

**THE FUNCTIONAL CONDITION OF THE STOMACH IN GOATS
INFECTED WITH *O.CIRCUMCINCTA***

***O.CIRCUMCINCTA* IETEKME UZ KAZU KUŅĢA FUNKCIONĀLO
STĀVOKLI**

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ABSTRACT

The task of this investigation was to study if the abomasum pH dynamics change in goats artificially infected with *O.circumcincta* and if it does change, then what the changes are. Five 2 -3 months old kids and five 1 – 2 years old goats were used for the investigation. Before the infestation all the animals were operated fistulae in the abomasum and rumen. The artificial infestation was started on the 10th day after operation. Each of the goats received 5000 *O.circumcincta* larvae. In the third and fourth week after the artificial infestation eggs

typical of the parasite were found in faeces of all the goats. McMaster technique was applied for counting parasite eggs. In the group of adult animals the number of eggs varied within the range from 114 to 250 eggs per 1g of faeces, but in 2-3 months old kids the intensity of infection was higher – 282 to 512 eggs per 1g of faeces.

KEY WORDS: goats, invasion, *O.circumcincta*.

INTRODUCTION

The infection of alimentary tract nematodes in goats is one of the main reasons of their emaciation and decreased productivity. It is known that not all species of nematodes are equally pathogenic (Smith, Sherman, 1994).

Ostertagia circumcincta or *Haemonchus contortus* parasitise in the abomasum of goats. It is reported that in such cases the pH increase in the abomasum can be observed (Lawton et al., 1996). The excreted products of the matured parasites and larvae damage the abomasal mucous membrane followed by different disorders of physiological functions of the stomach (Simpson et al., 2000).

The aim of this study was to investigate the functional condition of the rumen and abomasum in 2 – 3 months old kids and in 1 – 2 years old goats in association with the *O. circumcincta* infection.

MATERIALS AND METHODS

The experiment was carried in the Clinic of the FVM LUA. Two animal groups were used: five goats at the age of 1 – 2 years, and five kids aged 2 – 3 months. Before investigations all the animals were operated in chronic rumenal and abomasal fistulae.

The adult animals received 1 kg of meadow hay, 0.5 kg of concentrated mixed feed and 0.2 kg of carrots per day. The kids were fed 3 l of goat milk and 0.5 kg of meadow hay. Before and during the experiment the animals were assessed clinically. All the animals included in the investigation were clinically healthy.

The larvae of trichostrongyloids were collected from the goats that belonged to the farm “Līcīši, Jelgava district. Faeces were kept in plastic containers with a little water added in room temperature for two weeks. During that time the material was refreshed with water, and it was also stirred in order to aerate. In two weeks time, when the larvae had reached the stage of being infective, they were isolated from the faeces by the Baerman method. They were identified according to morphological features and introduced into the stomach of goats through the rumenal fistula. Each of the goats received 5000 *O. circumcincta* larvae (Hansen, Perry, 1994).

In order to assess the infection degree, in the third and fourth week after artificial infestation faeces were examined for *O. circumcincta* eggs. McMaster technique was applied for counting parasite eggs (Hansen, Perry, 1994).

The stomach functional investigations were carried out by applying potentiometrical intragastric pH measurement method with a special two-electrode pH-probe (the probe had two antimony electrodes which were placed 12 cm one from another, and one calomel electrode at the end of the probe). The probe was inserted through the rumenal and abomasal fistulae, respectively. The pH-probe was introduced into the rumen in such a way that the first (end) electrode would be close to the ventral wall of the rumen, and the other one 12 cm higher of it. In the abomasum the probe was directed to the pyloric gland zone so that the end electrode would be maximum close to the pyloric sphincter. That would ensure the end electrode recording of the possible flow of the duodenal content into the abomasum during the duodeno-gastric reflux (Birģele, 2002).

The functional stomach examinations were started at 6 o'clock in the morning before the animal feeding. At 6:30 the animals were fed without interruption of intrarumenal and intra-abomasal pH measurement. The intragastric pH measurements were continued seven hours after animal feeding. Therefore, the uninterrupted intrarumenal and intra-abomasal pH

measurement in goats was continued at least for seven hours. Analogous studies were carried out at least five times in each of the animals.

RESULTS AND DISCUSSION

The coprological examinations showed evidence that the selected animals for the experiment had been susceptible to the trichostrongyloid infection. In the third and fourth week after the artificial infestation eggs typical of the parasite were found in faeces of all the goats. In the group of adult animals the number of eggs varied within the range from 114 to 250 eggs per 1 g of faeces. In 2 – 3 months old kids the intensity of infection was higher – 282 to 512 eggs per 1 g of faeces. That shows evidence that young animals are more susceptible to the infection than the adult ones. A conclusion can be drawn from the measurement results that the pH changes in the rumen of the infested and noninfested goats in the adult animal group did not differ greatly. At 6 o'clock in the morning before feeding the rumenal pH in noninfested goats was on average 7.6, but in the infested goats it was 8.1. Two hours after feeding the intraruminal pH decreased slightly; moreover, such a tendency in the rumen was observed both in noninfested and in infested animals (Fig. 1, 2). It should be noted that the rumen content in noninfested goats both before and after feeding was in general a little more acid than it was in infested animals – pH 7.6–6.7 and pH 8.1–7.7, respectively.

