DETERMINATION OF QUALITY INDICATORS OF GRAINED COTTON AND FIBER AND REQUIREMENTS APPLIED TO THEM

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ABSTRACT

This article is about determining the quality indicators of cotton seeds and fiber and what requirements are placed on them, which should be used today based on modern technologies and the correct use of continuous methodology, including the essence of the article is to determine the level of development and maturation of the fiber.

The cotton delivered to the cotton mill contains a large amount of various foreign impurities. Before the cotton is processed, it is cleaned. If we take a certain amount of cotton sample, we will see that in addition to the normally ripened fibers, there are also fibers mixed with a lot of wood and defective ones. Such defects are biological and mechanical, and they appear during the growth and development of cotton, during the initial processing of cotton in cotton mills, and sometimes during the extraction of yarn from cotton in a spinning mill. If there are many such defects, the value of cotton decreases, and its quality deteriorates, it is more likely to break during the spinning and weaving processes, as a result of which the productivity of machines decreases.

he main characteristics of cotton - the fibers and defects are as follows:

Impurities – Crushed leaves, stalks, cotton buds, etc. are stuck to the fibers and are very difficult to remove.

Fibrous dead – A mixture of broken fibers, crushed chaff, and immature seeds with varying degrees of fluffiness resulting from cotton ginning.

Diseased and damaged fibers - It can occur when the cotton plant is infected (biological defect) and during processing of cotton in cotton mills and spinning mills (mechanical defect).

Ground flaxseed (seed flakes - formed during the initial processing of cotton. They can be further crushed and turn into husks on which the fibers are stuck. This defect is the most harmful defect for spinning mills and can also occur in spun yarn.

The skins with the fibers stuck to them - It is considered a harmful defect and is formed during the initial processing of cotton as a result of the crushing of seeds, in the ginning and winnowing machines. They adhere tightly to the fiber and are very difficult to separate. Therefore, it is necessary to identify the causes of such defects and reduce them.

Most of these defects are mainly formed during the initial processing of cotton, so improving the performance of cotton ginning plants is of great importance in delivering fiber with fewer such defects.

The results of scientific research conducted by scientists show that cotton is already susceptible to diseases and damage from the bollworm during its growth and maturation. Fungi and bacteria have also been found to severely damage cotton fiber. Cotton fiber is also damaged during the picking, transportation, storage, and processing of cotton.

According to the results of scientific research, biological and mechanical damage to cotton fiber reduces its strength to a certain extent, depending on the degree of biological damage to the fibers, by 15-68%, and by 12-70%, depending on the degree of mechanical damage.

If the fiber is biologically damaged, its cross-sectional area is determined using the following formula:

$$F_{op} = \frac{B^2{}_0 - T^2}{K_0}$$

Where V0 is the cross-sectional width of the fiber under consideration;
K0 is the calculation coefficient indicating the residual thickness of the fiber wall;
T2 is the correction coefficient.
If the fiber is mechanically damaged, its cross-sectional area is found using the following formula:

$$F_{\mu P} = \frac{B^2 \cdot \varphi^2}{K_{m\text{я}}} \cdot \gamma_m$$

where V is the width of the undamaged section of the fiber.
Kmya is a coefficient indicating the amount of cellulose cells collected in the inner layers of the fiber.
φ - correction coefficient.
γ_m - coefficient for calculating the undamaged cross-sectional area of the fiber.

Cotton fiber is a very common product among the fibers of the textile industry. It is a very elongated cell of the epidermis of the seed coat, and each fiber, considered a hair, consists of a single cell.

The chemical composition of cotton fiber is as follows:
Cellulose - 97.-98.5%
Pectin substances - 0.8-1.0%
Oil, waxy substances -0.3-1.0%
Nitrogen and proteins -0.2-0.3% and other substances.

During the flowering period, the process of fiber formation begins. By this time, some cells of the upper epidermis of the seed begin to grow lengthwise. Fibers grow from the active cells of the outer epidermis of the ovule. Active cells that turn into fibers appear on the surface of the ovule at different times. Therefore, they are not evenly distributed on the surface of the ovule and their development is also different.

The development of cotton fiber mainly consists of two periods. Each period lasts 25-30 days under favorable conditions. In the first period, the fiber grows mainly in length and reaches the length characteristic of the cotton variety. The main fiber reaches half of its actual length within 15 days of this period, and the growth of the fiber in length almost stops in the first period.

In the second stage, the inner cellulose layers of the fiber appear and the fiber begins to ripen. The process of forming the cellulose layer can last up to 50 days.

The degree of ripeness of the fiber is usually determined by the thickness of the cellulose layer in it. The thickness of the cellulose layers can vary depending on the cotton variety and its growing conditions. The more cellulose accumulates in the fiber, the better the fiber is. After the boll is opened, the fiber dries, its walls take on a ribbon-like shape, and it

Curling is formed. The higher the degree of maturity of the fiber, the more curled it becomes. As the cotton fiber ripens, its outer diameter increases relative to its inner diameter, and it is called the ripening coefficient.

