Lysine Requirement of PrimeGro Females and Improvac Vaccinated Males between 60 and 100 Kg Live Weight

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Rivalea Australia
Dr Cherie Collins
PO Box 78
Corowa NSW 264

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Executive Summary

A recent study by Moore et al. (2010) using the PIC genotype suggested the lysine requirement for female and entire male pigs between 50-100 kg was 0.63 and 0.65 g available lysine /MJ digestible energy (DE) respectively; higher than that currently used in the Australian industry. The growth performance observed in this previous investigation was generally in excess of that commonly seen under commercial production conditions. As such, the Pork CRC and Australian Pork Limited arranged for the three largest piggeries in Australia to conduct a lysine titration experiment using diets of similar ingredient composition. The study presented within this report relates to the validation experiment conducted at Rivalea (Australia) using the PrimeGro™ Genotype.

The study was conducted during spring 2012, with commercially housed female and immunocastrated males allocated to one of seven test diets (0.40, 0.46, 0.52, 0.58, 0.64, 0.70, 0.76 g available lysine per MJ DE). The test diets were fed from an average live weight of 59.0 kg ± 0.41 kg through to slaughter at an average live weight of 87.9 kg ± 0.49 kg. During the initial 21 day period, average daily gain and feed conversion ratio improved linearly with increasing dietary lysine concentration, while feed intake remained constant across the treatment groups. The linear response in daily gain and feed efficiency to increasing lysine was still evident when the data was examined over the entire experimental period, although the magnitude of the response was smaller than that observed during the initial three weeks.

The data suggests that the lysine requirement during the early finisher period may be greater than that currently used in commercial feeds (currently between 0.52 to 0.60 g available lysine/MJ DE, depending on sex and genotype). Moore *et al.* (2010) suggested an optimal lysine level of 0.70 g available lysine/MJ DE for female pigs between 65 and 80 kg bodyweight to maximise daily gain and feed efficiency. The results from this current investigation supported this recommendation, with a linear improvement in rate of gain and feed efficiency between 58 and 76 kg body weight (day 0 to day 21) with increasing dietary lysine.

This study was not able to confirm or reject the recommendations of Moore *et al*. (2010) of 0.63 g available lysine /MJ DE for females between 60 and 100 kg body weight as the pigs in this investigation did not attain a pre-sale weight of 100 kg. The results do however indicate that between 58 and 76 kg (early finisher period) producers may achieve improvements in rate of gain and feed efficiency from increasing the current specifications closer to the 0.70 g available lysine: DE recommended by Moore *et al.* (2010).

Introduction

In 2009, an experiment to determine the lysine requirement of the PIC genotype from 50 to 100 kg live weight was conducted by Moore *et al.* (2010) at the Medina Research Station. The results indicated that the lysine requirement for females between 50-100 kg was 0.63 g available lysine /MJ digestible energy (DE) and 0.65 g/MJ DE for entire males; higher than that currently used in the Australian industry. In addition, the growth performance seen in this study greatly exceeded that being observed in commercial situations. Prior to this investigation, it had been a number of years since the amino acid requirements of the modern genotype had been determined.

The commercial applications of the results from Moore *et al.* (2010) have been questioned by some in the Australian pork industry because of the superior performance seen at Medina. As such, there was a need for commercial validation studies to be conducted before producers would be confident in utilising the results. The Pork CRC and Australian Pork Limited arranged for the three largest piggeries in Australia to conduct lysine titration experiments using diets of similar ingredient composition. In addition, a follow up study was also conducted at the Medina Research Station. In comparison to the experiment conducted by Moore *et al.* (2010), these commercial studies were set up to stop at a standard live weight (60 to 100 kg) rather than age and utilize more diets over a greater range of dietary lysine concentrations to allow the requirement to be determined using break point analysis.

The results outlined in this report relate to the study conducted at Rivalea (Australia) utilizing PrimeGro™ Genetics. The study tested the hypothesis that pigs will display an increased growth rate and improved feed efficiency with increasing available lysine (g available lysine/MJ DE) up to the point of their genetic potential when a plateau will be reached.

