



Organic acids, essential oils and permeabilising substances as an alternative to antibiotic growth promoters and zinc in control of post-weaning diarrhoea and enhancement of growth performance in weaned pigs.

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Aims and Objectives: The objective of this study was to evaluate whether feeding a diet to pigs after weaning supplemented with a blend of organic acids, cinnamaldehyde and a permeabilising substance (Biotronic Top 3[®]; Biomin) would decrease post-weaning diarrhoea and increase growth performance following infection with enterotoxigenic *E. coli*. This product was examined against a diet devoid of any antimicrobial compounds and a diet containing zinc oxide (ZnO). The study lasted 21 days.

Key Findings:

1. The prevalence of post-weaning diarrhoea (PWD) was lower in pigs fed ZnO than in the pigs fed the control diet or Biotronic Top 3[®] following *E. coli* infection.
2. Pigs fed ZnO grew faster than control-fed pigs but similar to Biotronic-fed pigs in the 21-d after weaning, with pigs fed Biotronic growing the same as control-fed pigs.
3. Pigs fed ZnO ate more feed than control-fed pigs but similar to Biotronic-fed pigs in the 21-d after weaning, with pigs fed Biotronic eating the same as control-fed pigs.
4. Feed conversion ratio (FCR) was similar for all diets in the 21-d after weaning.
5. Faecal F4 (K88) *E. coli* numbers increased from d 4 to day 11 after weaning, with no difference between treatments.
6. There were no differences between treatments in numbers of other faecal bacterial populations, namely *Lactobacillus* spp., total *E. coli*, and *Enterobacteriaceae* spp.
7. Plasma albumin and haptoglobin (acute phase protein markers) levels were unaffected by time or treatment.
8. C-reactive protein (an acute phase protein marker) levels were higher on d 11 than day 4, and ZnO-fed pigs had lower levels compared to other pigs.
9. No differences between days or treatments were found for blood cell counts and the neutrophil:lymphocyte ratio (indicator of stress).
10. Pigs fed Biotronic had a higher concentration of short-chain fatty acids in their faeces.

Application to Industry:

1. ZnO reduced PWD more than pigs fed a control diet or Biotronic following *E. coli* infection after weaning, however this was unrelated to changes in faecal populations of selected bacteria.
2. Similar statistical performance in daily gain and daily feed intake was seen between pigs fed ZnO and pigs fed Biotronic in the 21-d period after weaning, however ZnO-fed pigs performed better statistically than control-fed pigs.
3. ZnO reduced the circulating concentration of C-reactive protein, a key acute phase protein and biomarker of inflammation, relative to control-fed and Biotronic-fed pigs.