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PROBLEMS AND SOLUTIONS TO THE QUALITY OF THE GINING PROCESS IN UZBEKISTAN

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Abstract: Saw gin's problems in separating fibers from seeds have been identified through extensive research and laboratory testing. First of all, the natural properties of six selected varieties of cotton fiber were determined and studied using modern complex laboratory equipment HVI-900 SA.

Keywords: raw cotton, fiber, joint, quality, gin machine, rotor-mechanical gin, textiles, micronaire, research, HVI laboratory system, breeding variety.

Introduction. Saw gin's problems in separating fibers from seeds have been identified through extensive research and laboratory testing. First of all, the natural properties of six selected varieties of cotton fiber were determined and studied using modern complex laboratory equipment HVI-900 SA. Next, using complex laboratory equipment HVI-900 SA, the quality indicators of cotton fiber of the same selection varieties obtained after ginning were determined. The main and only purpose of determining the natural quality of cotton fiber is to compare it with the quality of the fiber after ginning and to determine to what extent and by what percentage ginning will harm the natural quality of the fiber.

In the direction of studying the problem, a large number of fibers were determined in the complex laboratory equipment HVI-900 SA according to 11 international universal quality indicators. For laboratory tests, selected cotton varieties widely grown in our republic were S 64-24, S 82-86, Porlok-2, Namangan-34, Namangan-77, and Andijan-35.

Methodology & empirical analysis. Based on the results of laboratory tests, in the process of comparing the natural quality indicators of cotton fiber and the quality indicators of fiber obtained from the saw ginning machine, several serious shortcomings and problems of the saw ginning machine were identified and studied. Based on the results obtained, it was established that saw gin affects the quality indicators of natural fiber on average: the upper average length Len - 6.4%, the uniformity along the length Unf - 1.0%, the increase in the proportion of short fibers SFI - 4.9 %, to the relative strength of the fiber Str - 6.82 percent, or on average, according to four quality indicators, 4.8% of damage is caused to the fiber.

Results. It was also observed that in the raw material chamber of gin, in the composition of pure fiber, the appearance of tangled fiber flagella combined flagella, and fibrous seed fragments is observed, and the amount of fiber defects increases by 0.25-0.32%.

Despite the widespread use of the laboratory HVI system in the cotton and textile industry of the world in the 21st century, the natural quality characteristics and physical and mechanical properties of the newly created and widely distributed and produced cotton fibers have not been fully studied. Also, the natural quality characteristics of

technical and sowing seeds have been studied. as well as fiber quality indicators after the saw ginning machine and problems were identified.

The scientific significance of the research results is explained by the fact that a new mathematical model has been created in the direction of the process of separating fibers and seeds from raw cotton in a new way;

a dynamic model of the aerodynamic movement of cotton, fiber, and seeds was created, and the patterns of movement of fractions during the ginning process were determined;

based on the analysis of the created models and patterns of movement, the rational parameters and mode of operation of the device were determined.

The practical significance of the research is explained by the creation and launch into the production of a completely new pneumomechanical gin machine that separates fiber and seeds from cotton, the determination of physical and mechanical properties of selected varieties of cotton fiber in the HVI laboratory system, and the determination for the first time in the course of research work of natural quality indicators of various varieties fibers based on an international universal standard, and this information will serve to enrich the existing information about cotton fiber and is also explained by the possibility of using the created experimental ginning device and its research methodology in the educational process of higher and secondary specialized educational institutions involved in the ginning process in the field of cotton processing.

Based on the results of scientific and practical research on the creation of a design for a pneumomechanical gin machine that ensures high-quality extraction of fibers and seeds from raw cotton: To create a model of one seed in existing gins, it is necessary to determine the volume of seeds for a given cotton variety. We determine this using the following equation:

$$V_c = \frac{m_c}{\gamma_c}, \text{ m}^3$$

где: $м_c$- seed mass, g;

γ_c – seed density, g/m^3.

The volume of compacted seed:

$$V_1 = \frac{m_1}{\gamma_1}, \text{ m}^3$$

where: m1 – mass of one seed, g;

γ1 - density of one seed, g/m3.

The volume of cotton fibers in one seed is determined by the following formula:

$$V_в = V_1 - V_c, \text{ m}^8.$$

Conclusions. 1. The factors influencing the efficiency of the fiber separator (gin), which is the main machine of cotton gin enterprises, were studied, that is, the density of the raw roller, the frequency of its rotation and the output of bare seeds from the chamber, various friction processes in it, and effective recommendations were given. However, it can be considered that current problems, such as mechanical damage to fibers and seeds, and relatively high energy consumption for the ginning process, have not yet been resolved in the research work carried out.

