INVESTIGATION OF THE MILK COMPOSITION OF DIFFERENT GENOTYPE MILKING SHEEP IN HUNGARY

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CERCETĂRI PRIVIND COMPOZIŢIA CHIMICĂ A LAPTELUI LA DIFERITELE RASE DE OVINE CRESCUTE ÎN UNGARIA

The authors investigated the fat, protein, lactose content, protein composition, and somatic cell count of milk samples of six genotypes milking sheep and their milk production during lactation. The Langhe, Merino, and Pleveni genotype gave the best values for the fat, the Langhe and Merino for the protein and lactose content, respectively. The somatic cell count fluctuated during the lactation months and distributed about 30% for the 1st; 2nd, and 3rd. class each and about 10% for the 4th class. As for milk production, the Cigája and East Frisian produced the highest amount of milk during lactation what were about 30 % more than the Hungarian Merino.

Key words: *Composition of sheep milk, milk production, different milking sheep genotypes*

The milking of sheep enjoys a considerable tradition in Hungary; nevertheless, conflicting tendencies can be traced in the number of milked sheep and milked milk quantity in the past. (SZAKÁLY 1993, FENYVESSY 1993, KUKOVICS - NAGY 1999).

The Hungarian Merino is a triple utilisation species of sheep, and it is capable only of average or sometimes poor milk production compared to the specialised species (JÁVOR et. al. 1999). Shepherds can get 40-50 litres of milk from a groomed and well-feed Comberd Merino (VERESS 1990; BEDŐ et. al. 1999), and most of them are able to produce 25-35 litres milk. (KUKOVICS 1988; FENYVESSY et. al. 1994; FENYVESSY 1998).

On the grounds on insufficient figures in the literature, we

extended our analysis to milk components, somatic cell count and milk production during lactation.

Material and methods

The composition of the sheep's milk was determined on the basis of investigation individual samples. The milk samples were derived from the regular sampling of six genotypes - Langhe F1, Sarde F1, East Frisian F1, Pleveni F1, Cigája and Hungarian Merino sheep. The length of the lactation in selected groups was different from each other, but the samples were taken every 10 days. We compared the figures of the different genotypes to the Hungarian Merino and noted the differences. We have determined the following parameters: fat, lactose, protein, protein fractions and milk production. The compositional investigation was carried out using the Milko Scan F104. The somatic cell count investigation was carried out using the Laborscale Analyser PSA_1. The somatic cell count was determined based on 434 samples of collected ewe's milk.

Result and discussion

Fat content: During the lactation the average fat content were 6.83 %; 6.75 %; 6.62 %; 6.76 %; 6.74 % and 6.94 % for the genotypes Langhe F1, Sarde F1, East Frisian F1, Pleveni F1, Cigája and Hungarian Merino respectively (Table 1).

Table 1

Fat content of the ewe's milk according to the genotype

Genotypes	n	Average %	Error	Difference from Hungarian Merino [%]
Langhe F1	136	6.83	0.18	-1.7
Sarde F1	142	6.75	0.18	-2.8
East Frisian F1	97	6.62	0.29	-4.7
Pleveni F1	170	6.76	0.15	-2.7
Cigája	57	6,74	0,21	-2,8
Merinó	119	6.94	0.40	0.0

The fat content showed an increasing tendency for all genotypes during the lactation. Despite that the Pleveni produced the lowest fat

content, it's fat production is 13.4 % higher than the Hungarian Merino's one. The East Frisian produced the highest amount of fat (5.76 kg), which were 67.7 % higher than the Hungarian Merino's one.

Protein content: During the lactation the average protein were 6.27 %; 5.93 %; 5.84 %; 6.10 %; 5.40 %; 5,61 % and 6.59 % for the genotypes Langhe F1, Sarde F1, East Frisian F1, Pleveni F1, Cigája and Hungarian merino respectively (Table 2).

Table 2

Protein content of the ewe's milk of different genotype

Genotypes	n	Average %	Error	Difference from Hungarian Merino [%]
Langhe F1	136	6.27	0.07	-4.9
Sarde F1	142	5.93	0,08	-10.0
East Frisian F1	97	5.84	0.12	-11.4
Pleveni F1	170	6.10	0.06	-7.4
Cigája	57	5,61	0,09	-14,87
Merinó	119	6.59	0.16	0.0

The Sarde F1 produced largest amount of protein , namely 5,12 kg which was 57,1 % higher than the Hungarian Merino's one. The protein productions of the other genotypes in comparison to the Hungarian Merino were 4.31 kg; 32.2 %; 3.5 kg; 8.1 %; 3.61 kg; 10.7 %, 4.9 kg, 48.4 % for Langhe F1, Sarde F1, Pleveni F1, and Cigája respectively. We experienced a slight variation in protein content it shows an increasing tendency during the lactation.

Protein composition: The casein protein fraction had a ratio of 78.2 % within the total protein content, which is very important from the point of view of cheese production. The percent amounts of the different genotypes were 4.9 %; 4.63 %; 4.56 %; 4.76 %; 4.21 % and 5.05 % for Langhe F1, Sarde F1, East Frisian F1, Pleveni F1, Cigája and Hungarian Merino respectively (Table 3).

