Characteristics of Sheep Milk, Milk Productivity and Possibilities of Machine Milking

Yusupov A.Kh.
(Samarkand state university of veterinary medicine, animal breeding and biotechnology agricultural institute)

Abstract. *Milk sheep long since it is considered one of valuable foodstuff of the person. Its structure includes fibers, fats, sugar, mineral elements and vitamins. The quantity of solids as a part of milk of sheep makes 20 %, acidity of milk local and Karakul is much more sheep of our corner of the world, than milk of cows and makes 20-25^{0}T. Today, sheep milk is widely used globally and amounts to 7-8 million tons. The data received is cited at studying. In article the data received is cited at studying of the sheep milk.*

Keywords. *Sheep milk, milk yields, the chemical composition of milk, karakul sheep, sheep herds, ayran, sour milk, yogurt, unused resources, material and technical means, pastures.*

Introduction.

The importance of the agriculture industry and its contribution to global food security are growing constantly. Utilizing local resources and opportunities is crucial in order to supply the population with agricultural products, boost interest and productivity, and incorporate scientific advancements and contemporary methods into the industry. President Shavkat Mirziyoyev emphasized in his address to the Oliy Majlis on December 29, 2020 that a substantial increase in agricultural output and efficiency is the most effective way to combat poverty and raise the income of the rural population.

One of the most pressing issues of our time is the development of sheep breeding on a scientific basis, the selection of breeding sheep suitable for local conditions, standard care, adequate nutrition, and further improvement of breeding and rational use of sheep products. Sheep breeding is crucial to cattle breeding and accounts for the majority of meat produced in the nation.

There are around 600 different sheep breeds worldwide. More coarse-wool breeds are common in Asian nations (except from Russia), whereas woolless and coarse-wool sheep predominate in Africa, semi-fine and coarse-wool sheep are raised in Europe, fine and semi-fine wool sheep are raised in America, and fine and semi-fine wool sheep are raised in Australia. In our country, sheep milk has long been valued as a dietary item. It includes sugar, fat, protein, and other essential vitamins and minerals for humans.

The total dry matter content of sheep milk is 20%, and its acidity is much higher than that of cow milk, 20 ... 25 ^{0}T. Currently, sheep milk is widely used around the world and its volume is 7-8 million tons per year. The countries that produce the most sheep milk in the world are Turkey, France, Iran, Italy, Greece, Bulgaria, Armenia, Moldova, and the republics of the Caucasus in Russia.

In the Central Asian republics, including Kazakhstan, Turkmenistan and the Republic of Uzbekistan, there are great opportunities for the production of sheep milk on karakul farms. It is known that 40 ... 50% of lambs born in karakul farming are slaughtered for 1 ... 3 days. As a result of lactation of slaughtered sheep during lactation, i.e on average 2 ... 3 months, it is possible to get an average of 30 ... 50 kg of high quality sheep milk from each sheep. It is possible to produce quality dairy products by milking and processing an average of 400 ... 500 grams of milk per sheep per day.

One of the underutilized resources in the nation is sheep milk. The following are the main justifications for not utilising these resources: For milking and primary processing of karakul sheep in pasture circumstances, inadequate study has been conducted and recommendations have not been developed. - inadequate machinery for milking karakul sheep - inherent challenges in milking karakul sheep, including labor-intensiveness, their incompatibility with milking, and other issues in keeping them during milking; - inadequate technical and material resources in karakul herds, - a rise in pasture production and more feeding of sheep that are milking, - the absence of options for small-scale milk processing on farms and herds.

Materials and methods. According to the data obtained, the milk yield and lactation period of sheep of different breeds are different, 60 ... 150 days, and the average annual yield is 40 ... 120 kg (Table 1).

Table 1

Sheep milk productivity

T/p	The breed of sheep	Lactation period, days	Annual milk yield, kg
1	Karakul sheep	60...90	40...50
2	Jaydari sheep	60...70	40...45
3	Hisori sheep	120...150	70...120

Sheep must be manually milked, which is a labor-intensive process that also costs money in materials and organizational effort. As a result, our nation's manufacturing of higher-quality goods and sheep milking is currently not sufficiently developed. Mechanization of sheep milking and processing boosts labor productivity and enhances milk quality. In turn, this opens up possibilities for its implementation, facilitates the organization of milk production in Karakul, and improves the sector's productivity. Sheep's milk production is often influenced by their breed, the environment in which they are fed, the state of the pasture, and a variety of other factors. In comparison to other breeds, Karakol sheep produce significantly less milk. However, it is profitable to milk sheep that have been killed for their skin.

Because sheep milk contains a lot of dry matter, its density is greater than that of cow milk and is 1,038 ... 1,040 g/cm^3. The density of Karakul sheep milk is the highest, its value is 1,042 g/cm^3. The results of experiments to determine the chemical composition of sheep milk are presented in Table 2.

