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БАЯНДАМАЛАРЫ

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[1]A.R. Akimbekov, [1]D.A. Baimukanov, [2]K.Zh. Iskhan, [3]M.M. Omarov,[4]Kh.A. Aubakirov

[1] Kazakh Scientific Research Institute of Animal Breeding and Fodder Production, Almaty, Kazakhstan;
[2] Kazakh National Agrarian University, Almaty, Kazakhstan;
[3]Innovative Eurasian University, Pavlodar, Kazakhstan;
[4]Taraz State University named after M.Kh. Dulati, Taraz, Kazakhstan

DAIRY PRODUCTIVITY AND MILK COMPOSITION OF MARES OF DIFFERENT GENOTYPES

Abstract. In the article, the materials of studies of the milking capacity of mares of different genotypes and the milk composition under the conditions of a stationary koumiss farm are presented. For the first time, the results of studies on the variability and interrelationship of the main components of milk and milk yield of mares under stable and pasture conditions are summarized and given in a comparative aspect. There are pedigree differences in the quantity and quality of milk, Novoaltaisk-Kazakh cross-breeds have a higher milking capacity, followed by the Kazakh mares of the Jabe type and the Don-Kazakh crossbreeds. During the lactation period, 1482.2 liters of commercial milk yield from the Kazakh mares of the Jabe type, 1513.4 liters from the Novoaltaisk-Kazakh hybrids and 1267.6 liters from the Don-Kazakh hybrids were received.

The highest fat content in milk was 1.79% in the Kazakh mares of Jabe type, in the Novoaltaisk-Kazakh hybrids it was 1.64% and in the Don-Kazakh hybrids - 1.52%. The protein content in milk of the Kazakh mares of Jabe type and the Novoaltaisk-Kazakh hybrids are practically the same 2.02 - 2.01%, and in the Don-Kazakh hybrids are only 1.87%. Variability of the fat content by lactation months is below the variability of milk yield and ranges from 5.06 to 7.88%. The correlation coefficient between milk yield and content of fat, protein, sugar had a negative value, and a positive relationship between the fat content and dry substance.

Keywords:genotype, milking capacity, lactation, variability, fat, protein, sugar, correlation.

Introduction

In the context of the complex mechanization of agricultural production, significant opportunities appear for the development of productive horse breeding in the direction of the production of koumiss and horse meat associated with extensive pasture lands in Kazakhstan (187 million hectares).

Great attention is paid to the development of horse breeding, especially herd horse breeding, as an important productive branch, in the Pavlodar region, where there are 8 million 235 thousand 900 hectares of steppe and semi-desert pastures and more than 135 thousand heads of horses, where horse herding is most effective. Herd horses, like many other species of animals, are able to selectively eat a necessary vegetation for them while free moving in the pasture area, which contributes to the production of environmentally friendly horse meat and koumiss [1].

Koumiss production in Kazakhstan has rich centuries-old traditions. Koumiss has always been a favorite drink for the Kazakhs and replaced the wine, mineral water and other drinks for them. The Republic annually produces about 24 thousand tons of koumiss, and by 2020 it is planned to produce up to 30 thousand tons.

In the solution of this problem, the transfer of dairy horse breeding to an industrial base, by means of the creation of large stationary koumiss farms, is of great importance. So, in the Pavlodar region, there are two stationary koumiss farms "Altai" and "Sakyp", which produce koumiss all year round.

Under the same conditions of feeding, care and maintenance, the mares of different breeds differ in unequal productivity in terms of quantity and quality. Therefore, a comparative study of the economic traits of horses contributes to the proper selection of the breed for certain specific conditions, that opens

up great additional reserves in increasing the production of horse breeding products. It is also important to study the nature and types of the interrelationship of the main selection characteristics of milking capacity: milk yield, fat and protein content in milk.

According to the chemical composition, the mare's milk differs significantly from the milk of other animal species, and the content of milk sugar and the qualitative composition of the protein is close to the human one. The similarity is also observed in the content of the "C" vitamin. The mare's milk is poorer in fat and protein than in cow milk. However, the milk of mares has a sugar content 1.5 times, and the vitamin "C" is almost 10 times more than cow's one. By the amount of lactose and ash, the mare's milk and human milk are almost at an early stage[2, 3, 4].