We have to calculate the decrease of the casein fraction during the milk processing depending on the technical level of the applied technology.

Lactose content: On the contrary to the other constituents the lactose content had the same ratio in the milk of different genotypes.

The average values were 4.69 %; 4.74 %; 4.77 %; 4.62 % and 4.71 % for Langhe F1, Sarde F1, East Frisian F1, Pleven Cigája and Hungarian Merino respectively (Table 4).

Protein composition of the ewe's milk of different genot

Genotypes	n	Average %		Error	Difference from Hungarian Merino
		Casein	Whey protein		
Langhe F1	136	4.90	1.37	0.07	-5.1
Sarde F1	142	4.63	1.30	0.08	-11.1
East Frisian F1	97	4.56	1.28	0.12	-11.3
Pleveni F1	170	4.76	1.44	0.06	-8.2
Cigája	57	4,21	1,40	0,10	-16,63
Merinó	119	5.05	1.44	0.16	0.0

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Lactose content of the ewe's milk of different genotypes

Genotypes	n	Average %	Error	Difference from Hunga Merino [%]
Langhe F1	136	4.69	0.06	-0.4
Sarde F1	142	4.74	0.06	+0.5
East Frisian F1	97	4.77	0.10	+1.2
Pleveni F1	170	4.62	0.05	-2.0
Cigája	57	4,75	0,09	+0,6
Merinó	119	4.71	0.13	0.0

The highest lactose content can be found in the milk of the Frisian F1, which is 1.2 % higher than the Hungarian Merino's va The lowest amount occurred in the milk of the Pleveni F1, whic 17.1 % higher than in the Hungarian Merino milk.

Somatic cell count: For 6 month periods we examined somatic cell count of collected merino ewe's milk and studied unfavourable effects of milk of high somatic cell count on the indust processing too. On the base of examination of 434 samples concluded that 25.6 % and 57.1 % of the samples had lower soma cell count than 500,000/cm^3 and 1,000,000/cm^3 respectively (Table 5

Table 5

Somatic Cell Count in ewe's milk per month

Samples		Somatic Cell Count x 10^3			
Month	N	<500	500-1000	1000-2000	>2000
2	39	28.2	35.9	12.8	23.1
3	58	20.7	32.8	24.1	22.4
4	96	39.6	24.0	22.9	13.5
5	78	33.3	29.5	30.8	6.4
6	125	16.0	37.6	33.6	12.8
7	38	10.5	29.0	44.7	15.8
Total/av.:	434	25.6	31.5	28.6	14.3

Correlation was found between the increased somatic cell count of milk and both increased loss of fat and amount of milk used for the production of 1 kg of cheese.

Milk production: The length of the lactation period in the case of these 6 genotypes changed between 85 and 134 days. The shortest was in the case of Hungarian Merino and the longest was in the case of Cigája (Table 6).

Table 6

Length of the lactation period of investigated ewes according to the genotype (day)

Genotypes	n	Average [day]	Error	Difference from Hungarian Merino [%]
Langhe F1	136	99.13	4.03	16.6
Sarde F1	142	97.14	4.07	14.2
East Frisian F1	97	110.87	6.56	30.3
Pleveni F1	170	92.88	3.41	9.2
Cigája	57	131,23	4,17	54,31
Merinó	119	85.04	9.13	0.0

The amount of the milked milk was the highest in the case of East Frisian F1 genotype (Table 7).

During lactation some of the parameters were different between morning and evening. Fat and somatic cell count were constantly higher in the evening milking; and production was higher in the morning milk. The other parameters do not present different trends in the two milkings (Table 8).

Table 7

Milk production of the investigated ewes during the lactation according to the genotype (litres)

Genotypes	n	Average [litres]	Error	Difference from Hungarian Merino [%]
Langhe F1	136	68.75	3.58	38.8
Sarde F1	142	59.47	3.61	20.1
East Frisian F1	97	87.06	5.82	75.8
Pleveni F1	170	59.14	3.03	19.4
Cigája	57	85,11	4,21	36,4
Merinó	119	49.51	8.09	0.0

Table 8

Daily milk production of ewes investigated according to genotype (litres)

Genotypes	n	Average [litres]	Error	Difference from Hungarian Merino [%]
Langhe F1	136	0.69	0.02	17.8
Sarde F1	142	0.61	0.02	4.2
East Frisian F1	97	0.75	0.04	28.9
Pleveni F1	170	0.63	0.02	7.5
Cigája	57	0,64	0,02	10,3
Merino	119	0.58	0.05	0.0

Concluson

During the lactation some of the milk parameters were differ between morning and evening. The fat content and the somatic c count were constantly higher in the evening milking on the contr production was higher in the morning milk. The other parameters not present different trends in the two milks. However the Merino h the highest value of milk component, the protein, fat and m production was better in other genotypes in the whole lactat Nowadays it is a fact that the income from milk gives 30 % of the t income of sheep breeding, where we also milk sheep. Hungarian s milk products are popular both abroad and on the domestic marke our dairy firms are able to process much larger amounts of sheep than now. If we want to win the serious problems in our s

breeding, we have to do the genotype alteration and the intense cross-breeding for higher production.

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