OnLine Journal of Biological Sciences

Original Research Paper

Productivity of Horse and Camel Breeds from the Arid Zone of the Republic of Kazakhstan

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Article history
Received: 06-03-2023
Revised: 08-05-2023
Accepted: 12-06-2023

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Abstract: The purpose of the study is to determine the milk productivity and chemical composition of camel and horse milk. The research was conducted in the conditions of the south and southeast of Kazakhstan, where productive horse breeding and camel breeding were developed in the period from 2021-2022. When conducting experimental studies, the basic principles of natural maintenance and feeding of experimental animals were observed. The research results were processed using MS Excel software. The reliability of the difference in indicators (P) was determined by Fisher's criterion. The content of fat-protein-lactose-ash was 1.51, 2.35, 6.05 and 0.6% for mares of the Kazakh breed, 1.35, 2.23, 6.13 and 0.5% for the Kazakh Jabe horse and 1.29, 2.27, 6.2 and 0.6% for the Kazakh horse of the Adai offspring. In camels of the Kazakh Bactrian (Camelus bactrianus), the mass content of fat in milk, protein in milk, lactose, and ash were: 5.8 3.9, 5.1, and 0.9%. In dromedary camelids (*Camelus dromedarius*), the mass content of fat in milk, protein in milk, lactose, and ash were: 4.1, 3.4, 4.5, and 0.8%. The average staging live weight in a one-year-old Kazakh Bactrian was 243.8±8.9 kg and the removable live weight was 302.6±4.1 kg, that is, the increase in live weight was 24.1%. In two-year-old Kazakh Bactrians, the increase in live weight during autumn fattening was 15.9%, with an increase from 336.4-390.00 kg. The slaughter yield in 1.5-year-old Kazakh Bactrian was 52.6% and in 2.5-year-old camels-53.2%.

Keywords: Camelus Bactrianus, Camelus Dromedarius, Horse, Productivity, Молоко, Fattening, Prematurity, Slaughter Yield

Introduction

In the Republic of Kazakhstan, the dairy industry is mostly developing through dairy cattle breeding for productivity.

According to Nurtazi *et al*., the local population still consumes traditional Kazakh dairy products when they are available. The most demanded in the southern regions of Kazakhstan are camel milk and fermented milk product shubat (Nurtazi *et al*., 2017).

In the world milk production industry, it is clearly noted that in some countries, due to the peculiarities of natural and climatic conditions, the development of dairy cattle breeding is difficult, for example, in the arid and semi-arid zones. The arid and semi-arid zones occupy a significant area (10.8 and 44%, respectively) (Faraz *et al*., 2018; 2020; 2021).

Therefore, it is advisable to consider options for the development of other sectors of dairy-productive animal husbandry, such as camel breeding, through the breeding

of Kazakh Bactrian camels (Baimukanov *et al*., 2019; Asylbekovich, 2020).

However, camel milk production is more efficient from dromedaries and hybrids, in comparison with purebred Kazakh Bactrians, due to their abundant milk content (Faye *et al*., 2008; Dioli, 2020).

Nikkhah in a review scientific article emphasizes that the milk of horses, camels, and yaks is available as a functional food in regions where it is difficult to breed dairy cattle (Nikkhah, 2011).

Dairy camel breeding in the arid zone of the southwestern region of Kazakhstan has the opportunity to occupy a premium-class niche in the near future. Camel breeding is the branch of productive animal husbandry that will allow involving more than 100 million hectares of desert and semi-desert lands into economic activity with the subsequent development of social infrastructure with all the attributes of a competitive market economy (Alibayev *et al*., 2020).

Camel breeding and horse breeding in areas with an arid climate are a priority for productive animal husbandry. Therefore, the breeding of horses and camels can be considered effective from the point of view of the economy (Farah *et al*., 2007; Baimukanov *et al*., 2020).

Of 5,170 registered farms, only 841 are registered as having livestock, with 452 farms owning more than 95% of the total livestock in this sector. In 2008, milk production in the country amounted to 5.2 million tons. Anton van Engelen goes on to note that the local population still consumes traditional Kazakh dairy products when they are available. Delivery is usually seasonal and prices are high. Koumiss and shubat are the main liquid traditional foods, while Kurt is the main dry traditional food. There are no reliable statistics on shubat, koumiss, and Kurt, since the bulk is sold through unofficial channels.

