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TO STUDY THE EFFECT OF COTTON HEAT ON CLEANING EFFICIENCY

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ABSTRACT

The article presents the results of the research carried out to determine the effect of change in cotton heat on cleaning efficiency. When the temperature of Cotton transferred to the cleaning process increased from 5 0S to 47 0S, the cleaning efficiency of the equipment was determined to rise from 13,13% to 15,52 %.

KEYWORDS: *Cotton, Cleaning Machine, Pile Drum, Dirt, Temperature.*

INTRODUCTION

In the world experience, a large-scale research work is being carried out on improving the technique and technology of the initial processing of cotton. In this area, including the creation of an effective technology for cleaning cotton from dirty impurities, optimization of moisture and heat indicators in the process of cleaning cotton, the creation of effective resurstejamkor structures of suppliers, optimization of performance profiles and indicators are of great importance.

In our republic, measures are being taken to develop cotton-textile clusters, modernize and Technical re-equipment of cotton cleaning enterprises, increase the profitability of production and initial processing of raw materials, as well as the competitiveness of the products produced. The continuous supply of cleaning equipment with cotton and taking into account the conditions of fumes and heat and humidity in the performance of the mentioned tasks is one of the important issues, namely the creation of an effective technology for the preparation of cotton for the cleaning process.

A number of studies **[1-14]** have shown that cotton temperature has a positive effect on the cleaning process. In the cleaning option we recommend, the cotton is heated during the cleaning process using hot air. It is known that cotton is given to the cleaning process after drying. During the drying process, the heated cotton is cooled until it reaches the UHC cleaning flow and is cleaned at different temperatures depending on the drying temperature value. The higher the temperature, the higher the cleaning efficiency.

Experimental methods. Experimental tests were performed to determine the hot air temperature given during the ginning process. To do this, the cotton was heated to different temperatures in a special equipment and then cleaned in a laboratory cleaning equipment. The equipment consisted of a 2x3m mesh surface drying chamber and an electric caliper fan and heat transfer tube, and the

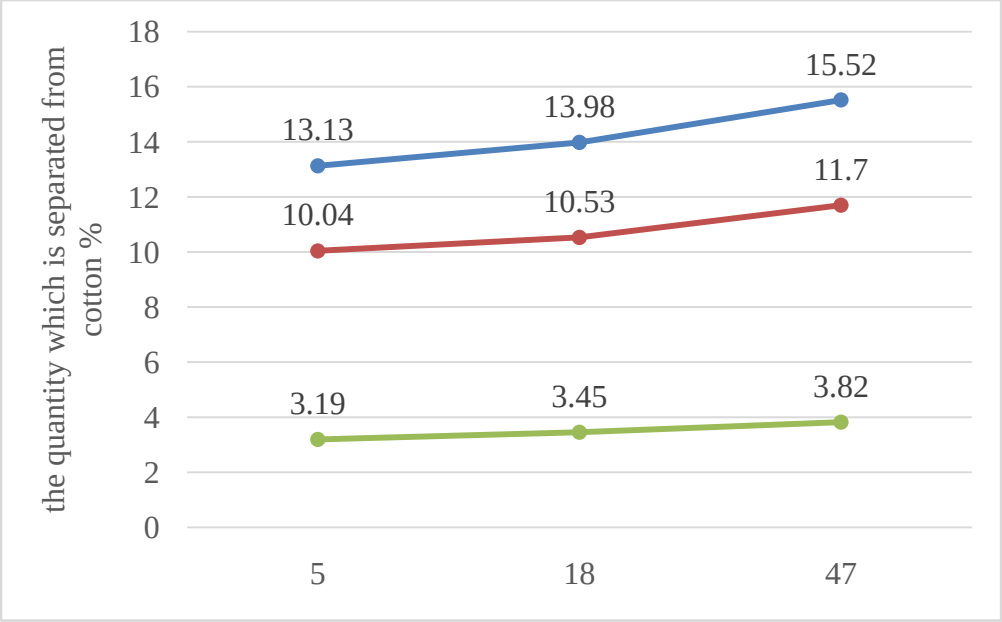
cotton was dried in the form of a single layer. Its temperature was measured using a laser thermometer.

