



Production of high quality sheep's milk

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Abstract

Sheep producing milk for people start with the beginnings of domestication. It is an excellent raw material for different types of food production, which gives prospective of its development in milk industry. Genetic selection and better feeding conditions led to several superior sheep breeds in Kazakhstan in terms of productivity, proving a great potential for evolution in market demand. The quality of sheep milk is paramount in controlling the quality of products made from it. It is necessary to identify the factors affecting the productivity and quality of sheep milk for production with emphasis on Kazakhstan. Some of the factors, such as genotype of the sheep are difficult to control, but the farmer to produce high quality milk can manipulate environmental factors, such as nutrition and management of the milking flock. To obtain a productivity of high quality milk ewes must be milked out regularly and completely, which implies adopting appropriate milking routines and milking equipment. It is also important that ewes are healthy and receive adequate diets. Comprehensive reviews are presented of the latest aspects of production, technology and quality of sheep milk.

Keywords: sheep's milk, production, technology, quality, dairy product, factors, genotype, milking routines

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INTRODUCTION

Production of typical products from sheep using local and traditional resources, plays a direct role in biodiversity enhancement. Typical products have been developed according to local resources available. The production of cheese with particular characteristics can be carried out only if genetic diversity in sheep rearing is retained. Milk composition, and especially proteins and fat, may vary according to genetic diversity of the animals and different feeding systems, giving peculiar features to the milk utilized to make typical milk products. Furthermore, the microbiological features and diversity in milk with a main focus on the interaction with the environment play an important role for milk production. Although in quantitative terms the production of sheep milk is of marginal importance compared to cow milk, it is of particular interest in Kazakhstan and has special importance for arid and semi-arid regions of the earth. Most sheep milk produced in the world is processed into cheese, yogurt and other dairy products. The specific composition of sheep milk makes it especially valuable nutritionally and for consumer health. The nutritional importance of sheep milk is due to its higher total solids and major nutrient contents than goat and cow milk. This article discusses current knowledge of the main natural bioactive substances contained in sheep milk, mostly linked to the lipid and protein fractions. Emphasis is

placed on quality of sheep milk, which can favorably contribute to human nutrition.

Sheep producing milk

Chemical composition of sheep's milk

Sheep milk can be frozen and stored until a sufficient quantity of milk is available to sell or make yoghurt or cheese. Freezing does not affect the qualities of the milk. The taste depends what the sheep are being fed. Some people are huge fans of keeping the milk really cold and minimally processed. It's like a creamier, smoother version of cow's milk. According to a German researcher, sheep milk has more conjugated linoleic acid (CLA) than the milk from pigs, horses, goats, cattle, and humans. CLA is a cancer-fighting, fat-reducing fat. The fat globules in sheep milk are smaller than the fat globules in cow's milk, making sheep milk more easily digested.

As we know, today the population of the planet grows, and there is a growing need to increase the production of human food. Animal proteins are the main source for person's energy. Such proteins are meat, milk, eggs, and fish. Casein is 80% of the total protein content, serum proteins (20%) of them:

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Table 1. Nutritional value. Vitamins. Macroelements. Microelements

Calories: 109.7 kcal	109.7 kcal
Protein	5.6 g
Fats	7.7 g
Carbohydrates	4.8 g
Vitamin A	0.06 mg
Vitamin PP	0.3 mg
Vitamin A (RA)	60 mcg
Vitamin B1	0.06 mg
Vitamin B2	0.3 mg
Vitamin B5	0.4 mg
Vitamin B9	2 mcg
Vitamin B12	0.5 mcg
Vitamin C	5 mg
Vitamin E	0.2 mg
Potassium	198 mg
Calcium	178 mg
Phosphorus	158 mg
Sulfur	56mg
Ferrum	0.09 mg
Iodine	2 mcg

