

Effects of Exogenous Glucose Oxidase on Nutrients Digestibility and Growth Performance of Broilers

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Abstract

This experiment was conducted to study the effects of glucose oxidase (GOD) on nutrients digestibility and growth performance of broilers. A total number of 125 one-day old AA broilers were randomly assigned to 5 treatments, with 5 replicates and 5 birds for each replicate. Positive control (PC) group was fed basal diet, and the other 4 treatment groups were fed basal diets added with 0.01%, 0.02%, 0.03%, or 0.04% GOD respectively. The results indicated: both dry matter (DM) and crude protein (CP) digestibility were significantly improved after supplementation with 0.04% GOD in broilers' basal diet ($P < 0.05$). In the commercial farm, average daily gain (ADG), feed conversion rate and European production efficiency factors (EPEF) were significantly improved ($P < 0.05$) by adding 100-200g GOD per 10000 broilers per day by drinking water. Thus, inclusion of GOD in broiler diet could result in increases of DM and CP digestibility, and improvement ADG, feed conversion rate and EPEF of broiler.

Introduction

More and more nutritionists are interested in stop using antibiotic growth promoters in animal husbandry because of the issue of antibiotic resistance in certain bacteria. In order to help maintain animal performance without antibiotics, a number of natural alternative growth promoters have been developed for use in commercial chicken feeds. Glucose oxidase (GOD) is an aerobic dehydrogenase that catalyzes the oxidation of β -D-glucose to gluconic acid. Its antimicrobial activity was shown subsequently due to the formation of H_2O_2 , as well as proliferation of anaerobic lactic acid bacteria due to oxygen consuming, resulted in feed lactic acid increasing and pH decreasing, harmful bacteria inhibited and abnormal fermentation avoided. There has been broad prospects in the application of GOD in animal production and feed industry as an alternative antibiotics. This experiment was conducted to investigate effect of exogenous GOD on nutrients digestibility and growth performance in broilers.

Materials and Method

Nutrients Digestibility

The experiment was designed by randomized block design (one factor). A total number of 125 one-day old AA broilers were randomly divided into 5 treatments with 5 replicates and 5 birds each. Broilers in PC, T1, T2, T3, and T4 groups were fed commercial corn soybean meal basal diets with addition of 0, 0.01%, 0.02%, 0.03% or 0.04% GOD respectively. The metabolic test started from 19 days to 24 days and the whole period was 6 days including 3 days' preliminary trial period and 3 days' fecal collecting period. All the birds fed the same diet until the trail started. The apparent digestibility of the crude protein (CP), drier material (DM) and gross energy (GE) were conducted to be measured by endogen indicator method. GOD was offered by Qingdao Vland Biotech Group, Shandong, China, with enzyme activity over 5000 IU/g which was measured under pH 6.0, 30°C.

Growth Performance

Six commercial broiler houses were randomly assigned into 2 treatment of PC and GOD group with 3 replicates each. All the birds were fed commercial broiler feed. Besides that, in 0-7 days, broilers in the GOD group were added with 100g GOD per 10000 broilers per day by drinking water and in 8-40 days with 200g GOD per 10000 broilers per day. The whole experiment lasted for 40 days. The growth performance indexes as average daily gain (ADG), feed conversion rate (FCR) and European production efficiency factors (EPEF) were measured.

Data were processed by SPSS software. Differences were considered to be significant at $P < 0.05$ and significant differences between means were separated by the Least Significant Difference test.

Result

The results showed:

Compared with PC, diet supplemented with 0.04% GOD could significantly improve broilers' DM and CP digestibility ($P < 0.05$), which were increased to 10.70% and 20.50% respectively. Although there was no difference between all GOD groups and PC group on energy digestibility, T4 group had the highest and 8.47% higher than that of PC group (Figure 1).

