

THE EFFECTS OF BFA ON WEIGHT GAIN AND COCCIDIOSIS IN MEAT RABBITS

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Abstract - Seventy-two Belgium rabbits distributed at random into three treatments were used in weight gain experiment to study the supplement effects of Rabbit-joy Biochemical Fumaric Acid (BFA), Rabbit-joy N° 1, and trace elements with Se. The basal diet was identical in three treatments. Average daily gain was 29.32 g, 26.71 g, 24.63 g, the feed efficiency was 3.42, 3.83, 4.25 respectively. Differences between the treatments were significant ($P < 0.05$) or highly significant ($P < 0.01$). Forty eight rabbits which had contracted coccidiosis distributed at random into three treatments were used in curative effect experiment. BFA 25 mg/kg, Diaveridinum (DVD) 800 mg/kg and Clopidol 1500 mg/kg were added to basal diet and cure rate was 100 %, 58.33 % and 83.33 % respectively. The differences between the treatments were significant ($P < 0.05$) and highly significant ($P < 0.01$). The results showed that the effects of BFA on growth performance and coccidiosis cure were better than the other two additives.

INTRODUCTION

Biochemical fumaric acid (BFA) is a polymer produced from organic substances through micro-organism fermentation. Studies have showed that BFA is widely used in plantation, such as in promoting growth, rooting and sprouting, drought and cold-resisting, output and quality increasing and so on. But reports about its usage in livestock farming have been not yet found. According to the reports, the mineral fumaric acid is inflammation-resistant, astringent, bleeding stopping, and organism metabolism adjusting, immunity strengthening. In this experiment, BFA was supplemented to basal diet to study the effects on performance and cure for coccidiosis of meat-rabbits. The tentative results have been obtained and are reported as follow.

MATERIAL AND METHODS

Materials

BFA : made in special chemical factory, ShenXian, HeBei, China.

Rabbit-joy N° 1 : Trace elements with Se for rabbits, made in develop mountain research institute of HeBei, BaoDing, China.

BFA Rabbit-joy : a kind of BFA additive which Rabbit-joy N° 1 is used as the carrier, the effective concentration of BFA is 1250 mg/kg.

Liming trace element with Se ; made in TianJin, China.

Clopidol : a kind of coccidiostat, made in the « eighth medicine factory » of Shanghai, China.

DVD (Diaveridinum): a kind of coccidiostat, made in ShiJaZhuang, HeBei, China.

Methods

Weight gain experiment - Seventy two Belgium rabbits at the age of 40-60 day-old were used. The rabbits were reared in cages and randomly distributed into three treatments, each containing 6 cages, and there are 2 female and 2 male rabbits in each cage. The cage space of each rabbit was 0.7 square metre. The basal diet was identical among the three treatments (DE 10.47 MJ/kg, CP 16 %, CF 14 %). BFA Rabbit-joy, Rabbit-joy N° 1

and Liming element with Se were added to the basal diet, respectively. The supplement percentage was 1 %. The rabbits were feed twice every day. Feed and water were supplied *ad libitum*. Feed consumption was measured every day, individual empty initial and final body weights were recorded at the beginning and the end of the experiment. The experimental period was 30 days (1992.8.25 to 9.25).

Curative effect experiment for coccidiosis - Forty eight suffering animals at age of 35-37 day-old were used in the experiment. The rabbits were chosen with the signs of scour, bloat, meagre and coccidiosis oocyst positive of excreta by the saturation salt-solution examination. They were randomly distributed into three treatments, each containing 16 rabbits and reared in cages each containing 3 rabbits. The space was 0.1 square metre, BFA 25 mg/kg, Clopidol 500 mg/kg and DVD 800 mg/kg were added to the basal diet, respectively. In the first two treatments, additives were added continuously and the last distributed for three days and withdrawn three days alternatively. During the experiment, vigour, appetite and excreta of experimental rabbits were observed, the number and date were recorded, bodies of the dead rabbits were dissected, the excreta were analysed and the reasons for the death were determined. The experimental period was 30 days (1992.8.25-9.25).

