Changes of Indicators in Fiber and Cotton Seed Quality in Separating Cut Fractions on Cotton Fiber Mass

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Abstract. ***This article describes the fourth type of medium-fiber Hampor, currently widely used in the Surkhandarya region, the lengnth is about 160-170 mg, 171-180 mg, 181-190 mg, 191-200 mg, 201-205 mg, 206-210 mg was divided into fractions by mass of fibers, the LKM equipment was cleaned of fine and dirty particles in the laboratory of the ginnery, DL-10 was isolated from the fiber on the ginning equipment, and the physical and mechanical properties of the seeds, the strength of the breakage, the modal mass, the length of the staple mass, the average mass, the ripening, the length and the squared irregularity were determined by the equipment. The optimal option for fiberglass mass fractionation was proposed to obtain high quality products.***

Keywords: ***fiberglass mass, fraction, halazone, micropyle, bark, knot, refined, sucrose, monochrome, dextrin***

I. INTRODUCTION

Seed cotton which has been purified at the ginneries, is broken into small pieces when it comes to gin equipment. As a result, without considering the small size of the seeds, it is sent to the gin equipment to remove the fiber from the seeds [1].

As it's known for us, fibers are deposited around the ball of the seed and have different mass and length. [5-7].

The size, physical and mechanical properties of the seeds depend on the selection varieties. Seeds are of various sizes, for example, 9.4±0.6 mm long, 5.2±0.4 mm wide, 4.5±0.4 mm wide, and in some breeding varieties the length of the seeds may be from 6 to 14 mm. For example, the seeds are inaccurate and symmetrical, with some parts resembling pear shapes. Seeds are composed of halazone, side and micropyle components. The seed consists of two parts, the bark and the core. Seeds are divided into technical and seeded seeds [2,3].

The seeds consists 55-60% of the ripe seeds. The seeds core are separated by a tightly knit together membrane feeder and endosperm. Basic providing tissue contains fat and sugar. In the central part of the seeds, during the beginning of development the basic providing tissue begins to cover this central part. During the 10 day development, the nutsellus grate develops, the brittle sac increases in size, resulting in a brittle spherical shape. After 10 weeks, the fat content per 100 grams is 12.57%. In addition, the kernel consists of 12-15% carbohydrates in the dry state, 8-9% of the substances in the state of refineries, sucrose, monochrome, dextrin, 3-3.5% hemicellulose and pectin. The bark of the ripened seeds is not the same in thickness and weight. In some seeds, the thickness is 0.25-0.35 mm and in others 0.53 mm. The bark of the ripened seeds is dark brown. The color of ripe and unripened seeds varies from light brown to yellowish [4].

Seed shellfish is 44.7%. Seed shell consists of the outer and inner coatings and develops rapidly. The ripened seed consists of several layers. For example, seeds contain 40-45% α-cellulose, 28-30% pentazone, 20-25% lignin, about 35% protein and other substances [8,9].

Seeds are stored for a long time after processing seed cotton. As a result, the effects of temperature and humidity are crucial. Seeds can be stored for a long time if there is constant temperature and humidity of 10%.

For example, during the development of the seeds, it suddenly changes its properties and composition, it has a strong bending, and the seeds are easily and easily broken. It undergoes chemical and biological changes. Within 4-5 days, the seeds can absorb up to 300% of moisture relative to their initial mass [10-12].

The strength of the cotton seeds depends on the maturity level. The essence of the ripened seeds is complete and can resist the influence of external forces. Different types of seeds differ greatly in mechanical properties. For example, cirrhosis is more stable than the herbaceous type.

II. METHODOLOGY

For the quality of raw cotton in the ginneries, the breeder of the type 4 "Hampor" is the best mass after the new cotton harvest season, which improves the production of first-time cotton, got in laboratory conditions, their mass was defined separately. Effect of fibers on the amount of fibers on mass fraction. The test results are presented in table 1.

Revised Manuscript Received on February 01, 2020.

