

Zinc methionine hydroxy analogue chelate supplementation at a low level could replace pharmacological level of zinc oxide in nursery pigs

P. Ren, J. Cushing, K. Wedekind, J. Chen, M. Vazquez-Anon,

Novus International, Inc., St. Charles, MO, USA

Background and objectives

Pharmacological levels of zinc oxide (ZnO) are widely used in the weaning pig diets to promote growth and prevent post-weaning diarrhea. This practice is not environmentally sustainable; therefore, an effective alternative is warranted to be investigated. The objective of this study is to evaluate supplementation of Zn as Zn methionine hydroxy analogue chelate (Zn-MHAC, MINTREX[®] Zn, Novus International Inc., St. Charles, MO, USA) at NRC (2012) recommended Zn level on growth performance, Ca, P digestibility and gut morphology in nursery pigs in comparison with a pharmacological level of ZnO.

Material and methods

A total of 288 weaning barrows (BW = 5.71 ± 0.81 kg), blocked by initial body weight, were randomly allotted to 1 of 2 dietary treatments, with 36 pens per treatment and 4 pigs per pen. The dietary treatments include: 1) 2000 mg/kg Zn as ZnO during phase 1 (d 1 to 14) and 2 (d 15 to 28), and 100 mg/kg Zn as ZnO during phase 3 (d 29 to 42), 2) 100 mg/kg Zn as Zn-MHAC from phase 1 to 3. Fecal samples were collected via grab sampling from d 25 to 27. Two cm segments of duodenum (10 cm distal to pylorus), mid-jejunum and ileum (5 cm proximal to the end of small intestine) were collected on d 42 for morphometry examination and measurements.

Results

ZnO supplementation significantly ($P < 0.05$) increased growth performance of nursery pigs during phase 1 compared with Zn-MHAC supplementation, in terms of average daily gain, average daily feed intake and gain to feed ratio. However, pigs fed Zn-MHAC tended to have greater ($P = 0.06$) gain to feed ratio during phase 2. There were no differences ($P > 0.10$) between ZnO and Zn-MHAC groups in terms of growth performance during the entire nursery period. Additionally, pigs fed Zn-MHAC had significantly greater standardized total tract digestibility of Ca (59.46% vs. 53.83%; $P < 0.01$) and P (39.50% vs. 18.17%; $P < 0.01$) during phase 2 compared with those fed a pharmacological level of ZnO. Furthermore, pigs fed Zn-MHAC tended ($P = 0.07$) to have shorter villus width in ileum on d 42 compared with those fed ZnO.

Conclusion and discussion

Results indicated that Zn-MHAC supplementation at 100 mg/kg could replace pharmacological levels of ZnO without affecting growth performance of nursery pig under the conditions of the current study. Nursery piglets supplemented with Zn-MHAC caught up with the positive effect of pharmacological levels of ZnO after phase 1. This could possibly be attributed to improved Ca and P digestibility, as well as enhanced gut morphology.

Keywords: Zinc oxide, zinc methionine hydroxy analogue chelate, growth, Ca and P digestibility, gut morphology, nursery pigs