EFFECT OF A MULTI-MICROELEMENT PREPARATION ON THE PRODUCTION AND METABOLISM OF BROILER RABBITS

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SUMMARY

Laboratory model experiments were conducted to test the effects of a multi-microelement preparation (Cuni-Stibol®) on certain production-, haematological and metabolic parameters. After weaning at 28 days of age New-Zealand White rabbits were randomly assorted into two control (untreated and positive) and four experimental groups. The groups were kept for 49 days in cages with optimum environmental condition and fed ad libitum with pelleted rabbit feed that contained coccidiostatic. Water was constantly available through nipple drinkers. Control rabbits consumed plain water. The water of the positive control group and experimental groups (3–6) was acidified with 7 ml 10% acetic acid per litre. The water of the four experimental groups was added a multi-microelement at 0.35, 0.7, 1.4 and 2.8 ml/litre concentration, respectively. The micro-element preparation did not have unpleasant organoleptic characteristics and improved weight gain and feed conversion rate. The preparation at 0.28% concentration had the best effect on FCR and total weight gain. The preparation did not have adverse effect on animal health.

Keywords: broiler rabbits, micro-elements

INTRODUCTION

The aim of our study was to test the effects of a multi-microelement preparation specially developed for rabbits (*Cuni-Stibol* produced by Béres Sc.) on certain production and metabolic parameters. The water soluble preparation contains chelated compounds of essential micro elements, even less-known ones as B, Ni, Se and V. Determining the micro- and trace-element demand of rabbits is a complicated, being caecotroph and rather costly field of research, thus testing the production- and health-related effects of such preparation seemed interesting.

MATERIALS AND METHODS

Animals and diets

After weaning at 28 days of age, New Zealand White rabbits were randomly assorted into two (untreated and positive) control (1,2) and four experimental (3–6) groups of 18. The animals were kept in the climate laboratory of the Faculty, providing optimal environmental and housing (3 animals/cage) conditions. During the 49 days of the experiment the animals were fed ad libitum with pelleted rabbit feed containing coccidiostatic and 5% complete premix (1517 ppm Fe; 111

ppm Cu; 320 ppm Mn; 1077 ppm Zn; 51 ppm I; 15,5 ppm Co). Water was constantly available from nipple drinkers. Dosage of the preparation was given in function with bodyweight, therefore a 72-hour pre-experiment was conducted in order to measure the daily water consumption of the animals. Based on the results (86 ml/rabbit; BW: 770–820g), the optimal concentration of the preparation was determined at 0,7 ml/litre. The water of the positive control and the experimental groups was acidified with 7 ml 10% acetic acid per litre to stabilize the preparation. The water of the experiment groups was supplemented with the preparation at 0.35, 0.7, 01.4, 2.8 ml/litre concentration, respectively. Micro-element concentration of the preparation was the following

Sampling and laboratory analysis

Feed intake was recorded daily, water intake was measured twice a week, and body weight gain was checked once a week. The health status was permanently monitored, dead and animals were culled from the statistical analysis, however. Mixed arterious and venous blood samples were taken once, under the anaesthesia preceding exsanguination and pathological examination, when the 49-day experimental period was over.

To monitor possible haematological changes, Hb-concentration and haematocrit value of whole blood were determined. Blood glucose-level, plasma AST activity, FFA-, triglycerid- total protein and urea concentrations were also measured to check metabolic status.

RESULTS AND DISCUSSION

Major production parameters are shown in *Table 1*. Feed intake did not differ significantly between groups. The water intake did not differ significantly. Total weight gain was highest in Group 5 and 6, though only Group 6 differed significantly ($P<0.01$) from untreated and positive control groups. Acidification had no effect on production. In function with feed intake and weight gain, the feed conversion rate of Group 6 significantly improved. Based on death records there was no connection between treatment and general health status of the animals.