Analysing the pH changes in the abomasum of the same animals, it was stated that the intra-abomasal pH before feeding was at the level of 4.0–4.5 both in noninfested and infested goats. After eating the pH-dynamics in the abomasum of animals of both groups differed only slightly (Fig. 3, 4). In noninfested goats 2–2.5 hours after eating the intra-abomasal pH decreased to 3.4–3.5, but in the infested animals only to pH 4.0–4.4. It should be noted that the obtained infection degree (114 – 250 eggs per 1 g of faeces) after the artificial infestation of animals was not high (Hansen, Perry, 1994).

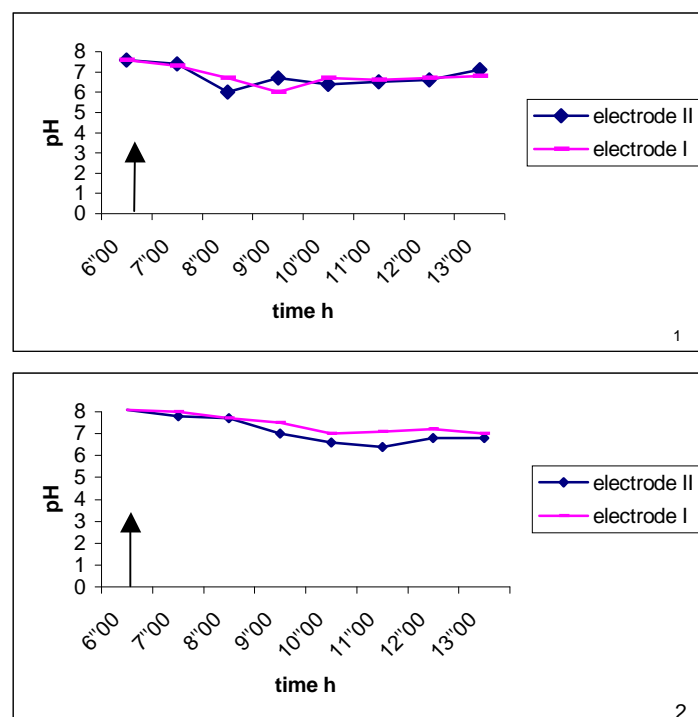


Figure 1.,2. Without (1) invasion and with (2) invasion 1 – 2 year old goat's pH change in rumen

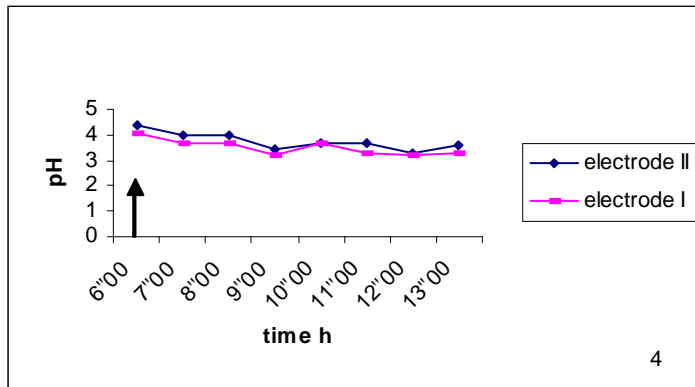
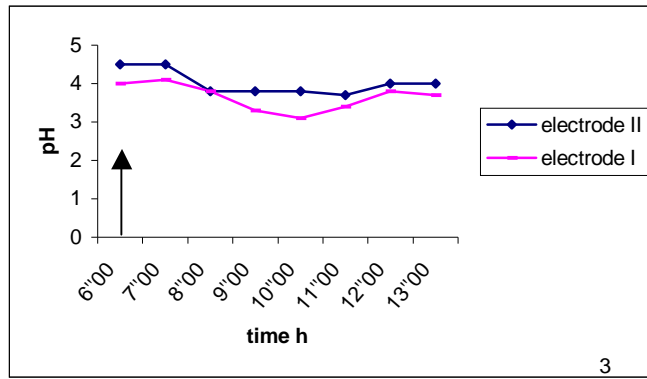


Figure 3, 4. **Without (3) invasion and with (4) invasion 1 – 2 year old goat’s pH change in abomasums**