In dairy horse breeding, all these issues are not fully studied in the complex, while in dairy cattle breeding they are explored quite deeply [5, 6, 7]. This situation has determined the direction of our research.

The object of the research – milch Kazakh mares of Jabe type and their cross breeds from factory breeds, bred in the conditions of the "Altai" peasant farm of Lebyazhinsk district of the Pavlodar region.

The aim of the research. To study the production and chemical composition of milk of mares of different genotypes, to determine the degree of variability, the interrelationships of the main components of milk among themselves and with the milk yield.

Method or methodology of the work. Studies of milk productivity and the chemical composition of milk were carried out at the stationary koumiss farm of the "Altai" peasant farm in the Lebyazhinsk district of the Pavlodar region on three groups of mares in the period 2016-2017.

There were 30 milch mares under the experience, 10 of them were Kazakh of Jabe type, 10 heads of the Novoaltaisk-Kazakh and 10 heads of the Don-Kazakh cross breeds.

To characterize the development and type of body build, the test mares were measured and weighed. From each animal 4 measurements were taken: height at the withers, oblique body length, chest girth and metacarpus girth [8]. For the purpose of studying the features of the body build of mares, the indices were calculated: format, wide body, massive and boniness. The live weight of mares was established by weighing on a monochrome scales in the beginning and in the end of lactation before morning feeding and watering.

The maintenance of milking mares in autumn-winter period is horsy-pasture, and in spring-summer - pasture.

The mares were milked 6 times a day, with intervals between milking of 2-2.5 hours with the DDU-2 electric milking machine.

In the autumn-winter period, except pasture vegetation, the mares were given coarse and concentrated fodder by classes, taking into account the live weight and productivity[9].

Commercial milking capacity was determined monthly during lactation by the method of milking control, twice a month on two adjacent days. Milk productivity was calculated taking into account the milk sucked at night by the formula of Saygin I.A. [10].

The chemical analysis of mares' milk was carried out in the laboratory of the Innovative Eurasian University in Pavlodar on the MilkoScan analyzer. The content of protein, fat and sugar in milk was determined. The percentage of dry fat-free residue "DFMR" in milk was determined by the difference in milk and distilled water values according to the "DFMR" scale.

All experimental data were processed by the biometric method, used for small samples [11].

Results of the research

*Zootechnical characteristics of milking mares.*In the "Altai" farm, along with the thoroughbred breeding of Kazakh horses of Jabe type injecting blood was used to increase the productivityof the Novoaltaisk and Don breeds, which produced positive results.

The body measurements and live weight of milking mares of different genotypes are given in Table 1.

The data in Table 1 show that the milking mares of the Novoaltaisk-Kazakh cross breeds are very tall (148.4 cm) with an elongated body (158.5 cm), a deep chest (191.5 cm), excellent boniness (20.3 cm), high live weight (506.0 kg), massiveness index - 154.7.

Kazakh jabe type mares, having a sufficient height of 142.7 cm, an oblique body length of 148.8 cm, a chest girth of 178.3 cm and a live weight of 436.2 kg are slightly inferior to the Novoaltaisk-Kazakh cross breeds by 69.8 kg (16.0%) in live weight, nevertheless, they have a high massive index-150.4.

Table 1 - average body measurements and live weight of test groups (n for 10 heads)

Indicators	Groups of mares					
	Kazakh of Jabe type		Novoaltaisk-Kazakh cross breed		Don-Kazakh cross breed	
	$X \pm m_x$	Cv	$X \pm m_x$	Cv	$X \pm m_x$	Cv
Measurements, cm: height at the withers	142.7±0.47	1.04	148.4±0.70	1.49	147.4±0.65	1.40
oblique body length	148.8±0.51	1.09	158.5±0.68	1.37	153.6±0.58	1.20
chest girth	178.3±0.70	1.24	191.5±0.69	1.13	174.0±0.57	1.04
metacarpus girth	18.4±0.11	1.85	20.3±0.21	3.25	19.7±0.18	2.89
Live weight, kg	436.2±3.42	2.47	506.0±4.07	2.54	412.6±3.12	2.39
Body build indexes,%::format	104.3	-	106.8	-	104.2	-
chest girth	124.9	-	129.0	-	118.0	-
boniness	12.9	-	13.7	-	13.4	-
massive	150.4	-	154.7	-	128.9	-

