Қарасай ауданының «Талғат» ШҚ-нан (2-сау тасымалдаушы); Қостанай облысы Қостанай ауданының «Ерғали» ШҚ-нан (3 ауру жылқы, 1 сау тасымалдаушы) алынды. Зерттеулер нәтижесінде гиалуронидазаның жылқы сақауының дерттенуіндегі рөлін анықтап, сақау ауруының жіті өтуі мен стрептококктардың гиалуронидазалық белсенділігінің арасындағы байланысты көрсетеді.

Кілт сөздер: гиалуронидаз, сақау стрептококк, изолят, синовий сұйықтығы.

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EFFECTIVE FERMENTED MILK TECHNOLOGY FROM A CAMEL MILK

Abstract

Based on integrated scientific-research works on improvement of traditional technology for the production, storage and processing of the camel milk, for the first time in the practice of domestic camel husbandry, new competitive, unique, promising technologies of the camel milk storage and processing have been developed by the method of cryosublimation with preservation of all natural properties of shubat for production of its dry powder, tableted shubat, sachet-granules from the dry shubat powder.

Key words: camel milk, shubat, processing, sublimation, dry powder.

Introduction

The Republic of Kazakhstan is a camel-raising country in the world, where camel population annually increases on 10% [1]. On this account, we observe a positive dynamics in increase of a camel milk production. However, considering a lack of scientific developments on production technology of milk products from a camel milk, produced milk products do not meet international quality and management requirements, a proteic coefficient (fat and protein relation in a milk). That troubles its use in the quality of a product of a mass consumption on the world market and production of baby food.

The camel milk is a curative natural product able maximally satisfy needs of a human body in macro-microelements, vitamins of "B" and "C" groups. An energy value of the camel milk is 911 kcal in 1 liter, at the same time, the energy value of a mare's milk is equal to 528 kcal and a cow milk is 660 kcal only. Besides, there is no a proteic allergen in the camel milk as against to the cow milk, which damages a pancreas. More than 30 items of curative-dietetic milk products, which have a great run both in domestic and international markets, can be produced from the camel milk. By scientific data, a shubat of the camel milk contains antibodies, which have properties of a natural immunomodulator and can be effectively used as polyvitaminic means in a treatment of such diseases as chronic diseases of the respiratory apparatus, the digestive apparatus, gastritis, affection of the liver, bile passages, small and large intestine, diabetes, psoriasis [2].

By data of T.Sh. Sharmanov, Academician of RK NAS, director of Academy of Nutrition of the Ministry of Health of the Republic of Kazakhstan, a clinical performance is achieved in a treatment of chronic tuberculosis, affection of the leaver, cholecystitis, biliary dyskinesia by the shubat. There is reduction in local phenomena of pain, a pickup of a bile outflow, reduction in an engorgement, inflammatory processes in a biliary of a gall bladder [3].

By data of national and foreign scientists, a daily drinking of a half of a liter of the shubat 30 minutes before meals during six months can help to cure such diseases as cancer, AIDS, Alzheimer's disease, gastrointestinal problems and cardiovascular system diseases [4].

On the basis of the camel milk curative features, the Department of Agriculture and food industry of the United Nations has concluded to provide population of Europe, America, Africa and Asia by fermented milk products from the camel milk. Many leading companies of Japan, European Union, USA and Australia, producers of the milk industry, are interested in the curative milk products from the camel milk [5].

Actuality: Seeing an increasing demand of domestic and world market in the fermented milk products from the camel milk, the actual is assortment extension of the camel milk products. With a view of effective transportation, the derived qualitative shubat should be deeply processed by sublimation to prepare dry shubat from the camel milk, with retention of organoleptic, biochemical properties and mineral composition in recovery, which will be popular among consumers at the internal and external markets.

Scientific and practical value is in improved shubat technology from the pasteurized camel milk, keeping organoleptic properties and biochemical composition common to the natural camel milk. We have developed an innovative technology for sublimation of the shubat into a dry powder. 2 innovative patents of the Republic of Kazakhstan for the developed qualitative shubat and dry powder have been received. Independent experts from "Academy of Nutrition" CJSC of the Ministry of Health of the Republic of Kazakhstan have evaluated the derived natural shubat and dry powder in the city of Almaty.

