

Dietary zeolite improves growth in weaner pigs

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Zeolites are a family of naturally-occurring minerals associated with volcanic ash sediments. The crystalline structure of zeolite consists of a three-dimensional framework of AlO_4 and SiO_4 tetrahedra. The spaces within this tetrahedral structure are occupied by cations to maintain electrical neutrality, and water molecules. Although the unique chemical and physical properties of zeolites have been used in a number of agricultural applications, such as odour control in animal effluent, pig response to dietary zeolite has been equivocal (Papaionnou *et al.* 2004). The objective of this study was to test the hypothesis that weaner pig performance is unaffected by dietary zeolite powder.

Forty eight male pigs (mainly Large White x Landrace) were allocated at 8.9 ± 1.3 kg (mean \pm SD) liveweight to three wheat-based diets. The diets were formulated to contain either zero, 25 or 50 g/kg of zeolite powder (Red Roc Booster: KLC Environmental Pty. Ltd., Boggabri, NSW). Digestible energy (DE) and available lysine content of each diet were maintained at 15 MJ and 12.3 g per kg respectively with the addition of feed oil and free amino acids. The wheat sample was analysed by nearinfrared reflectance to contain 14.8 MJ DE per kg (air-dry basis). The pigs were housed in individual wire-mesh cages in one room maintained at 27°C. Each cage contained an individual feed trough and nipple drinker. Feed was offered fresh

each day as a mash diet to maintain at least 500 g of feed in each trough. The experiment continued for 21 days. Individual pig measurements included liveweight at the start and finish of the study and feed intake. Mean live performance (Table 1) was analysed by analysis of variance.

The live performance results from this study did not support the hypothesis that weaner pig performance is unaffected by dietary zeolite powder. The main finding was a significant ($P < 0.05$) 16% improvement in daily gain for weaner pigs offered 50 g dietary zeolite per kg compared to the zero control diet (Table 1). This improvement in daily gain was achieved with no significant increase in diet cost per kg gain (Table 1). The improvement in pig growth observed in this study may be associated with an increase in dietary net energy when feed oil was added to compensate for the inclusion of 25 and 50 g/kg zeolite. The diets used in this study should be examined with group-housed pigs in a commercial environment.

Papaionnou, D.S., Kyriakis, C.S., Alexopoulos, C., Tzika, E.D., Polizopoulou, Z.S. and Kyrakis, S.C. (2004). A field study on the effect of the dietary use of a clinoptilolite-rich tuff, alone or in combination with certain antimicrobials, on health status and performance of weaned, growing and finishing pigs. *Research in Veterinary Science* 76, 19–29.

Table 1 Mean live performance of 48 male pigs grown from 9 to 22 kg liveweight and fed wheat-based diets containing either zero, 25 or 50 g of zeolite¹ per kg.

Measurement	Dietary zeolite (g/kg)			SEM ²	Probability
	0	25	50		
Daily intake (g)	933	993	1000	57.3	0.482
Daily gain (g)	567 ^a	635 ^{ab}	660 ^b	19.3	0.035
Feed:gain	1.66	1.57	1.52	0.059	0.295
Diet cost ³ (c/kg gain)	65.6	64.8	65.9	2.39	0.939

¹Red Roc Booster supplied by KLC Environmental Pty. Ltd., Boggabri, NSW

²Standard error of the mean

³Diet cost was 39.5 c/kg (zero control); 41.3 c/kg (25 g/kg); and 43.4 c/kg (50 g/kg)

^{a,b}Means within rows with different superscript are significantly different ($P \leq 0.05$)