Mares of the Don-Kazakh hybrids differ in harmonious body build, they do not have a high chest girth (174.0 cm), typical for the riding constitution of the exteriors, slightly inferior to the first two groups of mares by live weight on 23.6 kg (5.4%) and 93.4 kg (22.6%). The mares of this group do not have a high massive index of 128.9.

By measuring the height at the withers, the oblique body length and the chest girth of the mares of all three groups, the more stable parameters of the coefficient of variability (from 1.04 to 1.49) are inherent. Higher coefficients of variability were observed in mares in live weight (2.39-2.54), then in metacarpus girth (from 1.85 to 3.25). In further breeding and pedigree work, the selection of horses according to live weight and boniness will yield positive results in improving these characteristics.

Milking mares of all three groups had a strong type of constitution, a well-developed chest, rounded ribs, an elongated body. The strong type of the body build of mares can be judged by the development of theskeleton. So, the boniness index was: among the Kazakh mares of jabe type - 12.9, in the Novoaltaisk-Kazakh hybrids - 13.7 and in the Don-Kazakh hybrids-13.4.

*Dairy productivity.*Studies conducted in 2016-2017 on the stationary koumiss farm of the Altai peasant farm showed that mares of different genotypes had unequal dairy production. Higher dairy productivity in pasture and horsy-pasture conditions is in the Novoaltaisk-Kazakh cross breeds. Then in the descending order, there are the Kazakh mares of the jabe type and females of the Don-Kazakh hybrids (Tabilica 2).

Table 2 - Actual (commercial) milk yield of mares by lactation months, l (n by 10)

Indicators	Month of lactation (2016-2017)						
	May II	June III	July IV	August V	September VI	October VII	November VIII
Kazakh jabe type							
$X \pm m_x$	9.1±0.37	9.2±0.31	8.7±0.33	7.5±0.29	5.9±0.25	4.9±0.24	3.1±0.19
Cv	18.1	15.1	16.8	17.1	18.9	21.5	26.3
Novoaltaisk-Kazakh cross breeds							
$X \pm m_x$	9.3±0.50	9.4±0.48	9.0±0.41	7.8±0.38	5.8±0.36	4.6±0.34	3.2±0.29
Cv	16.9	16.1	15.8	15.5	19.8	23.7	28.7
Don-Kazakh cross breed							
$X \pm m_x$	7.2±0.29	7.9±0.40	7.5±0.29	6.7±0.30	5.1±0.22	4.2±0.19	2.8±0.17
Cv	17.9	22.4	17.3	19.7	19.5	20.4	27.4

From the data in Table 2, it can be seen that the lactation curve by the months of lactation in the mares of all three groups changed markedly. The higher actual mare's milk yield was shown in the 2-3 month of lactation, then the yield gradually decreased, and more sharply towards the end of lactation.

In the milch Kazakh mares of jabe type and the Novoaltaisk-Kazakh cross breeds, after 2 months of lactation, there is a decrease in individual variability of the milk yield, which reaches the lowest index in the Kazakh mares of the jabe type (15.1), in Novoaltaisk-Kazakh cross breeds in the fifth month - 15.5 and in the Don-Kazakh hybrids in the fourth month of lactation - 17.3, after which an increase in the coefficient of variability is observed, especially sharply in the 7th and 8th month of lactation.

Our studies showed that mares of different genotypes had different milking capacities (Table 3).

The data of Table 3 show that for 214 days of lactation, the dairy productivity of the Novoaltaisk-Kazakh cross breeds was 3167.2 liters, the Kazakh mares - 3103.0 liters and the Don-Kazakh hybrids - 2632.2 liters.

