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The Effect of Crop Type on Cotton Quality Indicators

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ABSTRACT:This article quality of cotton is determined not only by types of machines, but also by the climatic conditions during the harvest, cotton opening, field preparation and other factors, and the contamination by the State Standard UzDst 592-2008 on the methods of determining the cotton contamination. The results of a practical study of comparing moisture and contamination of cotton harvested by hand and by cotton picking machine "Case-2020" in Genefon breeder type 1 in the Dustlik district of Jizzakh region of Uzbekistan and contrasting type cotton harvested by JohnDeere by SPD90 and humidity and humidity indicators of hand-picked cotton УСХ or ВХС-М-1, ЛКМ, and number of blanks and length of staples in cotton fiber МЧЖ Jizzakh textile The analysis of the results of the tests performed on the laboratory equipment on the USTER AFIS PRO 2 equipment installed in the laboratory of the divice is presented in table and graphical form. Based on the results of the research, it is stated that it is necessary to develop recommendations on technological processes of cotton processing and spinning based on the analysis of moisture content, contamination, number of sticks and staple lengths of cotton.

KEY WORDS: Cotton, machine harvesting, hand harvesting, moisture, dirt, staple length, grade, spinning. Classification, Data Mining, Machine Learning, Predictive analysis, Social Networking Spam, Spam detection.

I.INTRODUCTION

Cotton is one of the most valuable raw materials among other technical crops. The Republic of Uzbekistan is one of the leading cotton producers in the world among China, USA, India and other countries. Hand-harvested cotton does not allow for the short-term harvest of cotton when grown on a great amount of land, but the quality of hand-picked cotton is better than machine-picked.

The main link in the technical progress in cotton harvesting is mechanization of harvesting.

The benefits of mechanization of manual harvesting, including all costs associated with cotton transportation, have been practiced by all farmers, and the desire to harvest their own cotton in high quality cotton without the precipitation for high-quality crop shows the need for mechanization of harvesting.

The country has a total of 1,500 sources of cotton harvested to allow for the harvest of 3.5-5% of the total cotton fields. According to a program developed by our government, it is planned to increase this figure to 35% by 2025. [2].

In recent years, most of the cotton grown was hand-picked. According to government decisions, the main task is to improve cotton harvesting machines. In recent years, the volume of hand-picked cotton in the Republic was 90-95%. Since 2020, the process on the production of raw cotton in the full cluster system is underway. Cotton textile clusters expect to create more than 19,000 new jobs through the implementation of projects worth 4.8 trillion soums in 2020-2021. According to the government's decision to reduce manual labor and introduce a cluster system in cotton production, large-scale work on mechanization of cotton harvesting is underway. The technique and technology used in the cotton and fiber cleaning process is also based on the fact that nowadays it is mainly hand-picked. If there is an increase in machine harvesting in our country, the amount of cotton pollution coming to the enterprise will increase in proportion to it, so this research is relevant.

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II. LITERATURE SURVEY

Numerous theoretical and practical studies have been carried out on manual and machine-made cotton and its quality. It takes about 100 days, or 3 months, to pick cotton manually. To prevent this, due to the development of technology, it is possible to gathet the harvest in 20-25 days. It is important to study the impact of cotton products on quality indices first and foremost when introducing promising technologies for machine harvesting [3,4].

During the operation of the technological equipment, different types of waste and dust particles are extracted, depending on the industrial varieties and classes of cotton used [5-8].

Cotton contains green foliage or herbs, weeds, green leaves and other impurities.

[9,10] - The study investigated the amount and types of pollution in machine and manual cotton. According to the study, the pollution was classified (Figure 1). Dirty by the same classification. 1 - leaves, 2 - branches;

The analysis of the quality and type of contamination of cotton fiber, machine cotton, and the type and amount of impurities was investigated. The results revealed the impact of cotton picking on the amount of machine pollution and its processing. It is noted that the passage of pollutants into acute pollution is enhanced by machine picking (Figure 1).