Table 2

Chemical composition and density of sheep milk

T/p	The breed of sheep	Composition (%)						Density, g / cm3
		Water	Fat	Protein	Milk sugar	Mineral salts	Dry matter	
1	Karakul sheep	81,4	8,5	3,2	4,7	0,90	19,6	1,042
2	Jaydari sheep	81,5	9,2	3,6	4,8	0,75	18,5	1,040
3	Hisori sheep	82	7,6	4,5	4,6	0,85	18,0	1,038

Because sheep milk is high in protein and ash, its sourness is much higher. For example, the milk of karakul sheep was 19 ... 24 ^{0}T, and the milk of Jaydari and Hisori sheep was 22 ... 28 ^{0}T. Similarly, the

higher the fat content of milk, the higher the amount of mineral salts in it. The total amount of protein in sheep milk is 2.0 times higher than in cow milk, and the amount of dry matter is 1.5 times higher. The melting point of fats in milk is 35.5 ... 36 ^{0}C and the melting point is 24.5 ... 25 ^{0}C.

It is known that the milk of astrakhan sheep is a valuable food product, which contains 8-10% fat, 4-6% protein, 4-6% milk sugar and a dry matter content of 20-22%. This figure is notable for 1.8-2.0 times more than cow milk. Each mother sheep has the opportunity to milk an average of 0.5 kg per day during lactation (60… 90 days). From 20 kg to 50 kg of milk can be milked from slaughtered lamb.

Sheep are milked twice a day. Sheep with lambs are milked first twice and then once after the lambs are separated. Sometimes sheep start milking when their lambs are one and a half months old. In this case, the lambs are separated from their mothers when they are late and kept in separate places. In the morning the sheep are milked and then the lambs are added and they are provided with additional feed. Sheep are milked by the side or back. Before milking, they are tied and wiped with a damp towel on the hands and nipples, and then proceed to milking. To do this, hold the hand with the left hand and squeeze the suckers from top to bottom with the fingers of the right hand. In this order, each suckler is milked and only then does milking begin.

Sheep milk can be consumed in its natural state. Karakul sheep milk is mainly used in cheese making. Ayran, sour milk, yogurt and other products are also made from sheep milk.

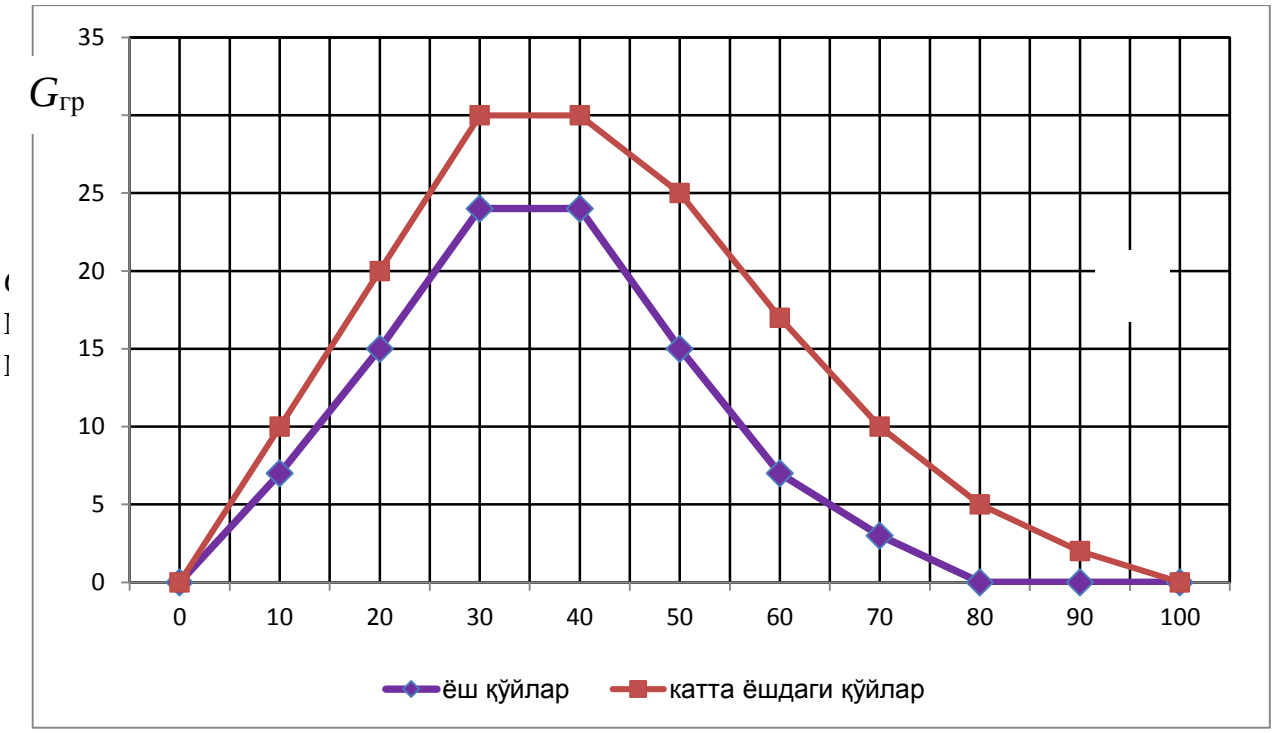
Today, the technology of milking karakul sheep in the country and the main processes that make up its composition, i.e. the physiology of their lactation, the structure and size of the udder, preparation of sheep for milking, milking, termination of milking, supplementary feeding during milking, number of daily milking sufficient scientific substantiation of the requirements for the devices is required.

