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丁酸梭菌对蛋用仔公鸡生长性能、免疫指标及空肠组织相关细胞因子基因mR

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Clostridium butyricum Affects Growth Performance, Immune I Expression of Related Cytokine Genes in Jejunum of Egg-Laying

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- 摘要
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摘要 本试验旨在探讨饲料中添加丁酸梭菌对蛋用仔公鸡生长性能、免疫指标及空肠组织相关细胞因子基因mRNA表达的影响。只1日龄健康海兰褐蛋用仔公鸡,随机分为6组,每组4个重复,每个重复10只鸡,各组分别在基础饲料中添加0(对照组)、150 mg/kg(抗生素组)和250、500、750、1 000 mg/kg丁酸梭菌,试验期为42 d,分别在14、28、42日龄测定各组的生长性能,42日龄测定器官指数、血清免疫指标及空肠组织相关细胞因子基因mRNA相对表达水平。结果表明:1)与对照组相比,1 000 mg/kg添加组内显著提高了蛋用仔公鸡平均体重和平均日增重($P<0.05$),添加各水平丁酸梭菌对全期平均日采食量和料重比的影响均不显著($P>0.05$)。2)1 000 mg/kg添加组的脾脏指数显著高于对照组($P<0.05$),各组之间胸腺指数和法氏囊指数均差异不显著($P>0.05$)。3)各丁酸梭菌添加组血清免疫球蛋白G(IgG)的含量与对照组相比均显著提高($P<0.05$),其中750 mg/kg添加组、1 000 mg/kg添加组血清IgG的含量与抗生素组相比也显著提高($P<0.05$);1 000 mg/kg添加组血清免疫球蛋白A的含量最高,显著高于对照组和抗生素组($P<0.05$);各丁酸梭菌添加组血清补体3的含量与对照组相比均显著提高($P<0.05$)。4)750 mg/kg添加组、1 000 mg/kg添加组空肠组织白细胞介素-6基因mRNA相对表达水平与对照组相比显著降低($P<0.05$),1 000 mg/kg添加组肿瘤坏死因子- α 基因mRNA相对表达水平最低,与对照组相比差异显著($P<0.05$)。结果提示,饲料中添加适量的丁酸梭菌可在一定程度上提高蛋用仔公鸡的生长性能,促进免疫器官发育并提高免疫力,抑制炎症的发生。本试验条件下,1 000 mg/kg的添加量效果最好。

关键词: 丁酸梭菌 生长性能 免疫指标 细胞因子 mRNA相对表达水平

Abstract: This experiment was conducted to study the effects of *Clostridium butyricum* on growth performance, immune indices and the mRNA relative expression of some related cytokine genes in jejunum of egg-laying chicks. A total of 240 one-day-old healthy Hy-Line egg-laying male chicks were randomly divided into 6 groups with 4 replicates in each group and 10 chicks in each replicate. The basal diet was supplemented with 0 (control), 150 mg/kg aureomycin (antibiotic group), 250 (EG250), 500 (EG500), 750 (EG750), and 1 000 mg/kg (*E. Clostridium butyricum*, respectively). Growth performance, immune organ indices, serum immune indices and relative expression of some related cytokines were determined in different periods. The experiment lasted 42 days. The results showed as follows: 1) compared with the control group, average body weight and average daily gain of chicks in EG1 000 were significantly increased ($P<0.05$), but the supplementation of *Clostridium butyricum* had no effects on average daily feed intake and feed/gain ratio during the whole experimental period ($P>0.05$). 2) Spleen index of chicks in EG1 000 was significantly higher than that in the control group ($P<0.05$), but there were no significant differences in thymus index and bursa of Fabricius index of chicks among all groups ($P>0.05$). 3) Serum IgG content in all *Clostridium butyricum* groups was significantly higher than that in the control group ($P<0.05$), and serum IgG content in EG750 and EG1 000 was significantly higher than that in the antibiotic group ($P<0.05$). The serum IgA content of chicks in EG1 000 was the highest during the whole experimental period ($P<0.05$). 4) IL-6 mRNA relative expression level in jejunum of chicks in EG750 and EG1 000 groups was significantly lower than that in the control group ($P<0.05$), and TNF- α mRNA relative expression level in jejunum of chicks in EG1 000 group was the lowest, and the difference was significant ($P<0.05$). The results suggest that the addition of appropriate *Clostridium butyricum* to the feed can improve the growth performance of egg-laying chicks to a certain extent, promote the development of immune organs and improve immunity, and inhibit the occurrence of inflammation. Under the conditions of this experiment, the addition effect of 1 000 mg/kg was the best.

there was a significant difference between EG1 000 and the control group or antibiotic group ($P<0.05$). The C3 content of chicks in all *Clostridium butyricum* groups was significantly higher than that in the control group ($P<0.05$). 4) The relative expression level of IL-6 mRNA in jejunum of chicks in EG750 and EG1 000 was significantly lower than that in the control group ($P<0.05$); the relative expression of TNF- α mRNA in EG1 000 was the lowest during the whole experimental period, and there was a significant difference between EG1 000 and the control group ($P<0.05$). In conclusion, adding appropriate level of *Clostridium butyricum* to the diet can improve growth performance, enhance immune organ growth and function of chicks, and suppress the inflammation. The 1 mg/kg *Clostridium butyricum* had the best effect among the six groups.

Keywords: *Clostridium butyricum*, growth performance, immune indices, cytokine, relative expression level

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