Materials and Methods

Animals and Treatments

All procedures and protocols utilised in this investigation were approved by the Rivalea Animal Care and Ethics Committee. Three thousand and eighty pigs (1584 females and 1496 Improvac vaccinated males, Large White x Landrace, PrimeGro™ Genetics) were housed in a commercial finisher facility in pens of approximately 37 pigs per pen (84 pens in total). Pens were allocated to a 2 x 7 factorial design with the respective factors sex (female and immunocastrated males) and dietary lysine concentration (0.40, 0.46, 0.52, 0.58, 0.64, 0.70, 0.76 g available lysine per MJ DE). Pigs commenced the test period over four replicates beginning on 19th September 2012. The heaviest pens were allocated to the test diets over two days during the first week, while the lighter pens started one week later when they attained the targeted 60 kg average pig weight. All test diets were pelleted and fed *ad libitum* from an average start weight of 59.0 kg ± 0.41 kg (mean ± SE) through to slaughter at an average final live weight of 87.9 kg ± 0.49 kg. A Big Dutchman feeding system was utilised to deliver the allocated test diets to individual pens by blending the two extreme diets shown in Table 1. The blend ratios used to create each of the test diets is displayed in Table 2. Samples of the blended diets were obtained from the feeder of numerous pens offered each of the test diets. These samples were obtained periodically throughout the feeding period, combined and a representative sample of each of the test diets analysed for crude protein and amino acid profile (Table 3).

Management and Measures

All pigs were transferred into this facility in one batch at 13 weeks of age (August 2012). Pigs were housed within sex in partially slatted pens with approximately 37 pigs per pen. A commercial grower diet was offered to all pigs prior to the start of the test period (approximately 17 weeks of age). All male pigs were administered the priming Improvac® (Zoetis Australia) vaccination at 13 weeks of age and the secondary vaccination at 17 weeks of age. The finisher facility was naturally ventilated with automatic side curtains. All animals had *ad libitum* access to water via nipple drinkers for the entire experimental period.

Pen weights were recorded at the start of the test period (day 0), day 21 and at sale. Feed intake and feed efficiency were calculated on a pen basis from day 0 to day 21 and from day 0 to sale. All deaths and removals were recorded and taken into account when calculating feed intake and feed efficiency by the adjustment of the number of days that pigs were on trial. Pigs were slaughtered in a commercial abattoir at the conclusion of the 35 day experimental period. Individual hot standard carcase weight (HSCW) and fat depth at the P2 site (65mm from the midline, obtained using a Hennessy Chong) were measured. Dressing percentage was calculated from the individual live weight and carcase weight measures and analysed on a pen basis.

Statistical Analyses

Data was analysed by analysis of variance (ANOVA) with the pen as the experimental unit for all analyses. The response to increasing dietary lysine content was tested for linear and quadratic effects using the polynomial function in Genstat for Windows 10th Edition (VSN International Ltd, Hertiz, UK). All analyses were performed using Genstat 10th Edition (Payne *et al.* 2005).

Table 1: Ingredient profile and nutrient composition of the two extreme diets

	Diet A Low	Diet B High
Ingredient, % as fed		
Wheat	66.9	47.7
Barley	20.0	20.0
Soyabean meal	7.5	27.5
Water	1.0	1.0
Tallow	2.1	1.1
Salt	0.2	0.2
Limestone	1.8	1.8
Dicalcium phosphate	1.0	0.9
DL-methionine		0.14
Choline chloride	0.06	
Vitamin and mineral premix	0.20	0.20
Lysine	0.20	0.34
Threonine	0.04	0.14
Salinomycin 120ppm	0.05	0.05
*Estimated nutrient composition, %**		
DE, MJ/kg	13.97	13.97
Crude protein	13.0	20.1
Crude fibre	2.90	3.10
Crude fat	3.26	2.35
Total lysine	0.64	1.23
Available lysine: DE	0.40	0.76

*Estimated from Rivalea Australia Pty Ltd composition data

Table 2: Blend ratio in the Big Dutchman feeding system of the two extreme diets to produce the seven experimental diets

Dietary lysine concentration, g av lysine per MJ DE	Diet A Low (%)	Diet B High (%)
0.40	100.0	0.0
0.46	83.3	16.7
0.52	66.7	33.3
0.58	50.0	50.0
0.64	33.3	66.7
0.70	16.7	83.3
0.76	0.0	100.0

