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THE EFFECTS OF VEGETABLE LECITHIN ON SOME SANGUINE BIOCHEMICAL PARAMETERS AT LACTATING SHEEP AND GOATS

EFECTELE LECITINEI VEGETALE ASUPRA UNOR PARAMETRII BIOCHIMICI SANGUINI LA OILE ŞI CAPRELE ÎN LACTAȚIE

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From a complex experiment of establishing the effects of lecithin supplemented in the diet of small ruminants, in this paper we present the influence of lecithin on some sanguine biochemical parameters at lactating sheep and goat. The researches were made on a experimental group formed by 5 sheep from Ţurcana breed and 5 goats from Crapatina breed, which were fed in the first experimental period with a base ratio (Br) formed by 1.5 kg of hill hay and 0.2 kg concentrate forage mixture, in the second experimental period the Br was supplemented with 100 g lecithin/day/animal. At the end of each experimental period were taken blood samples to establish some biochemical parameters from sanguine serum. The supplementation of base ration with 100 g lecithin/day/animal at lactating sheep and goats did not produced significant changes to values of total proteins (TS), albumin, creatinine, urea and total bilirubins (TB) from sanguine serum. Contrary to expectation the cholesterol and triglycerides were higher than normal both in sheep (from 82 mg/dl to 83 mg/dl for cholesterol and from 23 mg/dl to 45 mg/dl for triglycerides) but specially in goats (from 59 mg/dl to 68 mg/dl for cholesterol and from 24 mg/dl to 55 mg/dl for triglycerides). Were registered significant increment of activity of alkaline phosphatase and in γ – GT and a decrease of plasmatic activity of pancreatic α-amylase both in sheep and goats.

Key words: lecithin, sanguine biochemical indices, lactating sheep, lactating goats

Introduction

Is frequent the recommendation to supplement the lecithin in the animal diets foe its function in the lipids metabolism (Jenkins şi Fotouhi, 1990). Naturaly the lecithin is a component of biliar secretion, her function is to solubilise the biliar salts and to emulsifyng the cholesterol, preventing the formation of bile calculus (Lough at al., 1992).

From a complex experiment of establishing the effects of lecithin supplemented in the diet of small ruminants, in this paper we present the influence of lecithin on some sanguine biochemical parameters at lactating sheep and goat.

Materials and Methods

The experiment was carried out according to the scheme presented in table 1. Were formed two experimental groups, one formed by 5 sheep from Țurcana breed and the other by 5 goats from Crapatina breed, which were fed in the first experimental period with a base ratio (Br) formed by 1.5 kg of hill hay and 0.2 kg concentrate forage mixture which satisfied the nutritive requirements of animals. In the second period beside the Br, the diet was supplemented with 100 g lecithin/day/animal. At the end of each period were taken blood samples to establish from serum the biochemical indices and the determination were made with the Fully Vet analyzer.

Table 1.

The experiment organisation scheme

Period	Duration	Activity	The evaluation way
Pre-experimental	21 days	- chemical analysis of forage from base ratio - formation of ratio for sheep and goats from experimental groups - verification of forage consumption prescribed in ration	- Determination of DM, ash, CP, CFat, CF, CENS - establishing the nutritive values of forages - formation of base ratio and verification of these
I	10 days	- administration of Br to sheep and goats from experimental goups	At the end of the period are made determination from sangiun serum: albumin, total proteins, alkaline phosphatase, urea, bilirubins, cholesterol, creatinine, triglycerides, pancreatic α-amylase, gamma GT
II	21 days	- administration of Br+lecithin to sheep and goats from experimental goups	At the end of the period are made the same determination from the sanguine serum like in the period I

Results and Discussions

The results of determination made from serum at lactating sheep and goats, before and after administration of lecithin are presented in Tables 2 and 3.

