Lucrări ştiinţifice **Zootehnie şi Biotehnologii**, vol **41 (2)** (**2008**),Timişoara

USE OF VEGETAL LECITHIN IN THE RATIOS OF MILKING SHEEP AND GOATS

UTILIZAREA LECITINEI VEGETALE IN RAŢIILE OVINELOR ŞI CAPRINELOR ÎN LACTAŢIE

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With the purpose of increasing the milk production at milking sheep and goats they were given a supplement of vegetal lecithin, residue (mucilage) from manufacturing the soy and sunflower, which was administrated in the morning, in the drinking water (100/200 ml mucilage), after a previous dilution with warm water in a proportion of 1/1. At all experimental lots of sheep and goats the total milk production of milk increased with 5-12%, even if sometimes the production of merchandise milk had close values between the experimental and witness lots, in a few cases even, this being due to the lactation period, which was also variable. It was determined the chemical composition of the sheep and goat milk and it was noticed that at the experimental lots, which received a plus of vegetal lecithin in the fodder ratios there were determined higher values at the dry substance, fat and protein, however the changes were not constant during determination and sometimes the values were equal with those from the witness lot or even inferior to these. It was determined the structure of the fat of milk and it was noticed an increase of the content of non-saturated fat acids in the case of the experimental samples which came from the animals that received vegetal lecithin in their ratios comparatively with the content determined at the milk of animals from the witness lot.
Key words: vegetal lecithin, milk production, sheep, goats;

Introduction

To increase the milk production and improve the chemical composition of milk, in the ratios of sheep and goats there were included as lipid supplement, the vegetal lecithin from soy and sunflower, by using the secondary product resulted in the process of manufacturing soy and sunflower oil, in the same time being watched the equilibration of the negative energetic balance, produced in the first two months of lactation at the small ruminators. The vegetal lecithin, product rich in phospholipids (62% from SU) have hepatic-protective role, participates at the synthesis of the lipoprotein composes and with big molecule, with a big energetic value and on blood way reach the mammal gland, where at the level of glandular

participate at the lactate secretion. It was noticed that the lecithin from soy reduces the number of infusers, helps the increase of the total number of cellulose bacteria, determining the improvement of fibril digestion and thus the supplementary production of acetate, precursor of the milk. The supplement of vegetal lecithin administrated in the food of ruminators influences positively the metabolic profile, brings the glicemia at physiological value, decreases the level of the piruvic acid and reduces cytogenesis (important phenomenon for the good milking production ruminators). It also determines the increase of the biological value of milk, decreasing the content of saturated fat acids and increases the content in non-saturated fat acids. We proposed to experiment the advantages of the use of vegetal lecithin in the food of sheep and goats.

Material and Methods

The researches were made at ICDCOC Palas and the research centers from co-ordination, at a private breeder of sheep and goats and at CCAI Bucharest.

The animals in the works were individually watched under the report of the own performances, registering data regarding: the control of milk production and qualitative determinations of milk. The control of milk production was made on the basis of Romanian method and of control coefficient (***Nica-Dermengi),*** by which the milking sheep and goats are controlled and also those which weaned their lambs and kids. The method is based on the report between the daily milk production and the quantity at a single milking in the same day and it can be applied on the whole duration of lactation, once or twice a month and on the whole effective of mother sheep and goats, beginning from the first week from dropping, with the condition that the lambs and kids to be sufficiently developed, to resist the separation from their mothers for 10 -12 hours (the method really expresses the milking capacity of sheep, the error is of approx. 2%).

The maintenance of sheep and goats was made in the stable for 150-160 days and 205-215 days in the pasture. Foddering during stable period was made with hays of vegetable roots, 0,5-1 kg/animal and day; with juicy fodders, with warehoused corn, 1.5-2 kg/ animal and day; with mixture of concentrated fodders, in whose structure were in average of 25-30% barley, 50-60% corn, 8-12% grist of sunflower or soy, 1% salt, 2% fodder chalk. Watering of sheep and goats was made with water from a source of potable water, assuring 6.5 liters/animal. The sheep and goats pastured on lots seeded with a mixture of 70-75% grained plants and 25-30% perennial leguminous herbs, with high degree of consumption, of 94.12%, also a mixture of 0.5-0.7 kg from chopped and concentrated hays being administrated in this period.

Determination of the content of fat acids from the sheep and goat milk was made through the gas-chromatographic determination method of methyl esters of the fat acids, with a VARIAN CP 3800 gas-chromatograph with the capillary column with a high SP-2560 polarity.