Table 2. Comparison of characteristics of dairy products cows and sheep

Indicators	Sheep's milk	Cow's milk
Color	cream, with a slight yellowish tinge	white
Taste	rich, tender, sweet	specific, sweet
Smell	Specific	characteristic, milky
Density	1035-1040	27.47
Fatness	6.7%	3.6-6%
Calories (kcal/100 ml)	111	62
Mass fraction:		
Dry substances	20%	11.6%
Proteins	10.4%	10.4%
Fats	34.4%	3.45%
Titrated acidity	20 degrees	18 degrees

immunoglobulins (19.7%), lactalbumin (28.8%), p-lactoglobulin (48.9%), and serum albumin (2.7%). In 100 g of sheep's milk contains 5575 mg of amino acids, including essential-2441 mg. Compared with cow's milk, sheep's milk contains more essential amino acids: valine (370 mg), isoleucine (278), leucine (518), lysine (571), tryptophan (170), methionine (134), threonine (232), and phenylalanine (268 mg) (Chernyshova. 2013).

Vitamins like the B-complex vitamins and especially vitamins like A, D and E are absolutely essential for good health and is normally recommended as supplements. All these vitamins occur naturally in large quantities in sheep milk. Sheep milk is especially high in folic acid and Vit. B12. The calcium: phosphorus ratio in sheep milk is nearly perfect because the one can't be digested without the other. Zinc is essential for a healthy skin. Sheep milk contains 3 times more of this type of protein than goat's or cow's milk which also contributes to better digestibility. The chemical composition of sheep's milk includes (Table 1) (http://1ovcevod.ru/produkcija_ovcevodstva/oveche_moloko/).

We will not argue with the truth – yes, sheep's milk is really very fat. But do not immediately reject it because of this. Let's try to figure it out. The composition of fats that are contained in sheep's milk includes three vital fat-

soluble vitamins: A, D and E. Sheep's milk contains more of them than cow's or goat's milk. For example, the content of vitamin D is 0.18 g/100 g, (for comparison, in summer cow's milk, this indicator is only 0.04 g/100 g.) Here is a table of other comparisons of cheep's milk and cow's milk: (Table 2) (<https://fermer.blog/bok/zivotnye/ovcy/polza-i-vred-produktov-ovcevodstva/9956-oveche-moloko.html>)

Sheep's milk also contains a lot more saturated fatty acids with medium-and short-length chains that promote the absorption of lactose. Theoretically, you can get milk from any sheep. But, of course, milk productivity depends on the breed, age, feeding conditions and content, as well as the duration of the lactation period. Fine-fleeced, semi-fleeced, Romanov sheep are usually not milked. The largest amount of milk can be obtained from the East Frisian sheep breed (up to 1,500 kg of milk). The lactation period can last up to 260 days.

It should be borne in mind that when people breeds sheep for milk, the technology of their cultivation should be more intensive. Animals are depleted much faster and require special feeding and maintenance conditions. During lactation, making the right diet for females is especially important, because if the nutrition is unbalanced, it can negatively affect the quality and quantity of milk, as well as the duration of the lactation period. Diets for feeding dairy sheep are developed specifically. (Rikhtegarzadeh, et al, 2016).

Sheep's milk is obtained from sheep during lactation. The average duration of this period is 150 days (5 months). However, the largest amount of sheep milk is given for the 3rd month. Some breeds of sheep during this period give milk up to 40% of the total volume. In most farms, lambs are weaned at the age of 3-4.5 months. Some farms produce lamb chops at 1.5 years of age. As a rule, the remaining period is used for obtaining sheep's milk. In the first half of lactation, milking is performed 2 times a day. In the second lactation period, the sheep are milked once a day. For example, you can get daily from sheep (fine and semi-fine breeds):

- in the 1st half of lactation: up to 1.5 kg
- in the 2nd half of lactation: up to 1 kg

Sheep's milk productivity

The amount of milk produced from sheep is called "milk productivity". Productivity depends on the breed of sheep, conditions of keeping and feeding. However, one of the main factors that directly affects the milk production of sheep is the number of lambs during lambing. Milk productivity is most dependent on the duration of keeping lambs under the wombs. In our country, most of the commercial milk comes from Karakul sheep, because their lambs are killed in the first days of life to get skins. If the lambs are kept on suckling for 1-3 days, after which they are transferred to a sheep's milk substitute, the Queens can be milked

throughout the entire lactation period (4-5 months). Moreover, the first 2 months of milking can be performed twice a day, and then once.

