INVESTIGATION OF METHODS OF PREPARATION OF COTTON AND ITS COMPONENTS FOR STORAGE

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Abstract: This article discusses the regulation of the process of technical preparation of seeds to send oil mills. Regulations is applicable technical measures for the preservation of quality of seeds on the cotton oil mills. There is expressed the most important physical-mechanical properties of microhardness peel. The results of theoretical study on heat and mass transfer in order to analyze the possibility of an intensification of the uniformity of the heating and drying of raw cotton components.

Keywords: Cotton fibers, polyester, moisture, seeds, oil, drum dryer, peel, core, micro-hardness, heat treatment.

Annotatsiya: ushbu maqolada neft tegirmonlarini yuborish uchun urug'larni texnik tayyorlash jarayonini tartibga solish muhokama qilinadi. Nizom paxta yog'i tegirmonda urug'lik sifatini saqlab qolish uchun amaldagi texnik chora-tadbirlar hisoblanadi. Microhardness qobig'ining eng muhim fizik-mexanik xususiyatlari mavjud. Paxta xom ashyosini isitish va quritishning bir xilligini kuchaytirish imkoniyatlarini tahlil qilish maqsadida issiqlik va massa uzatish bo'yicha nazariy tadqiqotlar natijalari.

Kalit so'zlar: paxta tolalari, poliester, namlik, urug'lar, yog', baraban quritgich, qobig'i, yadrosi, mikro qattiqlik, issiqlik bilan ishlov berish.

Аннотация: В данной статье рассматривается регламент процесса технической подготовки семян к отправке на маслобойни. В регламенте приведены применяемые технические мероприятия по сохранению качества семян на хлопкоочистительных маслобойнях. В нем выражены важнейшие физико-механические свойства кожуры - микротвердость. Представлены результаты теоретического исследования тепло- и массообмена с целью анализа возможности повышения равномерности нагрева и сушки компонентов хлопка-сырца.

Ключевые слова: хлопковые волокна, полиэфир, влага, семена, масло, барабанная сушка, кожура, сердцевина, микротвердость, термообработка.

Introduction

As everyone knows that cotton is the most useful products in the world. It is breathable, hypoallergenic, soft to touch, comfortable for body, rather warm,

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absorbs moisture, easily bleached, not electrified. Sometimes as an addition it is added an artificial fibers, such as polyester or lycra [1,4].

Four species (Gossypiumarboreum, Gossypiumbarbadense, Gossypiumherbaceum, Gossypiumhirsutum)of cotton began independently used for textile production. In general, since the beginning of the XX century took place in employment drop in the cotton industry due to the development of mechanization. Today, cotton remains as one of major export goods in many countries (Table 1) and a large part of the annual cotton harvest is long staple cotton [2].

Including cotton in Uzbekistan is an export crop and one of the main strategic resources of the country and the main source of hard currency for the country. Uzbekistan is the sixth largest producer of cotton in the world and the fourth largest exporter of fiber, which is 5 percent of the world production of cotton fiber. Uzbekistan exports about one million tons of cotton fiber per year. In order to preserve the natural quality of the produced fiber it is necessary to comply with certain technical regulations and the conditions of storage, which is the main key.

Top 10 Cotton Producing Countries (in metric tonnes)

Rank	Country	2016	2017	2018
1	China	5,970,000	6,281,000	6,532,000
2	India	5,683,000	6,071,000	6,423,000
3	United States	3,941,700	3,412,550	3,553,000
4	Pakistan	1,869,000	2,312,000	2,308,000
5	Brazil	973,449	1,673,337	1,524,103
6	Uzbekistan	1,136,120	983,400	849,000
7	Turkey	816,705	754,600	697,000
8	Australia	386,800	473,497	501,000
9	Turkmenistan	230,000	295,000	210,000
10	Mexico	225,000	195,000	198,000

Source: Statistical data of top cotton producers.

Experience shows that a significant portion of the cotton produced in the ginning factories, has high humidity. In accordance with the process regulated cotton temporarily stored before being processed mainly at the sites. The fibers and seeds are subjected to additional moisture due to rainfall. Such seeds and fiber, respectively, require a change in processing conditions of storage and processing in oil and fat, and textile mills.

