Analysis of Namangan 77 cotton in production line with different saw gins for short fiber yield

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Abstract. For the accuracy of the results, the study was carried out for three years. The average of each factory gins was chosen. Comparison of fiber properties processed in different cotton processing plants, with different models of fiber separators. Each sample of fiber grade 1 Namangan 77 raw cotton was obtained as a result of ginning with such factory gins 4DP-130.5 DP-130, 3HDD and Lummus gins in Namangan region. The Fiber properties of all samples were measured with the Advanced HVI Fiber Information System, to determine the yield of short fibers. The main purpose of the study is to determine which model of sawing gin to produce more short fibers. For next modernization working parts of other model gin for increasing quality of fiber.

1 Introduction

At primary cotton processing plants in Uzbekistan, cotton is usually collected from the bunt by a mechanical picker or stripper, transported in a pneumatic module and transferred to technological chain through a sequence of processes including drying, cleaning, ginning, lint cleaning, and bale packing. Some of these processes change various properties of cotton. The cotton fibers offered for sale are selected and modified in accordance with the standards (HVI). Standards (HVI) for fiber are set by the joint-stock company SIFAT in Uzbek standard to determine the properties of fiber, such as color, length, microneyr, strength, and trash content, which are important in textile processing.. Fiber quality is an important aspect of cotton research, and the fiber must be removed from the seed to determine its bulk properties.

American scientists have conducted research on the comparison of factory and laboratory gins since the differences between laboratory gins and production gins have not been studied. Their research proved that the results obtained from laboratory gins could not be accurately reproduced, even with a correction factor, in production gins of cotton processing plants. [1,2]

But the correlation Analysis indicated that the experimental gin, close to factory parameters, withstands lint production samples that were the most similar to lint production samples, considering all properties. These results show that factory-close experimental laboratory gins offer an effective, convenient screening tool for cotton researchers predicting fiber quality in production gins. Using this data, we determined our way of conducting the research. [3,4]

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2 Methods

The purpose of this study was to compare the quality of fiber to analyze cotton plants in the Namangan region with different types of gins and their working parts that contribute to the output of short fiber. Determining the optimal parameters of the working parts of the gin to modeling the quality of the fiber.[5,6]

To begin with, we conducted a statistical analysis after receiving data from the company SIFAT on cotton fiber of the grade - 1 Namangan77 harvest of 1st year of research, 2nd year of research, 3rd year of research the main indicator we took is the yield of short fibers.

SFI-index of short fibers, or the number of fibers in the measured sample that are less than 0.5 inches long %. after receiving the data on the table, we displayed them in graphical order to determine the properties and factors that affect the quality of the fiber during saw ginning.[7–9]

Table 1. Statistics of 1st year research on the quality of cotton fiber on Namangan 77, grade -1.

Names of cotton processing plants	Average IBLENGTH in	Average in SFI	Average STRENGTH in
3028 Pap	111.9523	4.19351	31.59734
3041 Uychi	112.600	3.813758	33.92539
3042 Namangan 3	112.5114	4.000455	30.17477
3043 Tashbulak	112.7144	3.761403	33.15875
3044 Norin	112.5878	3.687161	33.60263
3046Chust	112.5576	3.619007	33.14875
3047 Uchkurgan	112.4583	3.847357	33.34615
3048 Gulbax	112.3386	4.296065	32.20291
3049 Chartak	112.4991	3.976447	33.78364
3050 Kasan	111.7887	4.180011	31.18185
3051 Mirishkor	113.6079	3.623138	33.94058

Fig. 1. Statistics of 1st year research on the quality of cotton fiber on Namangan 77, grade -1.

A statistical study of 1st year showed that this graph showed that the lowest SFI – index of short fibers at The Mirishkor cotton plant and makes up 3.62 % of the total weight of cotton. [10] For short fibers, SFI is the index of short fibers, or the number of fibers in the measured sample that are less than 0.5 inches long,% . And the highest yield of short fibers is at the Gulbax plant and is 4.30%

Table 2. Statistics of 2nd year research on the quality of cotton fiber on Namangan77, grade 1.