When keeping lambs under the uterus up to 3 months of age, after weaning the females are milked 1.5-2 months. In this case, the uterus and lambs must be fed. Scientists from Poland Anna Jarzynowska and Ewa Peter found out how the addition of herbs to the winter diet of sheep affected the quality of sheep cheese and its nutritional value. The scientific work was published in the Scientific Annals of Polish Society of Animal Production (Ospanov, & Toxanbayeva, 2020).

The study was conducted on samples of raw sheep's milk and cheeses made from it. The milk was obtained from colored Merinos of Polish breeding. From February to March, the animals were kept in a sheepfold and received as feed a loose concentrate with the addition of rapeseed concentrate.

Three groups were formed for the experiment: group I - food without adding grass to the feed and groups II and III, in which a mixture of herbs added to the concentrate in the amount of 10 and 20 g per head per day, respectively.

Then experimental batches of rennet cheese were made from the resulting milk and the chemical composition and nutritional value were compared. The results showed that adding 20 g of grass per sheep significantly increased the mineral content of cheese from milk obtained from group III sheep by 6.1% and 6.6% compared to group I and II, respectively. The experimental factor did not affect another parameter of the nutritional value of cheese, i.e. the protein and fat content or their mutual proportions, i.e. the energy value of the product.

An important indicator was that feeding with the addition of herbs in the winter (when the animals have an increased incidence of diseases associated with the peculiarities of the diet) helped to strengthen the health of sheep with a proven positive effect.

The herb mixture used in the experiment consisted of 9 herbs (common nettle *Urtica dioica*, fennel *Filicium capillaceum*, caraway *Carum carvi*, coriander *Coriandrum sativum*, fenugreek *Trigonella foenum-graecum*, peppermint *Mentha piperita*, calendula *officinalis*, chamomile *Matricaria chamomilla* and milk Thistle *Silybum marianum*). It is assumed that this mixture of herbs improved digestion and metabolism in animals, providing bacteriostatic and anti-inflammatory effects, thereby improving the quality of milk used for cheese production.

Since modern consumers prefer products that are not only delicious and safe, but also healthy, it is possible to improve the quality of food, in this case, sheep's cheese, by properly feeding animals. In a survey conducted by Polish scientists among fellow citizens, up to 78% of respondents stated their desire to buy healthy and less processed food with natural ingredients.

Among the food products of sheep farming, cheese was named the most famous (it was named by 72% of respondents), although sheep's milk is also very useful.

The study of individual components of sheep's milk has shown that it has a much higher dry matter content and, consequently, more protein and fat than cow's or goat's milk. Therefore, it is an excellent raw material for cheese production, which gives a greater yield of the product (the amount of cheese per kg obtained from 100 kg of milk) than cow's or goat's milk. The largest amount of milk per day in sheep falls on the second decade after lambing. Milk yield increases until the fifth lactation, and then decreases. At the end of lactation, the milk yield decreases to 100-200 g per day. Before preparing sheep for mating, milking and suckling lambs should be stopped for 2-3 months. The milk productivity of Romanov sheep reaches 160-180 kg of milk per lactation. This amount enough to feed lambs while milking sheep for commercial milk.

The milk of Romanov females sheep contains a sufficient amount of protein, which increases to 6.20% by the end of lactation. The content of milk sugar in the milk of ewes of the Romanov breed is reduced to the end of lactation. If at the beginning of lactation, it is 5.15%, then by the end of lactation it is reduced to 4.54%. During lactation, the calcium content in the mother's milk decreases from 0.19 to 0.16%. The content of phosphorus during lactation increased slightly from 0.106 to 0.111%. Fluctuations containing deposits of ash during the lactation period are in the range from 0.88 to 0.83 percent. The density of milk by the end of lactation decreases slightly and is 1.036. In Romanov sheep, the specific weight of milk is higher than in other breeds of sheep, it also exceeds this indicator of cattle milk, which is equal to 1.031.