Table 3: Analysed nutrient composition of the blended test diets as delivered to the pen by the Big Dutchman feeding system

	Dietary lysine concentration, g available lysine per MJ DE						
Amino acid concentration (mg/g)^	0.40	0.46	0.52	0.58	0.64	0.70	0.76
Lysine	6.9	8.3	9.0	10.1	10.8	12.3	13.3
Methionine	1.8	2.2	2.4	2.7	2.9	3.2	3.4
Threonine	4.7	5.5	5.9	6.6	7.1	7.9	8.4
Isoleucine	4.3	5.0	5.3	5.9	6.2	7.0	7.4
Leucine	8.7	9.9	10.5	11.6	12.1	13.6	14.0
Alanine	4.8	5.5	5.8	6.6	6.9	7.7	7.9
Arginine	6.8	8.0	8.5	9.6	10.2	11.6	12.0
Aspartic acid	9.1	11.1	11.9	14.3	15.5	18.1	18.7
Glutamic acid	31.3	33.7	34.6	37.8	38.8	41.6	42.3
Glycine	5.7	6.0	6.3	7.0	7.2	8.0	8.2
Histidine	2.9	3.3	3.5	3.8	4.0	4.5	4.7
Phenylalanine	5.9	6.7	7.1	7.7	8.2	9.1	9.4
Proline	10.7	11.3	11.6	12.2	12.4	13.1	13.3
Serine	6.2	7.0	7.4	8.3	8.7	9.7	9.9
Tyrosine	3.6	4.1	4.3	4.7	5.1	5.7	5.8
Valine	5.7	6.4	6.7	7.1	7.4	8.2	8.6
Crude Protein^	13.3	14.9	16.0	17.4	18.3	19.2	20.3
Crude Protein (%)*	13.6	14.6	15.4	17.0	17.2	18.5	19.3

^Analysed by George Weston Technologies, Enfield NSW.

* NIR analysis conducted by Rivalea (Australia)

Results

During the initial 21 day period, average daily gain and feed conversion ratio improved linearly with increasing dietary lysine concentration, while feed intake remained constant across the treatment groups (Table 4). The linear response in daily gain and feed efficiency to increasing lysine was still evident when the data was examined over the entire experimental period, although the magnitude of the response was smaller than that observed during the initial three weeks. All animals were sold out after an average of 30.7 ± 0.39 days on trial and at an average live weight of 87.9 ± 0.49 kg. The initial aim of the study was to sell out when the pigs reached an average of 100 kg live weight. Unfortunately the animals grew slower than anticipated during the grower period and were therefore slightly older than expected at the start of the test period. The production flows at the research site meant that there were another 3,500 pigs coming directly behind these animals and therefore the group could not be held beyond 22 weeks of age. There was no obvious disease outbreak during the grower period that could be attributed to the slower growth rates. The number of days on trial and the average weight at sale was similar across the seven treatment groups. As such, carcase weight was not influenced by dietary lysine concentration ($P=0.94$) nor was dressing percentage ($P=0.80$). There was however a linear improvement in P2 back fat depth ($P<0.001$) with increasing dietary lysine concentration and a trend for a linear reduction in the percentage of pigs with a P2 greater than 12mm ($P=0.081$)

Both sexes responded similarly to increasing dietary lysine concentration, with no interactions between sex and dietary treatment found for any of the growth performance or carcase composition data. The magnitude of the growth performance and carcase composition response in each sex is displayed in Tables 5 and 6 and Figures 1 to 4. Over the entire test period, immunocastrated males consumed more feed (2.70 and 2.30 kg/d, respectively, $P<0.001$), and gained weight more rapidly (1.024 and 0.862 kg/d, $P<0.001$) than the females. Feed efficiency (FCR) was however similar between female and immunocastrated males (2.67 and 2.64 kg/kg, respectively, $P=0.28$).