Experiments on manual milking revealed the potential and intensity of lactation of sheep (Table 3).

Table 3

№	Type of sheep	Time, c									
		10	20	30	40	50	60	70	80	90	Overall
1	Young sheep	7	15	24	24	15	7	3	0	0	95
2	Older sheep	10	20	30	30	25	17	10	5	2	149

In the experiment, the milking process of young and older sheep at each milking was studied. A graphical representation of the initial results is shown in Figure 1. Milk yield of young sheep (1 year old) is 80-100 g. Breastfeeding time does not exceed 60… 70 s. In older (two and older) sheep, the milking process is 120-180 grams depending on the weight of the sheep and the milking time is 80-100 seconds.



Here $t_т$ – preparing the sheep for milking, c, $t_т$ = 10…20 c, t_c – time spent milking, c, t_c =50…70 c, $t_{ту}$ – time taken to finish, c, $t_{ту}$ = 5…10 c.

This indicator, i.e. T, averages T_k = 90… 100 s in older sheep, and $T_ё$ in young sheep - 60… 70 s.

The main problem in milking sheep is the process of catching the sheep and keeping them calm during milking. Because karakul sheep are grazed in groups in a completely free pasture environment, keeping them and keeping them calm is one of the most difficult problems to solve. Therefore, providing them with nutritious food during milking in the form of stimuli is one of the main factors in preparing and training them for milking.

The lactation diagram of the sheep, in general, is intense at the beginning, then continues in an almost steady state, and decreases sharply at the end of milking. The frequency of pulsation in manual milking is in young sheep f_n = 0,8…1,0 c^{-1} ни, in older sheep f_n = 1,1…1,3 c^{-1}.

When milking sheep in the machine, the shape of their udder, the location and size of their suckers, and the uniformity of the milk coming from each sucker are of great importance. The location of udder and suckers in most sheep is similar, their height from the ground is h = 250… 350 mm, the distance between suckers is a = 100… 150 mm, γ=5..12° (fig.2).

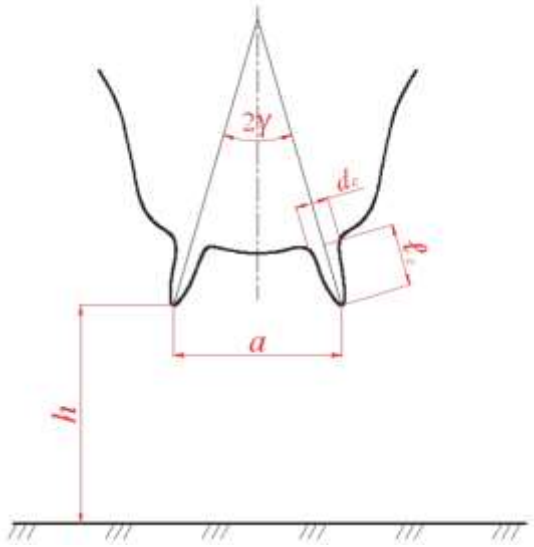


Fig.2. *Structure and dimensions of Karakul sheep hand.*

The shape of the udder is mostly deep, symmetrical with respect to the body of the sheep. Suckers are inclined relative to the vertical axis in most sheep (60… 70%). The angle of inclination of the suckers γ is greater in young sheep than in older sheep, γ=8..15^o , resolution i.e. length l_c = 22…25 mm, diameter at the bottom d_c = 16…18 mm , in older sheep, these figures are in turn, length l_c = 25…30 mm, the diameter of the bottom of the sucker d_c = 18…20 mm and the angle of inclination of the suckers with respect to the vertical axis is γ = 5..10^o. The difference in the amount of milk coming from each sucker is 3… 5%, which is of great importance when milking a sheep in a machine.

CONCLUSION.

Milking and milk processing of Karakul sheep in pasture conditions is a complex biotechnological process from the engineering point of view, and its zootechnical, engineering, technological and economic issues require the development of a scientific solution as a whole system. Taking into account the above, it will be possible to create a high-quality milking device for sheep and process milk from sheep to get a high income.

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