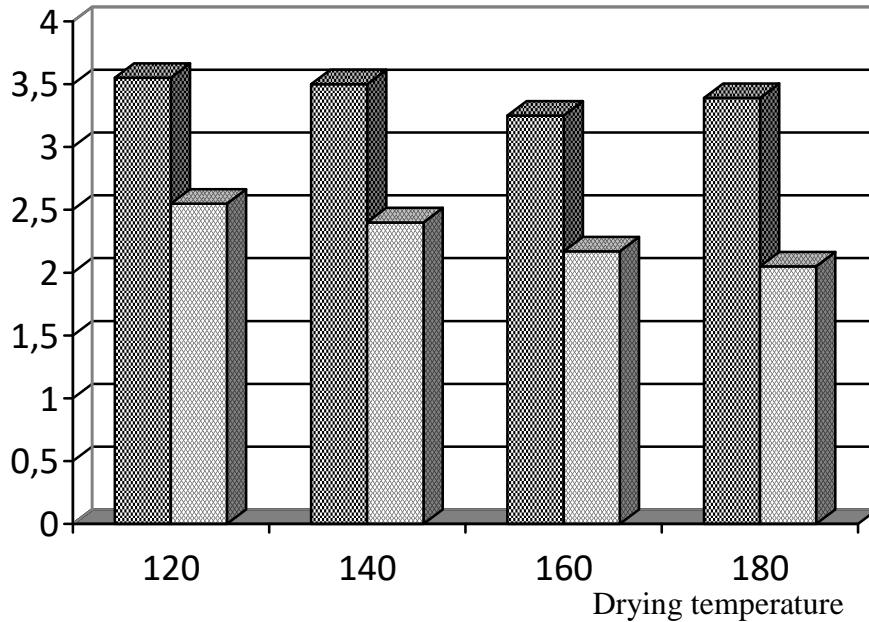


Figure 2. The amount of common defects and impurities in the cotton fiber drying process effect.

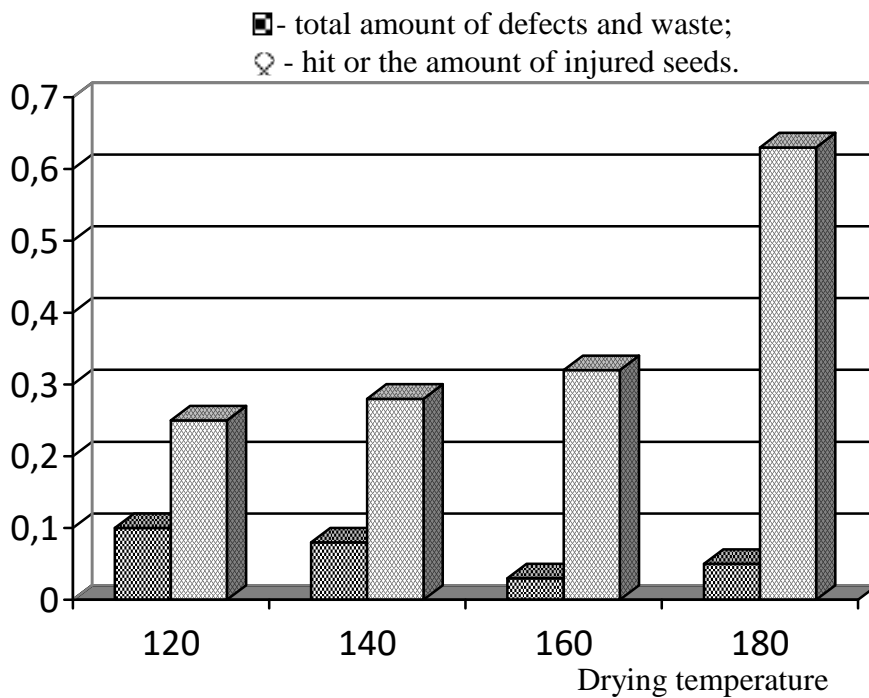


Figure 3. Influence of the drying process on the amount of beaten or injured seeds and bark fiber in the cotton fiber content.

■ - the amount of seeds sown or injured;
 □ - the amount of bark fiber.