Table 4: Influence of increasing dietary lysine concentration on growth performance and carcase composition

	Dietary lysine concentration, g available lysine per MJ DE								P-value	Contrast	
	0.40	0.46	0.52	0.58	0.64	0.70	0.76	SED	lysine	linear	Quadratic
Days on test (d)	31.7	30.5	30.6	31.1	30.5	30.2	30.1	1.53	0.95	0.35	0.91
Live weight (kg)											
Day 0	58.9	58.8	59.2	58.8	59.3	58.8	59.5	1.65	0.99	0.76	0.88
Day 21	76.6	78.2	78.5	78.4	79.0	79.3	80.3	1.93	0.65	0.059	0.89
Sale	87.5	87.6	87.5	88.7	87.9	87.6	88.7	1.55	0.96	0.50	0.99
Average daily gain (kg/d)											
0-21 days	0.840	0.924	0.919	0.932	0.941	0.973	0.990	0.027	<0.001	<0.001	0.39
0-sale	0.902	0.946	0.929	0.957	0.943	0.953	0.969	0.025	0.018	0.017	0.59
Average daily feed intake (kg/d)											
0-21 days	2.41	2.46	2.46	2.42	2.43	2.43	2.44	0.063	0.99	0.98	0.81
0-sale	2.47	2.51	2.53	2.50	2.50	2.49	2.52	0.061	0.98	0.75	0.66
Feed conversion ratio (kg/kg)											
0-21 days	2.84	2.66	2.69	2.61	2.59	2.51	2.47	0.064	<0.001	<0.001	0.36
0-sale	2.74	2.66	2.73	2.62	2.65	2.61	2.60	0.052	0.044	0.003	0.84
Carcase characteristics											
HSCW (kg)	67.6	67.7	67.6	68.4	67.7	68.0	68.8	1.26	0.94	0.36	0.77
P2 back fat depth (mm)	9.9	10.1	9.9	9.6	9.8	9.7	9.6	0.28	0.44	0.050	0.98
P2 back fat depth (mm)*	10.0	10.2	10.0	9.5	9.9	9.9	9.4	0.18	<0.001	<0.001	0.63
% pigs P2>12mm	40.4	21.2	18.0	15.5	16.5	17.4	15.1	12.87	0.45	0.081	0.18
Dressing percentage (%)	77.3	77.3	77.3	77.2	77.0	77.6	77.6	0.46	0.80	0.42	0.35

*HSCW included as a covariate in the analysis

Table 5: Influence of increasing dietary lysine concentration on growth performance and carcase composition of Improvac vaccinated male pigs

	Dietary lysine concentration, g available lysine per MJ DE								P-value	Contrast	
	0.40	0.46	0.52	0.58	0.64	0.70	0.76	SED	lysine	linear	Quadratic
Days on test (d)	31.8	30	30.2	30.2	29.7	29.7	29.7	2.03	0.94	0.32	0.58
Live weight (kg)											
Day 0	59.4	59.5	60	59.8	60.1	59	60.1	2.28	0.99	0.89	0.88
Day 21	78.6	80.7	80.8	81.3	82.3	81.4	82.3	2.93	0.84	0.17	0.55
Sale	91.1	90.7	89.9	91.6	90.4	89.8	90.6	2.26	0.99	0.72	0.94
Average daily gain (kg/d)											
0-21 days	0.914	1.010	0.991	1.024	1.053	1.066	1.057	0.045	0.027	0.001	0.20
0-sale	0.996	1.039	0.996	1.048	1.023	1.037	1.028	0.039	0.76	0.43	0.61
Average daily feed intake (kg/d)											
0-21 days	2.63	2.64	2.62	2.62	2.66	2.60	2.62	0.092	0.99	0.84	0.93
0-sale	2.71	2.71	2.71	2.71	2.71	2.66	2.69	0.089	0.99	0.64	0.89
Feed conversion ratio (kg/kg)											
0-21 days	2.89	2.61	2.67	2.57	2.52	2.44	2.48	0.108	0.005	<0.005	0.17
0-sale	2.73	2.61	2.73	2.59	2.65	2.57	2.62	0.076	0.22	0.097	0.60
Carcase characteristics											
HSCW (kg)	69.3	69.4	68.9	70	69.1	68.8	69.3	1.76	0.99	0.90	0.92
P2 back fat depth (mm)	10.6	10.8	10.4	10.2	10.4	10.2	10.2	0.46	0.76	0.14	0.83
P2 back fat depth (mm)*	10.6	10.8	10.5	10.0	10.4	10.3	10.2	0.27	0.14	0.025	0.62
Dressing percentage (%)	76.1	76.6	76.6	76.5	76.5	76.7	76.6	0.58	0.96	0.47	0.57