Milking can be manual or machine. The main principle when milking is to observe cleanliness and hygiene rules, i.e. you need to carefully ensure that the milk does not get hair, feed residues, and sewage. They are milked in various ways: goats, usually from the side, and sheep - from behind. The milk is filtered through a cloth or filter, or filtration in wooden buckets. During manual milking, the udder is carefully milked, which prevents the development of various diseases, such as inflammation of the udder, increases milk output. Machine milking improves the culture of labor, increases the degree of purity of milk. Good results are obtained with manual milking after machine milking.

Milking units for large sheep farms are produced by various enterprises, with simultaneous production of 8 to 16 sheep. When using machine milking, the requirements for the shape of the udder and teats are increased. It should be milked twice a day and always at the same time. The milk of sheep and goats in many countries of the world is the most important food for humans. Currently, in many European countries, such as Romania, Bulgaria, the Czech Republic, Turkey, and

Table 3. Sheep's milk production in the world

Continent	Year 2010	Year 2011	Year 2012	Year 2013	Year 2013 in accordance to year 2010 in %
Africa	2157.9	2198.2	2226.0	2250.6	104.3
America	40.6	40.4	41.0	42.1	103.7
Asia	4541.3	4574.1	4742.9	4823.3	106.2
Europe	3126.6	3038.7	3000.4	3021.7	96.6
The whole world	9866.5	9851.5	10010.4	10137.8	102.7

France, the share of marketable sheep's milk is a third of the total production of the dairy industry is produced. Mostly sheep's milk is used for the preparation of fermented milk products and many high-quality specialized varieties of cheese, which are in great demand around the world. More this also applies to countries in Asia and Africa, located in extreme climatic conditions (arid steppes, deserts, mountains and highlands), where it is difficult to breed cattle. In many European countries it is also given a great attention to the production of commercial sheep and goat milk. There is an analysis of the production of sheep's milk on the continents of the world and in the world all in all. (Yerokhin, et al. 2014). The analysis of the state and dynamics of milk production of sheep and goats was carried out on the basis of FAO data (**Table 3**).

In 2013, the production of sheep milk in the world was 10137.8 thousand tons. In Asia, this figure was 4823.3 thousand tons, in Europe-3021.7 thousand tons, in Africa –2250,6 thousand tons, in America-42,1 thousand tons.

Over the period from 2010 to 2013, the production of sheep's milk in the world increased by 2.7 %. During this period, the increase in sheep milk production in Asia was 6.2 %, in Africa-4.3 %, and in America-3.7 %. In Europe, production decreased by 3.6% during the period under review. In the countries of Oceania (Australia, New Zealand), sheep are almost not milked.

For today, the largest amount of sheep's milk is produced in China (1,540 thousand tons), Turkey (1,101 thousand tons), Greece (705 thousand tons) and Syria (684,6 thousand tons). They account for 40 % of global production[6].

For more complete use of the growth reserve of production of sheep's milk and products from it, it is necessary to:

- work to improve existing local breeds and create new populations of sheep with high milk production;
- accelerate the creation and industrial production of domestic milking units for machine milking of sheep and mobile mini-factories with the simplest equipment for cheese production;
- development and approval of special regulatory and technical documentation for harvested sheep's milk, its processed products and optimal prices for them.

In modern conditions, the production of commercial sheep's milk and the production of cheeses from it of different assortment should play an important role not only in increasing the food resources of countries, but

also in increasing the profitability of sheep farming (Hinkovski 1980).

Economic significance of sheep products

In recent years, there has been a significant change in the economic significance of certain types of sheep products. Until recently, the economy of sheep farming was based mainly on the production of wool. This was facilitated by relatively high prices for wool, which stimulated an increase in the production of this type of raw material. The experience of the world development of sheep breeding in modern conditions shows that in all sheep-breeding countries of the world, increasing the efficiency and competitiveness of the industry is associated with a more complete use of not only meat, but also dairy productivity of sheep, which in the structure of the gross value of sheep products is 30 – 35%. Underestimating the dairy productivity of sheep and sheep breeding as a source of food production naturally leads to a reduction in the role of the industry in the national economy and attention to the problems of its development.