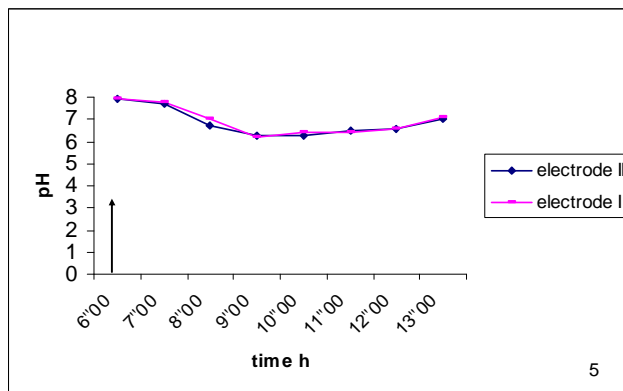
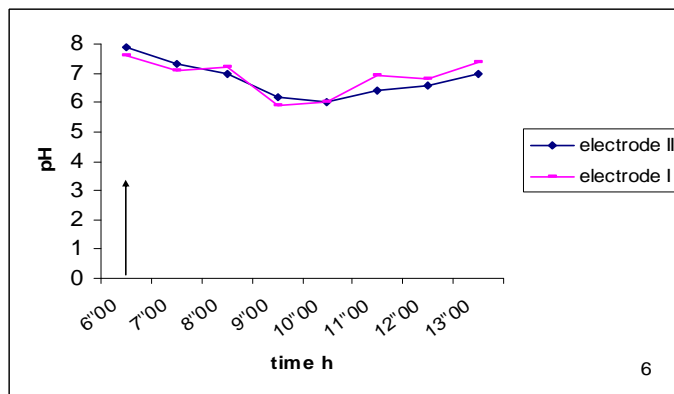


Figure 5.,6. **Without (5) invasion and with (6) invasion 2 – 3 months old goat’s kids pH change in rumen**

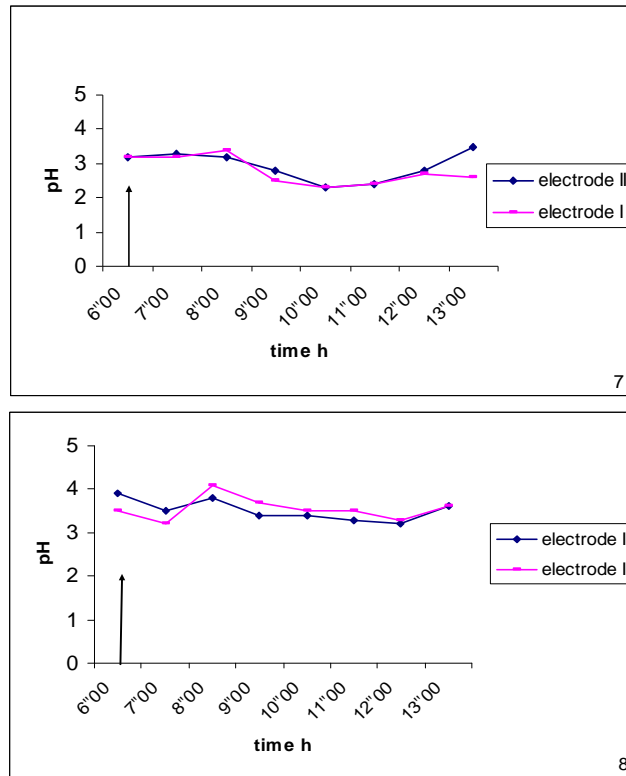


Figura 7., 8. **Without (7) invasion and with (8) invasion 2 – 3 months old goat's kids pH change in abomasum**

Regarding 2 – 3 months old kids, it was found out that in both infested and noninfested animals of that age the pH-dynamics in the rumen differed little. Similar to the adult animals, the rumen content reaction in noninfested kids was a little more acid – in the second and third hour after the animal feeding pH decreased to 6.7 level, but in the infested kids it was 6.9–7.0.

Greater changes were observed in the pH-dynamics of the infested kids (Fig. 7, 8). The abomasal pH changes appeared already before the animal feeding. So, the abomasal pH was at the level of 3.2 in the noninfested kids, but in the infested ones it was 3.5–3.9. After eating the abomasal pH in noninfested kids started to decrease already in the second hour, i.e. hydrochloric acid concentration started to increase reaching its maximum (pH 2.8–2.3) in 3 – 3.5 hours after eating (Fig. 7). Whereas, in the infested kids the intra-abomasal pH did not decrease lower than 4.1 after eating; moreover, the lowest pH level in the infected animals was found only in the fifth hour after eating (Fig. 8), and the acid concentration was comparatively low – pH 3.9.

Obviously, the *O. circumcincta* infection in the abomasum influenced the intra-abomasal pH making it impossible to reach the acid concentration after eating adequate to the age of kids.

CONCLUSIONS

1. In the group of adult animals a slight *O. circumcincta* infection (114 – 250 eggs per 1 g of faeces) does not cause significant changes of intraruminal and intra-abomasal pH-dynamics.
2. Two to three months old kids are more susceptible to the experimental *O. circumcincta* infection.

3. The infection degree of 512 eggs per 1 g of faeces causes the pH level increase in the abomasum in kids both before and after eating. Thus, such a degree of infection in 2 – 3 months old kids is sufficient to cause the intra-abomasal pH changes making it impossible to reach the acid concentration after eating adequate to the age of animals.

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