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POULTRY RESEARCH BULLETIN 3

The effect of Provilli-Max on the growth response of Ross x Ross 708 male broilers in a live coccidiosis challenge



**PROVILLI
MAX**

INTRODUCTION

Coccidia are single-celled protozoa that infect the intestinal tract of poultry and cause disease. The disease is characterized by enteritis, diarrhea, and mortality, and is one of the most severe and costly diseases worldwide. The genus and species that affect poultry are primarily *Eimeria acervulina*, *Eimeria maxima*, *Eimeria tenella*, *Eimeria necatrix*, and *Eimeria brunetti*.

Coccidiosis is prevented by using vaccines or coccidiostats in the feed. However, there are concerns that drug-resistant coccidia strains may emerge. Thus, the poultry industry is interested in natural feed additives that may alleviate the negative effects of and/or prevent coccidiosis. The complex carbohydrates from yeast cell walls, such as those in Provilli-Max, can play a role in mitigating the effects of coccidia in broilers. Additionally, the *Bacillus* in Provilli-Max can aid in the prevention or treatment of the necrotic enteritis, resulting from the coccidia infection, by controlling the *Clostridium perfringens* that benefit from the intestinal damage by the *Eimeria*.

METHODS

► One thousand fifty-six Ross x Ross 708 male day-of-hatch broilers were randomly allotted to treatment groups:

1. Control, non-challenged; 2. Control, challenged;
3. Coccidiostat (Zoamix, Zoetis, 1.0 lb/ton), challenged; or 4. Provilli-Max (0.5 lb/ton), challenged. There were 12 replicate pens per treatment with 22 chicks per pen. Chicks were fed a standard starter diet from day 0 to 14 and a standard grower diet from day 14 to 21, including their respective feed additives. On day 14, the challenged treatment groups were administered 0.5 mL of 10X live coccidiosis vaccine (B52, Merck) via oral gavage. The

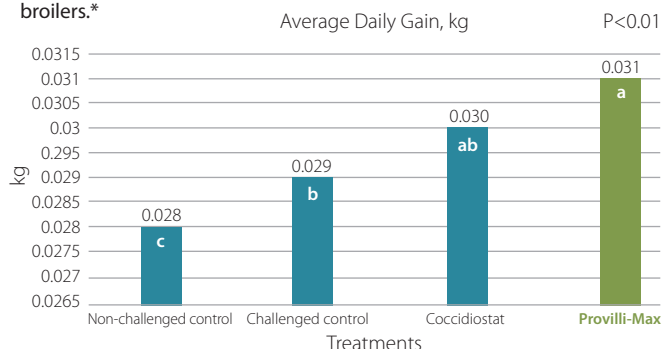
non-challenged treatment group was given distilled water via oral gavage. Birds and feed were weighed on days 0, 14, and 21. On day 21, one random bird per pen was evaluated for intestinal lesions. Also on day 21, fecal samples were collected from each pen for oocyst counts.

► All chicks were vaccinated at a commercial hatchery using commercial hatchery standards and vaccination programs, except for a live coccidiosis vaccine. At placement, only the control, non-challenged treatment group was administered 1X live coccidiosis vaccine (B52, Merck) by spraying it on their feed.

RESULTS

► From day 0 to 14, prior to the coccidiosis challenge, chicks fed Provilli-Max or the coccidiostat had increased ($P < 0.01$) average daily gain (Figure 1), increased ($P < 0.05$) feed intake, improved ($P < 0.01$) feed conversion ratio (Figure 2), and heavier

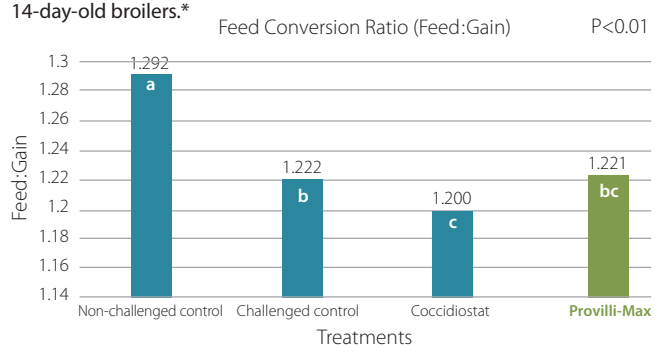
Figure 1. The effect of Provilli-Max on average daily gain of 0- to 14-day-old broilers.*



*Data are means of 12 replicates per treatment.

*c Data with different superscripts are different ($P < 0.01$).

Figure 2. The effect of Provilli-Max on feed conversion ratio of 0- to 14-day-old broilers.*



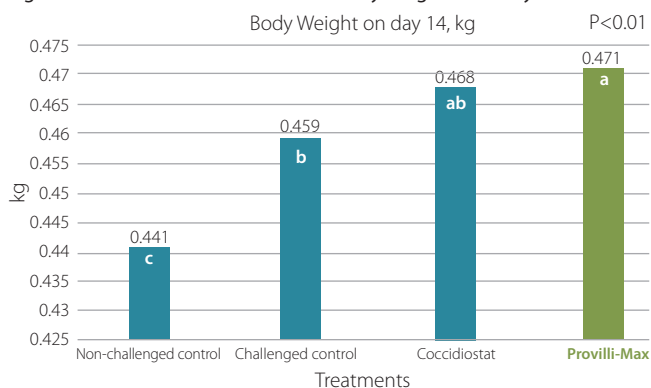
*Data are means of 12 replicates per treatment.