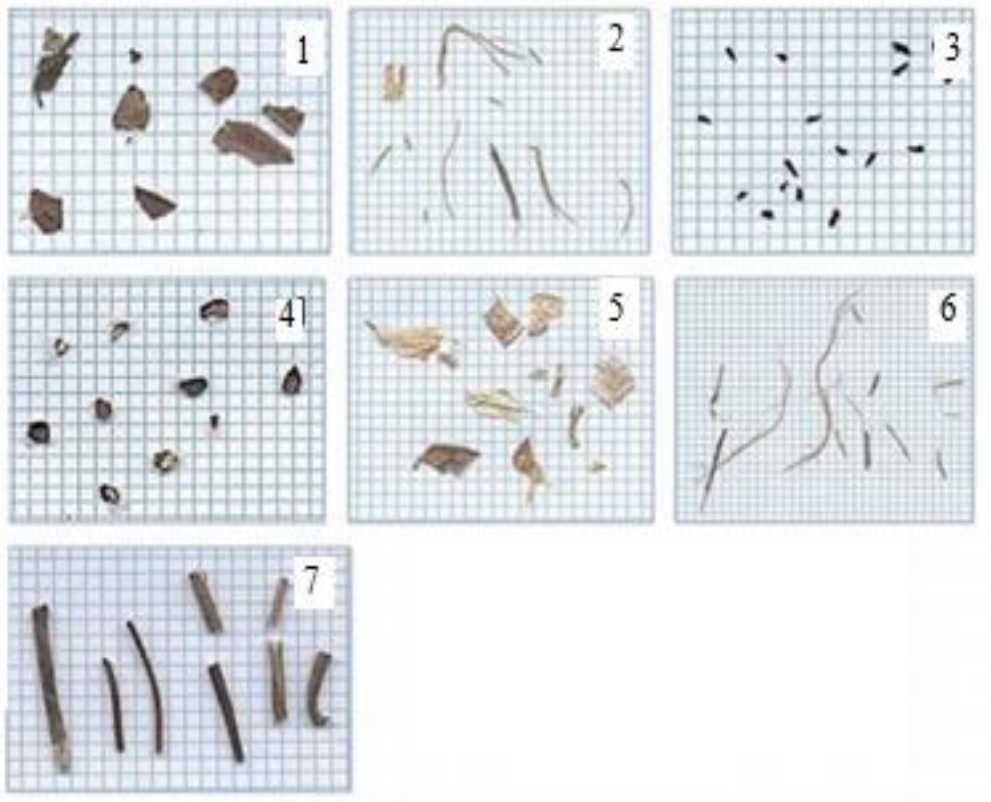

Figure 1 Classification of machine and hand picked cotton pollution
1 - leaf, 2 - stem, 3 - funiculi 4 - seed coat, 5 - shale, 6 - grass, 7 - steck.

In Syrdarya and Jizzakh provinces, tests were carried out using cottons which picked by hand and the Sase-2020 machine and the JohnDeere campaign, based on the sampling technique.

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III. METHODOLOGY

The moisture content of cotton depends on a number of factors, such as weather conditions during the harvest, cotton opening, field preparation, and other factors. Moisture is a major factor affecting the value of cotton in both commercial and technological quality. During the period of storage of cotton in high humidity, the biological process of the seeds goes on and produces heat. As a result, it reduces the quality of the cotton, which reduces the strength of the fiber, the level of fat in the seeds, and changes the appearance of the fiber. In the process of processing, it complicates the smooth operation of technological equipment and drastically reduces the quality of products [11,12].

The ВХС-М1 and the УСХ-1 thermonam meter is used cotton labs and cotton plants for rapid detection of cotton, cotton fiber and cotton seeds.

For testing on the УСХ-1 thermonuclear device (UzDst 644-2008), by standard 40 g of sample size is collected from daytime skin. If the sample humidity is above 20%, two of 40 g are taken. The average sample is obtained in 3-4 samples as follows: 10-13 g of cotton in each jar and combined with the first sample and weighed on an average of 0.01 g ВЛКТ-500 electronic scale.

