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Effect of Cotton Maturity Degree on Changes in Fiber Quality Indicators

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Abstract: the research was carried out in the field of the REEL technical engineering agrocluster in the Orta Chirchik district. For this, cotton plants with a distance of 100x100 meters were selected. First, the first bolls opened on the cotton after defoliation were harvested, then bolls weighing about 1 kg, ripened for 3 days, 6 days, 9 days and 12 days, were harvested. The peeled bolls were separated from the fiber by hand. The physical and mechanical properties of the fiber were determined.

Keywords: class, staple length, micronaire index, reflection coefficient, length uniformity index.

1. INTRODUCTION

The US cotton fiber classification is a well-known practice widely used in the world. The modern classification of cotton fiber in the US still retains its old foundations and traditions, although there is a modern laboratory base for new fundamental reforms.

The official quality classification of cotton fiber by the US agricultural sector takes into account three factors: grade, staple length and micronaire index. The grade is determined by the color of the cotton fiber and the content of impurities. Staple length is usually characterized by the length of the fiber. Micronaire is a conditional characteristic of the linear density of the fiber.

In the United States, the classification of cotton fiber is characterized by appearance samples located in special boxes developed on the basis of a standard that is recognized as the Universal Standard in international practice. These standard samples are developed and distributed by the US Agricultural Marketing Services.

If we have a normative-technical document in the form of "Technical Conditions", then in the USA this document replaces physical standards for cotton fiber, since in determining the quality of fiber samples, they are compared with standard samples by a classifier who tests them using the organoleptic method. Later, these devices began to be replaced by classifiers. But physical standards still play a major role in classifying fibers.

The grade of cotton fiber is determined by its color, the content of impurities and its condition after combing. Each factor is evaluated separately and summarized. Medium-fiber cotton of the Upland type differs significantly from fine-fiber Pima cotton.

The linear density of textile products, as well as cotton fibers, is expressed in tex or millitex units in the standards of the Republic and European countries and is evaluated depending on the length and type of fiber. According to modern standards, long-fiber cotton is divided into types I-III, and medium-fiber cotton is divided into types IV-VII, that is, the linear density of the fiber increases in accordance with the order of increasing type, and the length decreases inversely. If

the fiber exceeds the limits in linear density or length, then it passes to lower types, as a result of which the spinnability of the yarn is reduced and poor-quality finished products can be produced.

Determining the linear density of cotton fibers is quite complicated. Therefore, the American fiber certification system introduced the micronaire indicator, which is determined by the amount of air consumption from a group of parallel fibers. Air resistance is proportional to the cross-section of the fiber.

The fiber color is characterized by the American standard Rd (%) and the degree of yellowness (+b). The color of cotton fiber has always been considered one of the highest requirements. Therefore, the acceptance of cotton fiber in the country is carried out only during the day, and laboratory technicians determine the fiber color subjectively, by the classifier method and by comparison with special samples.

Currently, in all regions of the world, cotton fiber quality indicators are studied based on the modern HVI 900 SA system. Cotton fiber is divided into varieties based on color, appearance, and ripeness.

According to international standards, the quality of cotton fiber is assessed using classifiers and measurement methods in the HVI 1000 SA system according to UzDst 604-2016.

2. METHODS

According to the international standard, the quality of cotton fiber is determined by the color, contamination and quality of the fiber, staple length (Staple Length) in 1/32 inch and micronaire indicators.

The linear density of the fiber is expressed in tex or millitex units in the standards of the Republic and European countries and is evaluated depending on the length and type of fiber. According to modern standards, long-fiber cotton is divided into types I-III, and medium-fiber cotton is divided into types IV-VII, that is, the linear density of the fiber increases in accordance with the order of increasing the type, and the length decreases inversely. If the fiber exceeds the limits in linear density or length, then it passes to lower types, as a result of which the spinnability of the yarn is reduced and poor-quality finished products are produced.