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RESULTS

($P < 0.01$) body weights (Figure 3) than chicks fed the control diet. After the coccidiosis challenge, chicks in all treatment groups had similar ($P > 0.05$) growth performance from day 14 to 21 (data not shown). For the entire trial (day 0 to 21), chicks in the control, challenged; coccidiostat, challenged; or Provilli-Max, challenged treatment groups had increased ($P < 0.01$) average daily gain (Figure 4), improved ($P < 0.01$) feed conversion ratio (Figure 5), and heavier ($P < 0.01$) body weights (Figure 6) than chicks in the control, non-challenged treatment group. Average lesion scores of the duodenum, jejunum, ileum, ceca, or total gastrointestinal tract (Figure 7) were not affected ($P > 0.05$) by treatment. However, oocyst counts (eggs/g) were lowest ($P < 0.01$) for the coccidiostat, challenged and control, non-challenged treatment groups; intermediate for the control, challenged group; and highest for the Provilli-Max, challenged treatment group (data not shown). Overall, chicks fed Provilli-Max had similar growth performance and intestinal lesion scores as chicks fed the coccidiostat.

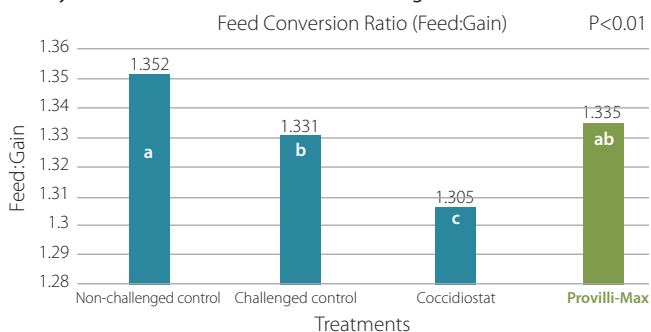
Figure 3. The effect of Provilli-Max on body weight of 14-day-old broilers.*



*Data are means of 12 replicates per treatment.

*c Data with different superscripts are different ($P < 0.01$).

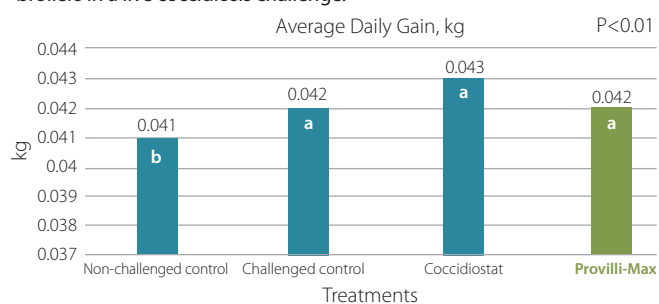
Figure 5. The effect of Provilli-Max on feed conversion ratio of 0- to 21-day-old broilers in a live coccidiosis challenge.*



*Data are means of 12 replicates per treatment.

*c Data with different superscripts are different ($P < 0.01$).

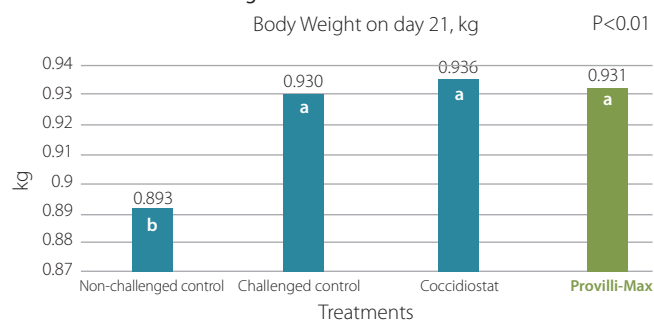
Figure 4. The effect of Provilli-Max on average daily gain of 0- to 21-day-old broilers in a live coccidiosis challenge.*



*Data are means of 12 replicates per treatment.

*c Data with different superscripts are different ($P < 0.01$).

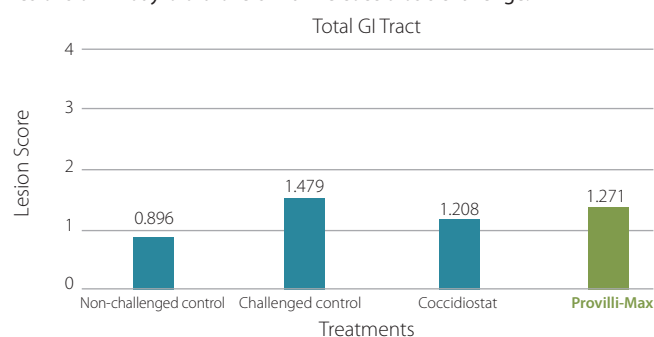
Figure 6. The effect of Provilli-Max on body weight of 21-day-old broilers in a live coccidiosis challenge.*



*Data are means of 12 replicates per treatment.

*c Data with different superscripts are different ($P < 0.01$).

Figure 7. The effect of Provilli-Max on average total gastrointestinal tract lesions of 21-day-old broilers in a live coccidiosis challenge.*



*Intestinal lesion scores were done using one randomly selected bird from each pen, scoring was done using the Johnson & Reid Method (1970).

IMPLICATIONS

In the starter phase of production (day 0 to 14), Provilli-Max can be utilized to improve growth performance of broilers. Provilli-Max may lead to improved immune function of broilers, in a live coccidiosis challenge, as demonstrated by growth performance and intestinal lesion scores similar to broilers administered a coccidiostat in their feed. Overall, these data demonstrate significant resilience of broiler chicks fed Provilli-Max and faced with a serious disease challenge.



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