

Research On The Quality Indicators Of Wool Fiber

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Annotation

The article studies the effect of wool fiber cleanliness, washing degree, and strength on the quality of the final product and production efficiency. The results show that these factors play an important role in improving product quality.

Keywords: wool fiber, oil content, moisture, oil mass fraction, coarse wool, unwashed wool.

Introduction.

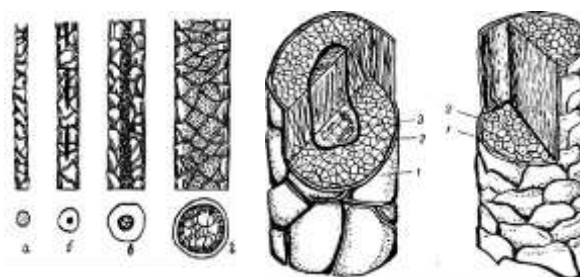
Recently, consumer demand for clothing, most of which is made from natural fibers, has been increasing. This is because products made from natural fibers have a very good effect on the human body in terms of hygiene. Currently, artificial and synthetic products are also developing in the world market. However, the high cost of raw materials and energy consumption in the world market leads to an increase in their cost, which allows for the widespread use of local raw materials.[1]

One of the local raw materials in the textile industry is wool fiber, and the problem of preparing wool fiber and producing finished products from it is one of the main tasks facing our government. The Decree of the President of the Republic of Uzbekistan No. PF-60 dated January 28, 2022 "On the Development Strategy of the New Uzbekistan for 2022-2026" includes the plan to produce industrial products by 2026 by filling the existing gaps in the production of import-substituting products..., Currently, the textile industry has a gross revenue of 15 times higher for finished products made of wool, ensuring the activities of almost all sectors and satisfying the population's need for necessary clothing.

Wool fiber is fundamentally different from other fibers in terms of its chemical structure, and the chemical structure affects its strength, elasticity, staple and permeability properties. Wool fiber also contains a small amount of fat, calcium and

sodium. The impurity content of wool fiber is 40-70%.

The main part of the wool used in industry is sheep wool: a smaller part of the wool is also made up of wool from goats, camels, ostriches, llamas (sable birds), horses, cows, reindeer, dogs and other animals. The wool fiber consists of a conical, shell and tubular layer. The conical layer can be horn-shaped, semi-circular and circular, covering the fiber from the outside. This layer protects the fiber body from decay, makes the fiber shiny and improves the felting properties of the fibers. The shell layer consists of spongy cells that form the wool fiber and is the main layer that determines its strength, elasticity and other qualities. Wool fiber is a product of the skin. The wool consists of a coat of hair and an undercoat. In sheep, the coat consists of:



a - solid, b, v - intermediate, g - dead

Sheep wool is divided into homogeneous wool, consisting of fibers of the same type, and heterogeneous wool, consisting of fibers of different types. In homogeneous

wool, the twill fibers are combined into groups, forming a staple (intermediate fibers in long-wooled sheep breeds - a homogeneous bundle). In heterogeneous wool, the twill, intermediate and core fibers are combined into bundles. The physical properties of wool determine its technological and product qualities: thinness, length, curliness, strength, elasticity, etc. Average thickness (μm): twill fiber 10-25; intermediate fiber-30-50; core (wool)-50 and more.

Wool is valued as a valuable raw material in the textile industry.

The amount of waste and foreign impurities in the wool determines the initial processing of the fiber and greatly affects the quality of the resulting textile products.

During the growth of sheep wool, during shearing and initial preparation, a number of wastes are formed that reduce the technological value of wool. These are plant residues, fat-sweat and mineral substances, waste from the shearing period and other foreign impurities.

According to studies, plant residues make up 0.5-22%, fat 4-30%, and skin 2-43%. The proportion of mineral substances depends on the fat-sweat substances secreted from the animal's skin layer

Fat-sweat substances mix together and settle on the animal's skin and, mainly, on the fibers. They are secreted from the sebaceous glands and the dermis.

The main share of waste in the wool is eliminated by washing. Depending on the amount of fat and sweat substances in the raw materials, the washing temperature (35-58 ° C), the amount of detergents, the module and processing time (3-20 minutes), the movement of the aggregate parts, etc. are selected.

The optimal regimes of wool processing enterprises are selected in relation to the share of waste and foreign impurities. A decrease in the wool washing regimes

below the norm leads to incomplete cleaning of the wool, excessive loss of the natural properties of the fibers, a negative change in the strength of the fiber, and increased costs.

In this work, we brought locally grown sheep wool fiber from the regions of Uzbekistan, including Tashkent, Jizzakh, Navoi, Bukhara and Karakalpakstan, as well as Merino sheep wool fiber raised in the Republic of Tajikistan and Jizzakh region, and conducted experiments to determine the level of fat content after washing. Of the sheep wool brought from the oases, the sheep wool from Navoi region was washed in cold water using a special softening liquid soap supplied from Russia. The sheep wool from the remaining regions was washed twice in hot water. The fat content of the washed sheep wool was determined in special laboratory conditions using the GOST 20576 standard. The results are presented in the table below.

Jun nomlari	unit	Fat content GOST 20576
Jizzakh region. Merino sheep wool	%	0.78
Tajikistan Rep. Merino sheep wool	%	2.18
Jizzakh region. Local sheep wool	%	1.26
Karakalpakstan Local sheep wool	%	0.84
Navoi region. Local sheep wool	%	1.12
Tashkent region. Local sheep wool	%	1.04
Bukhara region. Local sheep wool	%	5.93

The obtained samples are defatted in ether for 1 hour in a Soxhlet apparatus, then placed in glass containers and dried in a drying oven at 105 °C with the lid open for 1 hour, cooled in a desiccator, recorded and weighed. At the boiling point of ordinary ether, 6-7 extractions per hour should be made. Extraction is carried out for 5-8 hours. When testing samples with a high oil content, the extraction time is increased to 10-12 hours to obtain a more complete oil.

Conclusion, During the study, the oiliness of sheep wool after washing was determined using a Soxhlet apparatus. The results obtained showed that after the washing process, the excess oil content in the wool fibers decreased, and the purity and quality indicators of the fibers improved. This allows increasing efficiency in the subsequent technological stages - sorting, spinning and textile manufacturing processes. Thus, the method of accurately measuring and controlling wool fat content using the Soxhlet apparatus is of great importance in improving product quality.

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