

The effects of phytase supplementation and available lysine content of weaner diets on pig growth performance

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Microbial phytase supplementation of phosphorus adequate weaner diets has improved growth performance (Campbell *et al.* 1995) and responses in feed conversion have increased with dietary substrate concentrations of phytate-P or phytic acid (Cadogan *et al.* 1997). The release of phytate bound amino acids by the enzyme may improve protein digestibility (Officer and Batterham 1992) and, consequently, feed efficiency.

To investigate this hypothesis 14.8 MJ/kg DE wheat-based diets were formulated to contain three levels of available lysine (0.90, 0.85 and 0.80 g/MJ DE) with and without phytase (0 and 550 FTU/kg; Natuphos® Granulate). The non-supplemented diets contained 0.89% Ca and 0.49% available P; these levels were reduced to 0.77% and 0.37% respectively with added phytase. The pelleted (75°C) diets had substrate levels of 0.24% phytate-P with Ca:P ratios of 1.25:1. The six dietary treatments were offered to 72 individually housed male pigs from weaning (6.0 kg liveweight at 26 days of age) and their performance was recorded over a feeding period of 21 days. The results are presented in Table 1.

Phytase improved ($P < 0.01$) feed efficiency with a trend ($P < 0.10$) towards increased growth rates. Unexpectedly, lysine levels did not have any significant effects on performance, possibly because essential

amino acids were in excess of requirements. At the lowest lysine level, phytase significantly improved feed efficiency which may be related to increased protein and/or energy availability because phytase increased the digestibility of all three diets regardless of their essential amino acid content. The anti-nutritive properties of phytic acid (and excess Ca and P) and the response of weaner pigs to added phytase is again demonstrated in this study.

Cadogan, D.J. Selle, P.H. Campbell, R.G. and Walker, A.R. (1997). Effects of dietary phytate phosphorus and microbial phytase on the performance of weaner pigs. In: *Manipulating Pig Production VI*, p. 245 (ed. P.D. Cranwell). Australasian Pig Science Association, Werribee Vic 3030.

Campbell, R.G. Harrison, D.T. Butler, K.J. and Selle, P.H. (1995). Effects of dietary available phosphorus and phytase (Natuphos) on the performance of pigs from 19 to 40 days post-weaning. In: *Manipulating Pig Production V*, p. 193 (eds. D.P. Hennessy and P.D. Cranwell). Australasian Pig Science Association, Werribee Vic 3030.

Officer, D.I. and Batterham, E.S. (1992). Enzyme supplementation of Linola™ meal for grower pigs. *Proceedings of the Australian Society of Animal Production* 9, 288.

Table 1 Effects of phytase and lysine on the performance of male pigs for 21 days post-weaning.

Treatments		Performance		
Microbial phytase	Available lysine	Daily gain	Feed intake	Feed:Gain
(FTU/kg)	(g avail lys/MJ DE)	(g)	(g/day)	
0	0.90	361	427	1.18 ab
550	0.90	437	489	1.13 b
0	0.85	373	436	1.17 ab
550	0.85	359	398	1.11 b
0	0.80	353	437	1.24 a
550	0.80	393	446	1.14 b
Probability (P =):	Microbial phytase (MP)	0.072	0.592	0.009
	Available lysine (AL)	0.329	0.385	0.294
	Interaction (MP x AL)	0.154	0.165	0.777

a,b $P < 0.05$