The camel milk differs by high bactericidal power. Its initial acidity is kept during 48 hours at normal temperature in 19-22ºC, then the camel milk sours. Farm and peasant economies usually do not pasteurize a camel milk when preparing shubat traditionally. Therefore, more than 80% of the shubat has high bacterial content in more than 1.5 million bacteria in a liter of the milk. Moreover, camels, as any cattle, are amenable to tuberculosis and brucellosis. Private farms seldom provide veterinary inspection of animals.

To produce shubat according to the Standard of the Republic of Kazakhstan 166-97 "A camel milk for processing into shubat", it is necessary to use pasteurized camel milk. However, there is no perfect temperature conditions for the pasteurization and its duration. It is vulgarly supposed that during the pasteurization, the camel milk loses its feed values and qualitative characteristics, for example, vitamins, and therefore, the derived shubat is of poor quality.

By scientific findings of P.V. Kugenyev, a camel milk pasteurized at temperature in 85-87ºC without ageing is used to produce a shubat. However, the ageing without definite time does not give opportunity to produce shubat with silky, effervesce flavor perception [6].

The camel shubat by its biochemical properties is a short shelf-life product. Because of the increased acidity and effervescent property, it sours after 4-7 days, even while storing in refrigerated coolers at temperature in +4-6°C, and becomes outworn. Because of the increased acidity, it practically cannot be transported to long distances. In this connection, determination of optimal processing time for the milk pasteurization after camels' milking operation, acceptable in conditions of farm, peasant economies and private economies before delivery of the qualitative shubat to the consumers, has national economic importance. One of the efficient and simplified methods for decontamination of the milk from bacteria is pasteurization of a freshly drawn milk.

Research methodology

The method to reduce the bacterial content for production of the high quality shubat was carried out by adjustment of optimal pasteurization modes (in different temperature modes) of the milk. The camel milk pasteurization was carried out in three modes, at temperature in 55˚C during 20, 30, 40 minutes; at temperature in 65˚C during 10, 15, 20 minutes; at temperature in 75˚C during 3, 6, 9 minutes.

In a result of experimental studies, it was established that the milk appropriate to the Standard of the Republic of Kazakhstan 166-97 should be filtered through a double cheesecloth stratum and pasteurized at temperature in 75˚C during 3 minutes, then cooled down to 26˚C. The pasteurized cooled milk is poured into wooden 100 liters containers (beechen, oaken) in amount of 60 liters and shubat inoculum in amount of 20 liters is added. The mixture is blended by a dasher during 25 minutes. Then, it is settled during 15 hours at temperature in 21˚C for ageing of the shubat. After 15 hours, this shubat is intensively mixed during 15 minutes. The product is cooled down to +8˚C and poured into glass containers and bottled into plastic bottles of 1.0 – 2.0 liters, according to the Standard of the Republic of Kazakhstan 166-97 as is common in the milk industry. In a result we obtain the shubat with alcohol content in 0.8-0.9%, of a uniform consistency, with delectable flavor and shubat fermented milk odor, thick, firm, average effervescent, homogeneous without flocks, silky, nappy (Figure 1).

Independent experts from “Academy of Nutrition” CJSC have evaluated feed and biochemical values of the shubat in the city of Almaty (Table 1).

The shubat biochemical analysis results show: fat content is no more than 4.5%; protein content is no less than 3.6%; carbohydrates content is no more than 6.0%; free acidity temperature is 95-125ºC.

Table 2 shows microbiological characteristics of the prepared shubat.

Table 1 Physical-chemical characteristics of the shubat from the pasteurized camel milk

Characteristics	Weight fraction	Regulatory documents for test methods
Fat content, mass % (no more than)	4,5	58-67-90 RK standard 09-39-99
Protein content, mass % (no less than)	3,6	23327-98 RK standard 09-41-99
Carbohydrates content, mass % (no more than)	6,0	3628-78 standard
Moisture content, mass% (no more than)	86,5	3626-73 standard
Free acidity, T	95-125	3624-92 standard

Figure 1. The camel milk natural shubat

Table 2 Microbiological characteristics of the shubat from the pasteurized camel milk

No.	Characteristics	In fact received	Permissible rates	Regulatory documents for test methods
1	Total amount of viable microorganisms in 1g of the product	$< 1{,}5 \times 10^2$ 0,3 mln.	$< 5 \times 10^4$ 0,5 mln.	9225-84 standard
2	Coliform bacteria in 0.1cm of the product	Not detected	Unaccepted	9225-84 standard
3	Pathogenic microorganisms	Not detected	Unaccepted	305 19-97 standard

The shubat microbiological characteristics show total amount of viable microorganisms in 0.3 mln., in the permissible rate of 0.5 mln. coliform bacteria and pathogenic microorganisms haven't been detected. The bacterial content class pertains to the 1st class.