Commercial yield, received from the mares of the first group, amounted to 1482.2 liters, the second group - 1513.4 liters and the third - 1267.6 liters. The yield of the Novoaltaisk-Kazakh cross breeds exceeds the yield of the Kazakh mares of jabe type by 2.1% or 31.2 liters and the Don-Kazakh mares by 19.4% or 245.8 liters.

Table 3 - Dairy productivity of mares of different genotypes during the lactation period, l

Groups of mares	Actual milk yield		Dairy productivity		Live weight, kg	For 100 kg of live weight
	For a day	For a lactation	For a day	For a lactation		
Kazakh of jabe type	6.93±0.19	1482.2±39.3	14.5±0.39	3103.0±89.6	436.2	711
Novoaltaisk-Kazakh cross breeds	7.07±0.28	1513.4±52.9	14.8±0.54	3167.2±108.5	506.0	626
Don-Kazakh cross breed	5.92±0.17	1267.6±35.3	12.3±0.33	2632.2±73.6	412.6	638

However, according to the milking capacity index (per 100 kg of live weight), the mares occupy a slightly different position than according to the absolute indicator. This indicator was the greatest in the Kazakh mares of jabe type (711 kg), then in the Don-Kazakh cross breeds (638 kg) and in the Novoaltaisk-Kazakh cross breeds (626 kg). These data are consistent with the studies of professor Barmintsev Yu.N. [12], who notes that better numbers for the milking capacity index are for local breeds such as Kazakh, Bashkir and Novokirgiz, than for heavy-duty, trotting and riding breeds. He believes that such a valuable quality of horses of local breeds must be preserved and perfected in the course of breeding work.

*Chemical composition of the mares milk.*Studies of the chemical composition of mares milk of different genotypes are of great scientific and practical interest since on the basis of these data it is possible to perform an assessment of the breeds and to develop ways of their further improvement.

Information on the chemical composition of milk of mares of different genotypes is given in Table 4.

From the data in Table 4, it can be seen that the milk of the Kazakh mares of jabe type (10.68), of the Novoaltaisk-Kazakh cross breeds (10.50) contains more dry matter than the milk of the Don-Kazakh hybrids (10.23).

The highest fat content in milk was also found in the Kazakh mares of jabe type (1.79). The second place in fat-milking is occupied by the Novoaltaisk-Kazakh cross breeds (1.64), then the Don-Kazakh cross breeds (1.52). It is known that in the production of koumiss from mare's milk the fat remains practically unchanged since the normal microflora of koumiss does not produce a lipase that breaks down fat into glycerin and fatty acids.This is remarkable in that the components of milk fat of mares, especially linoleic, linolenic and arachidonic acids, which have vitamin properties and are not synthesized in human and animal organisms, are fully used in the use of koumiss[13, 14].

Table 4 - Milk composition of mares of different genotypes on average for lactation

Groups of mares	Indicators	Content in the milk, %				
		dry matter	fat	protein	sugar	DFMR
Kazakh of jabe type	$X \pm m_x$	10.68±0.06	1.79±0.02	2.02±0.03	6.48±0.05	8.90±0.05
	Cv	2.66	5.26	6.10	3.37	2.58
Novoaltaisk-Kazakh cross breeds	$X \pm m_x$	10.50±0.08	1.64±0.03	2.01±0.03	6.51±0.03	8.71±0.05
	Cv	2.50	5.06	5.12	1.27	1.94
Don-Kazakh cross breed	$X \pm m_x$	10.23±0.05	1.52±0.03	1.87±0.02	6.32±0.04	8.72±0.04
	Cv	2.10	7.88	4.66	3.00	1.92

The protein content in the milk of the Kazakh mares of jabe type is 2.02%, of the Novoaltaisk-Kazakh cross breeds - 2.01%, that is, they are almost the same, while in the Don-Kazakh cross breeds is only 1.87%.