Operating temperature of the heating surfaces at test УСХ-1 thermoelectric device is 195 ± 2. 40 g for testing in the УСХ-1 thermometer. The 40 g weight of cotton wrap is spread evenly over the surface made of aluminum mixture and the clamp is closed. Then the “drying” button is pressed, after which “4” minutes 45 seconds, the instrument will sound a warning signal and “5” minutes, the “drying” light goes off, warning that the drying time is over. Then open the tool and place it in a separate container. The dried sample was quickly removed from the container and weighed on a ВЛКТ-500 electronic weighing scale of 0.01.

Cotton moisture is calculated by the following formula:

$$W = \frac{m_n - m_q}{m_q} \times 100 - 0{,}6\%$$

Here: m_n- pre-drying sample weight, 40 g.
m_q - weight of the specimen after drying, d.
Error rate of instrument 0,6.
W- actual cotton moisture,%.

One of the indicators that defines the quality of cotton is its impurities. The level of cotton contamination is the percentage of dirty impurities in it.

Cotton compounds are divided into 2 types according to their origin: organic and mineral.

Organic mixtures include cotton leaf slices, dried slices of flowers, slices of cotton wool, parts of the stem, dried and rotten pieces of cotton.

Mineral compounds include dust, soil, fine rock and others. The presence of mineral and organic pollutants in cotton causes a number of difficulties in cotton processing. It also has a negative impact on the natural quality of the cotton during storage at the cotton processing facilities.

In terms of acclimatization it is divided into active and passive compounds. Active impurities are located on the inside of the cotton fiber and are tightly bonded to the fiber, cleaning them is difficult. Passive impurities are located on the surface of the cotton and are easily removed.

Depending on the size of dirty impurities, they are divided into small and large impurities. Small pollutants are defined as impurities less than 10 mm. Large pollutants include impurities greater than 10mm.

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State standard UzDst 592-2008 coordinates the methods of detecting cotton pollution. LKM Instruments are used in cotton laboratories and reception centers for rapid detection of cotton contamination.

The average daily amount of cotton is mixed on a flat surface (iron or plastic with a coating) so that dust and fine dust cannot be spilled. The sample is then mixed thoroughly and spread evenly in rectangular form and evenly divided into four parts. The two opposing parts are removed together with dust and dirt, and the other two are still spread and divided into four. In this manner, continue until 1 kg of sample is left. The remaining cotton are measured at 300g in a scale which degree of accuracy is 0.01 .

If the moisture content of the sample is greater than 12%, then the sample is dried in a laboratory device CXJI-3.

300 g obtained for experiments on LKM instrument. The weight of the cotton is put into the feeder bunker. Pressing the "Run" button, and as soon as the instrument starts working, the cover of the unit is pressed to ensure that the sample gets into the drum . In the first half, the cotton is removed from the dirt for 120 seconds, then gets into the second section, and for a further 45 seconds, removes large impurities. In the second part, the sample falls in a box for purified cotton for 15 seconds.

During this process the operating mode of the device will continue automatically. Using special flashing lights, the units work alternately. In the end the instrument will stop automatically.

The pieces of cotton that fall into the box for dirty impurities are separated from the major impurities. Then the box with the cotton wool is removed and the presence of large impurities is checked. If there are large dirty impurities, they are added to the resulting impurities. The rotten parts of the cotton and the powders collected from the grapes are weighed to a depth of 0.01 g [13-16].

Percentage of cotton pollution (pollution) is calculated in percentages by the following expression.

$$3 = \frac{m_C \cdot 100}{m_n}, \%$$

where: m_c- weight of impurities, d;
m_n - weight of cotton sample, g;

If the difference between the two levels of pollution levels of the two samples is less than 0.6% for cotton with up to 10% and more than 1% for cotton with more than 10%, then the average value of these indicators is used to find the actual contamination of cotton. If this difference is greater than the specified threshold, the third specimen designated for use shall be contaminated and the mean value of the three indices will be determined. Experiments were conducted on the methods of determining the moisture and dirtyness of the cotton mentioned above.