Cotton was passed 2 times in 4PB + 1SD + 4PB + 1SD cleaning stream and cleaned with 16 pile drums and 4 saw drums. The cleaning equipment was supplied with hot air at a temperature of tx = 90^0C. Experimental results shown in table 1 and figures 1-2. The regression equations of the curves shown in figure 1 have the following appearance:y_1=-0,0009x^2+0,30x+73,3;y_2=-0,0006x^2+0,34x+55,7;y_3=0,0015x^2+0,07x+17,6;

In Figure 4, the curve regression equations look like this: y_1=-0,0004x^2 + 0,055x +12,84; y_2=-0,00009x^2 + 0,039x + 9,84; y_3=0,0027x^2 + 0,013x + 3,11;

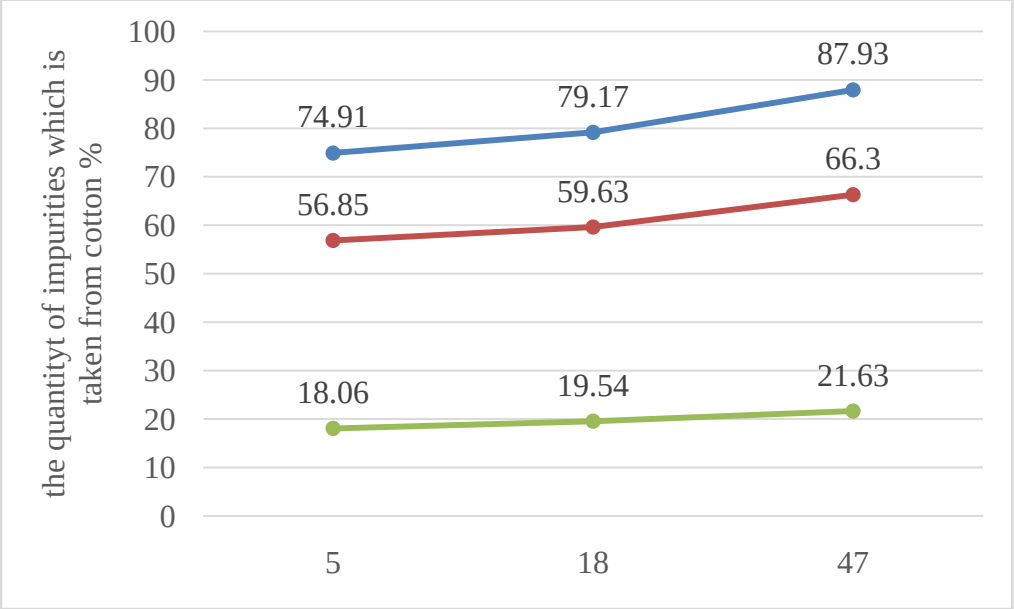
TABLE 1.COTTON WAS PASSED IN THE LABORATORY EQUIPMENT AT DIFFERENT TEMPERATURES, MACHINE PICKING C-6524 W= 12,1%, 3GENERAL= 17,66%, CM=14,14%, СЙ=3,51%,

№	Cleaning frequency	Separated dirt (4PD+1SD+4PD+1SD)			
		Conducted amount of cotton, gr	Dirt, gr	Reduction of cotton pollution,% $\Delta C = \frac{M_{ифл}}{M_n} \cdot 100$	Cleaning efficiency, %
Cotton temperature 5-6 ^{0}C					
1	1-pass	7000	655,34	9,4	53,2
2	2-pass	5100	141,68	2,78	15,74
Cotton temperature 5-6 ^{0}C, hot weather t=90 ^{0}C					
1	1-pass	7000	703,28	10,4	56,85
2	2-pass	4950	157,69	3,13	18,06
Cotton temperature 16-17^{0}C, hot weather t=90^{0}C					
1	1-pass	7000	736,06	10,53	59,63
2	2-pass	4875	168,15	3,45	19,54
Cotton temperature 45-48^{0}C, hot weather t=90^{0}C					
1	1-pass	7000	818,02	11,7	66,3
2	2-pass	4800	183,15	3,82	21,63



Cotton temperature, ^{0}C 1). general, 2). 1 after conversion, 3). After the 2nd transfer

Figure 1. The effect of cotton temperature on the amount of contaminants released from cotton



Cotton temperature, ^{0}C 1). general, 2). 1 after conversion, 3). After the 2nd transfer

Fig. 2. Influence of cotton temperature on cleaning efficiency

Experiments have shown that cotton temperature has a positive effect on cleaning efficiency. When the cotton temperature was increased from 5.5^{0}C to 47^{0}C, the overall cleaning efficiency was observed to increase from 74.97% to 87.93%. Cleaning efficiency was found to increase by the end of cleaning.