In an analytical review, Nikkhah notes that in European countries the consumption of natural milk ranges from 111 L in the UK to 184 L in Finland (Nikkhah, 2011).

The Kazakh horse and the Kazakh horse of the Adai offspring belong to the universal breed of animals. They are used in sports and productive directions. The Kazakh Jabe horse is considered to be a meat-milk type animal. But all of them are united by the fact that local breeds of horses have good adaptive qualities and are capable of year-round grazing. Not a few important factors that most strongly affect milk production are the development, shape, udder, and length of the teats. According to the dairy productivity of Kazakh horses of the Adai offspring and Kazakh Jabe horses, they can be attributed to the medium-milk group of animals and the mares of the Kazakh breed belong to the high-milk group of animals. Only horses of the Adai offspring are able to live on the Mangyshlak Peninsula, which is characterized by extremely continental climatic conditions.

Camels fatten well during the growing season of the plant community and the average slaughter yield reaches 50% (Morton, 1984; Hashi and Kamoun, 1995).

Males of one-humped camels significantly outnumber females in terms of live weight, meat carcass yield, and fat in the form of a hump (Kadim *et al.*, 2008; Australian Camel Meat, 2011; Ali *et al.*, 2011).

The fattening of camels of the Kazakh Bactrian breed is one of the most important economic activities that allow for increasing the production of camel meat and improving its quality by grazing on natural pastures (Alibayev *et al*., 2020).

The camels of the Kazakh Bactrian breed with milk productivity per lactation of 820.55 kg of milk, the peak of milk yield of 206.92 kg was noted at the 6th month of lactation, in August (Alibaev *et al*., 2022).

High daily milk yields of camel mothers are noted in the 2nd or 3rd month of their lactation. The content of fat in the milk of camels depended on the breed, season of the year, feeding and other factors and was in the range of 4.2-6.3% (Alibayev *et al*., 2021; Ermakhanov *et al*., 2022).

The research was conducted in the conditions of the south and southeast of Kazakhstan, where productive horse breeding and camel breeding are developed.

Aim of the Research

Based on the foregoing, taking into account the uniqueness of the local breeds of camels and horses in the Republic of Kazakhstan, the aim of the study was to determine the dairy productivity and chemical composition of milk: The Kazakh Bactrian camels breed of the Balkhash type and Turkmen dromedary of the Arvana breed of the Kazakh intrabreed type; Mares of the Kazakh breed of the southern population, Kazakh horses of the Jabe type of the southern population and Kazakh horses of the Adai offspring. To determine the patterns of fattening of the Kazakh Bactrian young stock on natural spring-autumn pastures, the formation of meat productivity of camels of the Kazakh Bactrian breed in the Balkhash zone during spring and autumn feeding.

Materials and Methods

The studies were carried out in 2021-2023 in the Republic of Kazakhstan. In the conditions of the Syzdykbekov farm of the Otyrar district, the Turkestan region, the Turkmen dromedary camels of the Arvana breed of the Kazakh intrabreed type of the southern population (KIBT-SP) were selected for experimental work, and on the territory of the Almaty region in Baiserke-Agro LLP research work was carried out on purebred Kazakh Bactrian camels of the Balkhash Type (BT).

Works on dairy horse breeding were carried out in the Bektobe farm of the Zhambyl district, the Zhambyl region, where the mares of the Kazakh breed of the Southern Population (SP) served as the object of study. In the Urker farm of the Moiynkum district, the Zhambyl region, mares Kazakh horses of the Jabe Type (JT) were selected.

In Taushyk LLP of the Tupkaragan district of the Mangistau region, the Kazakh horse of the Adai Offspring (AO) was chosen as the object of research. All experimental work was carried out on the territory of the Republic of Kazakhstan, so we used the instructions for assessing local horse and camel breeds (Baimukanov *et al*., 2019; Asylbekovich, 2020).

The marketable milk yield of mares during lactation was studied by the method of control milkings once a month for two adjacent days. Dairy productivity, consisting of actually milked milk and sucked by a foal, was calculated according to the Saygin Formula (1):

$$Dp = \frac{Da}{t}. x24 \quad (1)$$

Dp, daily productivity, liters.; *Da* actually milked milk, liters.; t-time of stay of mares in milking, h.; 24-number of hours in a day.