Results and Discussions

During milking period, the sheep from experimental and witness lots have received the same fodder ratio, 1.68 SU, 1.62 UNL, 118 g PDIN, 147 g PDIE, to which Calcium of 14.8 g and phosphor of 7g were added. The goats from experimental and witness lots have received the same fodder ratio, 1.61 SU, 1.50 UNL, 112 g PDIN, 137 g PDIE, calcium of 14.5 g and phosphor of 6.53g. The milking sheep and goats have received a supplement of vegetal lecithin, residue (mucilage) from manufacturing the soy oil, from S.C. ULEROM Constanța (the quality certificate attests its chemical composition: water and volatile substances 50%, fat substances (oil) 20-22 %, lecithin 18-20%. The vegetal lecithin was administrated in the morning in a quantity of 100/200 ml mucilage, in the drinking water, after a previous dilution with hot water, in a proportion of 1/1. It was noticed that the vegetal lecithin does not change the palatability of water and it is well supported by sheep and goats.

It was determined the milk production at sheep and goats through the bimonthly control, through Nica-Dermengi method (tables no. 1 and 2).

Table 1

The total average milk production, the average production of merchandise milk and the duration of milking at the sheep treated with lecithin and at witness lots

Sheep breed or population /lot	n	The average total milk production (liters)	The average production of milked milk (liters)	Duration of milking (days)
		- - X ± sx V%	- - X ± sx V%	
Merinos de Palas – Experimental lot	58	117.51 ± 3.1 20,16	48.66 ± 1.85 28.95	112.9
Merinos de Palas – Witness lot	38	84.21± 3.4 24.96	24.05 ± 1.01 25.89	97.4
Prolific population of Palas- Experimental lot	46	137,2 ± 4,6 22.74	560.2 ± 2.6 31.37	161.8
Prolific population of Palas - Witness lot	25	110.25 ± 2.1 9.75	42.75 ±1.63 19.06	156.3
Milk population of Palas- Experimental lot	25	217.3 ± 7.8 17.94	81.6 ± 2.8 17.15	203.6
population of Palas - Witness lot	70	197.6± 10.3 43.61	72.8 ± 3.9 44.82	184.7
Țigaie SCDCOC Reghin- Experimental lot	87	153.6 ± 6.9 41.90	54.7 ± 3.2 54.56	190.5
Țigaie SCDCOC Reghin- Witness lot	83	141.8 ± 4.7 30.20	55.2 ± 3.4 56.13	193.5
Țigaie SCDCOC Bacău - Experimental lots	65	140.9 ± 3.7 21.17	55.1 ± 2.8 40.96	191.5
Țigaie SCDCOC Bacău - Witness lot	72	132.6 ± 4.9 31.36	53.8 ± 2.8 44.16	195.8
Merinos- private breeder - Experimental lot	25	110.25 ±2.15 9.75	42.75 ±1.63 19.06	106.3
Merinos- private breeder - Witness lot	42	94.44± 3.01 20.65	28.26 ± 0.42 9.63	97.9
Karakul - Experimental lot	36	129.6 ± 4.9 22.68	55.1 ± 2.8 30.49	119.7
Karakul - Witness lot	32	102.91± 4.1 52.81	38.76 ±1.64 23.93	102.5
Țurcană - Experimental lot	36	143.6 ± 5.9 24.65	74.7 ± 3.2 25.70	141.5
Țurcană - Witness lot	25	123.6 ± 4.9 19.82	64.7 ± 3.7 28.59	124.6

At the sheep of Merinos de Palas breed from experimental lot, the total milk production was of 117.5±3.11 liters, with a medium production of milked milk of 48.66±1.85 liters, in a lactation which lasted for 112.9 days; at the sheep from witness lot the total milk production was of 84.21±3.41 liters, with an average production of milked milk of 24.05±1.01 liters, in a lactation which lasted for 97.4 days. At the sheep from Palas prolific population, at the experimental, the total milk production was of 137.2±4.6 liters, with a medium production of milked milk of 56.2±2.6 liters, in a lactation of 161.8 days; at the witness lot the total milk production was of 110,25±2,15 liters, with an average production of milked milk of