Names of cotton processing plants	Average in FIBLENGTH	Average in SFI	Average in STRENGTH
3028 Pap	112.1342	4.854719	32.03274
3041 Uychi	112.2726	4.83333	32.32988
3043 Tashbulak	112.6256	4.840825	31.98049
3044Norin	112.3186	5.075446	32.67889
3046 Chust	112.4721	5.488028	32.44607
3047 Uchkurgan	112.1036	5.145151	32.67528
3048 Gulbax	112.3562	5.276708	31.86648
3049 Chartak	112.4755	5.101204	32.92095
3050 Kasan	111.6537	5.157461	31.66534
3051Mirishkor	113.4279	4.569797	32.48395

Fig. 2. Statistics of 2nd year research on the quality of cotton fiber on Namangan 77, grade –1 indicators by plants.

2-year statistical study has shown that the lowest SFI – index of short fibers at Mirishkor cotton plant is 4.57 % of the total weight of cotton. [11] And the highest yield of short fibers is 5.49% at Chust plant.

Table 3. Statistics of 3 - year research on the quality of cotton fiber on Namangan 77.

Names of cotton processing plants	Average in FIBLENGTH	Average in SFI	Average in STRENGTH
3046 Chust	112.5192	4.747046	33.75442
3041Uychi	112.4293	4.390277	34.80671
3048 Gulbax	112.6788	4.304543	33.76084
3028 Pap	112.5627	4.441583	33.87558
3044 Norin	112.5782	4.417053	33.6169
3047Uchkurgan	112.4004	4.369703	33.51503
3046 Namangan 3	112.4591	4.796916	32.97717
3051 Mirishkor	112.7977	4.0449	35.44845

Fig. 3. Statistics of 2nd year research on the quality of cotton fiber on Namangan 77, grade –1 indicators by plants.

A statistical study of 3-year has shown that the lowest SFI – index of short fibers at the Mirishkor cotton mill and it makes 4.04 % of the total weight of cotton. [12,13] And the highest yield of short fibers is 4.80% at the Namangan3 plant.

3 Results

The results obtained from the production gins of cotton processing plants showed that the lowest SFI – index of short fibers at Mirishkor cotton plant, which uses an American-made Lummus fiber separator, the average value for three-year period is 4.07 % of the total weight of raw cottons. In second place, the Uychi cotton plant average value for three years is SFI 4.34 % of the total weight of cotton that uses fiber separators 4 DP -130.

Further analysis of the spinning industry that purchased raw materials from cotton fiber manufacturers showed the following results. Quality indicators on a single yarn such as thick

(THICK +50%) and neps (NEPS +200%) are relatively high for Lots of fibers Lot -2 and Lot -3 than Lot-1. According to Uster statistics -2001, the yarn produced by Lot-1 cotton fiber showed better results. This is due to the fact that the Lot-1 batch of cotton fiber accepted a fiber with the presence of short fibers in the limit of 4.07% and a yarn yield is 88% per 100 tons of cotton fiber. And on Lot-2 and Lot-3, the presence of short fiber content in the limit of 4.34 % and 4.63%, yarn yield is 86.5 % and 85.7 % respectively per 100 tons of fiber cotton. (Table 4).

Table 4. Statistics of Yarn output from fiber Namangan 77.

The batch number of the cotton fiber	The content of the short fibers, %	Yarn output from the fiber, %	Trash particles in fiber, %	Invisible trash, %	Profit, USD
LOT 1- 3051 Mirishkor	4.07	88	5,73	2,2	286 600
LOT2- 3041 Uychi	4.34	86,5	6,86	2,3	273 600
LOT3- 3048 Gulbax	4.62	85,7	7,28	2,4	264 020

Fig. 4. Statistics of Yarn profit and output from fiber Namangan 77.

4 Conclusions

The cost of raw materials represents more than 60% of the total cost of production in most spinning factories. This situation forces factory managers to have an excellent knowledge of raw materials and the correct choice of raw materials determines many reasons.

In order to reduce outcome of short fibers, working parts of the saw gin 4 DP-130 at Uychi cotton plants, Lummus gin at Mirishkor and 3HDD gin at Gulbax cotton plant are needed to explore. The gradual transition of Uzbekistan's cotton plants, which primary process cotton fiber, to a textile cluster will make it possible to conduct a deep analysis that short fibers impact on the cost of produced yarn and thread.

By modernizing and diversifying the industry's machines, our research has shown that it is necessary to determine the reasons for the output of short fibers in saw gins 4 DP-130,

Lummus and 3HDD and simulate a new experimental design of gin to reduce the output of short fiber fractions.

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