

EFFECT OF AN ACTIVATED ZINC OXIDE ON GROWTH PERFORMANCE AND POST-WEANING DIARRHEA IN PIGLETS

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BACKGROUND & OBJECTIVES

- Weaning is a stressful event for piglets, frequently resulting in intestinal inflammation and post-weaning diarrhea (PWD)
- The use of zinc oxide (ZnO) in high concentrations was an effective measure to prevent PWD but was banned in the European Union as the benefits do not outweigh the risks for the environment
- Therefore, alternative diet formulations, feed ingredients or additives are required to minimize PWD and the use of antibiotics
- Aim: to assess the effect of a novel, activated ZnO (MAXACTIVAT/Zn) on growth performance, diarrhea incidence, and fecal microbial composition at Zn concentration according to the European feed regulation

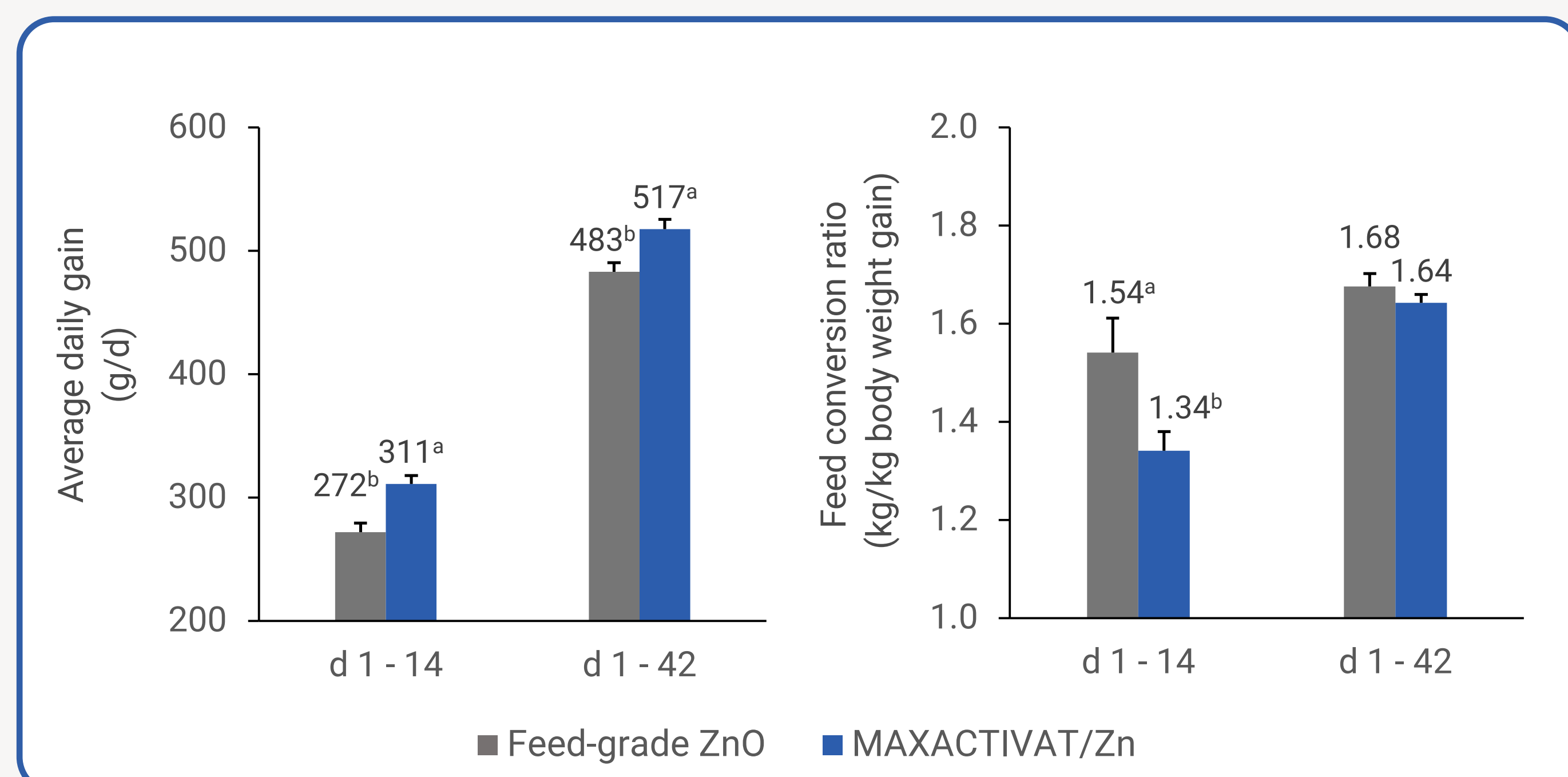


Figure 1. Effect of ZnO source on average daily gain and feed conversion ratio of weaning piglets. Data are expressed as LS means + SEM (n = 208; P < 0.05).