42.75±1.63 liters, in a lactation which lasted 156.3 days. At the sheep from Palas milk population, from the experimental lot, the total production was of 217.3±7.8 liters, with an average production of milked milk of 81.6±2.8 liters, in a lactation of 203.6 days; at the witness lot the total production was of 197.6 liters, with an average production of milked milk of 72.8±3.9 liters, in a lactation of 184.7 days. At the sheep of Țigaie breed from SCDCOC Reghin, from the experimental lot the total milk production was of 153.6 ± 6.9 liters, the average milk production of 54.7±3.2 liters, in a lactation of 190.5 days; at the witness lot the total milk production was of 141.8±4.7 liters, the average production of milked milk of 55.2 ± 3.4 liters, in a lactation of 193.5. At the sheep of Țigaie breed, from SCDCOC Bacău, at the experimental lot the total milk production was of 140.9 ±3.7 liters, the average production of milked milk of 55.1±2.82 liters, in a lactation which lasted for 191.5 days; at the witness lot the total milk production was of 132.6 ±4.9 liters, the average production of milked milk of 53,8±2,8 liters, in a lactation which lasted for 195.8 days. At the sheep of Merinos breed from the private breeder, from the experimental lot the total milk production was of 110.25±2.15 liters, the average production of milked milk of 42.75±1.63 liters, in a lactation which lasted for 106,3 days; at the witness lot the total milk production was of 94.44±3.01 liters, the average milked milk of 28.26±0.42 liters, in a lactation which lasted for 97.9 days. At the sheep of Karakul breed from SCDCOC Popăuți, from the experimental lot, the total milk production was of 129.6±6.9 liters, the average production of milked milk of 55.1±3.2 liters, in a lactation which lasted for 119.7 days; at the witness lot, the total milk production was of 102.91± 4.15 liters, the average production of milked milk of 38.76±1.64 liters, in a lactation which lasted for 102.5 days. At the sheep of Țurcană breed from experimental lot, the total milk production was of 143,6 ± 5,9 liters, the average production of milked milk of 74.7±3.2 liters, in a lactation which lasted for 190.5 days; at the witness lot, the total milk production was of 123.6±4.9 liters, the average production of milked milk of 64.7±3.7 liters, in a lactation which lasted for 124.6 days.

Table 2

The total average milk production, the average production of merchandise milk and the duration of lactation at the goats treated with lecithin and at the witness lots

Breed /lot	n	The average total milk production (liters)	Average production of milked milk (liters)	Duration of milking (days)
		$\bar{X}$ ± sx V%	$\bar{X}$ ± sx V%	
Carpathian. experimental lot. Palas	25	233.01±8.7 18.67	147.42±3.7 12.54	211.44
Carpathian. witness lot. Palas	49	227.49±6.3 19.38	128.47±2.8 15.25	184.65
Carpathian experimental lot. Reghin	25	146.73±3.9 13.32	82.56±2.2 13.32	177.18
Carpathian. witness lot. Reghin	25	129.67±3.2 12.57	78.98±2.08 3.16	151.45
Carpathian experimental lot. Caransebeș	30	283.89±7.5 15.85	124.81±3.8 16.68	201.76
Carpathian. witness lot. Caransebeș	30	266.59±9.8 20.13	163.72±3.2 10.69	218.44
White of Banat. experimental lot. Caransebeș	20	285.15±4.7 7.37	172.8±2.5 6.47	221.12
White of Banat. witness lot. Caransebeș	24	270.76±4.1 7.42	164.61±2.7 8.04	204.34

At the goats of Carpathian breed from the lot of ICDCOC Palas. At the experimental lot the total milk production was of 233.01± 6.9 liters, the average production of milked milk of 147.42±3.7 liters. In a lactation which lasted for 211.44 days; at the witness lot the total milk production was of 227.49± 6.3 liters in a lactation which lasted for 184.65 days. At the goats of Carpathian breed from the lot of SCDCOC Reghin. At the experimental lot the total milk production was 146.73 ± 3.9 the average production of milked milk of 82.56 ± 2.2 liters in a lactation which lasted for 177.18 days; at the witness lot the total milk production was of 129.67 ± 3.2 liters. The average production of milked milk of 78.98 ± 2.08 liters in a lactation which lasted for 151.45 days. At the goats of Carpathian breed from the lot of SCDCOC Caransebeş. At the experimental lot the total milk production was of 283.89 ± 7.5 liters. The average production of milked milk of 124.81 ± 3.8 liters in a lactation which lasted for 201.76 days; at the witness lot the total milk production was of 266.59 ± 9.8 liters. The average production of milked milk of 163.72 ± 3.2 liters, in a lactation which lasted for 218.44 days. At the goats of White of Banat breed of SCDCOC Caransebeş at the experimental lot the total milk production was of 285.15 ± 4.7 liters. The average production of 172.8±2.5 liters in a lactation which lasted for 221.12 days; at the witness lot the total milk production was of 270.76± 4.1 liters. The average daily production of 1.325 ± 0.147 liters, the average production of milked milk of 164.61±2.7 liters, in a lactation of 204.34 days.