IV. EXPERIMENTAL RESULTS

Before harvesting cotton, it is necessary to thoroughly defeat the field to be harvested. Defoliation is a process to reduce the level of cotton contamination and improve the quality of the products. Field deforestation, irrigation ditches, arches and turning areas will be properly leveled before defoliation. Then the spraying units work evenly, increasing their productivity and defoliation. The effect of soil moisture on defoliation efficiency is significant. Therefore, the soil moisture content during the defoliation period should be 60-65% against the limited field moisture content . If this figure is below 60%, the concentration of leaf and body fluid in the cotton will increase, the absorption of defoliants will decrease and the effectiveness will decrease. Conversely, higher than 70%, the concentration of the plant decreases and the effect of defoliants decreases. It is advisable to provide light irrigation 10-12 days before defoliation of very dry soils. One of the main factors determining the effectiveness of defoliants is air temperature. Each defoliant is subject to varying degrees of temperature depending on its chemical properties and mechanism of action. Therefore, it is necessary to take a clear air temperature forecast 7-10 days before defoliation and determine which defoliants to use and how long they should be used. In particular, if there is precipitation within 1-2 days after defoliation or if the temperature drops sharply, then this field will need to be re-defoliated. High temperatures can have a negative effect on

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high temperatures and reduce the productivity of cotton. Conversely, the use of defoliants at low temperatures can reduce the efficiency of the solution and increase costs. The term of defoliation depends on the soil-climatic conditions of the regions, the biological nature of the varieties of cotton, and the availability.

Artificial shedding-defoliation plays an important role in the rapid and high-quality harvest of cotton, not leaving the cold and rainy days of autumn. This is a timely and quality event. In order to compare the dirt and humidity of the cotton harvested by hand and in the Sase-2020 machine, in the Dustlik district of Jizzakh region, a case study was carried out on the 1st Gen selective breeder type. The results of the studies are presented in Table 1.

Table 1
Quality indicators of cotton harvested in Dustlik district

Breeding variety	type	Navi		Classification	Net real weight (net)	% Dirt	Estimated weight when normalized dirty	Humidity	Weight (condensation) weight
		Seed	Technical						
Hand picking									
Генафон	5	Technical	Skin 1	1/2	6910	7.10	6550(6618)	9.10	6544(6611)
Machine picking									
Генафон	4	Technical	Skin 1	1/2	4338	10,0	4025	11,0	3952

From the results we can see from the table that the humidity of manual and machine cotton in homogeneous varieties and grades increases from 9.1% to 11%, and pollution increases from 7.1% to 10%, which is extremely harmful to the farmer, which results in a sharp fall in cotton condensate weight. Secondly, there are many problems with processing and spinning such cotton.
Syrdarya region is equipped with the latest six-line SP690 cotton pickers manufactured by JohnDeere (Figure 2).
These innovative cotton pickers were tested for the first time by Indarama, a Singaporean company, in the Akaltin district of Syrdarya region.

Figure 2. JohnDeere is a cotton picker

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A comparative analysis of the dirt and moisture content of cotton by hand-harvested cotton and by the JohnDeere company SP690. In this case, samples of Sultan selection type cotton from type 5 cotton were sampled and carried out experiments on humidity and dirt from laboratory equipment of USC and LKM. The results are presented in Table 2.

Table 2
Quality indicators of the cotton harvested in Akaltyn district

Breeding variety	type	Navi		Classification	Net real weight (net)	% Dirt	Estimated weight when normalized dirty	Humidity	Weight (condensation) weight
		Seed	Technical						
Hand picking									
Султон	5	Technical	Skin 1	1/2	6910	7.10	6550(6618)	9.10	6544(6611)
Machine picking									
Султон	5	Technical	Skin 1	1/2	2650	9.2	2480	11.2	2431

From the results, we can see from the table that the moisture of the cotton and man-made cotton “SP690” by JohnDeere, from 9.1% to 11.2%, increases from 7.1% to 9.2%. It has a negative effect on the cleaning and harvesting of cotton, which is considered harmful. There are also many problems with spinning.

