

## Effects of Dietary Lysine on Growth Responses of Pigs to Increasing Doses of Ractopamine

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Commercial recommendations for dietary lysine specifications in diets for pigs supplemented with ractopamine (RAC) is 0.56 g available lysine/MJ digestible energy (DE; King *et al.*, 2000). A recent study confirmed that when RAC supplemented diets are formulated to 0.56 g available lysine/MJ DE, growth rate and feed efficiency are improved (Dunshea *et al.*, 2005), together with an increase in lean tissue deposition in both sexes, although fat deposition was reduced in boars and remained constant in gilts. The aim of this experiment was to determine whether the current dietary lysine recommendations are sufficient to optimize the response in feed efficiency (FCR), growth rate (ADG) and tissue deposition in boars and gilts offered high and low doses of RAC in diets.

The study involved 108 individually penned pigs (17 weeks of age, start weight 65 kg) in a 2x2x3 factorial design with 2 sexes (gilts, boars), 2 levels of dietary lysine (low and high, 0.56 and 0.65 g available lysine/MJDE respectively) and 3 RAC doses (0ppm, 5ppm and 20ppm Paylean<sup>®</sup>, Elanco Animal Health, Macquarie Park, NSW) for 28 d. Pigs were weighed at -7, 0, 7, 14, 21 and 28 d and voluntary feed intake (VFI) determined at d 7, 14, 21 and 28 d. Body composition was determined using dual energy X-ray absorptiometry (DXA) at d -1, 15 and 29 of treatment. Data were analysed by analysis of variance.

**Table 1.** Effect of ractopamine dose and dietary lysine on average daily gain (ADG), feed conversion ratio (FCR), lean and fat tissue deposition and carcass traits in finisher gilts and boars.

Treatment (T)	Sex (S)		RAC (ppm)			Lysine <sup>1</sup> (L)		SED	Significance			
	Gilt	Boar	0	5	20	Low	High		RAC			
									Sex	Dose	Linear	L
ADG (kg/d)	1.20	1.34	1.22	1.31	1.28	1.26	1.28	0.06	<0.001	0.026	0.072	0.268
FCR	2.47	2.30	2.45	2.36	2.35	2.43	2.34	0.09	<0.001	0.080	0.045	0.027
HSCW (kg)	76.8	78.8	76.5	79.0	77.9	77.4	78.2	1.92	0.016	0.045	0.153	0.315
P2 (mm)	14.0	12.2	13.9	13.9	11.6	13.4	12.8	1.31	0.002	<0.001	<0.001	0.302
Lean Tissue (kg/d)	0.98	1.11	1.00	1.03	1.10	1.03	1.06	0.91	0.001	0.111	0.044	0.451
Fat Tissue (kg/d)	0.34	0.35	0.34	0.38	0.32	0.37	0.32	0.06	0.776	0.161	0.509	0.072

<sup>1</sup>Dietary Lysine formulated to 0.56 (Low) and 0.65 (High) g available lysine/MJ digestible energy; HSCW, hot standard carcass weight.

Dietary RAC improved ADG, hot standard carcass weight and P2 back fat. FCR improved linearly ( $p=0.045$ ) with increasing RAC dose and was reduced by dietary lysine ( $p=0.027$ ; Table 1). Lean tissue growth increased linearly ( $p=0.044$ ) as dietary RAC increased whereas fat tissue deposition tended to be reduced in high lysine and high RAC diets. In the first 7 days (data not shown) there were interactions between the effects of RAC and lysine for FCR ( $p=0.013$ ) and ADG ( $p=0.023$ ) with both traits only responding positively to RAC dose on the higher lysine diet. The results suggest that in the early stages of a dietary RAC regimen, the high lysine diet enhances a response, while over the study duration both diets contained sufficient dietary lysine to elicit a similar response to RAC. These data verify that the current recommended lysine level is sufficient to elicit a similar response in ADG, FCR and lean tissue growth for low and high levels of RAC inclusion over 28 days.

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