Analysis of The Properties of Wool Raw Materials Obtained in Uzbekistan

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ABSTRACT: Information about the development of enterprises of primary processing of wool, as well as the amount of raw wool obtained in the Republic of Uzbekistan, are given in the flock. Provides information about the properties of the obtained raw wool in the Republic of Uzbekistan and abroad.

KEY WORD: breed, wool raw materials, fiber, processing of teeth, astrakhan fur, dirt, cleaning, storage, sorting.

I.INTRODUCTION

Information about the development of enterprises of primary processing of wool, as well as the amount of raw wool obtained in the Republic of Uzbekistan, are given in the flock. Provides information about the properties of the obtained raw wool in the Republic of Uzbekistan and abroad.

According to statistics, as of January 1, 2018, 20330 thousand heads of sheep and goats were raised in all farms of the Republic of Uzbekistan. If an average of 1 kg of wool is cut off from each sheep and goat, then we end up with 20,330 tons of wool. From the collected wool 15-20% is processed in the Republic of Uzbekistan.

At present, only in the specialized association "Karakulevodstvo", 1 million 100 thousand heads of astrakhan sheep are raised in specialized subjects. This year it is expected to receive 1 thousand 700 tons of wool [1].

Wool happens to be sheared with live cattle and scraped off the skin. The chemical method of scraping skin is obtained and wool with spoiled natural qualities and it is not widely used.

In the primary processing plant, woolen raw materials cut from livestock are classified by quality.

Wool raw material is taken mainly from sheep in the Republic of Uzbekistan. Raw materials from other animals: such as goat, camel, deer get in small quantities.

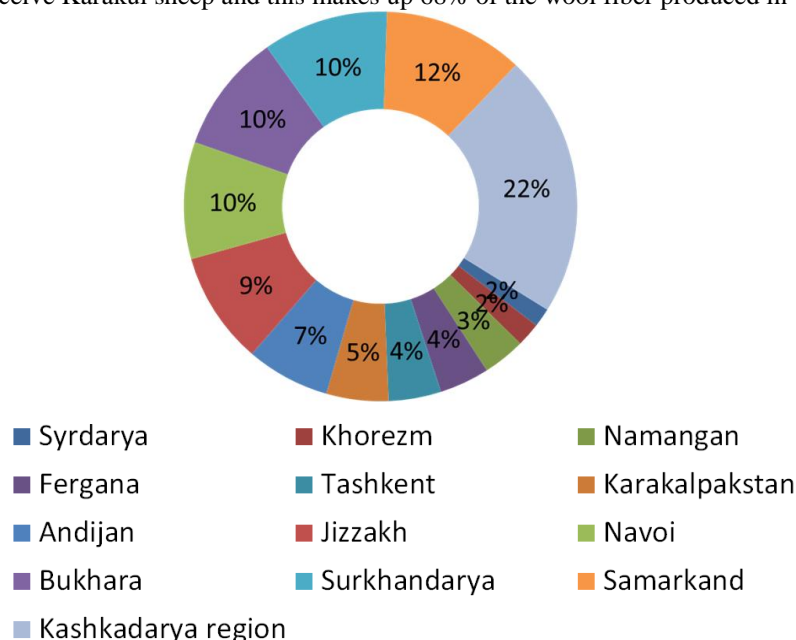The farms mainly receive Karakul sheep and this makes up 68% of the wool fiber produced in Uzbekistan.

Fig 1. Sheep and goats grown in the regions of the Republic of Uzbekistan.

Wool raw materials are sheared 2 times (in spring and shade) with sheep a year. The resulting spring wool is soft. In the textile industry, this wool has good spinning properties and is considered more expensive. In shearing wool from sheep, the breed is taken into account, and also sheep of different breeds have different indicators (length, color, fame), even each sheep has a different wool raw material by constitution.

So far, with the help of classification and according to (systems) standards, varieties of wool raw materials are studied, and immediately wool awareness is determined by the Bradford method and is divided into 14 classes. Only this method is used to study the fineness of the fibers, but it is not possible to determine the properties of wool raw materials.

Coarse and dead fibers are included in the composition of sheared wool from the Karakul sheep in spring, therefore they are classified according to the Bradford method.