Excessive moisture content and trash cause disturbances in the process of their processing. It should be noted that the measures applied to preserve the natural

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qualities of technical seeds and fibers and cotton oil mills are ineffective. It is known that the raw cotton is subjected to humid drying DCR ginning factories to processing at its humidity was within 8-9%. However, in most cases, the seeds go high humidity, because the residence time of raw cotton is limited to a drying drum and the seeds are dried because they are not uniform in their structure and are composed of three main components: fiber, peel and seed core. The chemical composition of the components is different and therefore different humidity their properties. With the change in the humidity of cotton seeds and change its physical and mechanical properties which depend on the process of processing the material and properties of the resulting products.[3]

Importance and the physic-mechanical characteristics isconsideredhardness of peel. During processing under the influence of mechanical stress seed peel is damaged seed, thereby forming a skin with a fiber and broken seed. The degree of damage depends more on the strength of the peel of seeds, which in turn is interconnected with its humidity. Therefore, to determine the influence of these factors on seed quality parameters studied in laboratory species in cotton seeds and S-6524, and Bukhgara-6 and humidity 7-15%. When humidity is 7.8% microhardnessof seeds for breeding. C-6524 and Bukhara-6 were respectively is 205.8 and 191.7 N / mm2. With an increase of seed moisture content to 12% microhardness decreased to 132.5 and 128.2 N / mm2. At that time, with the growth, humidity of 12% to 15% microhardness decreased by only 14 N / mm2. The weakest section of the seed capable of destruction and the formation of defects is oval part. Therefore, the processing of seeds with moisture content below 7.0% broken seed increases above 9.0% increases skin with fiber. It was assumed that by controlling the temperature conditions can not create favorable conditions that will reduce the extent of the damage and provide a uniform and intensive removal of moisture from the surface of the cotton component. To determine the temperature and moisture on the surface along which heat transfer occurs in contact with other surfaces, contact unsteady equations were used heat-change satisfying conditions and selection of heat absorption of moisture when passing through these surfaces. Assuming that is outer and inner surface temperature as well as humidity and the same, it is possible to write the following equation [4].

$$T_2 = T_{20}(t) = T_к + (T_в - T_я)Q(t),\ u_2 = u_н - (u_н - u_k)W(t). \quad (1)$$

Moisture on the surface of the skin and core seeds are calculated according to the formulas

$$u_{20} = u_2(r_1, \tau) = u_h - (u_h - u_k)\overline{W}(\tau), \quad u_0 = u_h - (u_h - u_k)p_n^{(0)}\overline{T}_0(\tau), \ (2)$$

T_0 - initial values of temperature and moisture-or some components (eg, air) of raw cotton.

ρ, ρ_1 - the density of the skin, the air layer and the core

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c ,c_1 - peel and core the heat capacity

$\overline{T}_k$, $T_в$ and $\overline{T}_я$ - respectively given skin temperature, air gap and seed kernel

According to the results of numerical and experimental studies obtained of temperature and humidity of the cotton fiber, peel and seed core of (Fig.1) time. They show that the temperature differential between the fibers and the peel and seed kernel after 30 seconds is 47 ^{0}C and 59 ^{0}C, a moisture gradient in this case is 1.6% and 9.6%.

These results suggest reviewing the application of the high temperature for drying cotton and difficulties to ensure uniformity deletion of moisture from the cotton component [5-6].

Further studies have shown that the storage of moist seed is higher than 10% without preventive measures, leading them to self-warming. The intensity of this process depends on the humidity and ambient temperature. Thus, the humidity in the seeds starts self-warming 12-15% on the third day, above 20% - in the second.

