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CHANGES IN THE FIBER STRUCTURE OF DIFFERENT SELECTION VARIETIES DURING THE INITIAL WORKING PROCESS OF COTTON

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Annotation: *in this article, it was conducted in "ZAMIN ANGOR CLUSTER" LLC and "SAX CLUSTER" cluster system enterprises in Surkhandarya region. For him, the morphological properties of the fibers of promising selection varieties Termez-49, Surkhan-101, Surkhan-9, Termez-208 and Surkhan-102, grown in some farms of Denov and Shorchi districts, were determined using an electron microscope*

Key words: *arrangement of fibrils in the primary and secondary layers, crystalline-amorphous submicroscopic structure, oily, waxy, coloring, mineral substances, hardness and sorption properties of the fiber.*

I. INTRODUCTION

Cultivation of high-quality raw materials in the cotton fields of our republic, broad regionalization of short-ripening, high-yielding selection varieties resistant to various diseases, and providing the population with ready-made quality products are among the urgent issues of today.

In order to ensure the production of competitive products by introducing modern forms of organization of cotton-textile production in our republic, on February 12, 2019, the Presidential Decree of the Republic of Uzbekistan "On measures to further deepen the reform of the textile and sewing-knitting industry and expand its export potential" The adoption of Decree No. 4186 serves to bring this field to a new level. In this regard, it is noteworthy that relevant decisions of the Government, in particular, Decision No. 253 on March 31, 2018 "On additional measures to organize the activities of cotton-textile productions and clusters" were adopted. In this, the most important thing is that as a result of integration between cluster enterprises and farms based on market relations, advanced agro-technologies and techniques are being introduced in cotton growing, and equipment with modern agricultural techniques is being achieved.

Cotton fiber mainly consists of cuticle, cellulose, tubular layers, and cuticle, in turn, consists of cellulose combined with oil, wax and other types of substances. This layer protects against external influences. The second layer is the cellulose layer.

Ripe cotton fiber contains 95-98% cellulose. For example, cellulose contains 44.44% carbon, 6.17% hydrogen and 43.39% oxygen.

Cotton fiber also contains hemicellulose. If cotton fiber ripening improves, hemicellulose content decreases.

The higher the cellulose content of cotton fiber, the more the fiber matures and does not change in diameter. The diameter of the inner cavity is reduced.

Cotton fiber has a crystal-amorphous submicroscopic structure. As shown in several studies, the cellulose macromolecule lies simultaneously in several crystalline and amorphous regions.

The degree of crystallinity increases rapidly during the ripening period of cotton fiber and increases to a small extent during 35-40 days, i.e. up to 80%, and then does not change.

Porosity of cotton fiber is an important structural component that determines the fiber's hardness and sorption properties. The small porosity in the fiber is 0.8•1014cm-3, which occupies 0.01% of the fiber volume, and the large porosity is 4.7•1014cm-3, which occupies 0.3% of the fiber volume.

When observing the structure of cotton fiber using an electron microscope, it was observed that the arrangement of fibrils in the primary and secondary layers is different. The primary wall layer of the fiber is 0.5 µm, and the fibrils are located at an angle of 400 to the fiber axis.

The second layer is the cellulose layer, which is 5-10 µm and is composed of fibrillar bundles, which are arranged at an angle of 20-350 to the fiber axis.

Of all plant fibers, cotton contains the largest amount of cellulose (95-96%). In addition to cellulose, fibers contain a small amount of fatty, waxy, coloring, mineral substances (4-5%). The substances that accompany cellulose are located between macromolecules and bundles of fibrils. Unripe cotton contains minerals (K, Na, Ca, Mg) that create conditions for the growth of mold fungi. It also contains elements (Fe, Cu, Zn) that stimulate the development of microorganisms. In addition, sulfates, phosphorus, glucose, glycides and nitrogenous substances, which also stimulate the growth of microbes. Differences in their concentration are one of the reasons for different levels of aggression of microorganisms to cotton fiber.

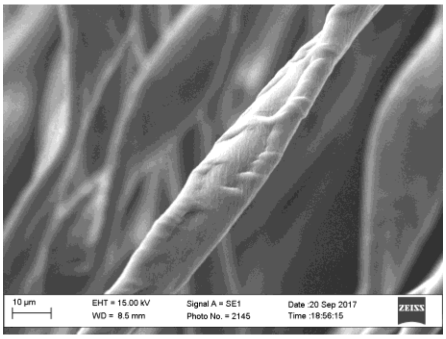
The presence of cellulose, pectin, nitrogen and other organic substances in cotton fiber and their high hygroscopicity make this possible.