Table 2

The values of biochemical indices before lecithin administration

Specification	Measure units	Sheep	Reference values in sheep	Goats	Reference values in goats
Total proteins	g/dl	5.70 ± 0.26	6-7.9	6.89 ± 0.31	5.58-8.64
Albumin	mg/dl	2.84 ± 0.15	2.4-3	2.38 ± 0.28	-
Creatinine	mg/dl	0.83 ± 0.05	1-2.7	0.63 ± 0.03	0.54-1.53
Urea	mg/dl	13.9 ± 0.43	17-48	20 ± 2.73	9.54-32.29
Bilirubins BT	g/dl	0.68 ± 0.03	0.04-0.22	0.08 ± 0.002	0-0.1
Cholesterol	mg/dl	82 ± 3.08	52-76 64-108 42.53-86.22	59 ± 2.63	80.03-129.91
Triglycerides	mg/dl	23 ± 2.67	-	24 ± 1.24	-
Alkaline phosphatase	U/l	93 ± 1.61	50-300	434± 35.31	41-1195
Pancreatic α – amylase	U/l	9 ± 0.94	-	24 ± 3.62	-
γ - GT	U/l	52 ± 1.67	25-59 13.3-40 40-94	47 ± 3.26	25-51 2.6-67.7

Table 3

The values of biochemical indices after lecithin administration

Specificare	Measure units	Sheep	Reference values in sheep	Goats	Reference values in goats
Total proteins	g/dl	7.17 ± 0.50	6-7.9	7.99 ± 0.42	5.58-8.64
Albumin	mg/dl	2.43 ± 0.26	2.4-3	2.30 ± 0.12	-
Creatinine	mg/dl	1.00 ± 0.06	1-2.7	0.98 ± 0.05	0.54-1.53
Urea	mg/dl	18.09± 0.76	17-48	28.40 ± 1.57	9.54-32.29
Bilirubins BT	g/dl	0.2 ± 0.03	0.04-0.22	0.1 ±0.001	0-0.1
Cholesterol	mg/dl	83 ± 2.97	52-76 64-108 42.53-86.22	86 ± 4.56	80.03-129.91
Triglycerides	mg/dl	45 ± 5.94	-	55 ± 2.63	-
Alkaline phosphatase	U/l	126 ± 1.92	50-300	910 ± 22.05	41-1195
Pancreatic α – amylase	U/l	7 ± 0.67	-	21 ± 1.63	-
γ - GT	U/l	57 ± 2.53	25-59 13.3-40 40-94	60 ± 4.56	25-51 2.6-67.7

Total protein from serum had increased values for animals from both experimental groups (sheep and goats) to which was incorporated lecithin in the ration: from 5.70 g/dl to 7.17 g/dl for sheep and respectively from 6.89 g/dl to 7.99 g/dl for goats. Because the values obtained do not exceed the reference values we consider that these raisings are not due to mobilisation of tisular proteins, but of the protective action that lecithin had exercise on essentials aminoacids from food, avoiding their degradation in energetic purpose. This action is desirable if we think to the limitative character of methionine beside lysine from ration destined to animals specialized in milk production and participates to synthesis of milk proteins.

Albumin, after supplementing the ratio with lecithin, the albumin levels from serum at sheep had a slight tendency of decreasing from 2.84 g/dl to 2.43 g/dl whereas at goat were relatively constant (a mean of 2.3 mg/dl). Therefore, it can be said that the intestinal absorption of aminoacids involved in synthesis of this protean fraction at hepatic level is not disturbed by the presence of the lecithin in the forage administrated to sheep and goats.

Creatinine, at the end of first experimental period the level of creatinine from serum of the sheep from experimental group was under the reference values specific for the species, respectively 0.83 mg/dl, while in the case of goats, for the same parameter was calculated a mean of 0.63 mg/dl. The introduction of lecithin in the ratio was followed by the increasing of serum concentration of creatinine to the inferior limit of reference values from sheep, and it was 1 mg/dl and in goats case the increasing was slight to a mean of 0.98 mg/dl.

The level of **urea** registered a similar evolution to creatinine, particularly in the case of sheep, who presented a mean initial concentration of 13.9 mg/dl, and after the supplementation the value obtained was 18.9 mg/dl. At goats in the same condition the value of urea raised from 20 mg/dl to 28.4 mg/dl. The values obtained are still in the normal limits for this species, without the intensification of protean catabolism or altering the renal function, but more likely a slight raising of effort made by the liver to detoxication the ammonia.