Haematological and metabolic parameters are displayed in *Table 2*. Hb-concentrations were physiological in all groups, results in Group 6 were significantly higher than in the untreated control Group 1 ($P<0.05$). Haematocrit values did not differ significantly between groups. Blood glucose-levels showed no statistically significant difference. Plasma FFA-concentrations in Group 3 and 4 were significantly lower than that of the untreated control Group 1. Plasma triglycerid concentrations in Group 2 were significantly lower than in control Group 1. AST activity of blood plasma tended to be lower in experimental groups, though the difference was significant only in case of Group 3 and 5. No significant difference in total-protein and urea concentrations was found between groups.

According to the results of our study it can be concluded that the preparation does not have unpleasant organoleptic effects, when mixed in drinking water. It can be stated that supplementing drinking water with the preparation at 0.28% concentration significantly improves weight gain and feed conversion rate. All haematological and metabolic results were in the physiological range, thus it can be concluded that the preparation had no adverse effect on animal health.

Table 1. The effect of CUNI-STIBOL® on major production parameters

Parameters	**Groups**					
	Control	**2.**	**3.**	**4.**	**5.**	**6.**
Live weight at start, g	971 +/–130,5	959 +/–128,9	984 +/–140,7	960 +/–101,4	1006 +/–100,7	971 +/–102,4
Live weight at conclusion, g	2434 +/–284,6	2442 +/–308,7	2524 +/–279,5	2525 +/–214,2	2624 +/–285,4	2665* +/–201,7
Total weight gain, g/49day*rabbit	1462,7 +/–218,3	1482,7 +/–276,7	1540,0 +/–212,7	1565,0 +/–215,1	1617,5 +/–257,1	1694,7** +/–157,0
Daily weight gain, g/day*rabbit	29,9 +/–4,5	30,3 +/–5,7	31,4 +/–4,4	31,9 +/–4,4	33,0 +/–5,2	34,6** +/–3,2
Daily feed intake, g/day*rabbit	110,5 +/–13,3	110,4 +/–15,1	107,3 +/–12,8	113,0 +/–14,4	116,6 +/–13,4	114,3 +/–12,5
FCR, kg/kg	3,7	3,65	3,41	3,54	3,52	3,3
Water consumption, l/kg feed DM	1,93	2,07	1,93	1,93	1,76	1,88
Micro-element consumption, ml/49 day*rabbit	–	–	3,04	6,42	12,07	25,3
Micro-element consumption, µl/bwt kg*day	–	–	35,4	75,2	135,7	284,1

*, **: difference is statistically significant compared to control (P>0.05, P>0.01)

Table 2. The results of measuring the blood samples

	Groups					
Parameters	**Control**	**2.**	**3.**	**4.**	**5.**	**6.**
Hb (mmol/l)	7,65 +/–0,39	8,32 +/–0,92	8,07 +/–0,46	7,96 +/–0,61	8,17 +/–0,81	8,48* +/–0,61
Htc (l/l)	0,4 +/–0,025	0,42 +/–0,028	0,4 +/–0,011	0,41 +/–0,031	0,39 +/–0,024	0,04 +/–0,02
Glucose (mmol/l)	4,5 +/–2,55	5,38 +/–1,75	5,57 +/–0,69	4,76 +/–0,84	4,46 +/–1,17	6,07 +/–2,03
FFA (mmol/l)	0,240 +/–0,107	0,19 +/–0,111	0,144* +/–0,08	0,106** +/–0,052	0,264 +/–0,183	0,170 +/–0,05
Triglicerid (mmol/l)	1,25 +/–0,85	0,31* +/–0,06	1,0 +/–0,43	0,93 +/–0,24	1,38 +/–0,69	1,19 +/–0,61
AST (U/l)	34 +/–13	33,0 +/–8,0	22,0* +/–9,0	29,0 +/–7,0	24,0* +/–7,0	30,0 +/–10,0
Total protein (g/l)	70,0 +/–5,0	67,0 +/–6,0	70,0 +/–3,0	70,0 +/–5,0	69,0 +/–4,4	70,0 +/–2,5
Urea (mmol/l)	7,76 +/–1,03	8,27 +/–0,99	7,79 0,73	8,27 0,74	8,21 +/–0,77	7,57 +/–0,77

*, **: difference is statistically significant compared to control (P>0.05, P>0.01)