



Established and supported under the Australian Government's Cooperative Research Centres Program



Pork CRC Research Summary

Project Number & Title:

2C-114 - Evaluating the replacement of zinc oxide with an encapsulated zinc oxide product as a means of controlling post-weaning diarrhoea in piglets

Principal Investigator:

Dr Jae Cheol Kim

Background:

Pharmacological use of zinc oxide (2,500-3000 ppm ZnO) is widely accepted as the means of controlling post-weaning diarrhoea (PWD) and is being used worldwide as an alternative for antibiotics. However, the strategy is criticized because high levels of zinc are excreted into the environment through the effluent system. Recently, a microencapsulated zinc oxide product was released on the market and the lipid-coated ZnO has been claimed to dramatically decrease inclusion of ZnO from 2,500-3,000 ppm to 100 ppm to achieve the same effect on PWD. Therefore, the microencapsulated zinc oxide was evaluated as a solution for the environmental issue as well as controlling PWD.

Methodology:

An experiment with a split-plot design for which the whole plots were arranged in randomised blocks was conducted. No-challenge versus challenge with Enterotoxigenic *Escherichia coli* (ETEC) (*E. coli* O149:K91:K88) were the factors in the whole plot, and the three dietary treatments (control, ZnO and encapsulated Zn) were used as subplots (n=12). A total of 72 weaner pigs (castrate and female, 1:1) were used in a 3-week feeding experiment (housed individually, providing 12 replicates per treatment). The experiment assessed the incidence of PWD, monitored production indices (feed intake, daily gain, feed conversion ratio), and measured faecal zinc excretion levels and plasma zinc concentrations.

Key Findings/Conclusions:

- The results in this experiment showed that inclusion of 100 ppm microencapsulated ZnO suppressed the incidence of PWD in both ETEC-challenged and non-challenged pigs, and the suppressing effect on PWD was comparable to that for pigs fed a diet supplemented with 3,000 ppm ZnO.
- In terms of performance responses, pigs fed a diet supplemented with microencapsulated ZnO had better feed conversion efficiency than pigs fed the control or 3000 ppm ZnO-supplemented diets.
- Plasma urea nitrogen content was significantly lower in pigs fed diets supplemented with 3,000 ppm ZnO and 100 ppm microencapsulated Zn than pigs fed a control diet, possibly indicating more efficient partitioning of amino acids in pigs fed both zinc products.
- Feeding a diet supplemented with 100 ppm microencapsulated ZnO maintained plasma and faecal zinc levels to those for pigs fed a control diet, however these were dramatically increased (3-7 fold) in pigs fed diets containing 3,000 ppm ZnO.

Potential Users of Information (including value assessment):

Nutritionists, producers, veterinarians, consultants