Table 6: Influence of increasing dietary lysine concentration on growth performance and carcase composition of female pigs

	Dietary lysine concentration, g available lysine per MJ DE								P-value	Contrast	
	0.40	0.46	0.52	0.58	0.64	0.70	0.76	SED	lysine	linear	Quadratic
Days on test (d)	31.5	31.0	31.0	32.2	31.3	30.7	30.7	2.29	0.99	0.74	0.75
Live weight (kg)											
Day 0	58.5	58.1	58.4	57.8	58.3	58.7	58.9	2.39	0.99	0.77	0.73
Day 21	74.6	75.7	76.2	75.5	75.8	77.2	78.3	2.82	0.88	0.20	0.71
Sale	83.9	84.5	85.1	85.8	85.5	85.4	86.8	2.14	0.88	0.18	0.94
Average daily gain (kg/d)											
0-21 days	0.768	0.839	0.848	0.841	0.829	0.880	0.924	0.033	0.003	<0.001	0.77
0-sale	0.808	0.854	0.862	0.867	0.863	0.870	0.911	0.032	0.12	0.006	0.82
Average daily feed intake (kg/d)											
0-21 days	2.20	2.28	2.30	2.23	2.20	2.27	2.26	0.087	0.85	0.81	0.80
0-sale	2.23	2.30	2.34	2.30	2.29	2.31	2.34	0.082	0.84	0.34	0.62
Feed conversion ratio (kg/kg)											
0-21 days	2.86	2.71	2.72	2.66	2.66	2.58	2.45	0.069	<0.001	<0.001	0.63
0-sale	2.76	2.70	2.72	2.66	2.64	2.66	2.57	0.072	0.23	0.011	0.79
Carcase characteristics											
HSCW (kg)	65.8	65.9	66.4	66.8	66.3	67.1	68.3	1.80	0.84	0.16	0.62
P2 back fat depth (mm)	9.3	9.4	9.4	9.0	9.2	9.2	8.9	0.32	0.76	0.19	0.73
P2 back fat depth (mm)*	9.4	9.5	9.4	9.0	9.3	9.1	8.7	0.21	0.010	<0.001	0.27
Dressing percentage (%)	78.5	78.1	78.1	77.9	77.5	78.6	78.7	0.71	0.63	0.66	0.10

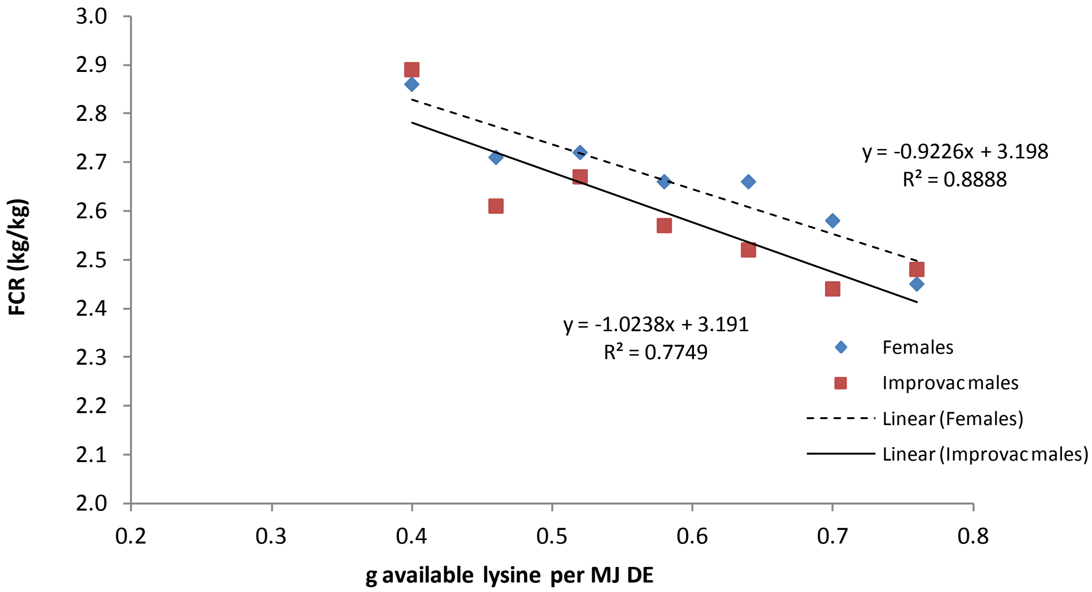

Figure 1: Feed efficiency from day 0 to day 21 with increasing concentrations of dietary lysine. Significance Females: linear P<0.001. Improvac males: linear P<0.001.

