Acid based Eubiotics as Natural Alternatives to Therapeutic Zinc Oxide in Newly Weaned Piglets

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Background and Objectives

The recent EU ban on therapeutic levels of zinc in animal diets has led to concern regarding potential performance losses and animal welfare. Potential alternatives such as organic acids have been shown to be beneficial in reducing gram negative bacterial and promote digestibility (Canibe et al., 2001; Mroz, 2005). These properties may also help in the replacement of zinc oxide (Roselli et al., 2005). The aim of the study was to evaluate two acid based eubiotics (ABE) in replacement for therapeutic zinc oxide in an *E. coli* challenge piglet study.

Materials and methods

Forty eight piglets (genetics; PIC (Yorkshire × Landrace) × Duroc)) were allocated to treatment diets at weaning (21 days) for a duration of 28 days in a random block design (2 pigs per pen, 6 replicates). All diets were formulated in excess of nutritional recommendations (NRC 2012) and were provided *ab lib.* Treatments were; Control (CON), basal diet, no additives; ABE 1, 3kg/t inclusion of a blend of formic and propionic acids on a mineral carrier (pHorce, Anparo plc, Worksop, UK) ABE 2, 4kg/t inclusion of a blend of formic and propionic acids and plant extracts on a mineral carrier (Genex Weaner, Anparo plc, Worksop, UK); Zinc oxide (ZnO) commercially available 3kg/t. Eight days post weaning (29 days of age), all piglets were challenged with 6 mL (6.1 × 109 cfu/mL) ETEC (*E. coli*, strain K88+). Body weight and feed intake were measured weekly and diarrhea scores and feacal pH was measured on D7, 14 and 28; data was evaluated using ANOVA using JMP Pro 13 (JMP.inc, SAS).

Results

Feed intake and feed conversion ratio (FCR) were not affected by treatment. Over the trial period (0-28 days) a significant (p<0.05) improvement of 2.11kg in final body weight was seen between ABE 2 and the CON group, ABE 1 and ZNO were statistically similar to ABE 2. Highest average daily gain was seen in ABE 2 group and was the only treatment which was significantly different to CON at D28 (p<0.05) (fig.1). Diarrhea scores were not significantly affected by treatment but were numerically lower 6 hours after challenge in ABE 1 and ABE 2 compared to the ZNO group. Faecal pH was significantly reduced at D28 with ABE 2 being significantly lower compared to ZnO, ABE 1 and CON (fig.2.).

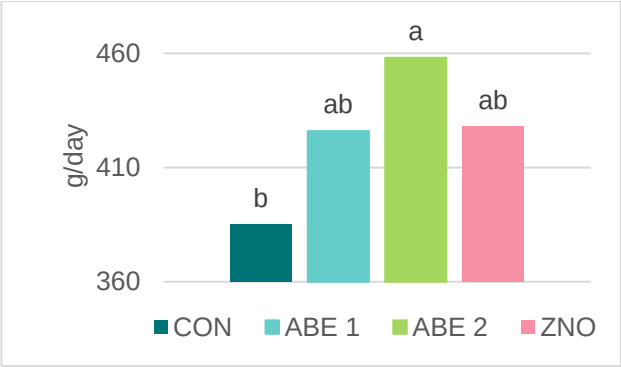

Fig.1. Average daily gain of treatments (day 0-28) Differing letters denote significant diff. p<0.05)

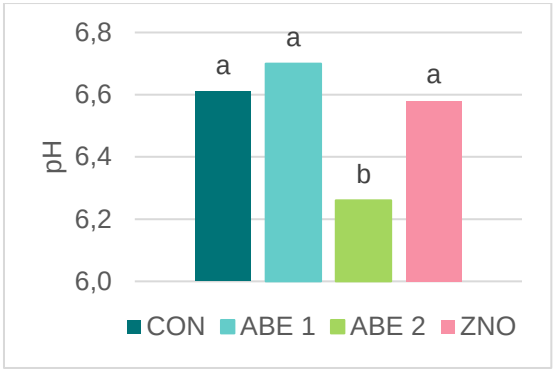

Fig.2. Faecal pH taken on day 28. Differing letters denote significant diff. p<0.05)

Discussion and Conclusion

The ABE 1 resulted in similar growth performance and digesta pH to the zinc oxide treatment. ABE 2 gave a numerical improvement in comparison to zinc treatment and digesta pH also significantly reduced, which can improve diet digestibility and help maintain good gut health. Using material costs at the time of the study the eubiotic treatments provided an economical benefit over the control and zinc oxide treatments.

References

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