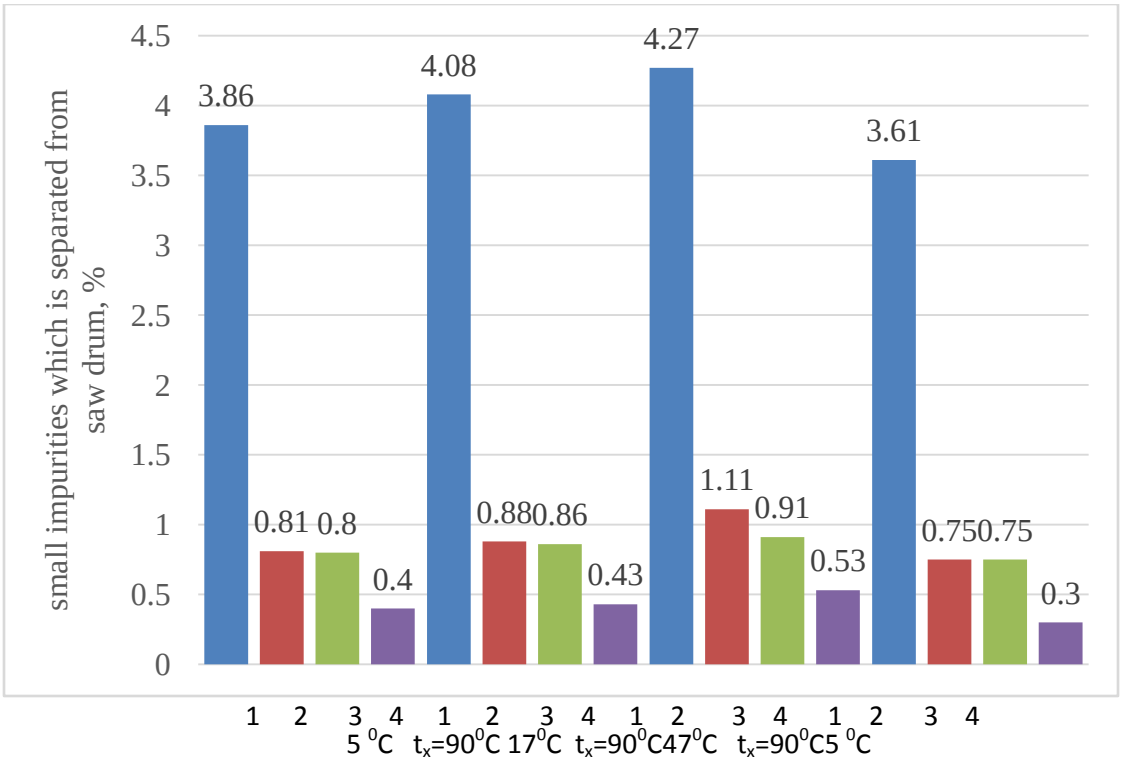


Fig. 3. Influence of cotton temperature on the amount of fine contaminants separated in pile drums