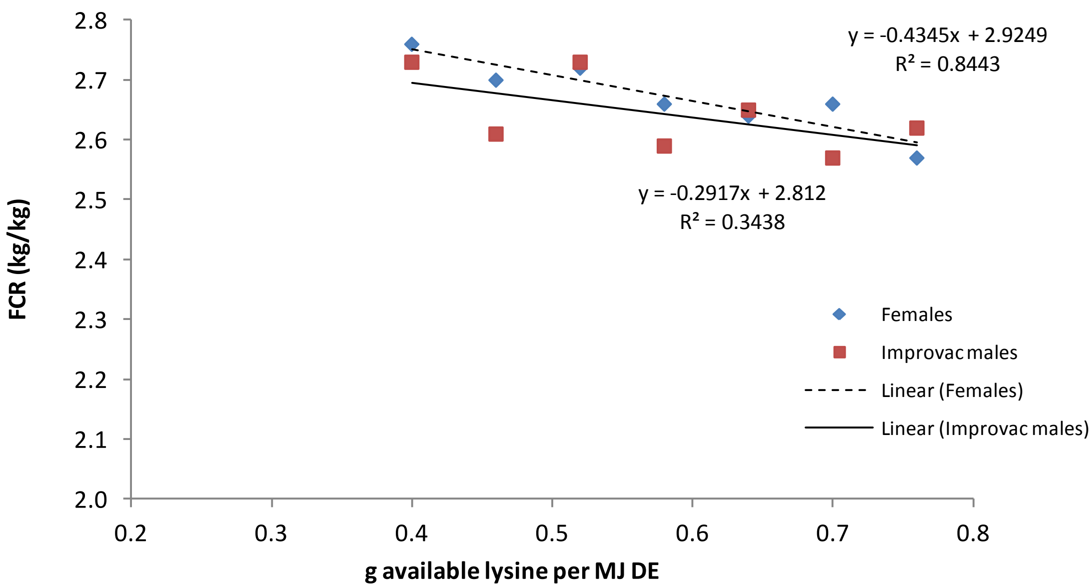

Figure 2: Feed efficiency from day 0 to sale with increasing concentrations of dietary lysine. Significance Females: linear P=0.011. Improvac males: linear P=0.097.