2. To eliminate existing problems in the ginning process, so that the fibers and seeds are not mechanically damaged, raw cotton must be separated from the fiber in a free state without any densities or obstacles.

3. In the roller gin process, the thickness of the fibers located on the surface of the seed was theoretically determined.

4. In the process of separating the fiber from the seed, the cotton flow speed reaches 0.5 m/s in 1-2 section cylinders, 2.3 m/s in 3-4 section cylinders, which leads to complete cotton supply and increased productivity.

REFERENCES

1. Б.Т.Алиев, Р.К.Абдуллаев, Р.М.Мурадов. Пахта толасини чигитдан ажратишда янги пневмомеханик жин машинасининг яратилиши ва тадқиқотлар таҳлили. Ўзбекистон табиий толалар илмий тадқиқот институти, халқаро илмий-техникавий анжуман. *"Тўқимачилик саноати корхоналарида ишлаб чиқаришни ташкил этишда илм-фан интеграциялашувини ўрни ва долзарб муаммолар ечими" (ЎзТТИТИ-80) материаллар тўплами. Тўқимачилик материаллари технологияси 2-қисм.* Марғилон, 27-28 июл 2017 йил 106-111 бет.

2. Х.Т.Ахмадходжаев, А.А.Обидов, Р.К. Абдуллаев, М.И.Охунжонова. Пахта толаси таркибидаги калта толалар фоизини камайтириш борасидаги олиб борилаётган илмий-тадқиқот ишлар ва натижалар тахлили. *Наманган муҳандислик-технология институти илмий-техника журнали. "Ишлаб чиқариш технологияси муммолари"* Том 4 №1 2019 3-7 бет.

3. Р.К.Абдуллаев, Х.Т.Ахмеджоджаев, М.И.Охунова, М.М.Султонов. Пахтани жинлаш жараёнида жин машинасининг селекция навлар бўйича тола сифатига таъсирини таҳлил қилиш. *Наманган муҳандислик-технология институти илмий-техника журнали. "Ишлаб чиқариш технологияси муммолари"* Том 4 №2 2019 21-27 бет.

4. Р.К.Абдуллаев, Р.М.Мурадов, М. Н. Салохиддинова. Пахта толаси сифатини оширилишида илм-фан ва ишлаб чиқариш интеграцияси истиқболлари. *"Инновацион ривожланиш даврида интенсив ёндашув истиқболлари" халқаро анжумани.* Наманган, 2018 йил 10-11 июл, 246-247 бет.

5. Р.К.Абдуллаев, А.А.Обидов, Р.М.Мурадов. Пахтани қайта ишлаш инновацион технологияларини яратилишида саноат ва илм-фан ўртасидаги кооперацияни йўлга қўйиш истиқболлари. *"Инновацион ривожланиш даврида интенсив ёндашув истиқболлари" халқаро анжумани.* Наманган, 10-11 июль 394-398 бет.

6. М.М.Султонов, Р.К.Абдуллаев. Тўқимачилик кластери комплекслари технологик жараёнларида тола йўқотилиши кескин камайтириш чора-тадбирлари. *Наманган муҳандислик-технология институти илмий-техника журнали. "Ишлаб чиқариш технологияси муммолари"* Том 4 №3 2019 66-73 бет.

7. Р.К.Абдуллаев, Б.Т.Алиев, Ж.Б.Мамаджонов. Анализ полученных результатов на новом экспериментальном пневмомеханическом джине. *Universum:*

технические науки №4 (109), апрель, 2023 г Стр. 40-44. https://cyberleninka.ru/article/n/analiz-rezultatov-issledovaniy-po-mezhdunarodnym-standartam

8. Р.К.Абдуллаев, Б.Т.Алиев, Ж.Б.Мамаджонов. Влияние эффективности сушки, очистки и джинорования хлопка сырца на качество волокна. *Universum: технические науки* №4 (109), апрель, 2023 г Стр. 44-47. https://cyberleninka.ru/article/n/vliyanie-effektivnosti-sushki-ochistki-i-dzhinirovaniya-hlopka-syrtsa-na-kachestvo-volokna

9. Б.Т.Алиев, Р.К.Абдуллаев, Ж.Б.Мамаджонов. Инновационная разработка по джинированию хлопка-сырца. *Механика ва технология илмий журнали наманган-2023* ISSN 2181-158X № 4 (7), 2023 Махсус сон. 229-235 betlar.

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