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Mare's milk and kumys

Describes the use of mare's milk and kumys as food and as a therapeutic and prophylactic agent in the traditional regions of horse breeding and developed countries. Enumerated major storage problems of horse milk and kumys and approaches to their solution. Adduced data of the microflora of kumys from Mongolia.

Key words: mare's milk, kumys, microflora.

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Бие сүті және қымыз

Бие сүті мен қымыздың тағам және емдік-профилактикалық зат ретінде дәстүрлі табынды жылқы шаруашылығы аймақтарында және дамыған елдерде қолданылуы сипатталған. Бие сүті мен қымызды сақтаудың негізгі қиындықтары мен оларды шешу жолдары көрсетілген. Моңғолия қымызының микрофлорасының нақтылы мәліметтері келтірілген.

Түйін сөздер: бие сүті, қымыз, микрофлора.

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Кобылье молоко и кумыс

В статье описывается использование кобыльего молока и кумыса в качестве продукта питания и лечебно-профилактического средства в традиционных регионах табунного коневодства и в развитых странах. Перечислены основные проблемы хранения кобыльего молока и кумыса и подходы к их решению. Приводятся оригинальные данные по микрофлоре кумыса из Монголии.

Ключевые слова: кобылье молоко, кумыс, микрофлора.

Kumys – National fermented milk product from mare's milk mixed lactic acid and alcoholic fermentation, traditionally common among the peoples of Central Asia since era chalcolithic (about 3500 B.C), as well as in Bashkiria, Yakutia and other regions horse breeding. In the 19-20 centuries in the Russian Empire, due to the obvious therapeutic effect of kumys with a number of diseases, particularly tuberculosis, in Tatarstan, Tajikistan, the Caucasus, Belarus and in the most central Russia were organized seasonal and even year-round kumys farm industrial type.

The latter had the appropriate infrastructure for stables and pastures-stables housing animal, equipment for mechanized milking, production and storage, veterinary service. If the herd of dairy horses in traditional horse breeding represented by local breeds (Kazakh, Kyrgyz, Bashkir, Yakut, Buryat, Tuva et al.). The stationary kumys farm consisted of mainly factory horses breeds primarily draught horse and by their hybrids with Kazakh and Bashkir breeds.

In the last 10-15 years, due to the surge of interest in the population of Europe and America to the issue of healthy eating, commodity dairy breeding and spreading to other countries, the production of mare's milk organized in Austria, Belgium, Hungary, the Netherlands, Italy, France [1]. In Germany, there are about 40 in Belgium, as in France, about 30 specialized farms supplying mare's milk, yoghurt, cream, milk powder and as tablets [2, 3, 4, 5, 6].

In addition to the taste and nutritional value of mare's milk also has properties that used in therapeutic and prophylactic purposes. Medicinal properties of kumys in traditional medicine have been known for a long time. People have successfully applied kumys during, after exhausting diseases, and after malnutrition. Modern and traditional medicine recommends kumys in diseases of the pulmonary and cardiovascular systems, gastrointestinal tract, beriberi, anemia, allergies, immunodeficiency, to strengthen the nervous system [7,2]. Therapeutic effect of kumys for patients with tuberculosis was overt a long time ago, which led to the creation in Kazakhstan and the Russian Federation special resorts with extensive use of kumys. According to the WHO is currently the world's TB kills more people than any other infection

TB situation in many parts of the world, including the CIS, remains tense. In connection with this, now need only kumys TB facilities Russia is about 20 thousand. tons per year [8], but produce only a tenth of that. An important area of use of mare's milk is the baby food industry. It is known that in composition of mare's milk is closer to the women's, therefore can serve as one of the main component of many infant formulas. Since almost one third of infants in the first days of life needs extra nutrition, development of dairy horse breeding can contribute to solving this issue [9]. High sugar content, easy digestible lipids, balanced content of essential amino acids and vitamins allows produce of dainty drink – kumys, which has unique nutritional, medicinal properties and exquisite taste.

