

The metabolic status of goats from Târnava Farm, Sibiu County

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Abstract

Târnava farm is located in Sibiu County, 12 km from the town of Mediaș and in 2017 owns 450 goats (740 goats in 2016, 420 in 2015). The farm is based on a reproductive core of different goat breeds: Saanen, French Alpine, Carpathian, cross bred Boer goats, both domestic and acclimated breeds. In establishing the metabolic status of these goats, we took blood samples from 10 2-year-old lactating goats, representing each breed. For each breed we averaged the values obtained and used as reference values the values provided by the equipment manufacturer; the samples were processed in the Laboratory of the Internal Medicine Department of the Faculty of Veterinary Medicine Bucharest. From the research we carried out, what we found metabolically in all the goat breeds on the farm was: normal proteic profile and lipid metabolism, normal enzymatic profile except for an increased alkaline phosphatase; hyperbilirubinemia; creatinemia and normal urea levels. As for the alkaline phosphatase – the orthophosphoric-monoester-phosphohydrolase has three isoenzymes: hepatic, bone, intestinal and during gestation, there is also a placental form. The hepatic alkaline phosphatase, which has major implications in veterinary pathology, plays a role in transport at the biliary and sinusoidal poles of the hepatocyte; in our research we observed that the hepato-biliary alkaline phosphatase is increased and accompanied by hyperbilirubinemia. Small non-specific increases may also occur in heart failure, possibly through intrahepatic biliary duct obstruction, all of which are difficult to follow pathological phenomena in veterinary medicine, so we can discuss about hepato-biliary dysfunction in the goats in this farm. The largest increase in alkaline phosphatase and bilirubin was registered in the Saanen breed, more pronounced in males than in females, followed by the French Alpine breed, while in the Carpathian the growth is moderate. We consider that this is a problem of functional adaptation in these imported breeds, one of the aspects observed during our research, constituting a part of a complex metabolic adaptation syndrome of imported goat breeds.

Keywords: *hepatic alkaline phosphatase, hyperbilirubinemia, metabolic syndrome of functional adaptation*

Introduction

Goat farming in an extensive system, under the geoclimatic conditions of our country, represents a continuing challenge for both the farmer who seeks the most profitable profits and the veterinarian who supervises the health of the livestock. In the present research we have monitored some biochemical parameters by which the veterinarian and the owner can supervise the health of the livestock. The goats harvest the crops obtained from the natural pastures and mountain meadows, which can not be used for the crops and can also utilize a range of industrial waste from large bakery businesses, from alcohol, beer, starch, vegetable and sugar factories (1, 4, 8).

The issue of feeding goats, through the level and quality of fodder administered during stabling and grazing during the warm season is one of the factors under the control of the grower, and who can ultimately decide the economic profitability of the goat breeding and exploitation.

In some countries in Europe like France, Switzerland, Austria, England, etc. effective programs of breeding and amelioration, nutrition, sanitary-veterinary etc. have been developed and implemented, which have imprinted with capriculture a special note of industrial exploitation by exploiting the lactogenic capacity and diversifying and selling the obtained products.

Implications of milk and meat productions obtained from goats in human food:

Goat milk is a good food, but can also be considered a preventive and curative medicine which is recommended for children, the elderly and the sick. Due to the calcium and phosphorus content, the consumption of goat milk contributes to the prevention of osteoporosis; balances blood pressure and relieves muscle and joint pains; helps regenerate cells; increases immunity, helping people with respiratory problems, especially TB; reduces the risk of breast cancer by 45% -65%; prevents colon cancer (5, 6).

Goat cheese has the property of treating pulmonary, cardiovascular and intestinal diseases; with a low fat content, goat cheese is digested more easily than other cheeses.

Goat meat is healthier than other types of meat. The calorie level reaches the 122 percent, similar to the non-skinned (120 calories), calculated for 100 grams. Furthermore, goat meat is 50-65% less fatty. It is also distinguished by the high nutritional value due in part to the high level of protein compared to other red meat, but also essential amino acids and iron and potassium salts. It has low cholesterol, a lipid level eight times smaller than beef and 40% lower than chicken (2, 7).