From the presented it can be concluded that at all experimental lots, both at sheep and goats, the total milk production increased with values between 5 and 12%. Even if sometimes the production of merchandise milk had closed values between the experimental and witness lots, in a few cases, even smaller, this being due to the lactation period which was also variable.

It was determined the chemical composition of the sheep and goat milk per months and per witness and experimental lots. At the experimental lots of sheep and goats, which received adding of vegetal lecithin in their fodder ratios, there were noticed increased values at the dry substance, fat and protein. However the changes were not constant during determinations and sometimes the values were equal to those from the witness lot or even inferior to them.

Determination of the content in fat acids from sheep and goat milk emphasized the results presented in tables 3 and 4.

There appeared differences between the fat acids of the fats separated from the milk of the two lots of sheep, in the sense of decreasing the content of saturated fat acids in the case of animals fed with vegetal lecithin.

As in the case of sheep, there have appeared differences between the compositions in fat acids of the separated fats in the milk of the two lots of goats in lactation, in the sense of reducing the content of saturated fat acids in case of the milk from the animals fed with vegetal lecithin.

Table 3

Determination of fat acids in the sheep milk from witness and Experimental lots

No.	Name of fat acid	Content of fat acids (%m/m) ***witness lot***	Content of fat acids (%m/m) ***lot treated with lecithin***
1	C4:0(butyric)	4.51	1.77
2	C6:0(caproic)	1.59	0.63
3	C8:0(caprilic)	1.45	0.49
4	C10:0(capric)	4.00	1.24
5	C12:0(lauric)	2.41	1.11
6	C14:0(miristic)	7.97	4.58
7	C14:1(miristoleic)	0.55	0.59
8	C15:0(pentadecanoic)	1.51	1.12
9	C16:0(palmitic)	25.96	26.83
10	C16:1(palmitoleic cis+trans)	0.74	0.77
11	C17:0(heptadecanoic)	0.81	0.63
12	C17:1(cis10)	0.14	0.17
13	C18:0(stearic)	14.80	15.20
14	C18:1(oleic cis+trans)	25.26	35.37
15	C18:2(linoleic cis+trans)	4.80	5.83
16	C20:0(arahidic)	0.21	0.40
17	C18:3(linolenic)	0.61	0.58
18	unidentified	2.68	2.69

Table 4

Determination of fat acids in the goat milk from witness and experimental lots

Nr.	Name of fat acid	Content of fat acids (% m/m) ***witness lot of goats***	Content of fat acids (%m/m) ***lot of goats treated with lecithin***
1	C4:0(butyric)	2.49	1.40
2	C6:0(caproic)	1.90	1.55
3	C8:0(caprilic)	1.87	1.64
4	C10:0(capric)	4.54	4.54
5	C12:0(lauric)	1.62	1.86
6	C14:0(miristic)	4.94	5.56
7	C14:1(miristoleic)	0.19	0.25
8	C15:0(pentadecanoic)	0.87	0.96
9	C16:0(palmitic)	25.91	25.77
10	C16:1(palmitoleic cis+trans)	0.68	0.93
11	C17:0(heptadecanoic)	0.69	0.96
12	C17:1(cis10)	0.14	0.27
13	C18:0(stearic)	15.89	16.46
14	C18:1(oleic cis+trans)	29.50	30.61
15	C18:2(linoleic cis+trans)	5.56	4.81
16	C20:0(arahidic)	0.35	0.35
17	C18:3(linolenic)	0.37	0.48
18	Unidentified	2.49	1.60

Conclusions

1. The vegetal lecithin from soy and sunflower, consisted by the secondary product (mucilage) resulted in the processing soy and sunflower oil does not modify the palatability of water in which it is administered and it is well supported by sheep and goats.
2. At all experimental lots, both at sheep and goats the total milk production increased with values between 5 and 12%.
3. Sometimes the production of merchandise milk had close values between experimental and witness lots, this being due to the lactation period which was also variable.
4. Determining the chemical composition of the sheep and goat milk it was noticed that at the experimental lots, which received adding of vegetal lecithin in their fodder ratios there were determined a little higher values at the dry substance. at fat and protein. However the changes were not constant during determinations and sometimes the values were equal to those from the witness lot or even inferior to them. The analysis of the milk fat reveal an increase of the content of not-saturated fat acids in the case of experimental samples from the sheep and goats in lactation to which vegetal lecithin was administrated in the ratio.

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