It is believed that, kumys has laxative properties and the first time it is recommended to drink no more than 100-200 ml per day, gradually bringing this rate to 1-2 liters a day. Kazakhs, according to the observations of professor Seitova Z.S. in summer can drink up to 10-15 liters daily. Seitov himself, who is now about 95 years old, in 80 years old drank daily 8-10 liters kumys [10]. According data Satomi Ishii, some Mongolian men in summer can drink in such quantities (up to 20 liters per day), which at this time does not consume any other food [11].

This review article discusses some aspects of development of milk horse breeding, milking capacity and quality of mare's milk and its chemical composition, various technological aspects of the production and conservation kumys, changes in chemical composition during fermentation, microflora and bactericidal properties of kumys's leaven.

Compared with the milk of other farm animals (cows, goats, sheep, camels, reindeer) mare's milk differs lowest content solids, ranging from Yakut horses 9.7% to 12.9% some of Kyrgyz. The composition of the milk of mares quite strongly varies depending on breed, age, lactation, feed and climatic conditions, seasons, physiological state of the animal [10]. It should be borne in mind that by numerous literature data is difficult to compare of milking capacity of mare, as is often not taken into account the exact amount of milk suckled by foal and often confuse milk productivity and milk yield. As a rule, in the first month of lactation foal should suckle all milk.

At the same time for increase of 1 kg of body weight, foal consumes about 10 liters of milk. Given the daily weight gain of foal, we can determine the daily milk efficiency of his mother. Usually commodity milk going for production of kumys in most kumys farms is 30-60% of the milk production of mares. However, in a small horse breeding farms where kumys is produced exclusively for their own use, 75-80% of the milk is sucked by foal, which, thanks to this, is growing rapidly even at low productivity of natural pastures [11]. It should be said that the high capacity and quality of mare's milk, which is the only feeding food in the first month of life providing exceptional locomotor activity of foals compared to newborn calves. Besides, daily average weight gain of foals is approximately twice as high as calves of mongrel cattle.

The selection of horses by lactescence historically conducted exclusively in regions of traditional production of kumys among local breeds, often in conditions of poor feeding, with low level of culture of animal breeding. However, due to national selection of horses in herd state (Kazakh Jabe, Bashkir, Kirghiz, Mongolian, Don, Kabarda, Yakut et al.), also their crossbreed with the factory breeds, especially draught horse differ with highest milk yield and lactescence index.

The average milk yield in the five months of lactation, listed breeds of mares ranges from 1730 to 2529 l. [8]. With high milking capacity (on average 18.4 l. per day in second and third months of lactation with individual fluctuation of milk yield 12-31 l.) characterized new-Kyrgyz horse derive from three-pedigree crossing of Kyrgyz, Don and marginally extent with purebred breeds [12]. This is probably because defined with high milking capacity but not large Kyrgyz breed improved with Don's breed to get large and massive exterior.

A significant indicator is the index of milk capacity, which determined by the amount of milk per lactation per 100 kg of live weight of mares and reflects the level of feed conversion. In the selection of mares on the kumys's farm should take into account the optimal ratio of milking capacity

and live weight at which the feed efficiency will be higher. With standard of dietary intake, breed's characteristics are in first place in their effects on milk production of mares. In dairy horse breeding, the selection works based on milk production is especially actually in the formation of livestock on large stationary kumys farm where costs for feeding and maintenance of animals expensive. At relatively not big, but massive with the broad constitutions mares as breed type Kazakh Jabe, Bashkir, new-Kyrgyz, index of milk production more: 580 – 680, than at racehorse and trotters breeds who have around 260 – 400, that in our opinion, is due the selection for speed. In trotters and racehorses, breast sizes are relatively small.

