Impact of Selective Prevention Treatments on Blood Parameters in Calves

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Abstract
The impact of alimentary supplement, homeopaticum and probioticum on selected blood parameters was examined in dairy calves. The effect of algae alimentary supplement on nitrogen metabolism was indicated by its decrease of urea in blood ($P < 0.05$). The beneficial effect of homeopaticum on health of calves was indicated by the levels of hemoglobin, leukocytes, glucose and protein in blood ($P < 0.05$). No effect of probioticum on mentioned blood health parameters was identified ($P > 0.05$).

Keywords: diarrhea, probiotics, homeopatics, algae

1. Introduction

The health status of calves determines the rentability of the farming. The application of the preventive treatments (alimentary supplements, homeopatics, probiotics) may contribute to a better health of calves. The tendency for a better gain was observed in calves fed by the probiotics [1, 2]. The probiotics can reduce the incidence of diarrheal diseases by preventing the pathogens entering the intestinal epithelial cells [3]. The aim of this study was to examine the impact of these feed supplements on the selected blood parameters indicating a functional and metabolic status of the calves.

2. Materials and methods

The study was conducted on a farm located at 760 m a.s.l. The calves of the Czech Spotted breed in the age of 5 – 14 days were treated by the Biopolym (alimentary supplement prepared from sea algae; 5 ml calf^{-1} day^{-1}), Lactovita (probioticum; 1 tablet calf^{-1} day^{-1}) or homeopaticum (mixture of PVB, *Aconitum napellus* and *Gelsemium sempervirens*; 5 ml calf^{-1} day^{-1}) which were added to a drinking water. Three groups of six calves treated by one of these feed additives and one control group were formed. All calves were fed by the Madesan Grand (8 l day^{-1}) and a starter feed ration ČOT B consisting of a starter and an oat. The application of the treatments was made immediately after the transport of calves to a high-capacity stall (for about 150 calves) from other four stalls at lower altitudes. The calves were fed by these feed additives for fourteen days. The blood samples were taken from *vena jugularis* in the third and in the seventeenth day from the beginning of the experiment. The hemoglobin and the leukocytes as the indicators of a functional status and the glucose, the urea and the crude protein as the indicators of a metabolic status of calves were measured in the blood samples. The difference in a content of these parameters between the first and the second sample was evaluated by the dependent t-test for the paired samples [4].

3. Results and discussion

The mean values of measured blood parameters are given in the Table 1. No significant difference between the first and the second sample was found

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in none of the measured blood traits in the control group. The concentration of hemoglobin was higher than 150 g l^{-1} in some calves in al the experimental groups indicating the occurrence of a diarrhea in calves at the beginning of the experiment. The significant depression of hemoglobin blood concentration between the first and the second sample was found only in the group treated by the homeopaticum ($P < 0.05$). The concentrations rested in a common physiological range, however. The concentration of leukocytes higher than 10 G l^{-1} occurred only in the homeopaticum group at the beginning of the experiment, which indicated the presence of infection diseases in these calves. The concetration of leukocytes depressed however in two weeks of the homeopaticum treatment ($P < 0.05$) to the levels similar to the other groups of calves. Significant increase of glucose in a blood between the first and the second sample was found only in the homeopaticum group ($P < 0.05$), which indicated a beneficial influence of this treatment on the metabolism of calves. The significant depression of urea in blood plasma content was found in the group treated by algae feed supplement ($P < 0.05$) but not in the other groups. This indicated a positive influence of this alimentary supplement on the nitrogen metabolism of calves. The levels of protein in blood plasma between 60 and 70 g l^{-1} are normally to be found in animals in a good health and its increase indicates a dehydratation caused by a diarrhea. The depression of the protein in a blood plasma found between the first and the second sample only in the homeopaticum group ($P < 0.05$) may thus be explained by a lower incidence of diarrhea and a better metabolism status of calves treated by homeopaticum.

Table 1. Mean values of measured blood parameters in a control group and in groups treated by some of feed additives after three (Sample 1) and seventeen (Sample 2) days from the beginning of the experiment. Hb – hemoglobin, Le – Leukocytes, Gl – glucose in blood, Ur – urea, Pr – protein in blood plasma, C – control, A – algae supplement, P – probioticum, H – homeopaticum; * difference at p = 0.05

Group	Sample	Hb (g l^{-1})		Le (G l^{-1})		Gl (m mol l^{-1})		Ur (m mol l^{-1})		Pr (g l^{-1})	
		mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
C	1	145.8	17.9	6.62	3.52	5.7	0.6	2.98	0.87	61	4
	2	150.8	23.8	7.46	2.49	5.0	0.6	2.29	0.22	64	6
A	1	160.0	33.9	7.87	2.01	5.1	1.3	4.42	1.51	60	5
	2	165.7	28.3	7.80	1.17	5.6	1.1	2.42*	0.42	56	3
P	1	149.3	16.7	8.77	2.82	5.8	0.7	3.48	0.46	56	5
	2	139.7	10.3	7.62	1.52	6.0	0.3	2.51	1.37	58	3
H	1	156.2	13.0	11.27	2.44	5.0	0.3	2.41	0.82	56	6
	2	141.3*	8.2	7.65*	1.25	5.6*	0.4	2.69	0.61	51*	5

4. Conclusions

In conclusion, the results indicated beneficial effects of homeopatics on a functional and metabolic status and of algae alimentary supplement on nitrogen metabolism in calves. In contrast to other studies [1, 2, 5], no effect of probioticum on blood health indicators was found in this study.

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