

HEALTH OF GOATS AND MILK QUALITY

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SUMMARY

It is established that nematodes invasion of digestive tracts affects quality and quantity the animal products. The subjects of this research are quality parameters of digestive tract. Eksperiments were conducted on the farm of goats "Līcīši" in Jelgava region.

Nematodes were detected by MacMaster method.

Goats were divided in to two groups: animals with and without nematode invasion.

Milk samples were tested for ure, cholesterol, amino acids level and fat content on regular basis.

Milk was sampled for several times. Urea, cholesterol and amino acids were estimated, and their relationships were compared in the infected and noninfected goats. It was stated that the invasion of nematodes in milking goats influence both blood haematological and biochemical parameters in many aspects, as well as resulted in the changes of some milk quality indices.

Keywords: goats, enteroparasitocenosis, haematological, biochemistry, milk quality

INTRODUCTION

Obtaining of the qualitative production of the animal kingdom depends on many factors. One of the most significant factors is the correct feeding of goats, keeping and prevention of various diseases. As it is known, goats often suffer from the digestive organs' strongylate invasion. There are many investigations on the digestive organs' parasites bad influence upon the quantity of the milk production to goats but there are little data in literature about the goats' milk quality. It is known that at big digestive parasite invasions, the blood haematological and biochemical indicators change first to animals as well as the mucuous membrane of abomasum to ruminants has been damaged seriously. In cases of parasitosis the eosinophile leucocytes and lymphocytes in blood react first (Scott et. al., 1998; Balic, 2000; Hertzbergs 2000; Jasmera, 2007). In case of the intensive parasite invasion of digestive organs the changes in the composition of blood protein are being observed as well (Smith, Sherman, 1994; Balic, 1999).

The curative qualities of goat milk are generally known. Goat milk is especially advisable to little children who suffer from allergia. It is an irreplaceable product for people who cannot use cow milk as food (Sprūzs, 1996; restani et. al., 1999; Madsen et al., 2003; McCullough, 2003).

What concerns to separate milk biochemical indicators, then there should be marked the urea amount in milk. Milk urea amount gives possibility to evaluate and control the level of protein feeding to animals. High urea content in milk indicates to the intensified nitrogen educing with urine, the residue of protein or the disparate sugar content in forage as well as it gives evidence of the high destroyable protein content in the rumen. But low urea content in milk gives evidence about an insufficient amount of protein in the forage (Osītis, 2005). It is known that the urea content in milk changes during 24 hours, it is connected with the number of feeding times and the

quality of the forage. The urea content in milk reflects its urea content in blood what the animals have had during the last 12 hours (Madsen et. al., 2003; Ositis 2005). If the protein content in milk is more than 3% but at the same time the amount of urea in milk is lower than 12 mg/100ml, then the conclusion can be made that there is low destroyable ingested protein content in the rumen, there are little carbohydrates in the forage ration and the residue of energy has been observed (Ositis, 2005). We have not succeeded to find an investigation if or how the digestive organs' strongylates of goats influence the milk quality obtained from them.

MATERIALS AND METHODS

Investigations have been carried out in autumn on one of the biggest goat farms of Latvia – p/f “Līcīši”. During the investigations the goats had been kept in the goat-shed and fed by hay, carrots and oats. Firstly all the milk goats of the farm had been taken the coprological samples and examined according to MacMaster's method (Hoste, 2001). For the further investigations there had been selected 20 goats which had been ascertained the strongylate invasion of digestive organs – 453 eggs per 1 g of faeces as well as 20 goats without the strongylates of digestive organs.

It should be marked that the strongylates of breathing organs had not been ascertained to groups of goats. In the investigations only clinically healthy animals had been used.

Haematological and biochemical samples of blood had been taken from the both groups of goats for several times as well as the samples of milk. Haematocrite (PCV), the number of erythrocytes, the amount of haemoglobin, the number of leucocytes and the leucocytary formula had been determined in the blood haematological samples. Glycose, urea, creatinine, total bilirubin, cholesterol, crude protein, albumin, albumin – globulin ratio, ASAT ferments and the alkaline phosphatase had been determined in blood biochemically. In the samples of goat milk there had been determined the fat content, the amount of protein, the amount of urea, as well as 17 amino acids. The statistical processing of the examination results of the blood haematological, biochemical and milk samples was carried out by the help of Mc Excel programme. The average arithmetical value of each blood biochemical indicator as well as the standard deviation had been estimated. In order to compare and evaluate the changes of blood indicators between the investigation groups of goats, for comparing the two sample sets' dispersion of F-tests and for comparing the average of the two sample sets of T- tests with equal and different dispersions (Arhipova et al., 1998)

RESULTS

The results showed that the invasion of the digestive organs of goats with strongylates essentially influences the blood morphological and biochemical indicators. (Table 1).