The color of cotton fiber is characterized by the level of Rd (%) and yellowness (+b) according to the American standard. The color of cotton fiber has always been considered one of the highest requirements. Therefore, in the country, cotton fiber acceptance is carried out only during the day, and laboratory technicians determine the color of the fiber subjectively, by the method of classification and by comparison with special samples. In our country, the fiber length is estimated by the staple and modal mass length measurements. The first, that is, the staple mass length, has a greater effect on the fragility properties, while the second, that is, the modal length, is the most common length. In the United States, one of the geometric properties of cotton fiber, the assessment of the fiber length, has been developed in advance, and is obtained not in the form of a staple diagram, but in the form of a fibrogram.

Research work was carried out to obtain high-quality raw materials at cotton ginning plants. For this, the quality indicators of fibers ripened at different times were determined using the modern HVI 1000 SA system.

The results of the research are presented in Figures 1 and 4, which show the histograms of changes in the quality indicators of fibers ripened at different times.

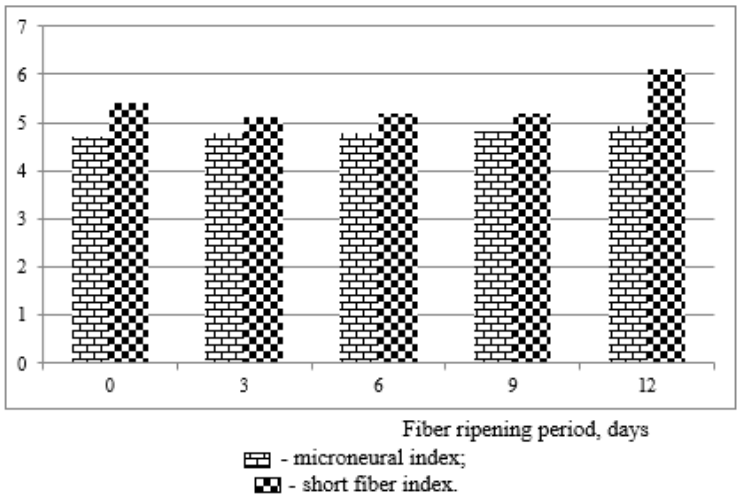

Figure 1. Changes in microneural index and short fiber index of cotton fibers ripened at different times.

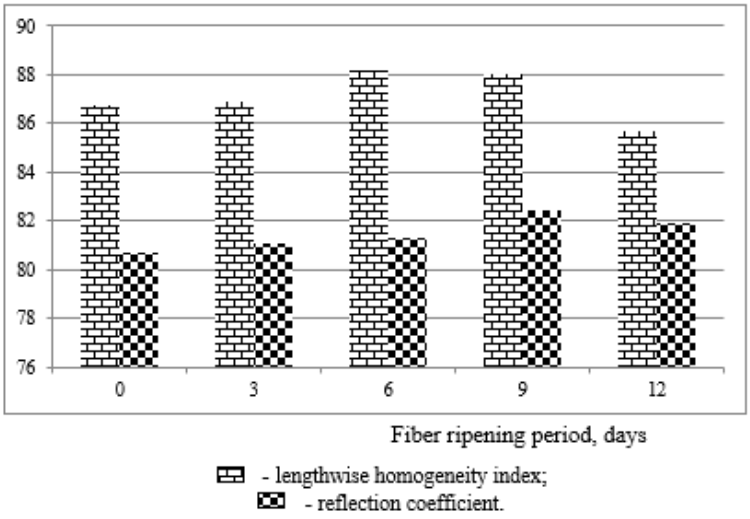

Figure 2. Changes in length uniformity index and reflectance coefficient of cotton fiber ripened at different times.