Cotton is the world's main source of renewable fiber and is mainly used in textile production. Cotton fibers are individual cells isolated from the ovary epidermis and are an excellent model system for studying cell elongation, polyploidization, and cell wall biosynthesis.

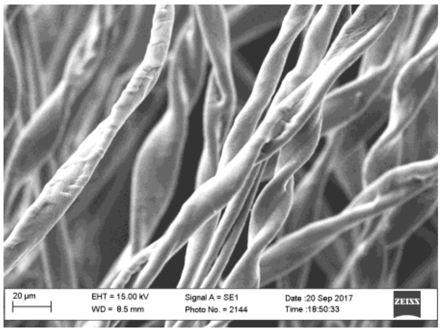
II. METHODOLOGY

Cotton fiber is the most important source of cellulose for the global textile industry. These hair-like unicellular trichomes develop from the epidermis of the egg. They are divided into long thread and short down. The main task of cotton breeding is to create elite varieties using lint-free seeds that provide high yield of cotton. The molecular basis of the formation of feathers and fluff remains unclear. An integrated model is presented as a conceptual framework for future studies aimed at analyzing the molecular network responsible for cotton fiber initiation.

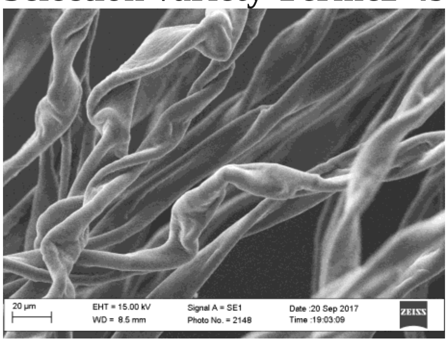
After the initial processing of cotton, the structure of different selection varieties was observed using an electron microscope. The resulting images are presented in Figure 1.



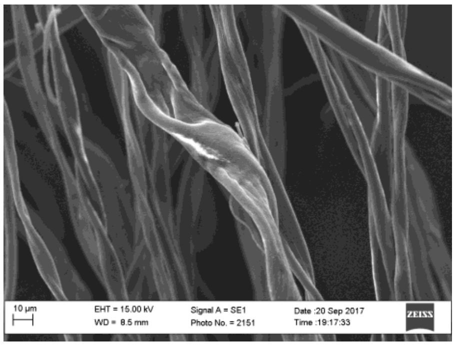
Selection variety Termez-49



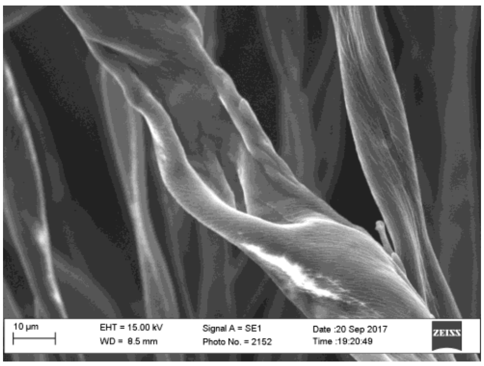
Selection variety Surkhan-101



Selection variety Surkhan-9



Selection variety Termez-208



Selection variety Surkhan-102

Figure 1. Changes in the fiber structure of different breeding varieties during initial processing of cotton.

III. RESULTS AND DISCUSSION

The structure of different selection varieties was observed using an electron microscope. As you can see from the pictures taken, the cotton fiber looks like a tube when viewed under a microscope. In ripe fibers, the wall of the tube is thicker. This is due to the fact that, as the fiber grows, new layers are added to its inner wall from the channel filled with protoplasm, and the cellulose molecules forming the layers are arranged in an elongated shape. A group of such molecules forms twists lying at an angle of 30-40° relative to the length of the fiber.

IV.CONCLUSION

As the wall of the tube thickens, the stiffness and toughness of the fiber increases. Fibers with different levels of maturity also have different twists on their surface.

Immature fibers are ribbon-shaped in cross-section, medium-ripe fibers are bean-shaped, and mature fibers are ellipsoidal or sometimes circular in cross-section.

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