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# IMPROVING THE QUALITY OF GINNING ON PRODUCTS

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**Abstract:** The ginning process depends on many factors, among which the main ones are the characteristics of the processed cotton, the rotation speed of the saw, and the geometric dimensions of the saw tooth. It is impossible to determine the quality of the fiber by the arc of saw teeth engaged on it and the fiber separated around the seed comb. It can only be determined after passing beyond the grate.

**Keywords:** raw cotton, fiber, joint, quality, gin machine, pneumomechanical gin, textiles, micronaire, research, HVI laboratory system, breeding variety.

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**Introduction.** According to the International Cotton Advisory Committee (ICAC), in the 2020-2021 season, 23.02 million tons of cotton fiber were produced, its consumption amounted to 24.8 million tons, and fiber reserves amounted to 16.4 million tons. Fiber production is expected to reach 25.8 million tons in 2023. Increasing demand for cotton fiber, in turn, requires constant improvement in its quality and production efficiency. Accordingly, the scope of research aimed at improving the quality and reducing the cost of cotton products is increasing globally. At the same time, the introduction of cotton varieties that ensure the production of cotton products with high consumer quality indicators, the creation of resource-saving technologies that ensure such quality indicators of cotton fiber as Len - upper average length, Unf - uniformity along the length, reducing the percentage of short fiber index - SFI, maintaining specific strength - Str, as well as reducing production costs remain one of the most important tasks.

**Methodology & empirical analysis.** Based on the production of high-quality fiber, seeds and cotton products from cotton raw materials grown in our republic and its deep processing, comprehensive measures are being taken to increase the competitiveness of a wide range of high-quality and inexpensive products of the textile and light industry. In the new Development Strategy of Uzbekistan for 2022-2026, including the rapid development of the national economy and ensuring high growth rates, the tasks of "Doubling the volume of production of textile products and the widespread introduction of programs to increase labor productivity in industrial sectors" were outlined. When implementing these tasks, it is considered important to preserve the natural properties of cotton fiber produced in the cotton ginning industry and prevent the fiber from getting into waste using resource-saving local technologies.

**Results.** This dissertation research to a certain extent serves the implementation of the tasks provided for by the Decree of the President of the Republic of Uzbekistan No. UP-4947 dated February 7, 2017 "On the Strategy of Action for the further development of the Republic of Uzbekistan", the Resolution of the President of the Republic of Uzbekistan dated November 28, 2017, No. PP-3408 "On measures on the radical improvement of the cotton industry management system", Resolution of the Cabinet of Ministers dated March 31, 2018 No. 253 "On additional measures to organize the

activities of cotton-textile production and clusters”, as well as from other regulatory documents related to this activity;

a new gin design was created based on a mathematical model for separating fibers and seeds from raw cotton using a pneumomechanical method;

based on the analysis of dynamic models of the aerodynamic movement of cotton, seeds and fibers with a fixed and variable cross-section, the rational parameters of a new pneumomechanical gin were determined;

in the process of ginning, based on the laws of motion of fractions, technological parameters and operating modes of the gin were determined, ensuring a reduction in the energy consumption of the gin.

A new design of the gin, which allows to dramatically improve the quality of fiber and seed seeds, technical seeds produced on a pneumomechanical gin machine, which is completely different from saw and roller gins in separating fiber and seeds from cotton, was introduced into production at Kasansay Cotton Ginning Plant JSC, owned by LLC "Namangan Buttermilk Tex" (Act of testing and implementation of Kasansay Cotton Ginning Plant JSC dated December 19, 2022). As a result, in the process of high-quality separation of fibers and seeds from raw cotton, an increase in the quality of cotton fiber (Len, Unf, SFI and Str) is ensured by an average of 11.3%, the quality of seed seeds and technical seeds - by 34% due to a reduction in seed damage.

Researchers have made significant contributions to the theoretical development of the ginning process. Having studied the composition of the raw roller, the nature and speed of ginning, the theory of seed release from the working chamber, the shape of the working chamber of the gin and the saw teeth, the cause of defects during the ginning process, and the possibility of covering the saw teeth, we found out that not all of them are evenly covered with fiber and not all are involved in progress. They believe that it is necessary to improve the shape of the raw material chamber to facilitate the rotation of the raw roller, increase the number of revolutions of the saw cylinder to 700...730 min<sup>-1</sup>, reduce the relative speed of the roller compared to the saws and speed up the removal of seeds from the center of the chamber.

It is also believed that one of the main ways to increase the efficiency of saw gin is to increase the fiber of the raw roll, quickly remove the cleaned seeds, and uniformly reduce its density. The widespread use of chambers with increased volume in the cotton ginning industry has made it possible to increase the productivity of gins to 10 kg/hour of sawing and higher.

According to the researchers, the improvement in fiber quality as a result of the gin working in a chamber of increased volume occurs mainly due to a decrease in the density of the raw roller, which improves the coverage of the fiber, reduces the friction force of the cotton on the walls of the chamber, and saves the energy spent on the gin.

They also studied the effect of raw roller during the ginning process and concluded that fiber quality indicators are high with the lower density of raw roller.

In their opinion, reducing the density of the raw roller will help improve the coverage of the fibers, and also serves to reduce the frictional forces when moving along

the surface of the working chamber and grate, thereby improving the quality of the fiber. In existing fiber separation machines, the efficiency is directly proportional to the density of the raw roller.

Scientific research shows that when fibers separate, various conditions arise, such as the deep surface of the tooth may or may not be filled with fiber, the fiber may only engage on the tip of the tooth, or it may be difficult to engage and disengage. It should be noted here that the above ginning phenomena can occur at any point in the interval from the tooth entry to the exit from the working chamber. The ginning process depends on many factors, the main ones being the characteristics of the processed cotton, the rotation speed of the saw, and the geometric dimensions of the saw tooth. It is impossible to determine the quality of the fiber by the arc of saw teeth engaged on it and the fiber separated around the seed comb. It can only be determined after passing beyond the grate.

**Conclusions.** The operating process of our machines and the operating process of American machines are completely different. All our gins are single chambers, and the American one has an additional cleaning and preparation chamber. It also varies greatly in effectiveness. The productivity of US gin machines is high. However, many domestic enterprises that have purchased this technology in recent years claim that it is not effective enough in the conditions of Uzbekistan. In addition, the price of these machines is several times more expensive than domestic ones, and due to difficulties in servicing them and providing spare parts, enterprises are forced to again turn to local machine builders. Therefore, the issue of scientific, technical, and technological development in the field of cotton ginning is more relevant than ever for our country.

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