Scientific and economic experiments were carried out in 2021-2022 at the camel breeding farm of the Kerbulak branch of the educational scientific and production center Bayserke-Agro, LLP of the Talgar district of the Almaty region of the Republic of Kazakhstan. The object of the research was the Kazakh Bactrian colts of the Balkhash type. Based on individual data, in May 2022, an experimental herd of colts born in 2020 of various productivity directions was formed to study meat productivity in the spring-summer and summer-autumn seasons of the year.

To study the nutritional value, the main types of fodder plants of saltwort desert pastures were used.

The dynamics of the chemical composition and, in general, the nutritional value of saltwort fodder plants were determined during the growing season.

According to the actual data on the chemical composition of fodder plants and the pasture herbage as a whole, the total, energy, protein (including amino acid), mineral, and other nutritional values of the pasture diet were determined.

Depending on the objectives of the research, for analysis, first of all, those feeds that are considered the main ones in feeding camels were delivered and studied.

The determination of the total and energy nutritional values of the feed was made by the content of gross, digestible, exchangeable, and productive energy in them in Mega Joules (MJ), using the appropriate energy coefficients according to the formulas of the VASKhNIL (all-union academy of agricultural sciences) method.

The composition and nutritional value of the feed were determined by the analyzer FOSSNIRSDS 2500 (Sweden) serial number 91714226 (Ali *et al*., 2011).

To conduct experiments in the direction of productivity (meat and milk, meat and wool, and milk and meat), 5 colts were allocated, a total of 15 animals for fattening.

The technology of rearing camels of the Kazakh Bactrian breed is typical for the Balkhash zone, which includes the Almaty region. The content of camels is year-round grazing.

The spring fattening of young camels of the Kazakh Bactrian breed was carried out from May 3-July 3, since during this period in the Balkhash zone of the Almaty region, there is widespread stormy vegetation of ephemeral plants and other vegetation. That is, in the spring-summer period, the vegetation in the Kerbulak branch reaches its highest nutritional value and productivity.

Autumn fattening was carried out by us from September 15-December 1, during the secondary vegetation period of natural pasture vegetation in the Kerbulak branch.

When setting up and at the end of the fattening, the main measurements were taken from all the experimental colts. The gain in live weight during the fattening period and the ability to fatten were determined by weighing every 10 days.

Before setting up experiments on fattening, individual weighing of colts on electronic scales, recording brand numbers, and determining the age and fatness of colts were carried out. Fatness was determined according to the common method (Asylbekovich, 2020).

To study the meat qualities and chemical composition of the Kazakh Bactrian colts, a controlled slaughter was performed in the slaughterhouse according to the common method (Kadim *et al.*, 2014) and following the technological instructions adopted in the meat industry.

The quality of the carcass was assessed by the development of muscle tissue, the presence of fat deposits on the surface (watering), and the thickness of fat on the abdominal wall. In addition, we studied the ratio between the mass of meat (flesh) and bones in carcasses and cuts; the ratio of individual cuts in carcasses (Summer *et al.*, 2019).

When conducting experimental studies, the basic principles of natural maintenance and feeding of experimental animals were observed (Plumb *et al*., 1984). The research results were processed using MS Excel software. The reliability of the difference in indicators (P) was determined by Fisher's criterion (Asylbekovich, 2020).

Results and Discussion

Dairy-productive camel and horse breeding began to develop dynamically over the past 15 years due to increased demand from the local population.

The research results showed that the expected milk yield for 105 days of lactation was 598.5±35.8 kg for Kazakh Bactrian camels of the Balkhash type and 1207.5±64.7 kg for the Turkmen dromedary Arvana camels. However, the actual milk yield for 105 days of lactation was slightly higher than predicted and amounted to 630.5±21.4 kg in Kazakh Bactrian camels and 1260.3±45.8 kg in Turkmen dromedary (Table 1).

The milk content of the mares of the studied groups of Kazakh horses during 105 days of lactation was not the same. At 3-4 months of lactation, the mares showed relatively higher productivity. Then the milk yield gradually decreased and at the end of lactation, it dropped sharply. The not unimportant physiological factor that affects milk yield is pregnancy.

