

Combining SCFA and MCFA in a zinc oxide free diet effectively supported post-weaning piglet performance

MMJ van Riet^{1,2}, P Chan³, S. Vermaut¹, RC Sulabo⁴, I Peeters¹

¹ Eastman chemical Company, Application development and technical service Animal Nutrition, Belgium

² Ghent University, Department of Nutrition, genetics and ethology, Laboratory of Animal Nutrition, Belgium

³ Eastman chemical Asia Pacific, Application development and technical service Animal Nutrition, Singapore

⁴ University of the Philippines Los Baños, Institute of Animal Science, Animal nutrition division, Philippines

Background and objectives

Pharmaceutical zinc oxide (ZnO) levels, up to 2500 mg/kg for 14 days post-weaning, have been used as an alternative AGP strategy which also overcomes post-weaning diarrhoea in piglets. However, concerns for excessive Zn excretion to the environment increased and the use of ZnO will be phased out within the EU. While post-weaning diarrhoea remains an important topic within the pig industry, other nutritional approaches need to be developed. The objective of this experiment was to determine the effect of the combination of SCFA and MCFA on growth performance and diarrhoea occurrence in weaned piglets fed a ZnO free diet.

Materials and methods

In total, 180 weaned piglets (28d-old, PIC L337 boar×C24 sow) with an initial 8 kg BW were blocked by BW and gender and randomly allocated to 1 of 6 experimental diets (5 piglets/pen); NC (negative control), AGP (35 mg/kg Tiamulin + 400 mg/kg Chlortetracycline), 2500 mg/kg ZnO, and 1, 3 or 5 g/kg SCFA + MCFA. A corn-soybean meal diet was fed for 27 days. The piglets had *ad libitum* access to both water and feed. The piglets were challenged (non-infectious) to induce diarrhoea. Performance and diarrhoea scores, assessed by 2 evaluators using a scale from 1 (normal) to 5 (watery diarrhoea), were determined.

Results

In the first week post-weaning, the ZnO supplemented piglets had lower ADG and FCR than AGP but did not differ from the SCFA + MCFA groups, whereas the 3 and 5 g/kg SCFA + MCFA supplemented groups did not differ from AGP supplemented piglets. The ADG and FCR remained highest for AGP over the whole 27 days period (Table 1). Only the 5 g/kg SCFA + MCFA group did not differ from the AGP group for ADG. Both the 3 and 5 g/kg SCFA + MCFA did not differ from the AGP group for FCR. Piglets receiving the 1 g/kg SCFA + MCFA had similar intermediate performance results as the ZnO supplemented piglets (Table 1). Diarrhoea scores were lowest for ZnO for the first 14 days and for the overall 27 days and differ from AGP and SCFA + MCFA (Table 1).

Table 1. Performance and diarrhoea scores (LSmeans) for weaned piglets fed SCA+ MCFA from 0 to 27 days post-weaning.

Parameter	Dietary treatments*						SEM	P-value [#]
	NC	AGP	ZnO	SCFA + MCFA				
				1	3	5		
ADG	0.27 ^a	0.34 ^b	0.27 ^a	0.27 ^a	0.29 ^a	0.30 ^{ab}	0.02	0.004
ADFI	0.59	0.58	0.61	0.61	0.57	0.58	0.02	0.420
FCR	2.18 ^a	1.70 ^b	2.25 ^a	2.26 ^a	1.96 ^{ab}	1.93 ^{ab}	0.03	0.004
Diarrhoea score	2.92 ^a	2.97 ^a	2.28 ^b	2.77 ^a	2.72 ^a	2.97 ^a	0.11	<0.001

* Dietary treatments were: NC; negative control without antibiotics, AGP; negative control with 35 mg/kg Tiamulin + 400 mg/kg Chlortetracycline, ZnO; negative control with 2500 mg/kg ZnO for 27 days, and SCFA + MCFA; 1, 3 and 5 g/kg SCFA + MCFA (Eastman Chemical Company). [#] Values within a row lacking a common superscript letter differ (P<0.050).

Conclusion

Combining SCFA and MCFA can be a good nutritional approach for ZnO free diets when based on growth performance but did not reduce diarrhoea occurrence as good as ZnO supplemented diets. However, the SCFA + MCFA values were in the range of the AGP group and need to be further tested with different dietary compositions.