Data Handling - The data were analysed by biostatistics and significant differences were determined by F-test.

RESULTS

Weight gain of meat-rabbits (Table 1)

Average daily gain (ADG), feed efficiency and rough income of BFA Rabbit-joy, Rabbit-Joy and liming brand element were 29.33 g, 26.71 g, 24.03 g/day ; 3.42, 3.83, 4.25 and 40.14 Yuan, 30.56 Yuan and 22.52 Yuan, respectively. The best results were obtained in treatment of BFA Rabbit-joy compared to the other two treatments. Its ADG has increased by 9.81 % (P<0.05), 19.80 % (P<0.01); feed efficiency improved by 10.70 %, 19.53 % and benefit increased by 31.35 %, 78.25 %, respectively (see

Table 1 : Performance and economic benefit of rabbits.

Treatment	Initial Weight	Finish Weight	weight gain	ADG	TWG	Total feed consumption	Feed efficiency	Feed cost	W.G. income	rough income	benefit ratio
BFA Rabbit-joy	1140.83	2020.73	879.90	29.33 ^a	21117.6	72222.00	3.42:1	54.89	95.03	40.14	100.00
Rabbit-joy No.1	1146.37	1947.67	801.30	26.71 ^b	19231.2	73655.00	3.83:1	55.98	86.54	30.56	76.13
LiMing element	1148.23	1887.13	738.90	24.63 ^c	17733.6	75968.00	4.25:1	57.28	79.80	22.52	56.10

(1) ADG difference between ab, bc is significant (P<0.05) and bc is very significant (P<0.01)

(2) Rough income es wight gain income subtract feed cost.

Cost of rabbits is 4.5 yuan/Kg, feed cost is 0.76 yuan/Kg.

Curative effect for coccidiosis (Table 2)

During the experiment period, number of dead, mortality rate and cure rate of rabbits in the treatments of BFA, DVD and Clopidol were 0, 0, 100 % ; 10, 41.07 %, 58.33 % and 4, 16.67, 83.33 %, respectively. The dead rabbits were diagnosed coccidiosis through body dissection and excreta test.

Table 2 : Curative effects for rabbits

treatment	number	number of diet	number of cured	cure rate	cost of medicines	cost of cure
BFA	24	0	24	100 ^a	1.63	0.068
DVD	24	10	14	58.33 ^{bc}	7.20	0.30
Clopidol	24	4	20	83.33 ^b	3.24	0.135

During the experimental period, after the treatments, the treatment of BFA mended apparently and excreta were basically regular in five days. In ten days, the hair become bright and fatness was improved gradually. At the end of the experiment, they were healthy and strong, their weight gains were increased obviously. The number of coccidiosis oocyst by micrography in the excreta was very small. In the treatment with DVD six rabbits died at the beginning and four in the middle period, all were diagnosed coccidiosis by body dissection and chemical test. The rabbits grew very slowly, and the hair was rough at the end of the experiment. Four rabbits died of coccidiosis at early days in Clopidol treatment. The excreta of the rabbits in this treatment returned normal in 7-10 days and the fatness recovered in 10 days. At the end of the experiment, there were still a few oocyst in excreta by the micrography.

The study showed that BFA was superior to DVD and Clopidol in curing coccidiosis while the cost which was 50 % of Clopidol and 23 % of DVD was the lowest. BFA has showed a new way for prevention and cure for coccidiosis because it show no poison and side effect on rabbits and no residuals in the tissue of rabbits.