The irrational use of sheep's milk, or rather, the refusal to milk sheep at all, from our point of view, is "not the fault, but the trouble" of those who are engaged in sheep breeding. The first reason is the long-term dominance of the above negative opinion about milking Karakul sheep in favor of using only smushki. Of course, it brought a good income. However, the development of sheep's milk production would also be no less profitable. The second reason for refusing to milk sheep is the lack of scientific information about the benefits of sheep's milk (Ayazbekova 2017).

An important role in reducing the production of sheep's milk today is played by the current purchase prices, which do not compensate for labor costs. In addition, many countries do not have regulatory and technical documentation for harvested sheep's milk and its processed products.

Products from sheep's milk

Most of the sheep milk produced in the world is made into cheese. Sheep's milk is superior to cow's and goat's milk in terms of protein and fat, and also contains more calcium. These characteristics make it one of the best components for cheese production. "Milk" from sheep is the raw material for delicious cottage cheese, and the remaining whey is very useful. Cottage cheese can be made at home, but it is difficult to buy natural sourdough. In this case, you can use tablets that replace lactobacilli, such as acidin-pepsin. On the grocery shelves you can

find ayran-fermented milk drink, which according to the legend of the highlanders helps longevity. We should also mention another well — known drink- yoghurt. Not everyone knows that this is yogurt, an invaluable product for the content of live lactobacilli.

Sheep's cheese can be called a concentrated product. For an adult body, a daily 100 g is enough to get a norm of protein, fat, amino acids and vitamins. Sheep's cheese is also rich in proteins, vitamin complexes, elements such as magnesium and potassium, essential amino acids and useful fats. If you want to preserve and prolong your youth, then include sheep's cheese in your daily diet – as a powerful antioxidant, it prevents the penetration of free radicals into the body and slows down the aging process. Sheep cheese is especially recommended for active people who spend a lot of energy, children, teenagers, pregnant women and nursing mothers. The General production technology of the product consists of the following stages: In the prepared milk, enzymes are added and the cheese mass is collected. The mixture is filtered, then heated. Then perform the test and send the mass to maturation. In some varieties, special bacteria or mold are added (Abrosimov, 2006).

The quality parameters and sanitary requirements for purchased milk are determined. A draft technological instruction for the production of cheese from sheep's milk has also been developed, which takes into account local conditions, the driving nature of sheep farming and the technical capabilities of farms. The proposed process instruction has the following features: provides for the production of cheese from whole sheep's milk without normalization of the fat mixture and from a mixture of sheep's milk with cow's (Buffalo, goat). It is allowed to produce cheese from raw (unpasteurized) milk with an increase in the maturation period to 60 days, against 30. In order to increase the yield of the product, the use of whey proteins is provided; along with the brine method of cheese maturation, a combined method of maturation (brine and air) is provided using paraffin or film coating, as well as coating with liquid vegetable oil and vegetable packaging. Sheep's milk is the ideal raw material for making brynza and other types of brine cheeses: Chanakh, Tushinsky, kobyisky, Ossetian, as well as rennet cheeses – Roquefort, Kachka-Vala and Pecarino. The following cheeses are made from sheep's milk: hard and soft, which are produced using rennet enzymes. They can be of different degrees of maturity and fat content, while soft usually have a pronounced crust, sometimes with mold, and often increased fat content (up to 60%); brine cheese, is stored in a special brine. Its fat content is usually 40-45%, there is no crust; whey, which takes the whey left over after cooking hard or soft cheeses.



Fig. 1. Feta cheese from sheep's milk



Fig. 2. Roquefort cheese from sheep's milk



Fig. 3. Brynza cheese from sheep's milk

Cheeses that are most famous

- Feta - a popular Greek cheese made from a mixture of sheep's and goat's milk. After cooking, it is cut into bars and stored in brine. It has a creamy texture, sharp salty taste. Aged for about 3 months in brine, which is why it has a specific salty taste (**Fig. 1**).
- Roquefort - obtained by maturing on oak shelves in a limestone grotto. The result is a cheese with mold, with a unique taste of hazelnuts. According to EU rules, only LaCon sheep milk is suitable for it. French cheese with a noble mold Matures only in the South of the province of Rouergue, in caves with limestone grottoes. And the French cheese Roquefort has been in the top positions in the "rating" of favorites around the world for many years (**Fig. 2**).
- Brynza - it is distributed throughout Eastern Europe and differs from feta with a stronger sour-milk taste and dense consistency, as well as lower fat content. There may be traces of a mesh separating the brine on the surface. It is made by adding a starter culture to pasteurized or raw milk. Brynza has no crust, the surface is clean, smooth, with traces of serpyanka (a rare mesh of flax or synthetic for separating the serum-brine), a slight deformation of the bars and minor cracks are allowed. It is often used in vegetable salads. (**Fig. 3**)