Another one of the methods for the classification of wool "Azov" in the first iabreten in Germany. Wool having a staple length of 1 cm is produced by sampling using the "Azov" method.

Wool fibers how thin, more amount of curvaceous wool.

Currently in Uzbekistan and Central Asia in determining the parameters. Wool is used according to industry classifications.

There are 13 classifications by quality (in terms of wool fineness)

1-Table

Scale of wool fineness according to industry classification in Central Asia.

Quality	Average fineness calculated micrometer (μm from-to)	Quality	Average fineness calculated micrometer (μm from-to)
80	24,5—18,0	48	31,1—34,0
70	18,1—20,5	46	34,1—37,0
64	20,6—23,0	44	37,1—40,0
60	23,1—25,0	46	40,1—43,0
58	25,1—27,0	35	43,1—55,0
56	27,1—29,0	32	55,1—67,0
50	29,1—31,0		

Poor wool in the Republic of Uzbekistan in the fall of Uzbekistan. Here the main reason for the breed is sheep and the climate of the area. In Uzbekistan, the climate is hot, so there is a lot of sweat, fat and dirt in the composition of wool. Due to the hot climate and low humidity, the composition of wool fibers is dried and becomes brittle.

Sheared autumn wool is classified by industry and this classification is divided into two groups:

1. Uniform fibers (thin, semi-thin, semi-coarse and uniform coarse fibers) wool;

2. Blended (blended fiber, semi-coarse, flat blended wool and uneven coarse fiber, too uneven coarse blended fiber) wool.

The definition of the fineness of sheared spring of mixed wool using the industrial classification includes the following types (Table 2).

Table 2

Classification of fineness wool

Name of varieties	Average fineness calculated micrometer (μm from-to)
Highest (extra) grade	24,1—29,0
1st grade	29,1—34,0
2 st grade	34,1—38,0
3st grade	38,1—45,0
4st grade	46,1 and higher

When sorting wool fineness, only average fineness and evenness matter in [2].

Physical and mechanical properties characterize wool fibers from the outside and explain the physical phenomena occurring in them.

The crimped coat. By crimpiness is meant the deflection of the fiber along the length to the side of the axial straight line passing through the center of the curls.

The curvature of wool in sheep of different breeds is different and depends on the density of the skin and its other properties. It is closely related to the fineness of wool and can serve as an indirect indicator of the fineness of the wool of sheep of a given breed. Curliness is determined by the number of curls per 1 cm of fiber length.

Different woolen fibers have different crimps. In the downy fibers of the convolutions are the smallest, up to 12-13 curls per 1 cm of length. The core fibers twist weakly; one curl takes 2-3 cm of fiber length from them. The covering hair does not have crimpiness or forms a single arc in its entire length.

Crimpiness is characterized by the shape, character, and degree of crimpiness.
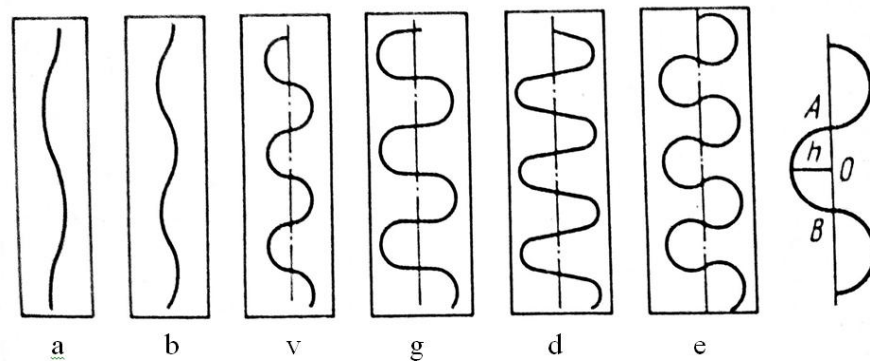
a-smooth, b -flat, in-normal, g-tall, d-compressed (marker), e-looped:

Figure 2. In homogeneous wool distinguish the following main forms of crimpiness

smooth crimpiness is characterized by a slight height and an increased base of the curl arcs, characteristic of coarsened fibers;

flat crimpiness is characterized by a slightly higher curl height than smooth, characterized by long (combed) wool of medium fineness;