Dosing the **total bilirubins** from serum and calculation of mean values obtained, shown the decreasing of the circulatory level from 0.68 mg/dl in the case of Br to 0.2 mg/dl after supplementation with lecithin in the case of sheep and a slight raising from 0.08 mg/dl to 0.1 mg/dl in the case of goats.

The cholesterol and triglycerides in this experiment were raised both in sheep (from 82 mg/dl to 83 mg/dl for cholesterol and from 23 mg/dl to 45 mg/dl for triglycerides) but mostly in goats (from 59 mg/dl to 68 mg/dl for cholesterol

and from 24 mg/dl to 55 mg/dl for triglycerides). We illustrate the effect of lecithin on lipidic metabolits level from serum in our study by the fact that microbial enzymes from reticulorumen can partially degrading the lecithin, and the lecithin quantity that escape from fermentation is capable to stimulate only partial the lipid absorption in the small intestine. Encouraged by the possibility of rumen-bypass, it may considered that once she reached the intestine, lecithin may intensify the digestion of fatty acids, but would reduce in the same time the digestibility of lipids on total ratio.

Alkaline phosphatase, at the animals from our study registered important increasing of serical ctivity (from 93 U/l to 126 U/l at sheep), doubling his serical concentration in the case of goats (from 434 U/l to 910 U/l). This large variation are not patological indices of biliar and hepatic activity for both species, because at sheep are permited limit till 300 U/l, and at goats till 1195 U/l.

Pancreatic α-amylase manifested a decreasing of his activity both in sheet (from 9 U/l to 7 U/l) and goats (from 24 U/l to 21 U/l), which means that lecithin do not affect the integrity of enzyme cell, actyng specificaly only at small intestine level were catalyse the hydrolise of polimeric carbohidrates.

γ-GT is an enzyme consideerd a very sensitive marker of hepatic cell alteration. In our experiment the serical activity of γ-GT rainsed with 5 U/l at sheep (from 52 U/l to 57 U/l) and with 13 U/l at goats (from 47 U/l to 60 U/l), but this raisings do not aproach the superior limit of normal values (Matthew and Borkowski, 1999; Gergariu and all., 2000) and do not indicate the existence of a hepatic and biliar disfunction at any animal from the experimental groups to which the Br were supplemented with lecithin.

Conclusions

- Supplementation of a base ratio with 100 g lecithin/day/animal at lactating sheep and goats did not modified significant the serical values of total proteins, albumin, creatinine, urea and total bilirubins.
- The cholesterol and triglycerides in this experiment were raised both in sheep (from 82 mg/dl to 83 mg/dl for cholesterol and from 23 mg/dl to 45 mg/dl for triglycerides) but mostly in goats (from 59 mg/dl to 68 mg/dl for cholesterol and from 24 mg/dl to 55 mg/dl for triglycerides).
- Were registered significant increases of serical activity at alkaline phosphatase and γ-GT both in sheep and goats, but did not exceeded the tolerance limits.
- A decrease of plasmatic activity of pancreatic α-amylase was registered both in sheep and goats.

Bibliography

1.**Jenkins T. C., Fotouhi N.,** (1990) *Effect of lecithin and corn oil on site of digestion, ruminal fermentation and microbial protein synthesis în sheep.* J-Anim-Sci. Feb., 68 (2) 460-6.

2. **Lough D. S., Solomon M. B., Rumsey T. S., Elsasser T. H., Slyter L. L., Kahl S. and Lynch G. P.,** (1992*) Effect of dietary canolla seed and soy lecithin in high-forage diets on cholesterol content and fatty acid composition of carcass tissues of growing ram lamb.* J-Anim-Sci Vol. 70.

3. **Ghergariu S., Pop A., Kadar L., Spânu Marina,** (2000) *Manual de laborator clinic veterinar.* Editura All Educational, Bucureşti.

4.**Matthew J. A., Borkowski G. L.,** (1999) *The laboratory small ruminant.* CRC Press, Boca Raton.

5. **www. Soychlor.com -** *Nutrition Plus*