Milking capacity of mares usually determined over a period of five seldom six months of lactation. The optimal period for animal yield considered April, in May starts milking; about 50% of the milk is sucked by foal at nighttime. The share of milk sucked by foal is usually higher in herds horses on natural often unproductive pastures conditions. Therefore, in Mongolia for normal growth and development of foals mares usually milked for the three summer months, per day only about 2 liters of milk [11]. At stable and stable-grazing content, when milking mares presented by draught horses and their crossbreeds gets a more varied and nutritious diet and able to increase of milk portion and duration of lactation up to 6-7 months [13]. For dairy horse, the duration of lactation is important economically useful criteria. It was established that under normal production conditions quite easily develop conditioned reflex to return of milk during milking. This allows to milked after completely weaning of foals (usually after 6 months) for another 3-4 months without reducing milk production and decay of lactation. Lactating period of pregnant mares on average 201 days (80 to 364). Single mares can feed of foals in next year even in third year if mare not pregnant [14]. However, development of a new pregnancy is going parallel with lactation. However, at some specified phase, often starting with 180-185 days germ exerts an inhibitory effect on lactation. Duration of lactation in mares and their milking capacity depends on several factors, primarily feeding, milking conditions, breed, constitution, individual characteristics etc., it is shows its significant variability. The duration of lactation of mares from 4 years to 16, changes very slowly. However, with age of animals milk yield regular increase. Usually mares aged 5 to 6 years give more milk than three years old. Significant increase in milk production comes from the first to the second lactation and from the second to third. Milk productivity of mare's increases until fifth lactation then stabilizes and remains at a high level until 11-12 lactation. However, of mares older (18-21 years) also often have high milk yield. Nevertheless, most often, increasing of milk productivity of mares occur until fifteen years old, and then begins to decline [15, 16, 17].

Lactation curve characterizing the dynamics of milk productivity, increases from the first to the second month and then gradually decreases. Animals with medium milk productivity has of lactation curve starts lowering from the third month of lactation. Lactation curve of mares with hight milk productivity increases from the first to the fifth of the month, and then sharply go down. G.K.Chhaidze (1955) notes that the nature of lactation curve is stable sign and is inherited [18]. For most mares is typical of damping of lactation curve, while the level of milk productivity in late of lactation depends on mares's milking capacity [13]. Total milk productivity of mares is directly dependent on the duration of lactation, as well as the nature of the lactation curve. Most farms milking of mares is seasonal and limited from May to September. Differences of the lactation curve explained by specifics of breed of horses, as well as feeding and other conditions. These individual characteristics mares should considered in breeding, selecting dam, duration of high level of milk yield.

Variability of quantitative traits, one of which is milk productivity, is the result of a complex interaction of polygenic systems and numerous environmental factors. With long-term purposeful of selection of criterion, its changeability is reduced. The above data indicate reserves of genetic potential of milk productivity of horses, which theoretically is not inferior to that of cattle and can be implemented under purposeful breeding works and the proper level of condition of keeping livestock. Currently the selection of mares for farms conducted by external signs of milk productivity from of different breeds and crossbreeds. Became the time for establish of specialized dairy lines, breed groups and breeds of horses with high dairy index and quality milk. Breeding of milk type horses, in our opinion, should be carried out in two directions: 1. receive of high milking lines adapted to technology of stables stable-grazing on stationary kumys farms with year-round production cycle inclusive an established system of storage and processing of dairy products; 2. The improvement of local breeds (Kazakh Jabe, Kyrgyz, Bashkir et al.) and their crossbreeds with more massive breeds Don adapted to the content of herd on natural pastures for seasonal farm kumys farm working in warm period of the year;

Dairy breed groups and lines, characterized by high milk yield, longer lactation period and quiet high quality milk for stationary kumys farms of industrial type, is reasonable derive based on a carthorse (Latvian draught, Soviet, Russian, Vladimir carthorse, or by selection of hybrids with local breeds with high milking properties. Carthorse breeds differing large body mass (700-850 kg) in conditions of abundant feed and stable-grazing demonstrate a high index of dairy and highest daily milk productivity (15-30 l) [19, 20 21]. Record of Soviet Union on dairy owned to mare Bishe – Lithuanian carthorse with dairy productivity 7003 l. for 303 days of lactation and mare Rebina – Soviet carthorse breed – 6143 l. for 323 days of lactation.