Normal tortuosity is characterized by twists, in form close to the semicircle. The height of the arc curl h is equal to AO, i.e. half of the base of the arc AB. This form of tortuosity is peculiar to wool of pure breed fine-fleeced sheep only;

high tortuosity is characterized by approximately equal in magnitude by height and the base of a curl, peculiar to merino sheep wool, for combed spinning is undesirable;

compressed (mark) crimp has crimps, in which the height is greater than the base, characteristic of sheep weak and unproductive;

looped crimp ("thread") has the form of a loose knitted yarn. The height of the curved arcs is greatly increased, and the base is reduced. Such tortuosity is characteristic of the wool of weakened, overdeveloped sheep. Wool - "thread" has a reduced strength and is undesirable for spinning [3].

Fiber length is one of the main parameters of wool fibers. The length of the fiber wool is called the distance between the ends of the fibers. How long the fibers are so much finer than the cross section of the yarn produced in the spinning mill. Therefore, when sorting wool raw materials, attention is paid to the length of the fibers [4].

Sheared woolen raw materials from sheep of different breeds are different throughout the body according to properties (fineness, length, crimpiness, color, strength, wool, fat, percentage of foreign material). In fig. 3 shows a diagram of the approximate distribution of uniform wool in the fleece. The thinnest coat is on the front shoulder blades and on the sides of the animal. On the back and on the back of the shoulder blades the wool is somewhat rougher. At the tail of the fleece and neck, the hair is usually less thin and more clogged.

When sorting, the thickness of the fibers of the uniform wool and its quality are determined by eye crimpiness, and the grade of heterogeneous wool is determined by the content of the fluff and the character of the braids.
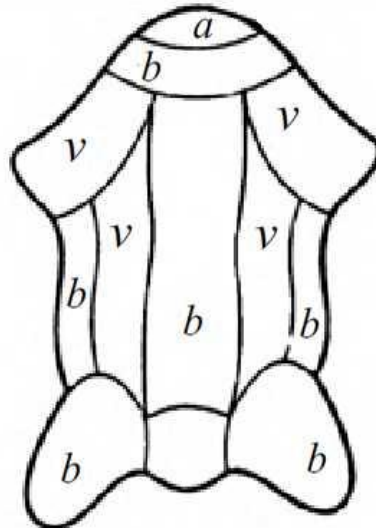
Figure 3. Scheme of the approximate distribution of wool in the rune by grades:

$a – 56^к$; $b —60^к$; $v — 64^к$

Wool sorting is a very important operation. The quality of sorting depends on the qualification of the sorter. With an individual sorting method, the sorter production rate is kg / h: for merino wool, 45-50; cross homogeneous - 60-65; crossbreed heterogeneous 70-80, rough 100 -120. Merino wool is divided by the state standard into 4 groups (in length)

1: over 70 мм, 2:50-70 мм, 3:40-50 мм, 4:25-40 мм.

These studies of the classification of wool on a global scale are given in the following table (3-table).

Classify 4 main groups of sources for wool production: sheep, goats, camels, rabbit down. Characteristics of some types of wool are shown in the table:

3- Table

Type of wool	Fineness class	Wool fineness, micron
Extra thin	80	14,5-18,14
Super thin	70	18,15-20,59
Thin	64	20,6-22,04
Semi-thin	62	22,05-23,49
Semi-thin	60	23,5-24,94
Semi-thin	58	24,95-26,39
Semi-thin	56	26,40-27,84
Semi-thin	54	27,85-29,29
Semi-thin	50	29,3-30,99
Rough	48	31,0-32,69
Rough	46	32,7-34,39
Rough	44	34,4-36,19
Very rough	40	36,2-38,09
Very rough	36	38,10-40,2
Very rough	32	> 40,20

Under production conditions, the wool fineness is determined organo-leptically, for which 3-5 staples are selected from different parts of the fleece. Each one is taken alternately with the thumb and forefinger of both hands at

the ends, straightened to the formation of a grid and viewed to determine the fineness of the fibers, the equalization of the fineness in the staple zones. When determining the class of fineness of uniform wool, sometimes (with disagreements, etc.) use reference samples of wool. For a more accurate determination of wool fineness, a laboratory method is used, in which the cross-sectional diameter of the wool fiber is determined under a microscope or a lanmeter and expressed in micrometers. [5]