In the commercial farm, the ADG, FCR and EPEF of GOD group were significantly increased ($P < 0.05$) than PC group by adding 200g GOD per 10000 broilers per day by drinking water (Figure 2)

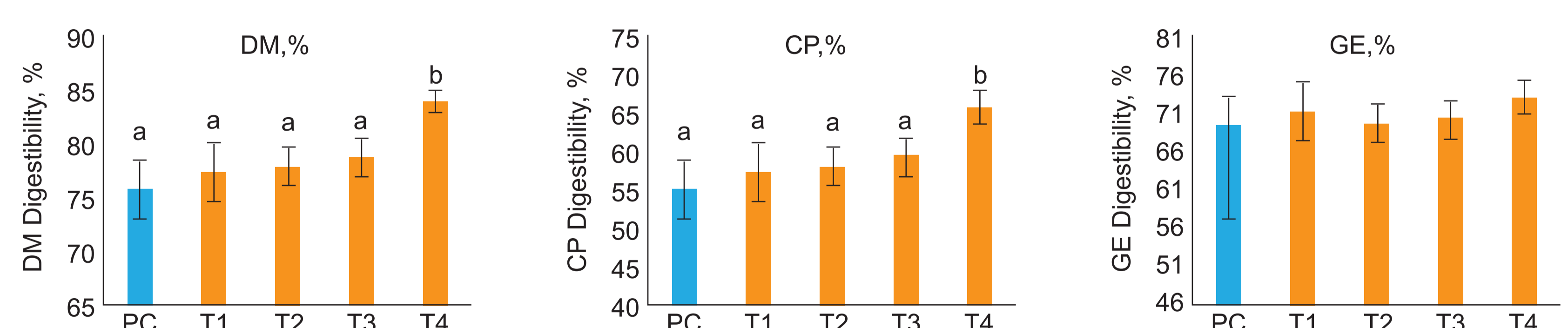


Figure 1. Changes of digestibility of DM, CP and gross energy in all treatments. Note: Column not sharing a common letter are significantly different ($P < 0.05$).

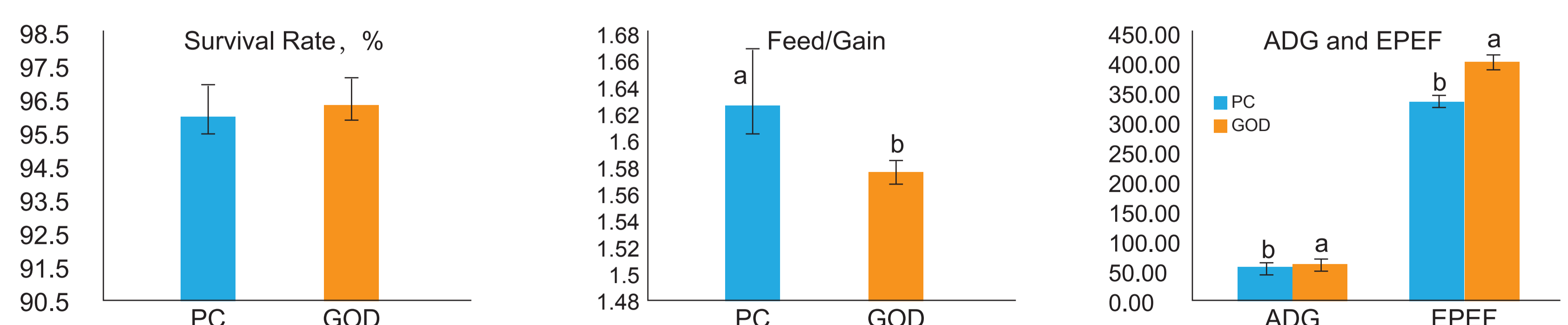


Figure 2. Changes of survival rate, feed/gain, ADG and EPEF in all treatments. Note: Column not sharing a common letter are significantly different ($P < 0.05$).

Conclusion

In this experiment, we found that the supplementation of GOD could not only improve broilers' DM and CP digestibility, but also broilers' growth performance as ADG, feed conversion rate and EPEF.