RESULTS

The supplementation of MAXACTIVAT/Zn resulted in:

- 14% greater ADG in Phase 1 and 7% greater ADG within the 42-d rearing period (P ≤ 0.002; Figure 1)
- 13% lower FCR in Phase 1 (P = 0.025; Figure 1)
- 1.1 kg greater final body weight (28.9 kg vs. 27.8 kg; P = 0.022)
- 68% reduced diarrhea incidence during d 1–10 post-weaning (P < 0.001; Figure 2)
- 60% reduced gene copy numbers of *E. coli* in fecal samples on d 7 post-weaning (P > 0.05; Figure 2)

CONCLUSION

- MAXACTIVAT/Zn improved growth performance and reduced diarrhea incidence in weaning piglets, probably by modulating intestinal microbiota resulting in improved gut health
- MAXACTIVAT/Zn is a suitable alternative to feed-grade ZnO in feeding concepts aiming to minimize *E. coli* induced PWD at concentrations < 150 mg Zn/kg complete feed

MATERIAL & METHODS

- 2 feeding trials with each 208 weaning piglets (Danbred × Duroc; initial body weight 7.6 kg)
- 42-d rearing period with 3-phase feeding of a wheat-barley-soybean meal based basal diet for *ad libitum* intake without supplemented Zn, providing as fed:
 - Phase 1 (d 1 - 14): 14.1 MJ ME/kg, 17.3% CP, 1.44% Lys
 - Phase 2 (d 15 - 28): 13.6 MJ ME/kg, 17.5% CP, 1.31% Lys
 - Phase 3 (d 29 - 42): 13.2 MJ ME/kg, 17.0% CP, 1.16% Lys
- 2 treatments with four replicates each:
 - 160 mg/kg feed-grade ZnO
 - 160 mg/kg MAXACTIVAT/Zn
- Recorded traits:
 - average daily gain (ADG)
 - feed conversion ratio (FCR)
 - fecal consistency during d 1 - 10 post-weaning
 - microbial composition of individual fecal samples taken on d 7 post-weaning (DistaMap™, Alimetrics Diagnostics, Espoo, Finland)
- Data were analyzed by one-way ANOVA

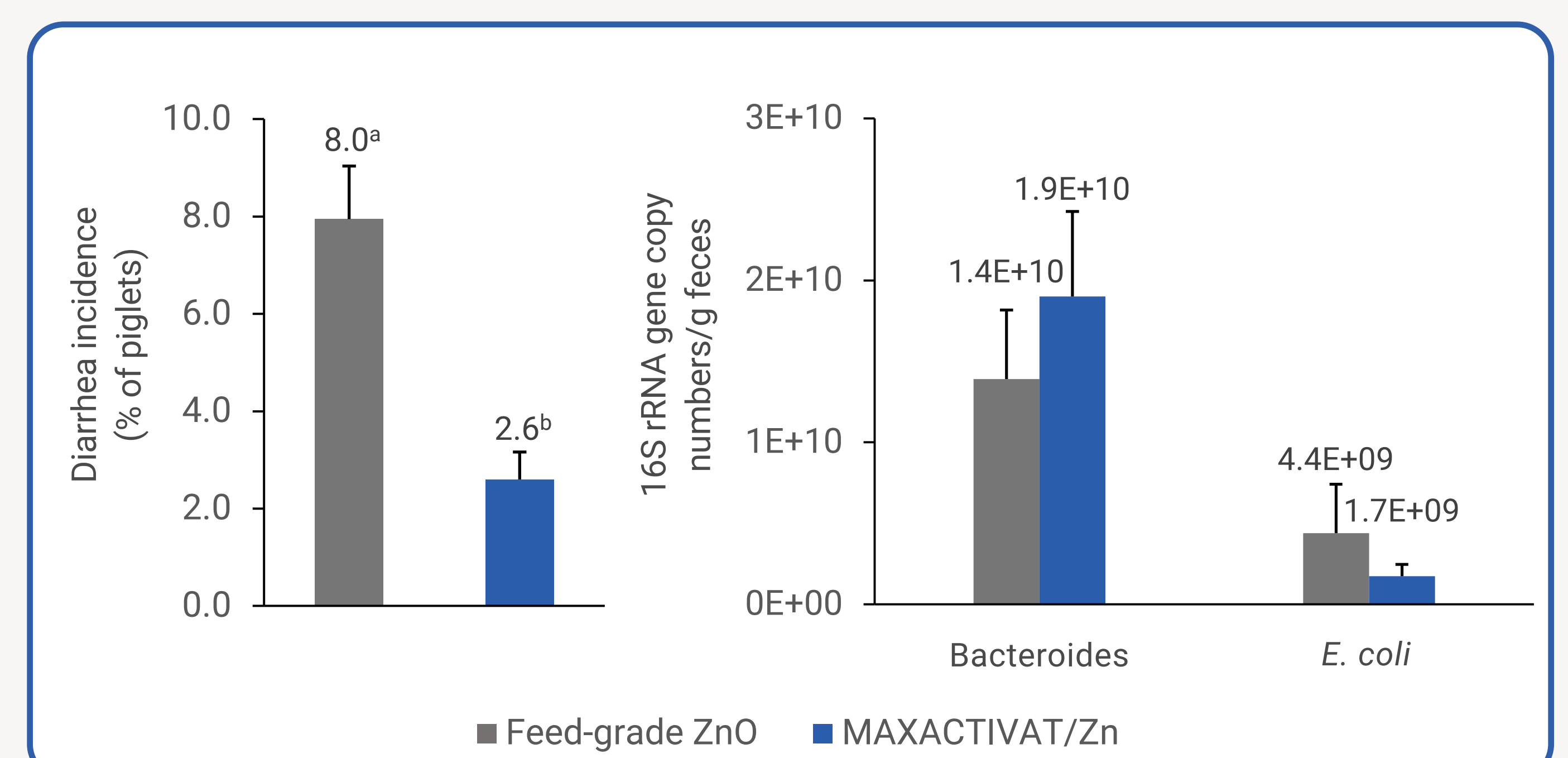


Figure 2. Effect of ZnO source on diarrhea incidence of piglets during d 1 - 10 post-weaning (n = 208; P < 0.001) and fecal microbial composition on d 7 post-weaning (n = 24; P > 0.05). Data are expressed as LS means + SEM.

PERFECT COMPONENTS. MAXIMUM RESULTS.