If the cotton fiber is not fully ripe (dead fiber), its walls are very thin and resemble long tubes. Such a fiber is very uneven and hollow, it is impossible to get high-quality yarn from it, and it does not take dye well. The wall of such a fiber consists of only one layer - the cuticle, and the cuticle contains a lot of oily-waxy substances, and very little cell-cellulose. Dead fibers consist of shiny, delicate layers that stick together.(Figure 1.1)

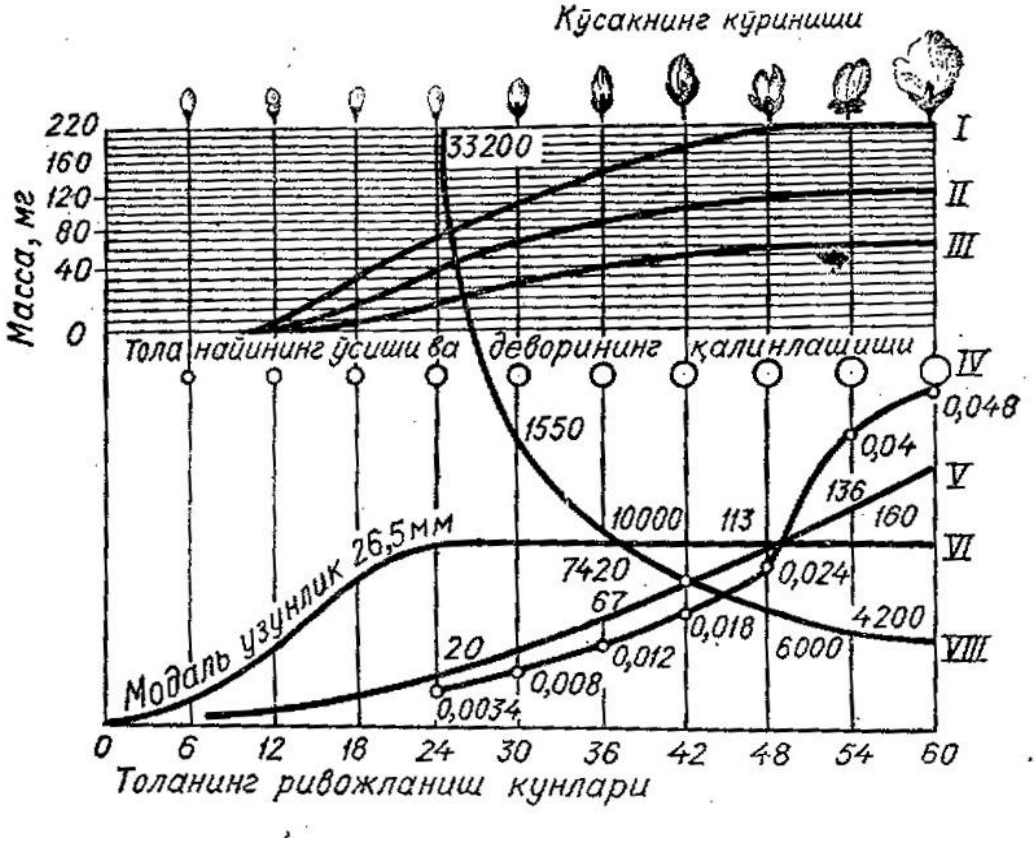

Figure 1.1)

When dead fibers are examined under a microscope, they look like crushed and distorted pieces of paper, and their walls are very thin.

After the boll opens, the fiber stops developing, the protoplasm in the fiber channel begins to dry out along with the seed and boll. Under the influence of these processes, the cotton fiber flattens slightly, takes on a ribbon-like shape and begins to twist around its axis. As a result of the twisting of the refined fiber 50-80 times for every 10 mm of length, its total length is reduced to 1-1.5 mm. The refined fiber is shiny, while the raw ones are not shiny. In cultivated varieties, the length of the fiber is 31-40 mm, and its cross-section is 15-25 μm (Figure 1.2)

(Figure 1.2)

The seed together with its fibers is called cotton with seeds or lint.

Long fibers (improved) make up 30-40% of the lint mass, short fibers-fluffs make up 3-4%, and the seed itself makes up 56-57%.

In a normally developed boll, some fibers or lint may be poorly developed. The ungerminated ovule and the fiber that grows from it quickly stop growing and die. As a result, when the dead ovule dries, the cotton takes the form of a short-fiber nodule, which is usually called a small deadhead. As a result of the failure of the fertilized ovules to develop, a large deadhead occurs.

The occurrence of small and large dead bolls depends on the location of the bolls in the cotton plant, plant nutrition, timely and high-quality agrotechnical measures, and the incidence of cotton with various diseases (especially wilt). In most cases, the amount of dead cotton in the cotton crop (by weight) is less than one percent. In terms of total seeds, the amount can range from a few percent to 20-30%.

Conclusion

In conclusion, it should be said that teaching technical subjects based on technology is very important today, because it is very important to create scientific areas by linking innovative development to the field of education and applying its essence to the whole society.

The implementation of the unified education policy implemented in our country in the regions shows the need for effective development of innovative components of the higher education system and ensuring competitiveness in the educational services market. A cluster is a form of integration of interconnected enterprises, which allows increasing the competitiveness of the regional economy.;

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