However, the freshly prepared shubat has short enough shelf life. An active process of self-aeration and fermentation begins in the shubat after 2-3 days. One of the main problems of the fermented milk products from the camel milk is impossibility to deliver the qualitative natural shubat to consumers and export to long distances because of the limited shelf life of the shubat.

On the ground of complex scientific researches to improve the traditional technology of production and processing of the camel milk, the authors, for the first time in the practice of domestic camel husbandry, have developed new, competitive, unique technology for processing of the natural shubat with appreciated feed value, in the form of dry powder.

The shubat sublimation method on a developed by us pilot arrangement is carried out in Kazakhstan for the first time. 4-day shubat is poured into containers by 1 liter capacity, rapidly freeze during 3-5 minutes, the frozen shubat is placed into a vacuum chamber of the sublimation arrangement УКС-3. The sublimation of the product is carried out by a multistage expansion in the sublimation chamber by АВЗ-20 vacuum pump in 6 stages with gradual supply of heat to the container's bottom. In the pressure reduction, moisture vapors are exhaled from the product and temperature of the product drops. The heat is supplied to the frozen product to provide acceleration of the sublimation, in a result, the water from ice passed into a phase state, the moisture from the product dawn down to a vapor state. The dry powder of the shubat preparation is carried out up to residual humidity of the powder in 4%. The whole sublimation process is controlled by special mechanisms of the arrangement.

The experimental studies have established that production of the dry powder of the shubat with moisture up to 4%, by the vacuum drying in the multistage expansion in the sublimation vacuum chamber with optimal temperature cooling and pressure conditions (Figure 2) allows the dry powder of the shubat maximally keep natural taste common to the natural product and keep its biochemical composition, i.e. content of protein, fat, vitamins, micro- and macro-elements, keeping all feed values of the shubat.

TECHNOLOGICAL PROCESS FOR MAKING OF SHUBAT'S DRY POWDER

Fig.2 – Arrangement for sublimation during drying condition process

Fig.3 – Sublimated powder of the shubat

In a result of the experiments, the dry powder of the shubat derived by the sublimation method is a light, loose mass of white color (Figure 3). The derived dry powder of the shubat (Figure 4) keeps its natural features more than 2 years, transported in a vacuum packaging to any place of the world without special cooling chambers.

The dry powder of the shubat derived at the sublimation drying, by its feed, energy and vitamin composition is a high-concentrated product. Results of a comparative analysis of feed values of the dry shubat derived by the vacuum and cryosublimation drying is shown in Table 3.

It follows from the analysis of Table 3 that the dry powder of the shubat (Figure 4), derived by the sublimation method on the experimental arrangement, maximally keeps all feed values of the camel shubat, such as protein, fat and the most important, one of the main values of the feed milk products, keeping of immunostimulating vitamin C, which was maximally kept. In the sublimation drying, preparation of the dry shubat from the camel milk occurs in short terms, during 6 hours. It is 2-2.5 times faster than in the vacuum drying.

Figure 4 – Sublimated dry shubat

Table 3 Independent experts of "Nutritest" LLP, "Academy of Nutrition" CJSC, certified experimental tests of the sublimated dry shubat on 27.10.2010, No.2 – 16/479-1p.

No.	Characteristics	The dry powder of the shubat		Regulatory documents for test methods
		Vacuum drying	Experimental sublimation drying	
Feed values, in % in 100g.				
1	Protein	23,3	30,29	23327-78 standard
2	Fat	39,6	48,4	5867-90 standard
3	Moisture	2,2	4,62	I.M. Skurikhin, 1987
4	Energy value, kcal/100g	561	590	SanPiN 04.01.071.03
5	Vitamin C, mg/100g	7,7	49,87	P No. 09-30-90

Conclusions

1. The authors have improved the preparation technology of qualitative shubat from the pasteurized camel milk, which keeps organoleptic and biochemical properties of the shubat.

2. The authors have developed the shubat sublimation technology into the dry powder with keeping of all natural features of the shubat.

3. The authors have established results of the shubat biochemical analysis: fat content is no more than 4.5%; protein content is no less than 3.6%; carbohydrates content is no more than 6.0%; free acidity temperature is 95-125ºC.

4. The dry powder of the shubat derived by the sublimation method is a light, loose mass of white color.

5. The dry powder of the shubat, derived by the sublimation drying method, by its feed, energy and vitamin composition is the high-concentrated product keeping all vitamins. Content of vitamin C is 49.87mg/100g, vitamin A is 0.278 mg/100g, E – 1.043mg/100g.

