Reduction of Zinc Oxide through the use of a probiotic, organic acids and water hygiene programmes

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Background and Objectives

High levels of Zinc Oxide in piglet feed have historically been used to control *E. coli* F18+ post-weaning diarrhoea. This high inclusion is currently being phased out, which has resulted in more attention for practical, low-cost alternatives. These alternatives usually focus on strengthening the piglet intestinal epithelial barrier and lowering the acid binding capacity.[1] The objective of this field study was to evaluate a combined product strategy based on a probiotic *Clostridium butyricum*, organic acids and an adapted water hygiene programme, applied around weaning whilst simultaneously reducing the high Zinc Oxide levels in the feed.

Materials and Methods

The trial ran from July 1st to October 3rd 2021. The probiotic *Clostridium butyricum* (Top Gut®, 1.25x10^9 CFU/g) was fed in the farrowing crates prior to weaning, using 10 g of Top Gut® per 50 L of milk replacer. From day 0 to 7 after weaning, the probiotic was added to the drinking water daily at an inclusion of 0.1 g per pig, for 8 hours per day. The dose was increased to 0.2 g per pig from day 7 to 21 after weaning. In between probiotic treatments, 15% bleach was added to the drinking water at 50ppm to avoid biofilm formation and to ensure adequate water quality. In addition, a commercial dry acid was added at 2.5 kg per tonne of feed for the first 21 days after weaning. Simultaneously, the standard 2500 ppm Zinc Oxide in the piglet feed mix was gradually reduced to 1040 ppm.

Feed composition did not change throughout the study. Water quality was monitored during the course of the trial using on-farm quick tests (Suretrend® Aquasnap for ATP (Adenosine triphosphate)).

Results

There was no significant performance loss during the treatment period (Table 1). The increased mortality seen during the course of the trial was due to extraordinary euthanasia of hernia pigs (local Danish regulations) and was not linked to the treatments. Antibiotic use did not show significant changes (8 average daily doses/100 pigs/day) and water quality was assured during the trial.

Table 1. Average performance results before (5696 pigs) and after (3681 pigs) the treatment period

Weaned pigs	April 1st to June 30th High ZnO (before)	July 1st to October 3rd Low ZnO (after)
Daily gain, g	531	525
Mortality post weaning, %	1,7	2,5
Feed Efficiency, kg/kg	1,75	1,70
Daily feed consumption (MJ)	8,18	7,92
Age at exit, days	83	82
Age at 30 kg weight, days	79	79
Sold - entered per week	438,2	409,0
Feed cost, DKK / kg gain	3,1	3,2

The herd continued to gradually phase out Zinc Oxide after the end of the trial. All weaning, since March 2022, is now completed without Zinc Oxide. These results support the use of the combined product strategy as an acceptable alternative to high levels of Zinc Oxide in the feed.

Conclusion

Following the proposed combined product programme (probiotic Top Gut®, organic acids and water treatment), the herd was able to gradually reduce the high inclusion of Zinc Oxide in the piglet feed around weaning. This was achieved without any loss of piglet performance, whilst there was also no increased use of antibiotics. The combined product approach offers a successful alternative to high levels of Zinc Oxide in piglet feed around weaning, without compromising profitability or health.

Reference

[1] The impact of feed additives on the microbial ecology of the gut in young pigs, Jensen B.B.J. Journal of Animal and Feed Sciences 1998, 45-64