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Short communication

The effect of humic-fatty acid preparation on selected haematological and biochemical serum parameters of growing rabbits

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Abstract

In this study, we assessed the effect of a humic-fatty acid preparation (HFA) used in rabbit feed on certain haematological and biochemical serum parameters (the lipid profile and the Ca, P and Fe contents). A higher RBC, HGB and HCT values were observed in the groups that were given HFA. An increase in Fe concentrations were also noted. The total and LDL cholesterol were lower in the groups which received HFA than in the control group.

Key words: rabbit, humic acids, fatty acids, haematology, cholesterol, minerals

Introduction

Recent years have seen intense study on the biological properties of the humic compounds contained in peats and lignites, and their potential for use in animal feed. The humic substances composed of decaying organic matter are used in veterinary practice as antidiarrheal, analgesic, anti-inflammatory, immunomodulating, antibacterial and antiviral agents, as well as heavy metals and micotoxin accumulation reductors (Islam et al. 2005, Herzig et al. 2007, Wang

et al. 2008). The aim of this study was to investigate the influence of humic-fatty acid preparation (HFA) on selected blood parameters of rabbits, what have not been undertaken so far.

Materials and Methods

The research material consisted of 24 rabbits of the New Zealand White breed aged 2 months, fed *ad libitum* with a standard commercial feed. The rabbits

were divided into 3 groups: C (control) – animals to be given the basal diet without any additives, H5 – the basal diet with 5% HFA and H10 – the basal diet with 10% HFA. HFA was composed of 80% humic-mineral carrier and 20% plant oils¹. After 3 and 6 weeks of the experiment, blood was collected from the marginal ear veins and analysed using a Pentra 400 analyser (HORIBA ABX). In the whole blood WBC, RBC, HGB, HCT were determined. In the serum the total, LDL and HDL cholesterol, TG, Ca, P and Fe concentrations were determined. The results were analysed with “Statistica 10”.

Results and Discussion

The results of the studies are shown in Table 1. The analysis showed statistically significant effect of HFA supplementation on the RBC, HGB and HCT indices. The addition of humic substances did not change the erythrocytic indices in fatteners and broilers (Dobrzański et al. 2005, Wang et al. 2008). However, in piglets and Japanese quails, the application of humic acid with the feed caused an increase in HGB, RBC and HTC (Jasek et al. 1997, Ipek et al. 2008), similarly to the rabbits in the present study.

An important effect of HFA used in this experiment was the reduction of the cholesterol level in the blood serum, especially of its LDL fraction. A positive influence of HFA was observed in mares by Mochol et al. (2009), who have reported a decrease in the

total and HDL cholesterol, as well as TG level. A beneficial influence of plant oils on the values of the serum lipid parameters in rabbits was also described (Hur et al. 2005).

We observed an increase in the serum Fe concentration after the HFA supplementation. The increasing effect of humic substances on the serum iron level was demonstrated also by Ipek et al. (2008) in Japanese quails. It was found out that the HFA additive caused Fe level increase in rabbit's meat (Mišta et al. 2012).

In conclusion, the HFA additive used in this study caused increases of the values of the red blood cell variables and of the Fe content in the blood serum of growing rabbits. The preparation also positively influenced the lipid parameters in the blood, which was manifested by the lower total cholesterol content and its LDL fraction. Present results allow to make an assumption that the application of the HFA additive could be used in the rabbit nutrition.

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Table 1. The effect of HFA on selected blood parameters in rabbits (n=8).

	After 3 weeks			After 6 weeks			SEM	Significance ¹
	C	H5	H10	C	H5	H10		
RBC (x10 ¹² /l)	5.64	6.31	6.36	5.68	6.02	6.01	0.097	**
HGB (g/l)	11.40	12.50	12.98	11.60	12.23	12.35	0.175	**
HCT (%)	36.47	40.10	41.72	36.48	38.57	38.98	0.566	**
WBC(x10 ⁹ /l)	11.06	7.63	7.94	7.86	8.75	9.92	0.332	NS
TC ² (mmol/l)	1.98	1.44	1.26	1.44	1.36	1.39	0.099	*
LDL (mmol/l)	0.87	0.49	0.45	0.75	0.49	0.55	0.071	*
HDL (mmol/l)	0.55	0.55	0.49	0.53	0.59	0.53	0.031	NS
TG (mmol/l)	1.96	1.36	1.42	1.24	1.26	1.64	0.097	NS
Ca (mmol/l)	3.42	3.40	3.34	2.87	3.43	3.33	0.066	NS
P (mmol/l)	2.86	2.59	2.47	2.22	2.14	2.86	0.074	NS
Fe (µmol/l)	23.20	24.82	32.70	21.60	28.02	29.70	1.145	**

¹ Probability of effect due to HFA, * $P < 0.05$, ** $P < 0.01$, NS – not significant (analysis of variance for repeated measures)

² Total cholesterol

¹ The main mineral components of this preparation were silica, Al, Fe, Ca, Na, Mg, P, Mn, Zn, Cu, K, Co, Se; the main plant oils: oleic, linoleic, linolenic and palmitic acid; the energy value per 1 kg was 8 MJ/kg.

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