For normal secretion important, that accumulated milk should suckled by colt or milked. Healthy foal in the first two months to 40 – 60 times a day sucks mother, thereby stimulating the synthesis of milk. Steppe breed of mares milked in 2 – 3 hours, and trotter and riding breed milked in 1.5 – 2 hours, as they have smaller udder. After the maximum yield of milk for 2 to 3 months of lactation milk yield mares decreases, so the intervals between milkings usually increased to 3 – 3.5 hours, and by the end of lactation to 4 – 5 hours.

The composition of the raw mare's milk

In many cases, raw mare milk and kumys does not correspond to entered in 13.10.2008 State Standard of Russian Federation by main organoleptic, physical-chemical, microbiological indicators, as is evident from table 1 which reduces the quality of all made from mare's milk products (kumys, yoghurts, creams, pastes, tablet and powdered milk). The composition of milk is very unstable and depends on breed, age, season of the year, feed, physiological condition of the animals and the conditions of keeping mares. Especially varies content of fat and total protein in milk, while mass fraction of lactose is relatively stable. Meanwhile, many researchers have shown that the chemical composition of mare's milk, including the content of fat and protein in a wide range depend of the quality of grazing in herd and ration in stable content with feed mixtures inclusive of variety of biologically active vitamin and mineral supplements [22,23].

Table 1 – Russian State standard to raw mare's milk and kumys, as well as literary and own data

Criteria	Mare's raw milk by State standard of Russia 52973-2008	Mare's raw milk by own and literature data	Kumys by State standard of Russia 52973-2008	Kumys by own and literature data.
Specific gravity, g/cm^3	1.032 г/см^3	1.031-1.035 g/cm^3	—	1.011-1.028 g/cm^3
Lactose	5.8-6.4%	5.8-8.1%	—	1.2-3.8%
Crude protein	No less 2%	1.6-3.27%	No less 2%	2.0-2.48%
Fat	2.0-2.48%	0.6-2.5%	2.0-2.48%	0.90-2.1%
Acidity – ^{0}T	5.0 – 6.0	4.0-12.0	No more 80.0	80.0-160.0
Somatic cells in 1 cm^3	2 x 10^5	—	—	—
Mesophilic microorganisms	No less 5x10^5/ см^3	—	No less 1x10^7/ см^3, yeast – no less 1x10^5/ см^3.	—

The protein content of mare milk varies between 1.6-3.27%, and fat in an even wider range of 0.6-2.5%. Higher content of protein and fat detected in milk of local breeds who adapted to year-round herd of content, as well as from some carthorse breeds [21, 22].

On the content of proteins, the mare's milk is considerably inferior to milk of other farm animals, but mare's milk proteins have been studied not enough. Was not extracting any homogeneous protein, there is only information about the electrophoretic fractions of casein and whey proteins. It should emphasized that horse's milk protein have completely different structure than ruminants. The specific of mare's milk is the predominance of serum proteins, whereas cows and sheep dominated much caseins. The index of bioavailability of whey protein is 110-159, casein-77. Whey proteins contain a high concentration of essential amino acids (valine, leucine, isoleucine, lysine, tryptophan, tyrosine, and arginine, etc.), is easily soluble in water and easily assimilable. Besides of proteins in the milk of mares

has other nitrogenous substances, peptones and amino acids unconjugated with protein [24]. Urea and ammonia are contained in small amounts in cow's milk in mare milk are absent.

