The role of the feed additive bentonite and protein intake on animal performance and gastrointestinal nematode control in confined Santa Inês lambs - Chagas A.C.S.[1], Fávero F.C.[2], Giglioti R.[2], Bogni S.C.[3], Beraldo M.C.D.[3], Bernardi A.C.C.[1], Esteves S.N.[1], Oliveira M.C.S.[1*]

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The effects of supplementation with bentonite and of a protein-rich diet were analyzed on the natural infection by gastrointestinal nematodes of confined Santa Inês lambs. Forty-eight animals weaned at 90 days of age and with average eggs per gram counts (EPG) of 4,969, were divided into 4 treatments of 12 animals each. Three groups received 25, 50 and 75 g of bentonite daily (T25, T50 and T75) and 0 g in the control group (T0). The roughage used was corn silage, with a concentrate: roughage ratio of 72:28 of dry matter. The diet contained 17.2% crude protein and 77.3% total digestible nutrients on a dry matter basis. Each 15 days, the EPG and coprocultures were performed, the packed cell volume (PCV) and total serum proteins (TSP) were determined. The mean EPG, TSP and PCV values were not influenced by the treatments. The mean values of log EPG observed for T0, T25, T50 and T75 were 2.99, 2.74, 2.74 and 2.67, respectively. The diet's efficacy in reducing the total average EPG in relation to day 1 of the experiment was 58% on day 14 and reached 97% on day 84. After 85 days the average daily weight gains were 0.176, 0.190, 0.189 and 0.203 kg/animal/day for T0, T25, T50 and T75, respectively. The supplementation with bentonite did not influence the infection by GINs but on the other hand, the diet composed of 17.2% crude protein drastically reduced the EPG of the lambs.

Key-words: *Haemonchus contortus*, protein intake, diet

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The role of the feed additive bentonite and protein intake on animal performance and gastrointestinal nematode control in confined Santa Inês lambs

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INTRODUCTION

Infection by gastrointestinal nematodes (GINs) is major obstacle in small ruminant production in tropical regions, where the climate conditions favor the dynamics of parasite populations. Sheep production has been increasing, but is still small in São Paulo state, making this region a large importer of lamb and mutton from other Brazilian states as well as from other countries (Veríssimo et al., 2012).

The initial aim of this study was to verify the effect of supplementation with the clay mineral bentonite on infection by GINs in Santa Inês lambs kept in confined conditions. Consequently, the impact of a rich-protein diet on this parameter was also verified.

METHODS

Forty-eight animals were used, weaned at 90 days of age and with average eggs per gram counts (EPG) of 4,969, divided into 4 treatments of 12 animals each. Three groups received 25, 50 or 75 g of bentonite daily (T25, T50 and T75) and the control group received no supplement (T0). The roughage used was corn silage, with a concentrate: roughage ratio of 72:28 of dry matter. The diet contained 17.2% crude protein and 77.3% TDN on a dry matter basis.

The animals remained confined for up to 85 days. The EPG were counted, coprocultures were performed and the packed cell volume (PCV) and total serum proteins (TSP) were determined. The bentonite clay chemical composition was obtained by analysis X-ray fluorescence spectroscopy. The EPG values were transformed into $\log_{10}(n+1)$ using the GLM procedure and the means were analyzed by the Tukey test.

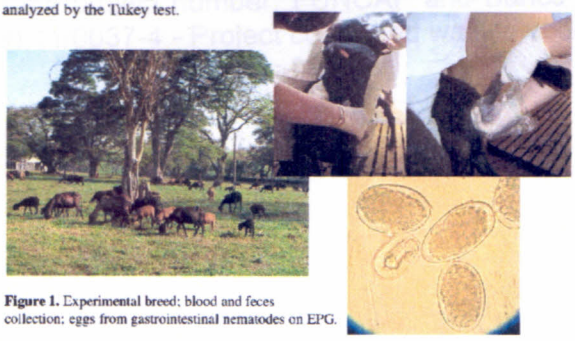

Figure 1. Experimental breed; blood and feces collection; eggs from gastrointestinal nematodes on EPG.

RESULTS

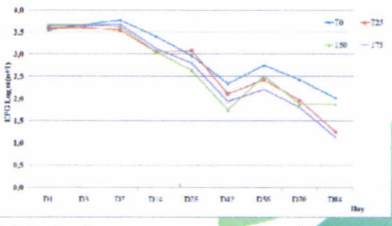

Figure 2. Reduction of average eggs per gram (EPG Log_{10} (n+1)) in confined Santa Inês lambs that received a diet rich in protein (17.2%) and bentonite (0, 25, 50 e 75 g/animal/day) in the four experimental groups of 12 animals each.

Table1. Means followed by standard deviations of the packed cell volume (PCV, %), eggs per gram (EPG, log 10 (n+1)) and total serum proteins (TSP, g/dL) by treatment and sex in confined Santa Inês lambs treated with bentonite (0, 25, 50 and 75 g/animal/day).

Treatments	Log EPG	PST	PCV
T0	2.99±0.06a	5.60±0.14a	37.19±0.50a
T25	2.74±0.06a	5.44±0.15a	37.20±0.53a
T50	2.74±0.06a	5.75±0.14a	36.99±0.50a
T75	2.67±0.06a	5.62±0.14a	36.23±0.59a
Female	2.70±0.043a	5.64±0.10a	38.12±0.35a*
Male	2.88±0.045a	5.56±0.10a	35.69±0.36b

*Different mean PCV values between males and females (P=0.03)

Table 2. Total mean eggs per gram (EPG) according to bentonite treatment (0, 25, 50 and 75 g/animal/day), mean EPG per day and efficacy in reduction of EPG in relation to day 1 in confined Santa Inês lambs receiving a protein-rich diet (17.2%).

Treatment	D1	D3	D7	D14	D28	D42	D56	D70	D84	Total Average
0	4254.2	5293.7	6810.0	3187.5	1800.0	779.2	1608.3	400.0	177.3	2701.1
25	4616.7	5172.9	5729.2	1408.3	1508.3	350.0	531.8	263.6	77.3	2184.2
50	5391.7	5289.6	5187.5	1808.3	750.8	245.8	900.0	179.2	158.3	2212.4
75	5616.7	5414.6	5962.5	1966.7	1375.0	720.8	375.0	200.0	95.5	2414.1
Diary Average	4969.8	5292.7	5922.3	2092.7	1358.5	523.0	853.8	260.7	127.1	
Efficacy		0.0	0.0	57.9	72.7	89.5	82.8	94.7	97.4	

Table 3. Mean of nematode species from coprocultures (%) in confined Santa Inês lambs treated with bentonite (0, 25, 50 and 75 g/animal/day).

Nematode	T0	T25	T50	T75	Total
Haemonchus contortus	74.6	66.4	80.2	81.6	75.7
Trichostrongylus sp.	23.4	29.6	19.2	15.8	22.0
Cooperia sp.	2.0	4.0	0.6	2.6	2.3
Total	100	100	100	100	100

Conclusions

❖The supplementation with bentonite did not influence the levels of infection by GINs as well as the weight gain relative to the control group;

❖The rich-protein diet reduced the total average EPG in relation to day 1 (D1) of the experiment in 58% on D14 and reached 97% on D84;

❖The substantial reduction in the EPG in all the experimental groups confirms the hypothesis that the diet was sufficient to inhibit infection by GINs in confined Santa Inês lambs with no need for anthelmintic treatment.

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This study is available on:
http://www.cppse.embrapa.br/sites/default/files/principal/publicacao/Comunicado100_0.pdf

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