When studying the dairy productivity of three studied groups of mares, it was found that mares of the Kazakh breed have higher dairy productivity under grazing conditions. The predicted milk yield for 105 days of lactation was 1186.5±28.4 kg for Kazakh horses of the southern type, 756.0±22.6 kg for the Jabe horses, and 703.5±17.9 kg for the Adai offspring. The actual yield of marketable milk for 105 days of lactation in mares of the Kazakh breed of the southern population was 1447.5 L, of the Jabe type-846.72 L, the milk yield of mares of the Adai offspring was less than the rest and amounted to 823.0 L.

Thus, the milk yield of mares of Kazakh horses of southern populations exceeds 600.75 L in comparison with Kazakh horses of the Jabe type, and mares of the Adai offspring were inferior to them by 624.5 L.

Mares of the Kazakh breed of the southern type are superior in all respects regarding the chemical composition of milk (Table 2).

The content of fat-protein-lactose-ash was 1.51, 2.35, 6.05 and 0.6% for mares of the Kazakh breed of the southern type, 1.35, 2.23, 6.13 and 0.5% for the Kazakh horse of the Jabe type and the Kazakh horse of the Adai offspring 1.29, 2.27, 6.21 and 0.6% The results of the study of the milk chemical composition of the Kazakh Bactrian camels showed the mass content of fat in milk 5.8±0.09%, protein 3.9±0.05%, lactose 5.1±0.04%, and ash 0.9±0.03%. In the camels of the Turkmen dromedary of the Kazakh intrabreed type of the southern populations, the studied indicators were significantly lower in comparison with the Kazakh Bactrians. The percentage in camel milk was 4.1±0.05 for fat, 3.4±0.0for protein, 4.5±0.08 for lactose, and 0.8±0.04% for ash.

Spring fattening actively lasts 60 days. Autumn fattening lasts 76 days. In autumn, as a result of autumn precipitation, the secondary vegetation of pasture vegetation begins, in addition, autumn in the conditions of the Almaty region is longer than spring. In autumn, camels use various types of plants to fatten well.

In the semi-desert and desert zones of the Almaty region, natural sagebrush-saltwort-mixed herb pastures are characterized by low productivity and the uneven yield of fodder mass during the seasons. As a result, the balance of natural food resources develops extremely unfavorably, and the disproportion between summer and winter is especially great. This leads to the fact that the huge stocks of spring-summer fodder are not fully used by livestock farming, while at the same time, the most difficult and responsible period in animal husbandry-winter-turns out to be the least provided with forage.

Saltwort pastures are bushy mainly with graceful tamarisk (*Tāmarixgracīlis*), sierozemic wormwood *(Artemísiavulgáris)*, Turan wormwood *(Artemisiaturanica)*, Salsola orientalis (*Salsolaorientalis*), Caspian saltwort (*Halostachysbelangeriana*), knobby sarsazan (*Halocnemumstrobilaceum*), camel thorn (*Alhági*) with a large group of fodder species of succulent, semi-succulent, and dry annual saltworts, such as fleshy saltwort *(SalsolaruthenicaUjin)*, woolly saltwort (*Climacopteralanata*), Turkestan saltwort (*Salsolasoda*), shaggy halimocnemis (*Halimocnemis*) with some admixture of small-leaved seepweed (*Suaeda microphylla*), saline seepweed (*Suaeda salsa*) and others form the basis of natural fodder semi-shrub vegetation that dominate and are considered zonal.

In the indicated type of wormwood-saltwort pastures, the representative of dry saltworts is the Turkestan stag (*Ceratocarpusutriculosus*) with spherical prickly bushes with a spring-summer vegetation cycle.

In addition to saltworts, small amounts of spring ephemeral plants and ephemeroids develop in this pasture area, such as beaked sedge (*Carexphysodes*), bulbous bluegrass *(Poaceae)*, cheat grass (*Bromus testorum L*), Bonaparte's eremopyrum (*Eremopyrum bonaepartis*), wall barley (*Hordeumvulgare L*).

Among the valuable annual herbaceous plants without a large supply of food, there are Turkestan malcolmia (*Strigosellaturkestanica*), leptaleum-leaved (karashytyr), thin-stemmed astragalus (*Astragalusfilicaulis*).

Heavy trampling in sagebrush-grass types encourages microhabitat conditions favorable for a succession of sagebrush rather than perennial grasses. Although precise amounts of trampling damage cannot be predicted under open-range conditions, results similar to these might be expected to be found in larger-scale animals (Plumb *et al.*, 1984).