Nutritional and biological value of proteins determined by their amino acid composition, especially by content of essential amino acids. During maturation of kumys by microorganisms occur proteolytic hydrolysis of serum proteins that lead to enrichment kumys with peptides and free amino acids, which absorbed by the body at lower voltage major digestive glands. Ascertained that in fresh milk of mare contained in free form aspartic and glutamic acid, glycine, threonine, alanine, asparagine + lysine, isoleucine + leucine traces cysteine, histidine, arginine, proline, valine and glutamine in a high concentration. During maturation of kumys occurs enzymatic and acid hydrolysis of proteins to form various polypeptides and even free amino acids. Initial concentration of amino acids increases in two-ten times. For example, the content of cysteine + cystine, histidine, arginine, proline, methionine+valine in maturated kumys increased respectively 2.8; 8.0; 5.8 and 4.2 times. The maximum content of amino acids: cysteine, serine, aspartic acid, glutamic acid, alanine, proline, tyrosine, and essential amino acids lysine, histidine, threonine, tryptophan, methionine, valine, phenylalanine, isoleucine, leucine in fully saturated of kumys observed with acidity 140 degrees by Turner [24]. On table 2 shows the contents of kumys of Mongolian mares in free amino acids. The main carbohydrate of mare's milk is lactose, fraction of total mass of which is more than half of the dry residue. Concentration of lactose most changes during maturation kumys because it is main source for energy microorganisms. So according A.G. Valieva, as far as fermentation of kumys lactose decreased from initial 6.33% to 2.99% in a strong kumys [24]. According Z.S. Seitova (2004) during the fermentation of kumis the sugar content decreases in 48 hours from 6.25% to 0.98% and concentration of lactic acid and the alcohol increases, while forming of carbon dioxide. Fermentation process reduces the specific gravity from 1.032 g / cm3 to 1.021 g / cm3, and the dry substance in milk, 9.94% to 7.04% [24].

Table 2 – Amino acid analysis of the Mongolian kumys

Sample of kumys	Asp	Thr	Ser	Glu	Gly	Ala	Val	Met
	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml
1	2.0	2.0	12.0	18.0	5.0	16.0	3.0	1.0
2	4.0	4.0	3.0	28.0	4.0	16.0	4.0	2.0
3	1.0	1.0	2.0	5.0	3.0	9.0	2.0	1.0
4	2.0	1.0	2.0	13.0	2.0	7.0	2.0	2.0
5	4.0	4.0	6.0	16.0	4.0	15.0	5.0	2.0
Sample of kumys	Leu	Tyr	His	Phe	Lys	Arg	Pro	Ile
	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml	mg/100ml
1	9.0	4.0	3.0	4.0	3.0	6.0	29.0	3.0
2	11.0	0	0	5.0	3.0	0	10.0	0
3	5.0	0	0	3.0	2.0	0	22.0	0
4	9.0	4.0	0	3.0	3.0	4.0	12.0	0
5	15.0	5.0	3.0	5.0	8.0	0	11.0	5.0

Physicochemical properties of fat of mares's milk also significantly different from fat of cow milk. Its melting point is 21-23 °, whereas cow's milk fat melts at 26-34 °. Iodine value of fat in mare's milk ranges 80-108, whereas in cow fat this figure is 25-40. Fat globules in milk of mares smaller than in cow's, so they are easier absorbed, but churn them more difficult. Fat of mare's milk obtained by fat rendering has the consistency of petroleum jelly and has a specific smell of drying oil, indicating its low stability, i.e. fast oxidation due to the presence of unsaturated fatty acids and low molecular weight. Therapeutic and prophylactic properties kumys probably to some extent related to the content of these essential fatty acids.

Mare's milk and kumys rich in vitamins, content of them several times more than cow's milk. Especially a lot vitamin C 100-200mg per liter. Sufficiently high content of vitamins B (thiamine, riboflavin, cobalamin, folate), vitamin A and E.

Milk also contains mineral substances: potassium, calcium, phosphorus and other. The total amount of ash in mare milk is 0,29-0,34%, proportion of calcium is 0,094-0,115% and the proportion of phosphorus 0.128 -0.140%. Half of the total of amount calcium in the milk included protein composition and well absorbed by the body. According to result, R. Kiryuhina in mare's milk contains from 2.7 to 16% cobalt, 20.5 to 42% copper and from 2.1 to 8.7% manganese. Mare's milk richer with cobalt and copper, poorer with manganese than milk of cow [25].

Storage of kumys

The most important components of mare's milk: albumin, polyunsaturated fatty acids, vitamin C, destroyed by heat treatment, even at pasteurization, which complicates its storage and preservation. Therefore, compliance with all sanitary and veterinary standards in dairy horse breeding is of fundamental importance. The simplest and oldest way save the mare's milk is its freezing followed by thawing. Unfortunately, Kumys perishable milk product, even at low temperatures 2-6 C sours after 4-5. As mare's milk, it loses its properties after heat treatment.