One of the most important features of cotton is the length of the staple fiber, ie the longer the fiber, the better the quality of the yarn. Length of a fiber - its quality is measured by indicators of the distribution law of length. There are two methods for determining the length of the fibers, which are performed manually and on instruments. Fiber lengths "Modal" and "Staple" are widely used.

Modal length is the most common length in a sample. The staple length is Lsht = Lmod + (3 ・ 4) mm.

HVI-1000 system has been used in recent years to detect fiber properties. In this system the following parameters of the fiber length are accepted:

High average length is the average length of the longest fibers in the sample and is called 2.5% length.

Staple length is the measured length of the fiber staple manually paralleled by the classifier.

50% length is the amount of fibers are capable of spinning.

Average length shows the average length of all the fibers in the sample.

UzDSt - 604-2016 is a technical specification of cotton fiber, which contains the requirements for classification of cotton fiber.

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Cotton fiber is divided into 9 types according to properties such as staple length, linear density, relative tensile strength. These indicators analyzed the quality of manual and machine cotton.

Hand-sorted breed of Mchj "Dustlik cotton cleaning" AnB-2 (1/2) cotton staple length, percentage of dirty particles in the detection area, number of dirty particles in the detection area, micronaire index, comparative tensile strength, high fiber content, high fiber content results were obtained for the average length parameters. The results are presented in Table 3.

From the results of the table we can see that the staple length of the manual and cotton class SP690 in the same grade and class decreased by 28.7 mm to 28.2, or 0.5 mm. The number of dirty particles in the detection area increases from 20 to 37. These indicators have a negative impact on the quality of the yarn during spinning.

Table 3
Quality indicators of cotton harvested in Duslik district

T/H	Stapl Staple length	Area Percentage of dirty particles in the detection area	CNT Number of dirty particles in the detection area	MIC Micronaire indicator	Strn Comparative tensile strength	Trash The pollution indicator	SFI The amount of short fibers	Unif High average length
1	28,19	0,4	19	4,6	31,9	4	6,3	82,9
2	28,45	0,2	18	4,4	32,0	2	6,7	83,6
3	28,95	0,2	20	4,6	28,9	2	5,4	81,7
4	29,21	0,3	23	4,4	29,7	3	7,5	82,8
Medium	28.7	0,3	20	4,5	30,6	2,75	6,5	82,7

Sase-2020 "Dustlik cotton cleaning" stock type selection type AnB-2 (2/2) cotton staple length, percentage of dirty particles in the detection area, number of dirty particles in the detection area, microwave polarity, granularity index , Information on short fiber content, high average length indicators. The results are presented in Table 4.

Table 4.
Quality indicators of cotton harvested in Duslik district

T/H	Stapl Staple length	Area Percentage of dirty particles in the detection area	CNT Number of dirty particles in the detection area	MIC Micronaire indicator	Strn Comparative tensile strength	Trash The pollution indicator	SFIThe amount of short fibers	Unif High average length
1	27,43	0,5	32	4,4	28,8	5	5,6	83,2
2	27,68	0,5	33	4,6	29,1	5	6,4	82,2
3	28,70	0,5	36	4,6	29,6	5	7,4	84,0
4	28,95	0,5	46	4,5	31,0	5	5,2	83,8
Medium	28.2	0,5	37	4,5	29,6	5	6,15	83,3

The results obtained in the tables, which affect the spinning, are mainly the number of cotton fiber (Fiber Nep count) and fiber staple length. Quantity of cotton fiber staples and staple length of fiber Experimental test results have been carried out in the laboratory of foreign joint venture Jizzakh textile LLC. The experiment was carried out on a USTER AFIS PRO 2 device and weighed 0.55 g of the sample. The results are presented in Table 5.