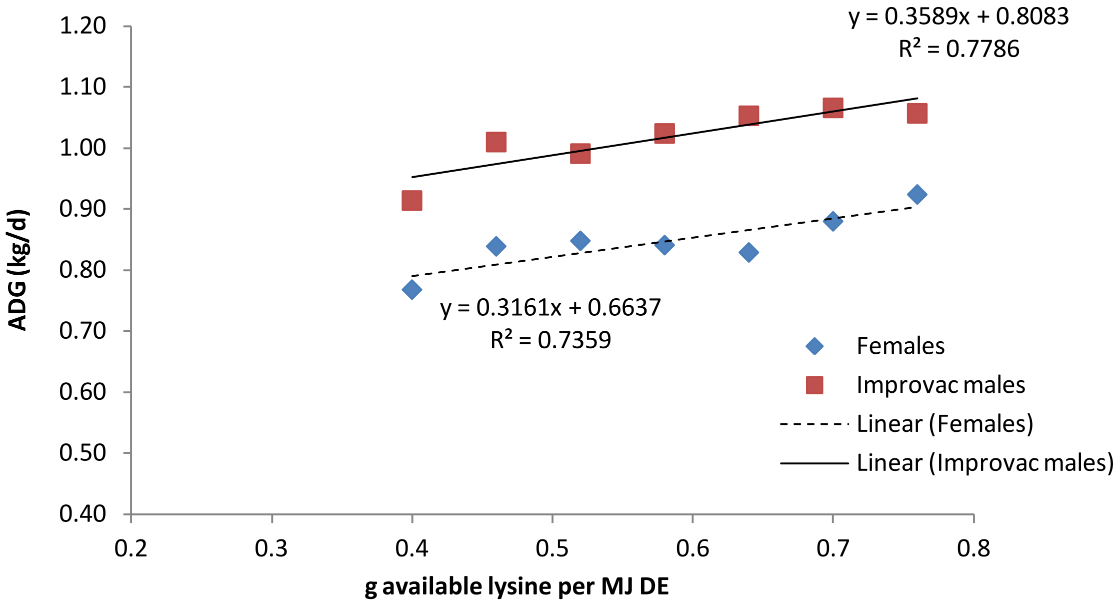

Figure 3: Average daily gain from day 0 to day 21 with increasing concentrations of dietary lysine. Significance Females: linear P<0.001. Improvac males: linear P=0.001.

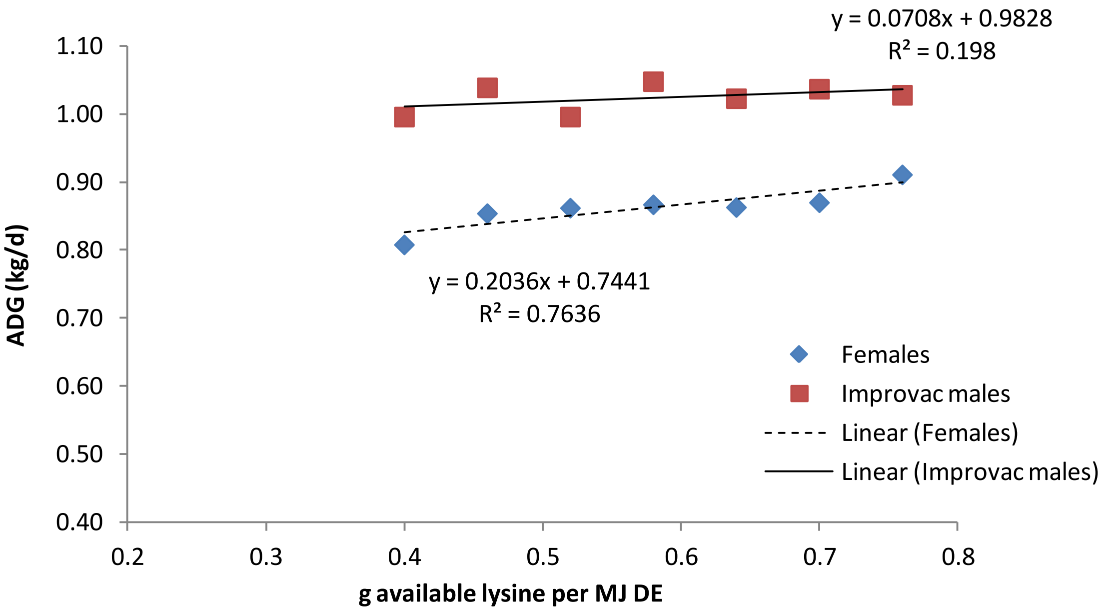

Figure 4: Average daily gain from day 0 to sale with increasing concentrations of dietary lysine. Significance Females: linear P=0.006. Improvac males: linear P=0.43.