Table 1: Dairy productivity of mares and camels

	Average daily milk yield at the 3rd month of lactation, l		Predicted marketable milk yield, for 105 days of lactation, l		Actual marketable milk yield, for 105 days of lactation, l	
Breed, type	X ± m_x	Cv	X ± m_x	Cv	X ± m_x	Cv
Female camels						
Kazakh Bactrian	5.7±0.2	3.5	598.5±35.8	6.0	630.05±21.4	3.4
Turkmen dromedary arvana	11.5±0.3	2.6	1207.5±64.7	5.4	1260.03±45.8	3.6
Mares						
Kazakh breed C	11.3±0.3	2.6	1186.5±28.4	2.3	1447.05±32.4	2.2
Kazakh horse JT	7.2±0.6	8.3	756.0±22.6	2.9	846.72±23.9	2.8
Kazakh horse AO	6.7±0.5	7.4	703.5±17.9	2.5	823.00±25.8	3.1

Table 2: Chemical composition of milk of female camels and mares

	Fat, %		Protein, %		Lactose, %		Ash, %	
Breed, type	X ± m_x	Cv	X ± m_x	Cv	X ± m_x	Cv	X ± m_x	Cv
Female camels								
Kazakh Bactrian	5.8±0.090	1.6	3.9±0.050	1.30	5.1±0.040	0.80	0.9±0.03	5.5
Turkmen dromedary arvana	4.1±0.050	1.2	3.4±0.060	1.70	4.5±0.080	1.80	0.8±0.04	5.0
Mares								
Kazakh breed SP	1.51±0.04	9.3	2.35±0.03	5.10	6.05±0.08	3.12	0.6±0.02	3.8
Kazakh horse JT	1.35±0.03	12.7	2.23±0.05	7.78	6.13±0.05	2.80	0.5±0.03	4.5
Kazakh horse AO	1.29±0.03	9.5	2.27±0.06	8.60	6.21±0.04	2.05	0.6±0.03	4.8

Table 3: Nutritional value of warm wood -saltwort-mixed herb pasture in the spring-summer seasons (at natural humidity)

Content in 1 kg of feed								
Dry matter, g	Feed units, kg	Metabolizable energy, mJ	Protein raw	Protein digestible	Feed per 1 feed unit, kg	Digestible 1 feed unit, g	ME concentration on in 1 kg of dry matter, MJ	Digestible protein in 1 MJ ME, g
643	0.44	4.96	103	66	2.27	150	8.71	13.30

The nutritional value of fodder resources of wormwood-saltwort groups of desert pasture in the spring-summer period of their use was set. It has been established that 1 kg of forage (grass) consumed by camels of wormwood-saltwort-mixed herb pasture contains 643 g of dry matter, 0.44 feed units, 4.96 MJ of metabolic energy, 1a03 g of crude protein, and 66 g of digestible protein (Table 3).

Through a comparative analysis of the nutritional value of the main "camel" feed, the dynamics of grass stand yielding capacity and pasture forage capacity were determined (Table 4). The results of the research made it possible to determine that the gross yield and the feedstock eaten by animals differed significantly.

It has been found that with a fodder capacity of 0.85 head/ha, 1.17 ha of pasture area is needed to provide pasture forage for 1 camel in the spring season. With a fodder capacity of 1.14 head/ha, to provide pasture forage for 1 animal in the summer season, only 0.77 hectares of a similar area of wormwood-saltwort-mixed herb pastures are needed. Only 0.86 hectares are required to provide pasture forage for 1 camel in the spring season on the wormwood-saltwort-mixed herb pastures of the Kerbulak branch, in summer-0.71 hectares. The results of experiments on spring fattening of 12-month-old and 24-month-old colts are shown in (Table 5). In the spring period, one-year-old and two-year-old colts of the Kazakh Bactrian have a high gain in live weight (Table 5).

One-year-old Kazakh Bactrians, when put on spring-summer fattening, had a live weight of 180.2±4.9 kg. For 60 days of fattening, the gain in live weight was 63.6±1.2 kg or 35.3%.

In a two-year-old Kazakh Bactrian camel, when put on spring-summer feeding, the live weight was 273.7±6.5 kg, the removable live weight was 336.4±8.9 kg, that is, the absolute increase was 62.7±1.5 kg or 22.9% in relative terms.