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n	Indicators	Fractionation of fractional masses , mg					
		160-170	171-180	181-190	191-200	201-205	206-210
1.	Seed mass, mg	107,2	112,6	116,8	122,4	144,2	149,4
2.	Fiber weight, mg	57,8	62,9	68,7	73,1	58,8	58,6

III. RESULTS AND DISCUSSION

Analysis of the results of the test shows that the mass of fiber seeds is 160,870 mg, while the weight of cotton seeds is 57,8mg, seeds are 107,2mg, fiber is 171-180mg, fiber is 62,9mg, seed mass is 112.6 mg, fibrous seed is 181-190 mg, fiber weight is 68.3 mg, while seed mass is 116.8 mg, when fiber seed weight is 191-200 mg, the lomgness is 73.1 mg of fiber, seed cotton mss is 122.4 mg, fiber mass is 201-205 mg while fiber weight 58.8 mg, a mass of fiber is 58.6 mg, seeds mass is 149.4 mg.

Cotton ginneries of the Republic are equipped with modern techniques and technologies for production of high-quality products. However, the breeding varieties produced in cotton fields differ greatly in terms of maturity, yield, quality, and the structure and properties of the seeds. For example, the raw materials harvested from cotton fields are taken into consideration by their wet and dirty use, primarily in the ginneries. The received raw materials are stripped, cleaned of minor and major impurities, in the process of insulation are separated from the cotton seeds, the fiber is cleaned and pressed. At the same time, the weight of the fibrous seeds varies in different breeding varieties and their quality characteristics vary.

The maturity of cotton fiber, the degree of thickening of the secondary cell wall relative to the perimeter, is one of the most important parameters for the quality and processing of cotton fiber [6].

The maturity of cotton is the main factor determining yield, fiber quality and net profit. However, surprisingly there is no consensus on determining the maturity of a crop in cotton, and there is no standard method for measuring its timing [10].

The number of fibers per seed surface area (fiber density) is a selection criterion used to improve the quality of cotton fiber and its yield simultaneously in cotton breeding programs. However, the parameters used to estimate fiber density are calculated based on fiber quality characteristics that are sensitive to environmental changes, especially fiber maturity. Fiber maturity is one of the most important fiber properties, which affects other fiber properties, such as the strength and length of a single fiber. To study the effect of fiber maturity within a plant on fiber density estimates, field experiments were conducted in Lubbock, Texas, during the growing periods of 2012, 2013, and 2014. A set of twelve upstream cotton varieties popular in Texas in the High Plains was grown in a randomized finished block design with three replicates of the field. Boxes were collected in a box during harvesting to obtain samples of each grade, representing the range of maturity of the fiber. Fuzzy seeds obtained after rolling were acid treated, scanned on a flatbed scanner, and WinSeedle Pro software was used to evaluate seed surface area (SSA). The number of fibers per seed was estimated using fiber quality parameters provided by the AFIS (Advanced Fiber Information System), lint weight and the number of seeds in the sample. The number of fibers per seed surface area was obtained by dividing the number of fibers per seed by the estimated SSA. In this study, varieties with relatively less stable fiber maturity on the fruit-bearing branches of a cotton plant tend to have a more variable number of fibers on seed surface area estimates, assuming that the calculation of fiber number per seed surface area may be biased. It is likely that fiber maturity is the source of bias (immature fibers are weak and tend to break during mechanical processing). Therefore, fiber maturity should be considered when checking lines based on estimated fiber density, since low fiber maturity can lead to unreliable estimates of fiber density [11].

One of the main characteristics of cotton fiber is its relative comparative strength and staple mass. If the length of the staple mass of the cotton fiber is reduced, the amount of short fibers will increase, while the strength and relative tensile strength will be reduced. As a result, the quality of the yarn from the fiber affects the quality.

In spinning factories there is a deterioration in the quality of yarn, even when the length of the fiber falls by 0.5 mm. It also contributes to increased waste during spinning.