DISCUSSION AND SUMMARY

1. Coccidiosis is a main parasitic disease in rabbits. It has been imperilling rabbits seriously, especially in warm and raining seasons. Although some medicines such as Sulphanilamide, Clopidol, Robenidine perform restrain function on coccidiosis, the coccidia can produce drug tolerance if one or a few kinds of them were used for a long time; the prevention and cure effect became worse. The study showed that BFA was better in curing coccidiosis than clopidol and DVD. Its mechanism was to improve organism immunity, therefore, it doesn't produce drug tolerance.
2. Coccidia are protozoa whose development is divided into three stages : schizogamy, gametogonia and sporogony. In the first stage, they destroy epithelium cells of intestines, liver and biliary to obtain their nutrients. Coccidia also can produce a kind of particular toxin which upsets the digestion and absorption, weakens liver function, disturbs intestines' normal microflora and breaks acid-base balance, electrolysis balance. These lead to some clinic phenomenon; such as sour, constipation, hematochezia, bloat, slow growth, emaciation, limb paralysis and acute or chronic death. Therefore, the reasons for death in coccidiosis is a complex course, so a ideal anticoccidial drug can not only restrain their development but also promote the recovery of wounded tissues, improve digestion and absorption, establish balance of intestines microflora, and promote the excretion of coccidiosis'toxin and poison produces.
3. The study showed that BFA was very quick with good effect in curing coccidiosis. We owe this to its qualities of anti-inflammation hemostasis, anti-ulcer, anti-analgesia, antidote, astringe and improving organism immunity. According to the reports, BFA can reduce penetrability of normal blood capillary, weaken inflammation oedema, increased the number of blood platelet, promote erythrocyte agglutination index, perform powerful hemostasis function, adsorb surface adsorb to of intestines tunica mucosa, prevent focus from diffuseness. BFA can anti-analgesia and antispasmo due to its adsorption ability and restraint the production of prostaglandin E which is a medium of the BFA can make excreta return normal due to its astringe function. Because of its powerful adsorption and complexation ability it can excrete the harmful substance (gases, ion, toxin and harmful metabolite) from intestines tract. BFA can obviously activate non-special immunity. Some one also think that BFA can improve organism immunity and produce powerful resistibility to pathogenic micro-organism through leeding organism to produce a kind of interferon. In a word, BFA's effect on coccidiosis is a synthetic result of many functions.
4. The results indicated that the effects of BFA is effective in increasing growth rate and improving feed efficiency. We believe that is because its complex structures and multiple. BFA is a condensable substance with many functional groups, such as phenyl-hydroxy, oxatyl, enol, sulfonic, amine, quinone, methoxyl and carbonyl. It has a powerful ability to exchange positive ions, to complexation, to buffer, to adsorb and to catalyse. It can increase the penetration of cell membrane, improve adsorption of nutrient, impulse parasympathetic nerve, promote digestive tract activity and digestive juice excretion. At the same time, BFA can restrain sympathetic nerve and dis-assimilation, has animals very quiet and promote assimilation. Therefore, rabbits can growth fast and feed efficiency is high.
5. In the experiments, the weight gain of BFA treatment which was mixed reasonably with trace element was greater than that in the treatment of trace element additive only. It showed that there was a synergism action between BFA and trace elements in promoting animal growth.

At all, the study showed that BFA had good results in curing coccidiosis and increasing performance of rabbits. It has been know a little. The study just in this experiment is at early days. The aim was to exploit and utilise BFA and advance the development of animal husbandry. The results are for reference only.

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生化黄腐酸对肉兔增重 及球虫病疗效的影响

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提 要

增重试验选择比利时幼兔72只,随机分成三组。在基础日粮相同的条件下,分别添加生化黄腐酸添加剂——BFA兔乐、兔乐1号和黎明牌含硒生长素,各1%。试期30天。三组试兔的日增重分别为29.33克、26.71克和24.63克;料:重分别为3.42:1、3.83:1和4.25:1,差异显著($P < 0.05$)或极显著($P < 0.01$)。治疗球虫病试验选择患病幼兔48只,随机分成三组,饲料中分别添加生化黄腐酸25mg/kg、敌菌净800mg/kg和克球粉500mg/kg。治愈率分别为100%、58.33%和83.33%,差异极显著($P < 0.01$)或显著($P < 0.05$)。试验表明,生化黄腐酸对于提高肉兔生产性能和治疗兔球虫病有较好效果。

关键词:生化黄腐酸、肉兔、生产性能、球虫病、治愈率、免疫力