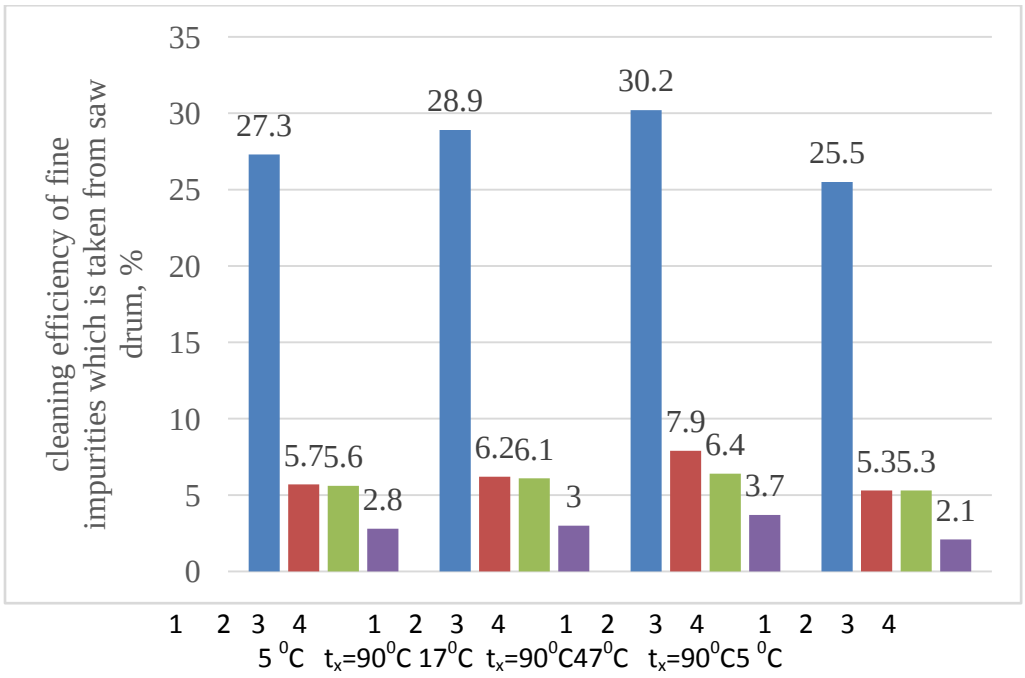


Fig.4. Influence of cotton temperature on cleaning efficiency of pile drums

Cotton was found to increase from 56.88% to 66.3% when cleaned at 4PD + 1SD + 4PD + 1SD and from 18.06% to 21.63% when cleaned for the second time. An increase of 2.57% in the efficiency of the second refining indicates the presence of impurities that are actively attached to the cotton fiber.

The cleaning efficiency was 13.13% for cotton with a temperature of 5^0C and 15.52% for cotton with a temperature of 47^0C, respectively. that is, the efficiency of 2.39% has a high value in the 1st conversion (10.04% in cotton at 5^0S, 11.7% in 47^0C) and in the 2nd conversion (3.19% in cotton at 5^0C and 3.82 in 47^0C). %), the total emissions were 76.5% and 75.4%, respectively.

The cleaning efficiency of the pile drums for fine contamination (Figure 3.4.4) was 27.3% in the first row cotton at 5^0C, 28.9% at 17.5^0C, and 30.2% at 47^0C. In the remaining sections, the cleaning efficiency also varied depending on the cotton temperature, in which the cleaning efficiency decreased sharply.In accordance with the cleaning efficiency, the amount of contaminants released in the pile drums was also the starting temperature of the cotton at 5^0C. In the first option, the cleaning efficiency in the pile drums was 41.4% in total, comparing the options for and without hot air (see Fig. 3 and 4). In the second option, it was 38.2%, which is 3.2% less. When the cotton temperature was 47^0C, the cleaning efficiency was 48.2%.

The amount of fine impurities from cotton was 5.87%, 5.41% and 6.82%, respectively, in the three options mentioned. The results noted showed that the transfer of cotton to the cleaning process while it was hot increased the cleaning efficiency.

CONCLUSION

When the hot air temperature supplied for cleaning was $t_x=90^0$C, the cleaning efficiency was 83.6%. at $t_x=150^0$C was 90.2%, while the amount of impurities released from the cotton was 7.03% and 7.58%, respectively.

When the temperature of the hot air supplied for cleaning $t_x=90\ ^0$C, the moisture content of the cotton in the 1st transfer was 11.02%. After the 2nd transfer, a decrease of 10.64% was observed. When the hot air temperature $t_x=120\ ^0$C, the moisture content of cotton in transfers 1 and 2 was 10.5% and 10.1%, respectively. When the hot air temperature $t_x=150\ ^0$C, the humidity change was 10.1% and 9.7%, respectively.

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