According to the sugar content in the milk of mares, the Novoaltaisk-Kazakh cross breeds (6.51) are on the first place, followed by the Kazakh mares (6.48) and the Don-Kazakh cross breeds (6.32). Milk sugar plays an important role in the production of koumiss, it is the main source of nutrition for lactic acid bacteria. Under the action of endocellular enzymes of bacteria, milk sugar is hydrolyzed with the formation of various substances that give koumiss a certain flavor and aroma. Therefore, it is important to have comparative data on the content of this component in the milk of mares of different genotypes [15, 16, 17].

The content of non-fat dry matters plays a substantive role in the qualitative evaluation of milk. If the fat content in mare's milk is subjected to the greatest changes under the influence of various factors, the amount of DFMR fluctuates within relatively narrow limits. According to our data, in the milk of mares of different genotypes, the content of DFMR was different. So, in the milk of the Kazakh mares of jabe type the DFMR content is more by 2.14% compared to the Novoaltaisk-Kazakh cross breeds and by 2.02% more than in the Don-Kazakh cross breeds.

The highest variability in milk composition was observed in the Kazakh mares in comparison with crossed animals, which is the basis for conducting an effective selection on these grounds when selecting breeds for seasonal and stationary koumiss farms.

*Interrelation of the milk components with milk yield and between themselves.*We analyzed the interrelation between milk yield, the content of fat, protein and milk sugar in mares' milk during lactation, as well as the type of connection between these components (table 5).

Table 5 - Coefficients of correlation between the average indicators of milk components and milk yield in mares of different genotypes

Indicators	DFMR	Fat	Protein	Sugar	Milk yield
Kazakh mares of jabe type					
Dry matter	+0.115	+0.408	+0.366	+0.072	+0.072
DFMR		+0.252	+0.271	+0.038	+0.127
Fat			+0.231	+0.247	-0.371
Protein				-0.013	+0.076
Sugar					-0.526
Novoaltaisk-Kazakh cross breeds					
Dry matter	+0.353	+0.722	+0.839	+0.686	-0.537
DFMR		+0.221	+0.306	+0.326	-0.121
Fat			+0.397	+0.403	-0.388
Protein				+0.572	-0.198
Sugar					-0.020
Don-Kazakh cross breeds					
Dry matter	+0.680	+0.367	+0.049	+0.036	+0.382
DFMR		+0.012	+0.551	-0.018	+0.463
Fat			+0.129	+0.015	+0.084
Protein				+0.059	-0.071
Sugar					-0.127

Data of Table 5 show that the correlation coefficient between the milk yield and the fat content is negative in the milk of the Kazakh mares of jabe type and of Novoaltaisk-Kazakh crossbreeds, with the exception of the milk obtained from Don-Kazakh cross breeds (+0.084) where interrelation is expressed as a positive, but with a very low index. The largest negative correlation coefficient was obtained in the group of the Novoaltaisk-Kazakh cross breeds (-0.388), then in the Kazakh jabe type mares (-0.371).

Between the milk yield and the protein content in the milk, the correlation is also negative, with the exception of the Kazakh mares, where the correlation coefficient is close to zero, but has a positive sign (+0.076).

The negative relationship is most pronounced in the group of the Novoaltaisk-Kazakh cross breeds, where the correlation coefficient has a value -0.198, and for Don-Kazakh hybrids it is low (-0.071).

The relationship between milk yield and milk sugar in all three groups of mares is negative. It is most pronounced in the Kazakh mares of jabe type, where the correlation coefficient is high (-0.526). And in Novoaltaisk-Kazakh and Don-Kazakh cross breeds, the correlation coefficients are low (from -0.002 to -0.127).

The coefficient of correlation between milk yield and DFMR in the Kazakh mares of jabe type (+0.127) and the Don-Kazakh hybrids (+0.463) has a positive value, while in the Novoaltaisk-Kazakh cross breeds it is negative (-0.121).

The interrelation between fat and dry matter in all three mares was positive. Thus, in the Novoaltaisk-Kazakh cross breeds this indicator is +0.722, in the Kazakh jabe mares +0.408 and in the Don-Kazakh cross breeds +0.367.

The correlation coefficients between the protein and other milk components as well as between fat in all cases are positive, with the exception of protein-sugar in the Kazakh jabe mares, which has a negative value, but close to zero (-0.013).