Table 1. The change of blood morphological and biochemical parameters of goats with and without invasion

Parameters	Goats with invasion 453 eggs per 1 g faeces	Goats without invasion	Value – p
Eosinophils, %	10.67 ± 3.98	2.67 ± 0.82	p < 0.01
Band. neutrophils, %	4.08 ± 1.62	2.00 ± 1.26	p < 0.01
Albumin, g/l	39.83 ± 4.43	35.67 ± 3.61	p < 0.01
Albumin/globulin coefficient, g/l	1.19 ± 0.24	0.93 ± 0.15	p < 0.01

From the investigated blood haematological indicators in the leucocytary formula the amount of eosinophile leucocytes changed statistically credibly – their number increased from 2.67% to 10.67 as well as the amount of band neutrophil leucocytes – from 2.00% to 4.08%. As it is known, the amount of eosinophile leucocytes has always been increased in cases when there is parasitary invasion in the body of animals (Smith, Sherman, 1994; Balic, 2000). What concerns to band neutrophil leucocytes then they from the moment of birth till the age of six weeks can constitute approximately 2.5% from all neutrophil leucocytes to goats but the band neutrophil leucocytes in the leucocytary formula can even not to be to grown up animals (Jasmer et. al., 2007). Obviously, the strongylate invasion of the digestive organs of goats causes certain intensified developing process of neutrophil leucocytes.

The amount of albumin – from 35.67 to 39.83 g/l had increased statistically credibly (p<0.01) from the investigated biochemical indicators in the blood, albumin globulin ration changed as well from 0.93 to 1.19. It is known that albumin is the main component of the blood serum protein what forms from amino acids in the livers and helps to keep unchangeable osmotic pressure in the body (Lazzarro, 2005). It has been proved that in cases of hard strongylate invasions of digestive organs, the protein level in the blood serum falls (Smith and Sherman, 1994; Balic, 1999). In our case the strongylate invasion of digestive organs to goats was quiet insignificant. Obviously, therefore the body with such a level of invasion at the beginning has quiet successfully coped with the level of albumin in blood is insignificantly but statistically credibly increased. Besides, it has been shown, that if there is sufficiently provided protein in the forage having been fed to animals, then the losses of albumin in blood may also not occur (Smith, Sherman, 1994; Simpson, 2000).

Analysing milk samples from goats which had been invaded by the strongylates of digestive organs and from animals without such invasion we ascertained that the fat % (p>0.05) to the invaded animals had increased a little (Table 2).

Table 2. The change of milk parameters of goats with invasion and without invasion

Parameters	Goats with invasion 453 eggs per 1 g faeces	Goats without invasion	Value – p
Fat amount, %	5.5 ± 1.5	4.5 ± 0.9	
Protein amount, %	4.2 ± 0.8	3.3 ± 0.4	p < 0.01
Urea amount, mmol/l	7.1 ± 1.8	4.7 ± 1.6	p < 0.01

What concerns to the protein content in milk, then it statistically credibly (p<0.01) increased – from 3.3% to 4.2%. Just so the amount of urea in milk (p<0.01) being got from the invaded animals statistically credibly increased– (from 4.7± 1.6 to 7.1±1.8).

Analysing the indicators of protein and urea in goats' milk, it can be accepted that there has been an insufficient amount of the micro-organism destroyed protein in the rumen (Table 3). The work in this direction is going on.

Table 3. The change of milk protein of goats with invasion and without invasion

Parameters	With invasion 453 eggs per 1 g faeces	Without invasion	Value - p
Lysine	2.47 ± 0.55	2.07 ± 0.29	p < 0.01
Histidine	0.83 ± 0.19	0.71 ± 0.24	p < 0.05
Arginine	0.99 ± 0.22	0.83 ± 0.18	p < 0.05
Apargine acid	1.54 ± 0.34	1.34 ± 0.34	p < 0.05
Treonine	1.48 ± 0.33	1.23 ± 0.28	p < 0.05
Serine	1.25 ± 0.41	1.16 ± 0.26	p > 0.05
Glutamic acid	7.27 ± 1.67	5.78 ± 0.36	p < 0.01
Proline	1.29 ± 0.29	1.14 ± 0.30	p > 0.05
Glycine	0.58 ± 0.13	0.48 ± 0.14	p < 0.05
Alanine	0.84 ± 0.18	0.70 ± 0.20	p < 0.05
Scystine	0.52 ± 0.13	0.43 ± 0.08	p < 0.01
Valine	1.41 ± 0.32	1.22 ± 0.31	p < 0.05
Methionine	0.98 ± 0.29	0.87 ± 0.29	p > 0.05
Ioleicine	1.68 ± 0.81	1.33 ± 0.31	p > 0.05
Leucine	2.06 ± 0.44	1.80 ± 0.38	p < 0.05
Tyrosine	1.10 ± 0.24	0.93 ± 0.22	p < 0.05
Fenilalanine	1.91 ± 0.42	1.69 ± 0.29	p < 0.05

CONCLUSIONS

1. The strongylate invasion of digestive organs essentially (p<0.01) influences the blood morphological and biochemical indicators of goats. Eosinophile leucocytes increased from 2.67% to uninvadated animals to 10.67% to the invadated ones but the band neutrophil leucocytes correspondingly from 2.00% to 4.08%. Albumins in the blood serum increased from 35.67 g/l to 39.83 g/l but the ratio of albumin globulin – from 0.93 to 1.19.
2. Protein in the goats' milk to the uninvadated animals increased from 3.3% to 4.2% to the invadated animals but the amount of urea in milk increased correspondingly from 4.7 mmol/l to 7.1 mmol/l.
3. For goats with a low stage of invasion at the beginning there is a tendency for increasing of the amount of all amino acids determined in the investigation.

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