However, MH Shigaeva and M.Sh. Ospanova (1982) developed a method of preparing kumys from soft (65 0 C) pasteurized milk, which keeps flavor qualities at temperature – 18-20 C for up to two weeks. ZS Seitov he developed and patented the technology of preparation of natural kumys from mare's milk that can be stored without loss of original properties up to 10 months.

In Mongolia, last collected kumys in September is freezed for use during the New Year holidays [11]. In Yakutia is freezed mare's milk at -25 C from which, after several months of storage by conventional techniques makes kumys [26]. A similar method of storage of milk is used kumys farm Hans Zollmann in Germany. At the same time, it was shown that after a simple freeze kumys at 20 C followed by thawing, it loses its classic quality and taste [16].

Among all the methods proposed for long-term storage of mare's milk, more optimum is in results and material and labor costs is drying. Drying of milk using vacuum apparatus removes moisture 98%, without subjecting the denaturation proteins and other undesirable changes. In result produced powdered milk, which is recovered by dissolving in boiled water then fermentation for 2 days till kumys. In Austria, has developed an innovative technology for producing dry concentrate mare's milk by freeze at a certain temperature. In general, the problem of affordable and effective method of preservation of mare's milk and kumis preserving their quality not completely solved.

The technology of manufacture and storage kumys

Traditionally manufactured from raw mare milk, the major components of which (albumin, fatty acid, vitamin C) destroyed by heat treatment, including pasteurization. Therefore, the whole process of milk production requires strict sanitary and veterinary standards. For traditionally manufacturing kumys very important tank, «saba» made of skin of horse, colt or a goat due to the nomadic lifestyle and lightweight, easy to transport andhas quite big. Currently kumys farms are widely used containers of wood and of stainless steel. In Germany, fresh milk is stored in iron containers. In Mongolia, along with traditional containers of cowhides for the manufacture kumys widely used plastic containers [11]. Saba and wooden tank during season several times fumigated with juniper or meadowsweet for sterilization.

Mandatory condition for obtaining a good kumys is its frequent agitation during fermentation special wooden whisk with holes at the end. Thousandfold shaking of kumys enhances alcoholic fermentation under the influence of aerobic yeast milk, as well as breaking protein aggregation at a fine fraction. The technological process of industrial production kumys consists of the following: a) raw material processing (filtering, to determine the quality of milk); b) yeast fermentation and shaking for 60 min. by mixer at temperature 26- 28 C; c) spill in glass bottles, capping, labeling; d) maturation at room temperature for 2-3 hours; d) cooling to 6 C; e) storage and transport at t. 4-6 C). Depending on the time of ripening, kumys divided into 3 categories: mild (maturation 1 day), medium (maturation 2 days); strong (maturation of 3 days).

Therapeutic effect of kumys and unique taste is due with not only composition of mare's milk, but also with unique microorganisms and their metabolic products. In microbiocenosis kumys dominated Bulgarian and acidophilic lactic acid sticks and milk yeast *Torula lactis*. In addition, lactic acid bacteria play an important role in the maturation and impart specific flavor qualities (flavor, texture, pH, etc.), a yeast provide fermentation of lactose in result that formed of alcohol, the concentration of which can be up to 3% [27].

Research of M.H.Shigaevoy and M.N. Ospa-

novoy (1983) showed that the composition of the microflora contain *Lactobacillus casei, Lactobacillus vulgaricus, Streptococcus lactis* [28]. Later, from sample of kumys in Almaty region was isolated as 1 strain *Streptococcus cremoris*. As for the yeast fermentation, the main type according to State standard considered *Saccharomices lactis strain Sk*, also extracted by M.H. Shigaevoy M.H. Ospanovoy *Torulopsis spaherica*, *Torulopsis kefyr* [28]. The antimicrobial effect of lactic acid bacteria used in humankind one form or another for many centuries to extend the shelf life of food with the concomitant lowering of pH, as well as biologically active substances having a bactericidal effect on a specific group of microorganisms, including pathogenic forms. During manufacturing kumys comes complete destruction of colon bacillus and proteolytic bacteria are killed on 90%. [16].