Soft cheeses made from goat's milk acquire a sharp, somewhat spicy taste and a specific aroma during maturation. The yield of cheese from sheep's milk is 1.5 times higher than from cow's milk, due to the large amount of dry matter in the milk. However, sheep's oil is much inferior to cow's. It has a salty taste and worse taste qualities (Gisin 1947). After opening the package, it is best to store the product in parchment, which will maintain a natural air balance.

The quality of sheep's milk

Sheep dairy products are unique in their useful qualities. The high content of the necessary elements allows it to be consumed in a small daily amount. If the price is high enough, this is a plus. Products from sheep's milk are delicious and absolutely safe. Knowing what diseases, they are especially necessary for, you can improve your health by minimizing pharmacy drugs. Sheep's milk in comparison with cow's milk is 1.5 times more nutritious. When consumed regularly, this product improves brain activity and increases the supply of oxygen to the cells.

Sheep's milk is a real record holder among other popular types of milk for the amount of calcium and minerals. Before you give an impressive list of "benefits", it is necessary to say about contraindications. Fortunately, only one thing is known — individual intolerance in the form of lactose-Allergy. Refuse to use this product is worth it for people who have gastritis, colitis and ulcers. In other cases, sheep's milk will only benefit, it is used in complex therapies for many diseases. Here are some of them: bronchial asthma, eczema, skin problems - in complex therapies; given the high content of potassium, sheep's milk has a positive effect on the cardiovascular system and reduces the risk of heart attack, stroke, and other problems. This drink takes part in protein synthesis, and it is an excellent antioxidant. Osteoporosis, restoration of bone mass — due to high calcium content; it also strengthens the skeleton; rickets - due to a large amount of vitamin D (and if you take into account the fact that vitamin D in sheep's milk is almost twice as much as in cow's milk, it becomes clear that for strengthening bones and preventing osteoporosis, it is simply irreplaceable). Anorexia — high calorie content allows you to eat a small amount. It improves vision and reduces the risk of eye diseases. A cup of warm sheep's milk before bedtime promotes a restful sleep. It is improving the condition of hair - zinc contributes to their strengthening and healthy appearance. Sheep were domesticated centuries ago. In addition to eating, women used their dairy products to preserve their beauty. It is known that particularly rich women took milk baths. Well, these days, milk concentrates are used in the cosmetic industry. They are added to lotions and shampoos, in creams. At home, to preserve the smoothness of the skin and an even complexion, you can make masks from serum or cottage

cheese. It is recommended to include this product in your diet for people who are allergic to cow and goat's milk, as well as for asthma, eczema and some skin problems. Various creams and lotions, shampoos and balms, and Soaps are produced in industrial production. Even greater use of sheep's milk is found in the beauty recipe of home, folk cosmetology.

In addition, to the function of strengthening bone tissue, calcium plays an important role in the recovery of the body after diseases and helps to strengthen the immune system. Any nutritionist will say that for the absorption of calcium, it is also necessary to use phosphorus, so it is in sheep's milk that the ratio of these two microelements is almost perfect. Like any milk, sheep's milk contains valuable vitamins. It is especially rich in folic acid and vitamin B12. Zinc is included into this product and has a positive effect on the skin.