During 60 days of spring-summer fattening, the average daily gain in live weight was 1060.2 g for one-year-old Kazakh Bactrian colts, and 1045.2 g for two-year-old colts. For the fattening of camels, the Kazakh Bactrian breed is most favorable from mid-September to December, we used this period for the autumn baiting of Kazakh Bactrian colts (Table 6).

Table 4: Dynamics of yield capacity, fodder value of grass stands of warm wood-saltwort-mixed herb pasture, and forage capacity of pastures in the spring-summer seasons of their use

	Warm wood-saltwort-mixed herb pasture	
Yield capacity and feeding value	Spring	Summer
Gross yield, dry weight c/ha	2.60	3.80
Eaten fodder stock of dry mass, c/ha	1.15	1.70
1 kg of feedstock contains		
Feed units, kg	0.67	0.77
Digestible protein, g	68.90	75.00
Conditional feed protein units, CFPU/kg	0.92	1.15
Carrying capacity, CFPU /kg	1.90	2.90
Fodder capacity, head/ha	1.15	1.40
Fodder capacity, ha/head	0.86	0.71

Table 5: The results of the spring feeding of experimental Kazakh Bactrian colts (n = 5)

			Direction of productivity			
Indicators	Age, Months	Duration of fattening, day	Meat, and milk	Meat-wool	Milk-meat	Average
Live weight at the beginning	12	60	175.8±5.80	189.4±4.50	179.9±4.90	180.2±4.90
of fattening, kg	24	60	284.9±7.30	261.2±5.80	275.1±6.70	273.7±6.50
Live weight at the end	12	60	239.2±4.20	243.8±6.50	248.4±6.20	243.8±8.90
of fattening, kg	24	60	341.3±9.60	329.3±9.30	338.7±8.40	336.4±8.00
Live weight gain, kg	12	60	63.4±1.80	54.4±1.60	68.5±0.95	63.6±1.20
	24	60	56.4±2.50	68.1±2.60	63.6±1.60	62.7±1.50
Average daily gain, g	12	60	1056.7±80.9	906.7±80.9	1141.7±60.9	1060.2±80.7
	24	60	940.1±96.7	1135.7±72.6	746.7±85.9	1045.2±97.3

Table 6: The results of the autumn fattening of experimental colts (n = 5)

			Direction of productivity			
Indicators	Age, months	Duration of fattening, days	Milk and meat	Meat and wool	Meat and meat	Average
Live weight at the beginning	12	76	239.2±4.20	243.8±6.50	248.4±6.20	243.8±8.900
of fattening, kg	24	76	341.3±9.60	329.3±9.30	338.7±8.40	336.4±8.900
Live weight at the end	12	76	298.5±3.80	308.4±4.30	300.8±5.80	302.6±4.100
of fattening, kg	24	76	394.2±7.30	383.7±6.70	392.2±7.20	390.00±6.80
Live weight gain, kg	12	76	59.3±1.20	64.6±1.90	52.4±1.50	58.8±1.700
	24	76	52.9±1.70	54.4±2.20	53.5±1.10	53.6±1.200
Average daily gain, g	12	76	780.2±77.9	850.3±91.4	690.1±85.2	773.5±71.8.7
	24	76	696.3±68.1	715.4±58.9	704.7±78.1	705.5±72.80

During autumn fattening, the average daily gain in live weight was 773.5 g in Kazakh Bactrian colts of one-year-old age and 705.5 kg of two-year-olds. The average production live weight in one-year-old Kazakh Bactrian colts was 243.8±8.9 kg and the removable live weight was 302.6±4.1 kg, that is, the increase in live weight was 24.1%.

In two-year-old Kazakh Bactrian colts, the increase in live weight during autumn fattening was 15.9%, with an increase from 336.4 kg-390.00 kg.

Since the colts of the Kazakh Bactrian camels in the studied groups were grown under the same conditions, the differences in their meat productivity were due only to genetic factors-heritability.

At the end of the experiments on fattening male camels (colts), the slaughter was carried out to study their meat qualities (Table 7).

All foal carcasses after spring and autumn fattening was highly rated for meatiness, were covered with an even layer of fat and were distinguished by well-developed muscle tissue, which is especially noticeable in the waist and back.