Considering the interrelation between the milk yield and the percentage of fat in milk by lactation months, it can be seen that in mares of different genotypes, it manifests itself in different ways (Table 6).

Table 6 - Interrelation of the value of milk yield, percentage of fat, protein and sugar by lactation months

Groups of mares	Correlation coefficient by lactation months						
	II	III	IV	V	VI	VII	VIII
Milk yield - protein							
Kazakh mares of jabe type	+0.086	-0.298	+0.126	-0.456	-0.320	-0.397	+0.083
Novoaltaisk-Kazakh cross breeds	-0.186	-0.238	-0.439	-0.082	+0.144	-0.794	-0.152
Don-Kazakh cross breeds	-0.173	+0.002	+0.236	-0.092	-0.174	+0.311	-0.377
Milk yield- fat							
Kazakh mares of jabe type	-0.153	-0.807	-0.509	-0.310	+0.273	+0.032	-0.256
Novoaltaisk-Kazakh cross breeds	+0.147	+0.005	-0.375	-0.232	+0.183	+0.051	-0.019
Don-Kazakh cross breeds	-0.043	-0.320	+0.186	-0.207	+0.071	+0.050	+0.024
Milk yield – sugar							
Kazakh mares of jabe type	-0.158	-0.628	-0.570	-0.663	+0.127	+0.068	-0.033
Novoaltaisk-Kazakh cross breeds	-0.491	+0.090	-0.174	-0.265	-0.303	+0.745	-0.699
Don-Kazakh cross breeds	-0.017	-0.630	+0.205	-0.600	-0.364	-0.043	+0.165

From the data in Table 6 it is clear that during the lactation period, the relationship between the milk yield and the protein percentage in the mare's milk is expressed by small negative correlation coefficients. The highly negative connection is manifested in the Kazakh mares of jabe type in the third (-0.298), the fifth (-0.456), the sixth (-0.320) and the seventh (-0.397) months of lactation. In the Novoaltaisk-Kazakh cross breeds in the third (-0.238), the fourth (-0.439) and the seventh (-0.794) months of lactation, in the Don-Kazakh hybrids only in the eighth month of lactation (-0.377).

High negative correlation coefficients between milk yield and fat percentage in the Kazakh jabe mares are observed in the third (-0.807), the fourth (-0.509), the fifth (-0.310) and the eighth (-0.256) months of lactation. In the Novoaltaisk-Kazakh cross breeds, a high negative correlation was observed in the fourth (-0.375) and fifth (-0.232) months of lactation, and in the Don-Kazakh hybrids in the third (-0.320) and fifth (-0.207) months of lactation.

The interrelation between milk yield and sugar in all groups of mares was negative during the lactation period. Kazakh mares had a higher positive relationship (+0.127) only at the sixth month of lactation, and the Novoaltaisk-Kazakh mares (+0.745) at the seventh, and the Don-Kazakh hybrids (+0.205) at the fourth month of lactation.

The data of analysis of the ratio of protein-fat in the milk of mares of different genotypes are given in Table 7.

From the data given in Table 7, it follows that the highest protein-fat ratio is observed in the milk of the Kazakh jabe mares, on average for seven months of lactation this ratio is 0.88 with fluctuations during the whole lactation from 0.76 in the seventh to 0.96 in the fourth months of lactation.

In the more liquid-milking Don-Kazakh cross breeds, this ratio was 0.86 for the experimental period with fluctuations from 0.70 in the fourth to 0.94 in the eighth months of lactation.

The ratio of protein-fat in the milk was lower in the group of Novoaltaisk-Kazakh hybrids than in the other groups and it was 0.81 with fluctuations from 0.76 in the seventh month of lactation to 0.89 in the fourth month.

