

Public Abstract

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Title:The importance of the supplementation of zinc in nursery pig diets

Two experiments were conducted to investigate the effect of feeding pharmacological concentrations of Zn, from organic and inorganic sources, on growth performance and intestinal microbial population in nursery pigs. Furthermore, to determine the effect of feeding pharmacological concentrations of Zn as ZnO on the number of *Escherichia coli* and lactobacilli excreted per gram of feces of nursery pigs. In Exp. 1, 96 crossbred pigs with an average body weight of 14.86 lbs and average weaning age of 19 days were weaned and allotted to one of four dietary treatments based on weight and ancestry (three pigs/pen and eight reps), for the 28-d study. In both experiments, Phase 1 (d 1 to 14) and Phase 2 (d 15 to 28) nursery diets were fed in meal form. Both dietary phases utilized four dietary treatments: (1) Basal diet contained 165 ppm Zn as ZnSO₄ which was supplied by the trace mineral premix, (2) Basal + 3,000 ppm Zn as inorganic ZnO, (3) Basal + 250 ppm Zn as organic Zn proteinate, (4) Basal + 250 ppm Zn as organic Zn polysaccharide. In Exp. 2, 40 crossbred pigs with an average body weight of 16.60 lbs and average weaning age of 24 days were weaned and allotted to one of four treatments based on weight and ancestry (one pig/metabolism crate and 10 reps), for the duration of the 28-d study. Diets were: (1) Basal diet contained 165 ppm Zn as ZnSO₄ which was supplied by the trace mineral premix, (2) Basal + 750 ppm Zn as ZnO, (3) Basal + 1,500 ppm Zn as ZnO, (4) Basal + 3,000 ppm Zn as ZnO. In Exp. 1 and Exp. 2, body weights, feed disappearance, fecal swabs (Exp. 1) and fecal samples (Exp. 2) were collected weekly. In Exp. 1, nursery pigs fed 3,000 ppm Zn as ZnO had greater average daily gain and average daily feed intake in wk 2, 3, and overall than pigs fed the basal or organic Zn diets. However, in Exp. 2, dietary Zn treatments did not affect average daily gain, average daily feed intake and the number of *Escherichia coli* and lactobacilli excreted per gram of feces of nursery pigs throughout the 28-d study. Data from Exp. 1 indicate that, supplementing 3,000 ppm Zn as ZnO in the nursery pigs diets improved growth performance throughout the 28-d study. However, the positive growth performance improvement of feeding pharmacological concentrations of Zn as inorganic ZnO had no effect under the environmental condition of Exp 2: minimal stress, minimal pathogen challenge, and high health status nursery pigs. Furthermore, this may be a reason why no difference was observed in fecal microflora among dietary treatments fed to nursery pigs in Exp. 2.