

Effect of reduced protein for weaners fed without medicinal zinc
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Background

Several international and Danish trials have shown that lowering protein levels in weaner diets can reduce post-weaning diarrhea. Results are conflicting as to the effect on productivity, probably depending on the levels of limiting amino acids in the diets. The aim of this trial was to test different protein strategies to reduce diarrhea without adversely affecting productivity.

Methods

The trial was conducted at SEGES research experimental farm Grønhøj. Newly weaned Danbred piglets (5.5-9.0 kg BW, 21-28 d old, blue SPF health status) were delivered from a sow farm. At delivery, all piglets were vaccinated with 2 ml ENTERISOL® ILEITIS VET against *Lawsonia intracellularis* and with 0.5 ml CIRCOVAC® against PCV2. The piglets were randomly assigned to one of six groups and fed ad lib from weaning to app 30 kg. The trial comprised 6 groups, and each was given 3 diets: 1) weaning to 14 days, 2) 14 days to 15 kg, and 3) 15 kg to 30 kg. Groups 1 (pos. control) and 2 (neg. control) were identical, except group 1 was given 2500 ppm zinc from weaning to 14 days. The diets for groups 3-6 represented four different protein strategies and contained no medicinal zinc. Free amino acids (lys, meth, treo, try and val) were added according to Danish standards. All groups were subject to pairwise comparison to gr. 2 (neg. control), totaling 125 replicates (pens) in gr. 2 and 50 replicates in the other 5 groups. In total 4500 piglets. Trial design is shown below (protein level, %).

Group	1	2	3	4	5	6
Diet 1, 6-9 kg	19.0	19.0	16.5	16.5	14.0	14.0
Diet 2, 9-15 kg	18.5	18.5	18.5	16.5	19.5	17.5
Diet 3, 5-30 kg	18.5	18.5	18.5	19.5	19.5	19.5

Productivity (daily gain, feed efficiency) and number of antibiotic treatments against diarrhea per pen were recorded.

Results

Productivity and medical treatments for diarrhea are shown below.

Group	1	2	3	4	5	6
No. of replicates (pens)	49	125	50	50	48	51
6 – 9 kg						
Daily gain, g	211a	206a	196a	191b	164b	156b
Feed efficiency, FU / kg gain	1.32a	1.36a	1.43b	1.45b	1.59b	1.62b
6 – 30 kg						
Daily gain, g	532a	527a	527a	511b	527a	506b
Feed efficiency, FU / kg gain	1.61a	1.63a	1.62a	1.63a	1.59b	1.61a
Antibiotic treatments/pig, days	1.7b	3.6a	3.4a	3.1a	3.1a	2.4b

Discussion and conclusion

No difference in performance was found between Gr. 1 with medicinal zinc and Gr.2 without zinc, but a significantly lower level of treatments was found in Gr. 1. Despite the fact that limiting amino acids (lys, meth, treo, try and val) were added to meet Danish standards, reduced daily gain and impaired feed efficiency were observed from 6-9 kg when protein was reduced below the standard compared to Gr. 2. Increasing the protein level in diets 2 or 3 nearly made piglets recover from low protein levels in the weaner diet, but none of the protein strategies exceeded the negative control Gr. 2. There was no effect on antibiotic treatments of lowering protein levels compared to Gr. 2 without zinc, except in Gr.6 where results showed significantly fewer treatments, but also the lowest daily gain compared to Gr. 2.