4- Table
The main properties of recycled wool fibers by state

Wool (fiber)	Animal	Major producing countries	Basic fiber properties	
			Tonin, micron	Length mm
Alpaca and llama	Animals from the family of llamas	Peru, Chile	20-34	80-120
Vicuna Velbyuzhya	Camels are single-humped and double-humped	China, Mongolia	10-30 19-25	30-50 25-125
sarlychya	yaks	Himalayan region	18-20	30-50
(yak wool) cashmere	Kashmir goat breed	China, Mongolia, Iran	12,5-21	25-90
Kashgora mohair	Cross the Angora goat breed	South Africa, USA, (state of Texas) Turkey, China, Australia, New Zealand	19-23 24-46	50-60 75-100
Merino sheep	Different merino rocks	Australia, New Zealand, South Africa, etc	17-24	75-100

Wool properties are result of its chemical composition and very complex protein structure.

Wool average chemical compositions (Krajinovic)
Table 5

	carbon	hydrogen	oxygen	nitrogen	sulphur
%	50	7	22-25	16-17	3-4

Each wool fiver has an outer layer of flat, scale-like cells which overlap like shingles and which are covered with a thin membrane. This is known as the epidermis. This membrane repels rain, but water vapor can penetrate it. The protein cells in the center of the fiber absorb the moisture, which may penetrate the membrane. This is known as the cortex. This property allows water-soluble *dye* to react with the proteins so the color becomes an integral part of the fiber.

A single wool fiber may be from 18 to 41 μm thick and 4 cm to 14 cm or more long.

The attributes of wool include fineness, length, crimp, color, strength, uniformity, and in grease wool, percentage of foreign material.

Fineness is considered the most important. Fineness is important because it allows the spinning of a finer yarn, tighter weaving of cloth, and production of lighter fabrics and garments.

Wool is elastic. It can be stretched 30% or crumpled tightly, and will recover its natural shape rapidly. This property becomes a built-in characteristic of fabric that has a high percentage of wool. It may be wrinkled, twisted, and stretched, but will regain its shape if allowed to hang overnight.

Wool has crimp. This natural wavy appearance adds to its effective elasticity, but also provides other advantages. Crimp prevents the individual fibers from lying close to each other in cloth. This produces a bulky effect with tremendous insulation value. Depending on texture and fineness of the fiber, from 60%-80% of the volume of woolen fabric may be air.

Wool is strong. It is often said that a single wool fiber is stronger than steel of the same diameter.

Wool's unique advantage is its breathability. That is it's ability to absorb and release moisture from the surrounding air, without compromising it's thermal efficiency. When wool fibres absorbs moisture, they generate tiny amounts of heat. While the exterior layer of a wool fiber is hydrophobic (water-resistant), its inner layer, its cortex, is hydrophilic (water-loving). The cortex can absorb about to one-third of its weight in moisture without feeling damp.

- Wool is natural, renewable and sustainable material

- It causes no irritation to the eyes, skin or lungs and wool fibres present no hazard to human health
- Wool fibres are breathable, meaning they can absorb and release moisture without reducing thermal performance unlike fibre glass based products which make it a perfect insulation material
- Wool does not support combustion and will extinguish itself in the event of fire
- Sheep wool is static resistant. Wool has very little tendency to collect static electricity because wool naturally absorbs moisture from the air.
- Wool absorbs noise and reduces noise levels.
- Wool is dirt resistant. Wool's ability to absorb moisture and therefore its low build-up of static electricity means that wool does not attract lint and dust from the air. The crimp in the fiber and the scales on the outside of the fiber deep dirt from penetrating the fabric [6].

Effective use of wool raw materials serves to increase the regional economy of the Republic of Uzbekistan. To increase the volume of export products, it is necessary to modernize the production of processing wool raw materials in the country. The above mentioned indication of wool, if we take into account the recycled wool raw materials by grades in autumn, by the grades, obtaining high-quality fiber will increase the competition of foreign products.

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