Speaking of lactose. Some people suffer from lactose allergies, but they can eat sheep's milk in the form of sour milk or yogurt, because the lactose in it turns into lactic acid. When making cheese, a sufficient amount of lactose remains in the serum. This is also proof that lactose in sheep's milk is much easier to perceive than lactose in other types of milk. Usually, people with allergies and intolerance to cow's milk can eat sheep's milk without any problems. It's really worth a try. We remind you that any disease or use of antibiotics threatens Your immune system. Helping to fight the disease, antibiotics simultaneously kill beneficial bacteria along with pathogens. Yogurt, especially acidophilic, promotes the reproduction of beneficial bacteria and thus - the restoration of normal intestinal flora. The multiplication of beneficial bacteria prevents the recurrence of the disease and strengthens the immune system. In addition to all the above, we add that sheep's milk is also a great snack before a meal. Before 1990, the relevant authorities decided that sheep's milk should be classified as food, and this is true. After returning the status of a drink to milk, it lost its significance. However, it is hoped that the medical and scientific community will initiate fundamental research into milk, especially its healing properties that help maintain the health of many people.

Also, milk drinks from sheep are recommended for pregnant women — the necessary amount of folic acid helps the normal development of the fetus. There is evidence that people who constantly eat dairy products from sheep are less prone to stomach diseases, they have clear vision until old age. Because the protein content of sheep milk is so high, it is not recommended for babies up to 12 months. Sheep milk is a natural high protein energy drink which, because it is more well-known in Europe, is used by sportsmen.

Technique for the evaluation of sheep milk

Today, many countries are struggling for this field of nutrition, as this milk has a lot of benefits. So, some

companies support the production of sheep's milk. For example, Danone Nutricia company has launched the production of infant formula from Sheep Milk, which, according to the company, is "a significant step for the development of New Zealand dairy sheep farming." The new product meets the growing demand among consumers in Australia and New Zealand for infant formula based on alternative sources of milk, such as goat and sheep milk. As it does not have lactose."As consumer preferences continue to evolve, it is important that we, as market leaders in Australia and New Zealand, can meet them in full," said Nutricia ANZ sales Director John Hoar. "In addition, we support our local dairy sheep farms by launching new production." Karicare sheep milk mixes for children 12+ months are now available in Australia. The full range of Karicare blends is scheduled for release in 2020. In 2018, the market size of Sheep Milk Soap Market is million US\$ and it will reach two million US\$ in 2025, growing at a CAGR of from 2018. The global Sheep Milk Infant Formula market focuses on the major factors mentioned below: a comprehensive outline of the Sheep Milk Infant Formula market has been analyzed, which involves the valuation of the different organization in the global market; developing trends in various Sheep Milk Infant Formula segments and geological market. Substantial changes in market strategies and Sheep Milk Infant Formula market synopsis. Market methodologies and market stakes of major players in the Sheep Milk Infant Formula market. Existing and future dimensions of Sheep Milk Infant Formula market based on both cost and volume point of view. Estimates of latest Sheep Milk Infant Formula industry trends and advanced development. Major references for the new entrants for stability in the global and competitive market.

There is a development of a laboratory technique for the evaluation of protease enzymes activity in goat and sheep milk. For milk protease activity evaluation, the method utilized was reported by Bendicho et al. (2002) and by Bilbao Sainz et al. (2009). (Palomba 2017). This colorimetric method utilizes the azocasein as substrate that is degraded, at suitable pH and temperature, by proteases present in milk, allowing the dosage of its proteolytic activity. More precisely, the degradation of azocasein releases achromophore group that is red when linked covalently to the casein and colorless when free in solution. The color intensity obtained by the reaction is quantified by spectrophotometer at 345 nm. The concentration of the chromophore is directly proportional to the activity of proteases present in the sample. This study was performed on goat and sheep raw milk. This method is useful for determining the proteolytic activity in different media and its effectiveness depends on chemical nutritional characteristics of the sample. Therefore, the method is good enough to determine the proteolytic activity in the different tested milk types. Further experiments will be

performed in order to improve and refine the method and to extend it to other matrices.