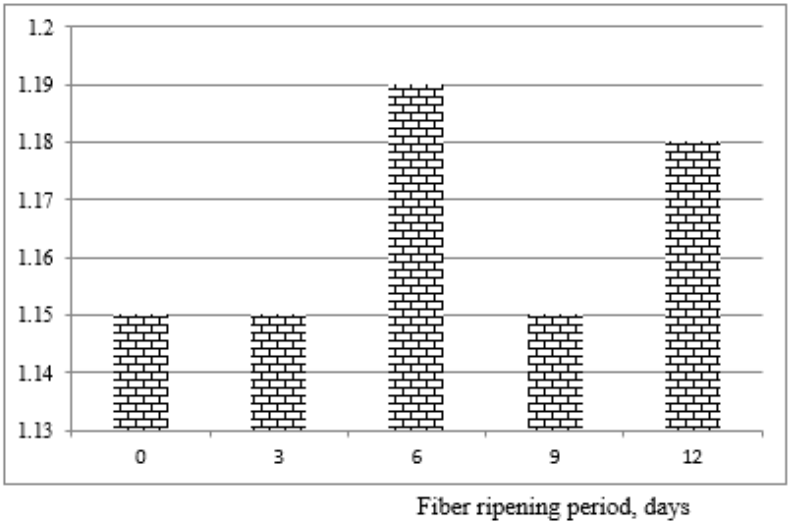

Figure 3. Changes in the average length index of cotton fibers ripened at different times.

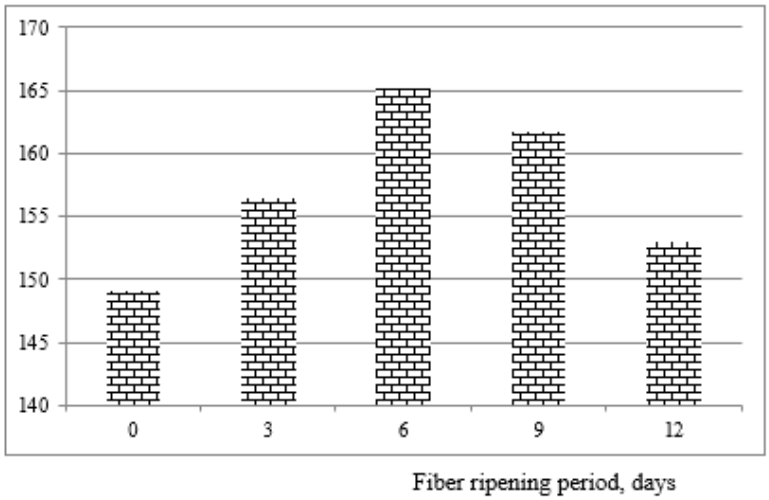

Figure 4. Change in the spin capacity of cotton fibers ripened at different times.

3. RESULTS

Analyzing the results of the research, the microneur index of the fiber in the first opening is 4.71, the short fiber index is 5.4, the uniformity index is 86.7, the reflection coefficient is 80.7, the high average length index is 1.15, the cotton fiber is 149.1. indicator 4.79, short fiber index 5.1, length uniformity index 86.9, reflectivity 81.1, high average length index 1.15, cotton fiber spinability 156.1, 6 days open fiber microneur index 4.78, short fiber index 5.2, length homogeneity index 88.2, reflection coefficient 81.3, high average length index 1.19, cotton fiber spinability 165.1, fiber microneur index 4.83, short fiber index 5.2, length uniformity index 88.0, reflection coefficient 82.4, high average length index 1.15, cotton fiber spinability 161.7, fiber microneur index 12 days in the bag 4.93, short fiber index 6.1, length uniformity index 85.7, light reflection coefficient 81.9, high average length index 1.18, cotton fiber spinability It was 153.0.

4. CONCLUSION

The test results showed that with the change in the ripening period of cotton fiber, the micron index of the fiber changed from 4.71 to 4.93, the short fiber index from 5.1 to 6.1, the length uniformity index from 85.7 to 88.1, the light reflection coefficient from 80.7 to 82.4, the high average length index from 1.15 to 1.19 g, and the spinnability of cotton fiber changed from 149.1 to 165.1.

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