Explanation of the antagonism of lactic acid bacteria given from specific antibiotic substances of protein nature – bacteriocins. Bacteriocins – heterogeneous bacterial system, a variety of levels of activity, spectrum and mechanism of action, molecular weight, physical and chemical properties, but the main biologically active part of bacteriocins is the protein component [29, 30]. Bacteriocynogenity – a phenomenon regular for almost all kinds of bacteria. Ecological importance of bacteriocins, synthesis of these substances performs a major role in competition in population.

Interest in the use of bacteriocins produced by Lactococcus recently surged due to only one of the antibiotics, recognized by the European Parliament, as safe as a food preservative, considered bacteriocin nisin. Nisin is not an alien substance for human digestive tract so long as lactococcus isolate of nisin from nasopharyngeal and feces of animals and humans. It established that these strains important for ecological balance group of lactic acid bacteria of the intestinal tract. As the protein with low molecular weight, nisin is easily digested, without affecting the microbiota of the gastrointestinal tract, non-toxic [31, 32]. Describes several forms of nisin (A, B, C, D, E, Z, R, Q) which are different strains of the subspecies *Lactococcus lactis subsp. lactis*. However, the activity described natural producers of low (579 to 1886 IU / ml) and antimicrobial spectrum of activity of nisin distributed mainly on gram-positive bacteria [33, 34]. In this regard, the screening of natural strains of Lactococcus of the natural habitat of lactic acid bacteria, in different species of farm animals and dairy products therapeutic and prophylactic purposes identification of strains has scientific and practical importance. By L.G. Stoyanova identified and selected from national product of mixed lactic acid and alcoholic fermentation of different territorial zones most promising natural strains of mesophilic Lactococcus: strain 119h activity with 3700 IU / ml (AS № I55I744) and strain 194 with an activity of 3600 IU / ml. Strains identified as Lactococcus lactis subsp. Lactis [35].

Table 3 presents our data of microflora isolated from kumys of Mongolia, among which were not described in local literature. Species of lactic acid bacteria and yeast, including Lactococcus lactis subsp. Lactis wide antimicrobial, including fungicidal action.

Table 3 – The microflora isolated from kumys of Mongolia.

lactic acid bacteria	yeasts
Lactobacillus acidphilus	*Kluyveromyces marxianus var.marxianus*
Lactobacillus delbrueckii subsp.*bulgaricus*	*Kluyveromyces marxianus* var.*lactis*
Lactobacillus delbrueckii subsp.*lactis*	*Kluyveromyces mesenteroides*
Lactobacillus paracasei subsp. *paracasei*	*Saccharomyces cerevisiae*
Lactobacillus paracasei subsp.*tolerans*	*Saccharomyces florentinus*
Lactobacillus plantarum	*Saccharomyces fragilis*
Lactobacillus rhamnosus	*Debaryomyces polymorphus*
Lactobacillus lactis subsp.*cremoris*	*Debaryomyces hansenii*
Lactobacillus brevis	*Candida kefyr*
Lactobacillus helveticus	*Candida tropicalis*
Lactococcus lactis* subsp.*lactis	*Torula delbrueckii*
Streptococcus salivarius subsp.*thermophilus*	
Pediococcus acidilactis	
Leuconostoc oenos	

Conclusions

1. There is large reserves of breeding work to develop a consolidated high milk lines of horses, when used as a dam of local breeds and their cross-breeds with the Dons or with carthorse by selection based the duration of lactation, milk productivity and quality of milk;

2. Necessary the development of standards and recommendations on the conditions and feeding mairy mares in order to guarantee of milk production and kumys respective to state standard;

3. There is the actual problem of the development of new and available technologies for mare's milk and kumys with long-term storage and preservation without loss of quality;

4. Have good prospects wide search in geographically remote areas of new strains of microflora, providing of kumys with most pronounced nutritional and medical-preventive properties.

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