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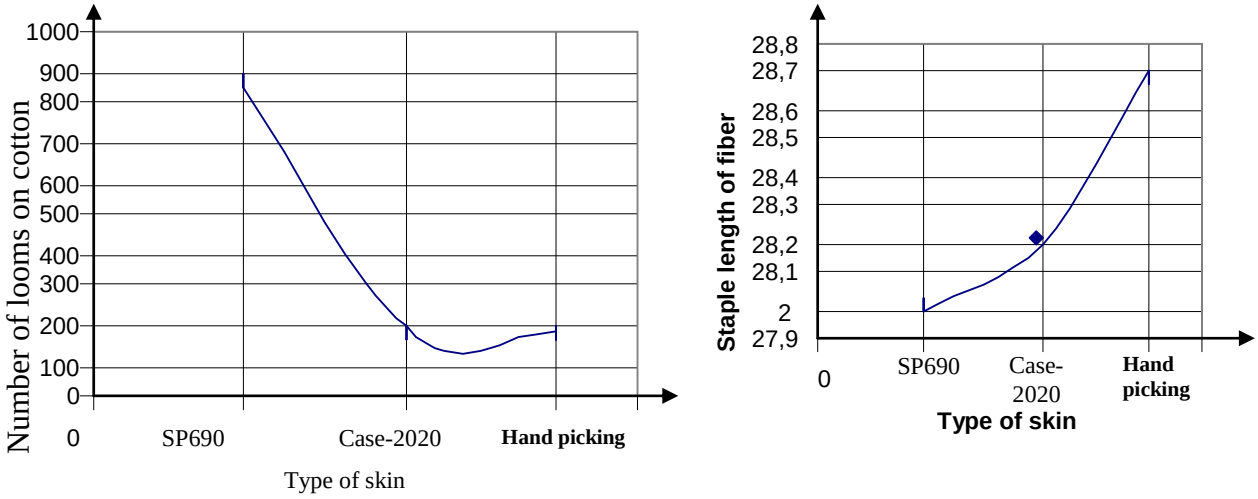

а) б)

Figure 3. Graphical analysis of the indicators of cotton fiber affecting spinning.

(Fig. 3 a) As shown by the type of cotton picking, namely SP690, Sase-2020 and hand-picked cotton in the laboratory, the quality of the fibers was 870, 186, and 172. Based on the results, we can say that the cotton harvested on the SP690 machine is higher. This indicator affects not only the quality of the yarn obtained during the processing of cotton, but also the spinning, which results in the loss of fiber due to the removal of the cloths in it. (Figure 3 b), when investigating the effect of the type of cotton harvest on the fiber staple length, was 28, 28.2 and 28.7 mm. As we know, every millimeter of fiber has a major impact on the quality and quality of the fiber. That is why the fiber is sold in 9 types. According to the results, the staple length of the fiber is 28mm, which is shorter when dialed on the SP690. We can see that these figures decreased by 0.7 mm compared to the hand harvest.

V.CONCLUSION AND FUTURE WORK

It can be said that when the cotton was harvested from the Sase-2020 car and the SP690 harvesters from the US JohnDeere campaign, the moisture content in the cotton was 9.1%, 11% in the Sase 2020 machine, and 11.2% in the SP690 machine. This results in a drastic change in the quality of cotton harvested on 11.2% of cars. Cotton pollution was 7.1% in hand, 10% in Sase 2020 and 9.2% in SP690. Based on the results, the cotton harvested on the Sase 2020 machine is more dirty than the SP690 machine, so it is necessary to increase the initial cleaning process of the cotton harvested on the Sase 2020 machine. The number of fibers in a laboratory is 55 g. During the sampling experiments, there were 172 units in hand-picked cotton, 186 in the Sase 2020 machine, and 870 in the SP690. Based on the results, we can say that the cotton harvested on the SP690 machine is higher. This indicator affects not only the quality of the yarn obtained during the processing of cotton, but also the spinning, which results in the loss of fiber due to the removal of the cloths in it. The length of the staple fiber was 28.7 mm for hand-picking, 28.2 mm for Sase 2020 car assembly and 28 mm for SP690. According to the results, the staple length of the fiber is 28mm when it is dialed on the SP690. We can see that these figures decreased by 0.7 mm compared to the hand harvest. As we know, every millimeter of fiber has a major impact on the quality and quality of the fiber. That is why the fiber is sold in 9 types. There are also many problems with spinning. This implies the need to improve the processes of drying and cleaning of cotton during the initial processing of cotton, as well as the process of cleaning the yarn.