At the cotton ginning plants the research work was carried out to obtain high quality raw materials. For this purpose, fiber samples were taken into fractions by fiber mass and their physical-mechanical properties were determined.

The results of the research are presented in table 2.Fiber divided into fractions by fiber mass
their effect on physical and mechanical properties

Table 2

n	Indicators	Fractionation of fractional masses on fractions, mg					
		160-170	171-180	181-190	191-200	201-205	206-210
1.	Linear density of fiber, mtex	189	179	185	182	186	185
2.	Fiber Strength, sN	4,7	4,4	4,5	4,4	4,6	4,5
3.	Specific gravity of the fiber, sN / tex	24,9	24,6	24,3	24,2	24,7	24,3
4.	Fiber length, mm						
	modal mass	28,9	29,3	29,3	29,3	28,9	29,0
	staple mass	31,3	32,1	31,9	31,7	31,2	31,1
	medium	26,6	26,8	26,3	26,8	25,0	25,3
5.	The ripening of the fiber	2,1	2,0	2,0	2,0	2,1	2,1
6.	Squared unevenness of fiber length,%	20,16	22,16	22,58	21,01	21,25	21,82

Based on the results of Table 2, figure 1-3 presents graphs of changes in fiber strength, fracture strength, staple mass length, and short fiber content in fractional mass fraction fractions.

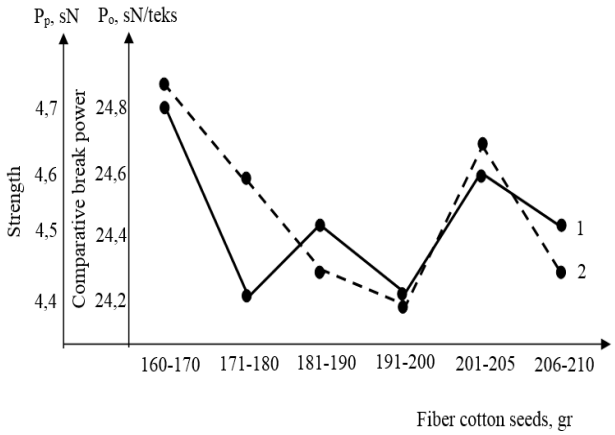

Figure 1. Changes in the strength of the fiber and the relative breakage strength of the fibers in fractions by mass1- strength; 2- comparative break power

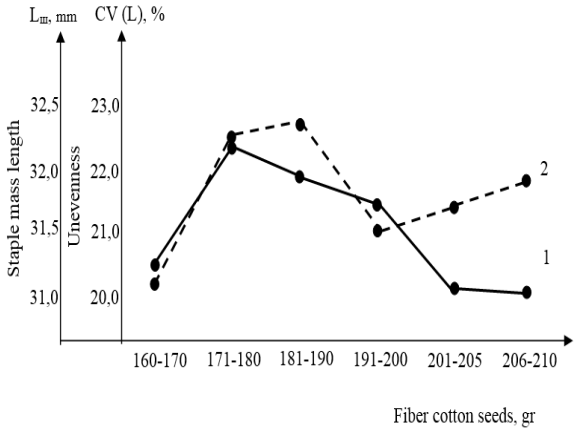

Figure 2. Changes in quadratic inequality of fiber length and length of staple mass in fractions by fiber mass. 1- staple mass length; 2- changes in squared unevenness in length.