Table 7 - Ratio of protein and fat percentage in the milk to mares of different genotypes by lactation months

Month of lactation	Groups of mares		
	Kazakh mares of jabe type	Novoaltaisk-Kazakh cross breeds	Don-Kazakh cross breeds
II	0.90	0.83	0.78
III	0.92	0.85	0.79
IV	0.96	0.89	0.91
V	0.88	0.87	0.76
VI	0.80	0.78	0.70
VII	0.76	0.76	0.80
VIII	0.87	0.82	0.94
On average	0.88	0.81	0.86

Thus, an increase in the yield of mares for lactation may be accompanied by a decrease in the fat content of milk while maintaining its protein content. If the percentage of fat increases, it can decrease in milk. While the percentage of protein in some cases will increase if the fat content of the milk does not exceed a certain level, but it can stay on the same level or decrease in cases of a sharp increase in butterfat percentage.

Along with that, according to the lactation months, there are large variations in the ratio of the studied characteristics to the degree and nature of the relationship between them, which is obviously due to their different and relatively independent variability.

Conclusions

In the conditions of the stationary koumiss farm of the "Altai" peasant farm, the dairy productivity and the chemical composition of mare's milk of different genotypes are not the same. Novoaltaisk-Kazakh cross breeds (3167.2 liters) and Kazakh jabe mares (3103.0 liters) are more productive than the Don-Kazakh cross breeds (2632.2 liters). According to the milking capacity index, Kazakh mares are up front (711 kg), followed by the Don-Kazakh cross breeds (638 kg) and the Novoaltaisk-Kazakh cross breeds (626 kg).

In terms of fat, protein, DFMR, dry matter in the milk, the Kazakh jabe mares favorably differ from mares of the Novoaltaisk-Kazakh and the Don-Kazakh cross breeds.

The variability of the basic indicators of milk yield in mares is low and ranges from 15.1 to 28.7%, fat content in milk from 5.06 to 7.88%, protein from 4.66 to 6.10%, sugar from 1.27 up to 3.37%.

The interrelation between the fat and protein content in the mare's milk is positive, but not the same (from +0.129 to +0.397). Selection by butterfat percentage does not ensure a simultaneous increase in protein content in the milk. Therefore, horse breeding is expedient not to maximize the development of individual traits, but to optimize their combination.

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[1]А.Р. Әкімбеков, [1]Д.А. Баймұқанов, [2]Қ.Ж. Исхан, [3]М.М. Омаров, [4]Х.А.Әубәкіров

[1] Қазақ мал шаруашылығы және азық өндіріс ғылыми зерттеу институты
Қазақстан Республикасы Алматы қаласы;
[2] Қазақ ұлттық аграрлық университеті Қазақстан Республикасы Алматы қаласы;
[3] Евразиялық инновациялық университеті Қазақстан Республикасы Павлодар қаласы;
[4]Тараз ұлттық университеті М.Х.Дулатиатындағы, Қазақстан Республикасы Тараз қаласы

ӘРТҮРЛІ ТҮРЛІ ГЕНОТИПТЕГІ БИЕЛЕРДІҢ СҮТТІЛІГІ ЖӘНЕ СҮТ ҚҰРАМЫ

Аннотация. Мақалада стационар қымыз фермасы жағдайында түрлі генотипті биелердің сүттілігі мен сүт құрамының зерттеу материалдары келтірілген. Алғашқы рет жайылымда және ат қораларда бағылатын биелердің сауылуы және сүттің негізгі компонентінің өзгергіштігі және өзара байланысының салыстырмалы аспектісінің зерттеу нәтижелері көрсетілген.

Зерттеулерден сүттің мөлшері және сапасына түрлік айырмашылықтар анықталған, жаңаалтай – қазақ қоспалары жоғары сүттілікке ие, кейінгі сатыда қазақы жабы биелері және дон – қазақ қоспалары. Лактация барысында алынған тауарлық өнім қазақ жабы биесінен 1482,2 л, 1513,4 л жаңаалтай – қазақ қоспасынан және дон – қазақ қоспасынан 1267,6 л.

Сүттегі майдың жоғары мөлшері 1,79% қазақы жабы биесінде байқалды, ал жаңаалтай – қазақ қоспаларында 1,64% және дон – қазақ қоспасында 1,52% теңелді. Қазақы жабы биесінің және жаңаалтай – қазақ қоспаларының сүтіндегі ақуыз мөлшері шамамен бірдей болды - 2,02 – 2,01%. Ал дон – қазақ қоспасында - 1,87% көрсетті. Сүттену айларындағы май мөлшерінің өзгергіштігі сауу өзгергіштігінен төмен және 5,06 до 7,88% құрады. Сауу арасындағы және май, ақуыз және қант мөлшерінің коэффицент корреляциясы теріс мәнге ие болды, ал май мөлшері және құрғақ заттардың арасындағы байланыс оң мәнге ие болды.