REFERENCES

[1] The resolution of the Cabinet of Ministers of the Republic of Uzbekistan from November 25, 2018 of No. 53 "About measures for introduction of modern forms of organization of the textile manufacture".
[2] Adoption of development programs up to 2025 based on a briefing with the leadership of “Uzagrotechsanoat” JSC on August 28, 2019.
[3] J Q Jumaniyazov, IZ Abbazov, FO Egamberdiev. Explore the effect of spinning cotton picking // Proceedings of the Republican scientific-technical conference "Innovative solutions for deep processing of textile threads". Namangan 2019. —B.61-62

ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 7, Issue 5 , May 2020

[4] KJJumaniyazov, JB Mirzaboev, B.Mirzaboev Properties of fiber waste and possibilities of their efficient use // Namangan Journal of Engineering and Technology Institute ISSN: 2181-8622 TOM 4-2, 36-41 p
[5] Khojiev MT; Abbazov, IZ; and Alimov, O.N. (2019) Ways of Cotton Cotton Cleaning, "Made in Cotton Factory," Textile of Uzbekistan: Vol.1: No. 1, Art. Eliktron: https://uzjournals.edu.uz/titli/vol1/iss1/2
[6]M.Xodjiev, I.Abbazov, O.Alimov, R.Karimova The Composition of Releasing Passion of Dusty in the Process of Pat // International Journal of Engineering and Advanced Technology ISSN: 2249-8958 Volume-8, Issur-3S (2019) —pp. 279-283.
[7]M.Xodjiev, I.Abbazov, O.Alimov, J.Karimov Fraction Structure of Cotton Cleaning Equipment in Cotton Enterprises and Their Cleaning Effectiveness // International Journal of Advanced Research in Science, Engineering and Technology ISSN: 2350-0328 Vol.6 Issue 1 (2019) —pp. 7983-7988.
[8]M.Xodjiev, I.Abbazov, B.Mardonov, O.Sarimsakov Effective Cleaning of Cotton Waste Produced at Cotton Cleaning Factories // American Association for Science and Technology ISSN: 2375-3803. Volume-5, Issur-2 (2017) —pp. 22-28.
[9] Ruixiu Sui, J.Alex Thomasson. Effect of machine-fiber interaction on cotton fiber quality and foreign-matter particle attachment to fiber// Journal of Cotton Science 14:145—153. 2010.
[10]I.Abbazov, O.Sarimsakov, M.Khodjiev, B.MardonovEffective Cleaning of Cotton Waste Produced at Cotton Cleaning Factories // American Journal ASCIT Communications 5, 22-28
[11] A.P. Parpiev, M.A. Akhmatov, AK Usmankulov, M. Muminov. Drying of raw cotton.Textbook. - T .: Chulpon, 2009.
[12]Parpiev A., M. Shorakhmedova and others. Some problems of fiber quality improvement // The role of innovations in the improvement of techniques and technologies of cotton cleaning, textile and light industry. Namangan 2015. —B. 40-45
[13] Coordinated Cotton Technology Technology (PDIZO 2012) Association "Uzpakhtasanoat", JSC "Cotton Research Center", Tashkent-2012.
[14]K.J.Jumaniyazov , SulaymonovR.Sh., KamalovSh.Z., AsadovaI.G., LugachevA.E., AminovH.H. Improvement of linter cleaning technology // Collection of results of scientific and technical achievements in the cotton sphere of the republic of Uzbekistan (UZPSIM-90) [text]: Collection of articles of the international scientific and technical conference, october 23 - 27, 2017. - T .: "Ilmiytexnikaaxboroti-press nashriyoti", p 126-130.
[15]K.Jumaniyazov, B.M. Mardonov, R.Sh.,Suleymanov, N.Z. Kamalov. Modeling process controls for linta zone zone pilot pilot cylinder and grebenkoy.// Conference on Innovation 2017, Innovation 2017, Tashkent, TUIT, 26-27 October, 2017. - p. 231—232.