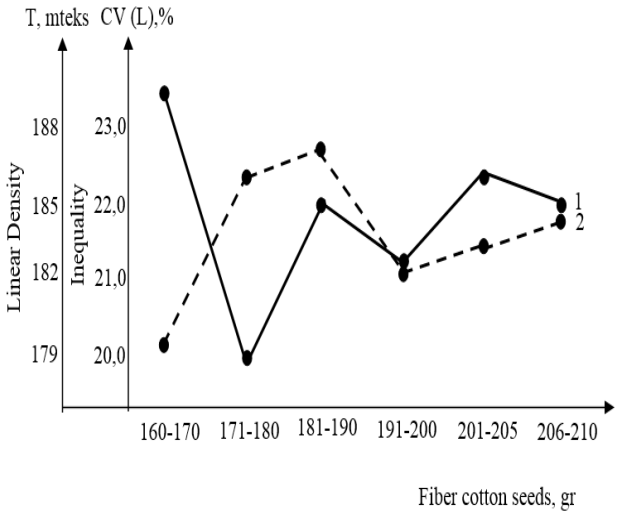

Figure 3. Change of quadratic inequality of fiber linear density and length in fractions by fractional masses 1- linear density; 2- changes in squared unevenness in length.

Analysis of the test results shows that the strength of the cotton fiber of 160-170 mg of fibers is 4.7 sN, the specific cut-off strength is 24.9 sN / tex, staple mass length 31,3 mm, linear density 189 mtex, quadratic unevenness of fiber length 20,16%, fiber strength of cotton fiber with weight of cotton seeds 171-180 mg 4,4 cN, specific cut-off strength 24.6 sN / tex, length of staple mass 32.1 mm, linear density 179 mtex, quadratic unevenness of fiber length 22.16%, fiber strength of cotton fiber with weight of 181-190 mg cotton fiber, specific gravity 24.3 sN / tex, length of staple mass 31.9 mm, linear density 185 mtex, quadratic inhomogeneity of fiber length 22 , 58%, fiber strength of cotton fiber with a weight of 191-200 mg cotton fiber, with a fiber strength of 4,4 sN, specific gravity of 24,2 sN / tex, length of staple mass 31,7 mm, linear density 182 mtex, quadratic inequality of fiber length 21.01%, fiber strength of cotton cotton with a mass of cotton seeds 201-205 mg, 4,6 sN, specific gravity 24,7 sN / tex, length of staple mass 31,1 mm, linear density 186 mtex, quadratic unevenness of fiber length 21,25%, fiber strength of cotton from 206-210 mg cotton fiber 4,5 cN, specific gravity strength was 24.3 sN / tex, length of staple mass 31.1 mm, linear density 185 mtex, quadratic inequality of fiber length 21.82%.

Besides this, comparing the results of the test with the quality characteristics of cotton fiber weighing 160-170 milligrams, the strength of the fiber from 171-180 mg of cotton fiber decreased by 6.4%, and the cut-off strength by 1.2%, length of staple mass increased by 2.5%, linear density decreased by 5.3%, quadratic inequality on fiber length increased by 9.1%,fiber strength of cotton fiber weighing 181-190 mg, decreased by 4.3%, specific gravity strength by 2.4%, staple mass increased by 1.8%, linear density decreased by 2.1%, length of fiber quadrant unevenness increased by 10.7%, fiber strength of cotton fiber of 191-200 mg fiber fiber decreased by 6.4%, specific gravity strength decreased by 2.8%, staple mass length increased by 1.3%, linear density decreased by 3.7%, squared irregularity of fiber length increased by 4.1%, fiber strength of cotton seeds with a mass of cotton seeds 201-205 mg, decreased by 2.1%, tensile strength by 0.8%, staple mass length by 0.4%, linear density by 1.6%, quadratic inequality of fiber length increased cotton fiber by weight of 206-210 mg, fiber strength by 4,3%, breaking power by 2,4%, length of staple mass by 0,6%, linear density by 2,1%. square in length increased by 7.6%.

IV.CONCLUSION

1. Increasing on fiber seeds mass of seeds increased from 107.2 mg to 149.4 mg, and fiber mass increased from 144.2 mg to 149.4 mg, and then decreased from 58.6 mg to 58.8 mg.
2. Reduced strength of fiber from 2.1% to 6.4% with increase in mass of fiberglass, reduction of relative breakage strength from 0.8% to 2.8%, length of staple mass increased from 0.4% to 2.5%, linear density 1 , It was found to decrease from 6% to 5.3%, and the square inequality on the length of the fiber increased from 4.1% to 9.1%.

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