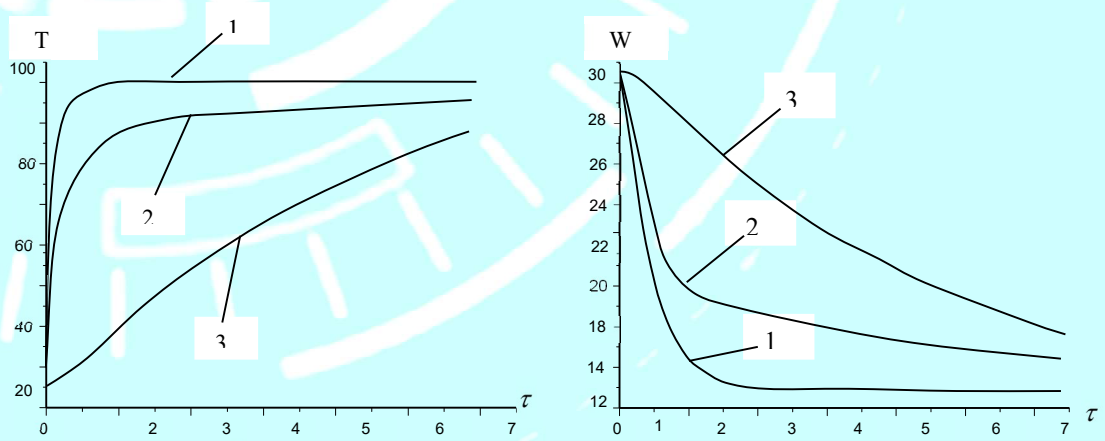


Fig.1. Temperature dependence of (a) and humidity (b) 1-fibers, 2-peel, cores 3 times.

When stored cotton seeds with a moisture content of 14.7% of its oil content has changed - the data on the first day I grade 22.4% after 7 days, in 21.6% at 21 days and 18.2% in 35 hours 17.3%.

Increased humidity and weed seed technology led to the creation of favorable conditions for the development of fungus end biological processes, which leads to a qualitative change and reducing their oil content [7-9].

To prevent these processes proposed treatment of cotton seeds in various ways: chemical, thermal, biochemical, electrical, etc. Each of the methods has its own characteristics, advantages and disadvantages. However, given storage cotton seed process is difficult to apply in industry.

One of the main ways to prevent the process of destruction of cotton seeds is heat treatment using heat and mass transfer and hydrodynamic processes. This

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method can be used in the processing of cotton seeds before storage or an intensification of technological processes of its processing.

Analysis of the known conditions and methods for the preparation of cotton seeds to the processing and storage has shown that it is possible to prevent the self-warming, and change their natural properties [10].

The basis of the study of self-warming process is settled down not only humidity factor of cotton seeds, but also biochemical and biological processes, which are recorded by changing the speed of germination and seed oil.

Conclusion: Based on the above analysis and research to develop and offer new ways of preparing cotton seeds for storage using the heat and mass transfer, hydrodynamic processes are new technologies.

REFERENCES:

1. RakhmanovKH.K. "Development of effective structures and methods of preparation of the system of calculation, loading and storage of cotton in the module",: Dis ... Doc. The.n. Sciences. - Tashkent, 2012.
2. Statistical data of top cotton producers.
3. H.K.Rakhmanov. The theoretical study of stress-strain state of free-bulk raw cotton layer to a limited extent. "Mechanical problems". Uzbekistan journal. 2005 -46s.
4. KH.K.Rakhmanov. Primary treatment of textile raw materials textbooks. Bukhara: Muallif-2014
5. Fayziev, S. H., Fatullayeva, S. I., & Nazhmiddinov, I. P. (2023). Influence of density and temperature on the rate of moisture release during drying of cotton raw materials. In Фундаментальные и прикладные научные исследования в области инклюзивного дизайна и технологий: опыт, практика и перспективы (pp. 135-140).
6. Ibodullayev, O. O., Rasulov, E. N., & Muxidinova, S. N. THE ROLE OF OPTICAL SENSORS IN OPTIMIZING THE TECHNOLOGICAL PARAMETERS OF COTTON CLEANING MACHINES SH Fayziyev Buxoro davlat texnika universiteti.
7. Rakhmonov Kh.K., Fayziev S.Kh 2021 Influence of temperature and humidity on the process of cleaning and cleaning cotton Development of science and technologies scientific and technical journal 5 p 262-266
8. Fayziyev, S. H., Ibodullayev, O. O., Rasulov, E. N., & Muxidinova, S. N. ENERGY-EFFICIENT CLEANING TECHNOLOGY OF COTTON RAW MATERIAL USING A VIBRATING MESH SURFACE.
9. Rakhmonov Kh.K., Shodiev Z.O., Fayziev S.Kh 2018 Theory and practice of priority scientific research IV p 62-63

ISSN 3030-3907

10. Fayziev S., Rakhmonov Kh., Rakhimov Kh., Ibodullaev O., Mirzoyeva S 2021 Theoretical, practical and experimental research on the creation of an energy-saving universal screw in a new design of the transfer line of the drying drum of raw cotton Scientific journal “Archivarius” 7(1) p 42-49

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