After 24 h of fasting, the average pre-slaughter live weight was 278.5 kg for 1.5-year-old Kazakh Bactrian colts and 369 kg for 2.5-year-old colts. The slaughter yield in 1.5-year-old colts of the Kazakh Bactrian breed was 52.6% and in 2.5-year-old-53.2%. The average coefficient of meatiness was 3.4 for 1.5-year-old Kazakh Bactrians and 4.5 for 2.5-year-old Colts. Moreover, the highest indicator of the coefficient was registered in colts of meat-milk (3.8-4.5) and meat-wool (3.4-3.9) direction of productivity, in comparison with the milk-meat direction of productivity (3.1-4.2).

Table 7: Meat productivity of experimental colts of the Kazakh Bactrian breed (n = 2)

The direction of productivity	Age, Months	Preslaughter live weight, kg	Carcass weight, kg	Slaughter yield, %	Coefficient of meatiness
Meat and milk	Eighteen	279.5	147.8	52.9	3.8
	Thirty	374.0	199.3	53.3	4.5
Meat and wool	Eighteen	285.0	152.5	53.5	3.4
	Thirty	369.0	198.5	53.8	4.9
Milk and meat	Eighteen	272.0	139.8	51.4	3.1
	Thirty	369.5	194.7	52.7	4.2
Average	Eighteen	278.5	146.5	52.6	3.4
	Thirty	369.5	196.6	53.2	4.5

Studies have shown that the dynamics of the content of milk sugar in camel and horse milk change over the months of lactation. From the beginning of lactation, an increase in lactose was observed and the maximum amount was noted at the fourth month of lactation. Starting from the fourth month and until the completion of the studies, the concentration of lactose began to decrease.

It has been established that 1 kg of forage (herbs) consumed by camels of sagebrush-saltwort-mixed herbs pasture contains 643 g of dry matter, 0.44 feed units, 4.96 MJ of metabolic energy, 103 g of crude protein, and 66 g of digestible protein.

During 60 days of fattening, the average daily gain in live weight during spring-summer was 1060.2 g for one-year-old colts of the Kazakh Bactrian, and 1045.2 g for two-year-old colts.

Based on the conducted research, we propose to expand the breeding area of camels and horses of the Kazakh population.

Conclusion

The research results of the dairy productivity of camels and mares showed a decrease in the protein content in milk in spring and the end of the lactation period. In summer, the protein content in milk is 16.5% higher. Another general pattern was observed with a decrease in milk yield, the fat content increases and the fat content in camel and mare's milk, starting from morning milking, gradually increases. By the evening milking, the fat content will increase by 1.3-1.7 times.

The content of minerals and ash is influenced by the period of lactation and the diet of feeding. Immediately after foaling, the content of ash and minerals is high. The data obtained differ from the research conducted in Mongolia (He *et al*., 2019).

It has been established that with a fodder capacity of 0.85 head/ha, 1.17 ha of pasture area is needed to provide pasture forage for 1 camel in the spring season. With a fodder capacity of 1.14 head/ha, to provide pasture forage for 1 animal in the summer season, only 0.77 hectares of a similar area of wormwood-saltwort-mixed herb pastures are needed. Only 0.86 hectares are required to provide fodder for 1 camel in the spring season on the sagebrush-saltwort-mixed herb pastures of the Kerbulak zone, in summer-0.71 hectares. The theoretical significance of the conducted research lies in the fact that the productivity of camels and horses of the Kazakh population has been determined for the first time. The practical significance lies in the expansion of the breeding area of camels and horses of the Kazakh population.

Acknowledgment

In the priority specialized direction of program-targeted financing for scientific, science, and technical programs of the Ministry of Agriculture of the Republic of Kazakhstan "development of animal husbandry based on intensive technologies" IRN BR10765072 "development of technologies for effective management of the breeding process of conservation and improvement of genetic resources in camel breeding".

Funding Information

IRN BR10765072 "Development of technologies for effective management of the breeding process of conservation and improvement of genetic resources in camel breeding".

Author's Contributions

Aidar Dastanbekuly Baimukanov: The head of the event, generalization, 17.5%.

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Dauren Maratovich Bekenov: Contractor, conducting experimental research, 15%.

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Ethics

All the principles of scientific ethics have been observed during the research work, there is no conflict of interest.

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