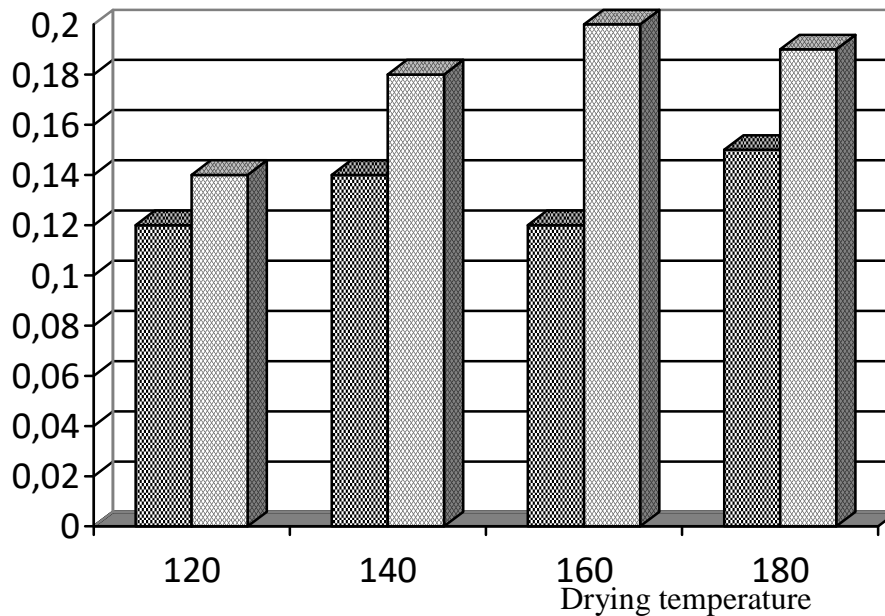


Figure 4. The effect of the drying process on the amount of unripe fiber stalks and knots in cotton fiber.

▨- unripe fiber bunch;
▩- the amount of nodes.

Comparing the results of the study with the fiber obtained from cotton dried at a temperature of 1200C, the total amount of defects and waste in the fiber obtained from cotton dried at 1400C decreased by 1.4%, the amount of crushed or injured seeds decreased by 20.0%, husk fiber by 10.8%. increased, the amount of impurities decreased by 5.9%, the amount of unripe fiber increased by 14.3%, the number of nodules increased by 22.2%, the total amount of defects and waste in the fiber obtained from cotton dried at 1600C decreased by 8.5%, the amount of crushed or injured seeds decreased by 70.0%, the amount of hull fiber increased by 21.9%, the amount of impurities decreased by 15.0%, unripe the fiber bundle did not change, the number of nodules increased by 15.0%, the total defect and waste content of fiber obtained from cotton dried at 1800C decreased by 4.5%, the amount of beaten or injured seeds decreased by 50.0%, the amount of cortical fiber increased by 63.5%, the amount of impurities decreased by 19.6%, the amount of unripe fiber increased by 20.0%, the number of nodules increased by 26.3%. It can be seen that with the increase in temperature, the amount of defects and wastes in the cotton fiber increases too.

If cotton is dried at high temperatures in ginneries, it will lead to an increase in the amount of defects and waste due to the increase in the amount of hull fibers and knots, which are harmful defects in the fiber content.

An increase in the amount of harmful defects in the composition of cotton fiber has a negative impact on the quality of yarns obtained from it, that is, the strength of the yarn decreases, leading to an increase in roughness. Therefore, in order to reduce the amount of these harmful defects in ginneries, an optimal variant of the drying process is developed.

V. CONCLUSION AND FUTURE WORK

From the result of high temperature during drying in ginneries, the total amount of contaminants ranges from 75.6% to 84.4%, the amount of minor contaminants from 80.0% to 87.9%, and the amount of large contaminants from 50.0% to 65.0% is increased. The results of the study showed that with increasing drying temperature, it was observed that the cleaning efficiency of cotton from small and large contaminants is high.

With the increase in the drying temperature of cotton at the ginnery, the total amount of defects and waste in the cotton fiber decreased from 1.4% to 8.5%, the amount of beaten or injured seeds decreased from 20.0% to 70.0%, the



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 6 , June 2020

amount of hull fiber 10.8 % is increased to 63.5%, the amount of impurities is decreased from 5.9% to 19.6%, and the amount of nodules is increased from 15.0% to 26.3,

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