6. In the vacuum drying of the dry shubat keeping of vitamins A is 0.037mg/100g, E – 0.12mg/100g and C – 7.7mg/100g.

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ТЕХНОЛОГИЯ ЭФФЕКТИВНОГО ФЕРМЕНТИРОВАНИЯ ВЕРБЛЮЖЬЕГО МОЛОКА

Аннотация

На основании комплексных научно-исследовательских работ по совершенствованию традиционной технологии производства, хранении и переработки верблюжьего молока впервые в практике отечественного верблюдоводства разработаны новые конкурентоспособные не имеющие аналога перспективные технологии хранения и переработки верблюжьего молока методом криосублимации с сохранением всех натуральных свойств шубата для получения сухого порошка шубата, таблетированного шубата, саше-гранулы из сухого порошка шубата.

***Ключевые слова*:** верблюжье молоко, шубат, переработка, сублимация, сухой порошок.

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ТҮЙЕ СҮТІН ТИІМДІ ФЕРМЕНТТЕУ ТЕХНОЛОГИЯСЫ

Аңдатпа

Түйе сүтін өндірудің, сақтаудың және өңдеудің дәстүрлі технологиясын жетілдіру бойынша кешенді ғылыми-зерттеу жұмыстарының негізінде барлық табиғи қасиеттерін сақтай отырып кәдімгі шұбат ұнтағын алуға арналған, криосублимация әдісімен түйе сүтін сақтау және өңдеу, шұбатты таблетка түрінде және құрғақ ұнтақ шұбат негізінде шығарылатын қапшық түйіршіктердің жаңа бәсекеге қабілетті технологиялары әзірленді.

Кілт сөздер: түйе сүті, шұбат, өңдеу, сублимация, құрғақ ұнтақ.

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1-285 ТӘУЛІК АРАЛЫҒЫНДАҒЫ ЖАПОН ТҰҚЫМЫ АНАЛЫҚ БӨДЕНЕЛЕРІНІҢ БЕЗДІ ЖӘНЕ ЕТТІ ҚАРЫН БӨЛІМДЕРІНІҢ САЛМАҚТЫҚ ҮЛЕС ДИНАМИКАСЫН АНЫҚТАУ

Аңдатпа

Алынған нәтижелерді сараптай келе әр кезең аралығында безді және етті қарын бөлімдерінің салмағының жас ерекшеліктеріне байланысты көтерілгенін анықтадық.

Жас ерекшеліктеріне байланысты безді және етті қарын бөлімдерінің қабырғаларының қалыңдығына оның өсу динамикасы бойынша анықталды.

Жас бөденелердің 40 және 60 тәулік аралықтарында безді қарын бөлімінің көлемі орташа есеп бойынша 9,1% құрады.

Кілт сөздер: Жапон тұқымды бөдене, безді қарын, етті қарын, салмақтық үлес, динамика.

Кіріспе

Бөдене шаруашылығы Қазақстандағы аграрлық сектордың маңызды бөлігін құрап отыр. Олай дейтініміз, оның құнды тағам өнімдері - жұмыртқасы өте құнды емдік антибактериалдық, иммундық және ісікке қарсы азық болса, етінің консистенциясы, дәмі, исі басқа құстардың етінен өзіндік айырмашылықтары бар. Сонымен қатар, бөдене саңғырығы органикалық тыңайтқыштың көзі ретінде ауыл шаруашылығы саласында таптырмас шикізат көзі ретінде маңызды [1].

Қазіргі таңда еліміздің құс шаруашылықтары саласында ет және жұмыртқа бағытында мол өнім беретін құс тұқымдарын өсіруді мақсат етіп қойған. Қазақстанда бөдене шаруашылығы ауылшаруашылық өндірісінің қазіргі таңдағы дамып келе жатқан жаңа саласы және көптеген шаруашылықтардың басшылары құс шаруашылығындағы бөдене жұмыртқалары мен етінің пайдалы әрі сапалы өнім екенін әлі де бағалай алмай келеді, және құс шаруашылығының бір саласы ретіндегі зор мүмкіндіктерін ескермей отыр [2,3].

Бөдене жұмыртқасы мен еті адам жүрегі мен ағзасындағы темірдің орнын толықтырып, ағзадағы радионуклидтерді сыртқа шығарады. Иммунитетті жақсартады.