In our country there are two native breeds of goats: the Carpathian breed and the White Banat race (9). *The Târnava Farm, where the research was conducted, is located in Sibiu County, 12 km from Mediaş; holds a total of 450 goats in 2017 (in 2016 there were 740, in 2015 to 420 goats).*

Material and methods

The biological core was made up of goats of different races, indigenous races or acclimatized in our country.

We took blood samples from a total of 10 goats, 2 years old, from the Carpathian, French Alpine and Shanen breeds, lactating; for each race we made an average of the values obtained.

As reference values or used the values provided by the apparatus with which it was worked; the samples were processed in the Internal Medicine Laboratory of the Faculty of Veterinary Medicine Bucharest.

Results and discussions

We initially present the location where the research was conducted:

Presentation of the farm

In the Târnava farm, the biological nucleus is complex, represented as follows:

1. The Carpathian breed predominates; Carpatina X Shanen has a production of 3 l milk / day, while Carpathian native breed has a production of 1.8-2 L milk / day.
2. On the farm there are also the Metis of the French Alpine.
3. In 2017, on the farm there are goats - Alba de Banat (only pure races exist); usually 4-5 births; maximum yield (3 l milk / day) is obtained between 2nd and 4th calving.
4. There are also Boer race breeds that are a meat breed; at calf lambs have 6-7 kg; 1 month have 12-13 kg; at 2.5 months have 13 kg of meat and at 6 months have 20 kg of meat.
5. Breed Shanen; the Shanen breed was made up of Shanen goats from Austria and Germany; there are 16 Shanen males out of which 4 are pure breeds and the rest are meticulous; initially there were 11 Shanen goats out of which 8 died (did not adapt) and 3 remained, as the farm owner performs intense activity for improvement.



Figure 1. The Goat Effect



Figure 2. Shanen breed



Figure 3. Taking samples of blood from Alpina French

Reproduction

Mount is natural. The herbs are introduced into the flock on August 25; in December to January is a 60-day rest period; 300 days / year goats are lactating.

With regard to the half-cattle, half of the produce is male and half are female; on March 1 begins the sacrificing of the fawns.

Nutrition.

Summer is grazing in the field; in winter, lucerne hay, corn meal and wheat 1.4 kg/goat/day are administered. The owner uses only maize of native varieties that has 14% protein against maize hybrids that have only 7%; for all cereals used, laboratory analyzes are performed.

In the Târnavă farm, between 10 December and 10 April the goats are not grazed except on warmer days. For feed, 20 maize trailers for 500 goats are needed compared to sheep where 30 t corn / 500 sheep are needed.

Pathology in the farm

1. There are 40-50 abortions / year.
2. Lesions of the limbs are common; most are of a mechanical nature due to thorn prickles over which bacterial infections overlap.
3. External parasites with lice and ticks were found; In this regard, baths are made at the beginning of summer and Ivomec is given in winter and spring.
4. Regarding parasites, the frequent findings of cases of Fasciolosis etc. on the farm are successfully treated with Bermectin, with the specification that carcass is not to be consumed for 66 days.

Therapy and immunoprophylaxis. Vaccinate against anaerobiosis and sputum (2 times / year); antiparasitic treatments and other supportive therapies are performed.

Biochemical Investigations in Goat (2017)

We determined the following biochemical parameters:

Biochemical parameters	V.N	A1	A2	B1	B2	C1	C2
Total protein (g/dL)	5,8-8,5	7,2	7,5	6,9	7,3	7,4	7,7
Albumin (g/dL)	2,5-3,7	2,7	3,0	2,6	3,0	2,8	3,1
Globulin		4,5	4,5	4,3	4,3	4,6	4,6
Cholesterol (mg/dL)	70-280	50,0	87,0	69,0	80,0	77,0	87,0
Triglycerides (mg/dL)	25-500	73,0	37,0	67,0	43,0	83,0	54,0
ASAT (UI/L)	0-82	16,0	24,0	18,0	25,0	14,0	23,0
ALAT (UI/L)	78-132	109,0	121,0	124,0	132,0	187,0	173,0
LDH (UI/L)	692-1445	863,0	766,0	784,0	744,0	848,0	763,0
Creatinine (mg/dL)	0,4-1,0	1,0	0,9	1,1	0,9	1,0	0,9
Urea (mg/dL)	10-25	14,0	17,0	18,0	21,0	16,0	19,0
Total Bilirubin (mg/dL)	0,2-0,3	0,4	0,4	0,4	0,5	0,4	0,6
Alkaline phosphatase (UI/L)	0-80	87,0	135,0	185,0	215,0	215,0	223,0

Table 1. Biochemical parameters determined in lactating goats (different breeds), Tarnava Farm 2017. Labels: Goats A - Carpathian breed, Goats B - French alpine breed, Goats C - Shanen breed; A1, A2, A3 - males; B1, B2, B3,- females; VN- normal values

Table 1 shows that in all breeds of goat farmed on the holding we obtained:

- ✓ normal protein and lipid profiles;
- ✓ normal enzymatic profile except for phosphatase which is increased;
- ✓ moderate hyperbilirubinemia;
- ✓ creatinemia and normal urea levels.

In relation to alkaline phosphatase (orthophosphoric-monoester-phosphohydrolase, FA) it is known to have three isoenzymes: hepatic, bone and intestinal; in gestational conditions, a placental form may also occur transiently. As far as hepatic alkaline phosphatase (this has major implications in veterinary pathology) plays a role in the transport of the bile and sinusoidal hepatocyte poles; of our research we noticed that FA (hepato-biliary) origin is accompanied by hyperbilirubinaemia; small non-specific increases may also occur in possible cardiac failure through intrahepatic biliary duct obstruction.

Interpretation of results depending on race:

Carpathian breed: proteinemia and high albuminemia in females; the same globulinemia in females and males; cholesterol increased in females; increased triglycerides in males; ASAT and ALAT increased in females; LDH increased in males; increased creatinine in males; urea increased in females; the same bilirubin in males and females, alkaline phosphatase increased in females.

French alpine breed: proteinemia and high albuminemia in females; the same globulinemia in females and males; cholesterol increased in females; increased triglycerides in males; ASAT and ALAT increased in females; LDH increased in males; increased creatinine in

males; urea increased to female; increased bilirubin in females; alkaline phosphatase increased in females.

Shanen breed: proteinemia and high albuminemia in females; the same globulinemia in females and males; cholesterol increased in females; increased triglycerides in males; ASAT increased in females; *ALT and LDH increased in males, increased creatinine in males; urea increased in females; increased bilirubin in females, elevated alkaline phosphatase in females*

From the above interpretations, in the three races, we found:

- ✓ the protein profile is normal; depending on sex - in females is higher;
- ✓ cholesterol increased in females; triglycerides grown in males;
- ✓ ASAT and ALAT grown in female Charpatina and French Alpine breeds;
- ✓ increased creatinine in males; urea increased in females;
- ✓ increased bilirubin in females at French Alpina and Shanen;
- ✓ high alkaline phosphatase in females.

So, the biochemical differences are:

- ✓ **Shanen breed-** enzymatic profile (ASAT increased in females, ALT and LDH increased in males);
- ✓ ASAT and ALAT increased in females of the Carpathian and French Alpine breeds;
- ✓ increased bilirubin in females in the French Alpine breed and Shanen.

Conclusions:

1. Clinically, goats are healthy.
2. Changes in liver transaminases occur in all three races.
3. In functional adaptation processes, the liver is one of the required organs, with malfunctions as before.
4. Paraclinical, we can discuss at this stage of cellular biochemical lesions without clinical expression.
5. Metabolically, females are more affected than males (protein metabolic changes, lipid, enzymes at the hepatocellular level).
6. Increased creatinine in males compared to females (within the normal range) may be genetic as human creatinine is also increased in males.

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