New approaches to improving oral health are aimed at exploring inflammatory-modulating effects, lowering the amount of biofilm, and reducing tooth demineralization, thus consequently preventing dental caries, have been developed and researched. One of the novel available strategies to combat dental biofilm disease is the use of probiotics, which are defined as live microorganisms that, when administered in appropriate amounts, result in a health benefit to the host. The review of the Journal of Functional Food (Journal of Functional Food 2019), about Probiotic fermented sheep's milk containing *Lactobacillus casei* 01: Effects on enamel mineral loss and Streptococcus counts in a dental biofilm model suggests that probiotics do not seem to be capable of preventing Streptococcus proliferation; however, FSMP showed a tendency to control internal enamel demineralization when compared with the other groups. Additionally, even in face of a high cariogenic challenge and presenting an elevated number of *L. casei*, both probiotic fermented sheep's milks (FSMP and FSMPs) presented degrees of similar performance in surface mineral loss. Despite the promising results of the present study, further research focusing on the mechanism(s) of anticaries properties and on the systemic action of probiotic bacteria appears to be required.

Small Ruminant Research about Nuclear magnetic resonance screening of changes in fatty acid and cholesterol content of ovine milk induced by ensiled olive cake inclusion in Chios sheep diets describes the effects of an ensiled agro-industrial by-product, the ensiled OC, on FA and cholesterol content in milk of Chios sheep by the use of the NMR methodology. From a nutritional point of view, our findings support that ensiled OC could be a valuable alternative in ruminant nutrition since it improves the FA profile of ovine milk by increasing health beneficial fats without adversely affecting milk fat percentage or milk yield. Overall, ensiled OC feeding reduced SFA and increased the UFA and MUFA contents of milk fat, while the cholesterol content was not affected. Furthermore, the inclusion of 1 kg (on fresh basis) ensiled OC per ewe could result in the highest contents in total unsaturated fats and particularly the CLA isomers and the essential linoleic acid. These findings support the ensiled OC by-product use in sheep diets with the scope to improve the lipid content in ovine milk and to assist the management of olive oil wastes in Mediterranean countries in a cost effective way. In addition, the present study demonstrates the use of NMR spectroscopy as an applicable routine analytical tool for milk lipids, including cholesterol, in nutritional studies (Small Ruminant Research, 2019).

Microbial Pathogenesis Research about Subclinical mastitis in Lacaune sheep: Causative agents, impacts on milk production, milk quality, oxidative profiles and

treatment efficacy of ceftiofur shows us that subclinical mastitis negatively affected udder conformation, production, composition and milk quality in Lacaune sheep. Although the sheep were clinically healthy, subclinical mastitis impaired their health, and they endured inflammatory processes that were intensely activated, reflecting higher energy expenditures as well as greater lipid peroxidation. Bacterial agents were present in the mammary gland of sheep, but did not cause clinical mastitis. The main isolated microbiological agents were those commonly described in ewes with mastitis. Low levels of antimicrobial resistance were detected in this study, possibly as a consequence of the absence of treatment with chemotherapeutic agents in ewes with mastitis. We also concluded that ceftiofur via both routes of administration had low efficacy; however, the intramammary route had 70% greater efficacy than that of the intramuscular route. Antimicrobial residue (ceftiofur) was found in the milk of some sheep within 120 h after application, exceeding the manufacturer's recommended shelf life for cows. This finding suggests that it is important to use commercial products specific for sheep, in light of the fact that production of dairy sheep has increased in Brazil. (Microbial Pathogenesis, 2019).

CONCLUSION

The study of individual components of sheep's milk has shown that it has a much higher dry matter content

and, consequently, more protein and fat than cow's or goat's milk. Therefore, it is an excellent raw material for different types of food production, which gives prospective of its development in milk industry. The sheep milk, after cow milk, is the one main milk can be produced and consumed all over the world as it belongs to category dairy products. Sheep's milk should be valuable food product that is rich in vitamins, trace elements, amino acids and minerals. Yogurts, cheese and ice cream from sheep's milk is a reality nowadays. It is a unique and surprisingly useful product. Although it is difficult to find it on the market or in a store, dairy sheep farming remains one of the branches of industrial animal husbandry even today. In this paper, we reviewed the characteristics of sheep's milk, its benefits, price, and products that people get from this milk. Here we tried to outline the prospective of sheep's milk industry with the focus on the technology and quality of its cultivation. The achievement of a certain level of quality is of interest for the cheese making industry, which has to deal with the ever-increasing demands of the consumer; it is also of interest to the milk producers, who can increase their earnings by pursuing high quality. The quality of the milk depends essentially on its physical and chemical composition and on hygienic and sanitary factors.

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