Түйін сөздер: генотип, сүттілік, сүттену, өзгергіштік, май, ақуыз, қант, корреляция.

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[1]А.Р. Акимбеков, [1]Д.А. Баймуканов, [2]К.Ж. Исхан, [3]М.М. Омаров, [4]Х.А. Аубакиров

[1] Казахский научно-исследовательский институт животноводства и кормопроизводства, Алматы, Казахстан;
[2] Казахский Национальный аграрный университет, Алматы, Казахстан;
[3] Инновационный Евразийский университет, Павлодар, Казахстан;
[4]Таразский Государственный университет им. М.Х. Дулати, Тараз, Казахстан

МОЛОЧНАЯ ПРОДУКТИВНОСТЬ И СОСТАВ МОЛОКА КОБЫЛ РАЗНЫХ ГЕНОТИПОВ

Аннотация. В статье приведены материалы исследований молочности кобыл разных генотипов и состав молока в условиях стационарной кумысной фермы. Впервые обобщены и даны в сравнительном аспекте результаты исследований по изучению изменчивости и взаимосвязи основных компонентов молока и удоя кобыл при конюшенно – пастбищном условий содержания. Установлены породные различия по количеству и качеству молока, более высокой молочностью обладают новоалтайско-казахские помеси, затем казахские кобылы типа жабе и доно-казахские помеси. За период лактации получен товарный удой 1482,2 л от казахских кобыл типа жабе, 1513,4 л от новоалтайско-казахских помесей и 1267,6 л от доно-казахских помесей.

Наиболеее высокое содержание жира в молоке 1,79% наблюдалось казахских кобыл типа жабе, у новоалтайско – казахских помесей оно равнялось 1,64% и доно – казахских помесей 1,52%. Содержание белка в молоке казахских кобыл типа жабе и новоалтайско – казахских помесей практический одинаковы 2,02 – 2,01%. А доно – казахских помесей всего лишь 1,87%. Изменчивость содержания жира по месяцам лактации ниже изменчивости удоя и составляет от 5,06 до 7,88%. Коэффициент корреляции между удоем и содержанием жира, белка, сахара имело отрицатешльное значение, а между содержанием жира и сухого вещества положительная связь.

Ключевые слова: генотип, молочность, лактация, изменчивость, жир, белок, сахар, корреляция.

Information about the authors:

Akimbekov Amin Richardovich– doctor of agricultural sciences, chief researcher of the Horse Breeding Department of LLP "Kazakh Scientific Research Institute of Animal Breeding and Fodder Production", Almaty, Kazakhstan. E-mail: akimbekov52@mail.ru;

Baimukanov Dastanbek Asylbekovich – corresponding member of NAS RK, Doctor of Agricultural Sciences, chief researcher of the department of dairy cattle breeding of LLP "Kazakh Scientific Research Institute of Animal Breeding and Fodder Production", Almaty, Kazakhstan. E-mail:dbaimukanov@mail.ru;

IskhanKairatZhalelovich -Candidate of Agricultural Sciences, associate professor of the department of the "Technology of production of livestock products" of the non-commercial joint-stock company "Kazakh National Agrarian University", Almaty, Republic of KazakhstanE-mail: kairat@mail.ru;

Omarov Marat Magziyevich– Candidate of Agricultural Sciences, associate professor of the of chemical and biological technologies. Innovative Eurasian University, Pavlodar, Kazakhstan. E-mail: marat-bura@bk.ru;

AubakirovKhamitAbilgaziyevich -Candidate of Agricultural Sciences, Associate Professor of the Department of Biotechnology, M.Kh. DulatiTaraz State University, Taraz, Kazakhstan. -mail: hamit_a57@mail.ru

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