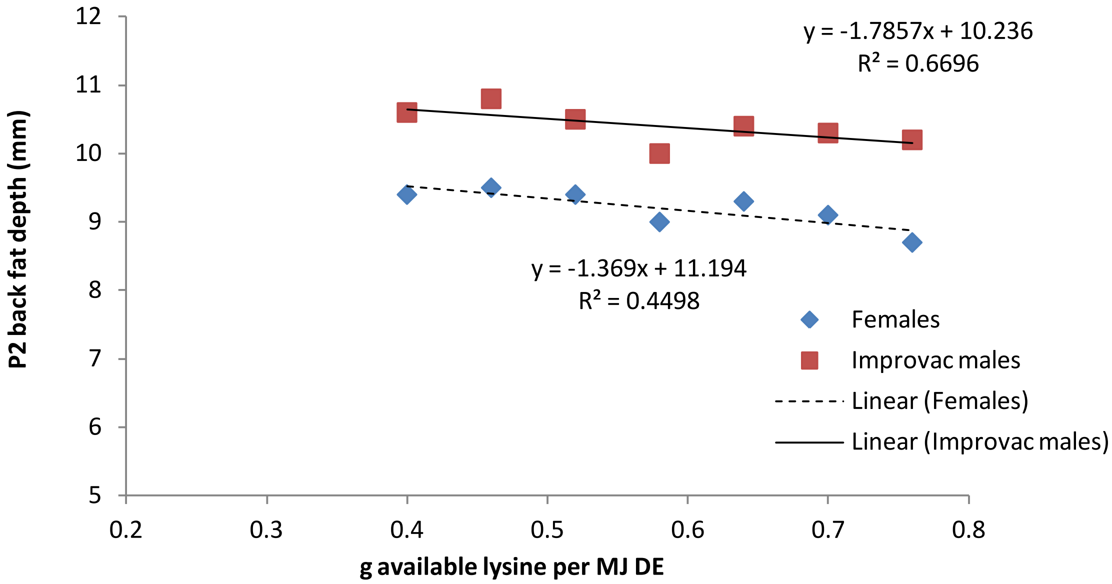

Figure 5: Carcase P2 back fat depth with increasing concentrations of dietary lysine. HSCW included as a covariate. Significance Females: linear P<0.001. Improvac males: linear P=0.025.

The linear response in many of the performance parameters appeared predominately due to the two extreme diets (0.40 and 0.76 g available lysine/MJ DE) deliberately included in this investigation to be well outside current recommendations. As such, the data set was re-analysed to determine if the linear improvement in growth, efficiency and carcase P2 would still be evident without the inclusion of these two extreme diets. The results presented in Table 7 indicate that there would be no growth or efficiency benefit from increasing dietary lysine concentration above 0.52 g/MJ DE from 60 kg through to sale at 88 kg body weight. There was however still a modest improvement in P2 back fat depth with increasing dietary lysine, presumably due to the improvement in feed efficiency during the initial 21 day feeding period. The use of these higher lysine diets during targeted periods of the year when excess fatness is problematic may be warranted (i.e. during the autumn period).

Table 7: Influence of increasing dietary lysine concentration on growth performance and carcase composition

	Dietary lysine concentration, g available lysine per MJ DE						P-value	Contrast	
	0.46	0.52	0.58	0.64	0.70	SED	lysine	linear	Quad
Average daily gain (kg/d)									
0-21 days	0.924	0.919	0.932	0.941	0.973	0.031	0.46	0.095	0.40
0-sale	0.946	0.929	0.957	0.943	0.953	0.026	0.84	0.64	0.85
Average daily feed intake (kg/d)									
0-21 days	2.46	2.46	2.42	2.43	2.43	0.066	0.97	0.59	0.82
0-sale	2.51	2.53	2.50	2.50	2.49	0.064	0.98	0.63	0.81
Feed conversion ratio (kg/kg)									
0-21 days	2.66	2.69	2.61	2.59	2.51	0.063	0.045	0.005	0.30
0-sale	2.66	2.73	2.62	2.65	2.61	0.051	0.22	0.15	0.54
Carcase characteristics									
HSCW (kg)	67.7	67.6	68.4	67.7	68.0	1.29	0.97	0.84	0.79
P2 back fat depth (mm)	10.1	9.9	9.6	9.8	9.7	0.28	0.43	0.14	0.33
P2 back fat depth (mm)*	10.2	9.9	9.5	9.8	9.7	0.18	0.006	0.009	0.055

*HSCW included as a covariate in the analysis

Discussion

The results indicate that daily gain, feed efficiency and carcase composition may be improved with increasing dietary lysine concentration, with the linear improvements in performance particularly evident during the initial 21 day feeding period. The response diminished from day 21 through to sale, resulting in modest linear improvements in growth rate and feed efficiency when the data is considered for the entire test period. Breakpoint analysis could not be utilised to determine the lysine requirement for this class of pig due to the lack of a quadratic response in the key performance variables. The data does however suggest that the lysine requirement in the early finisher period may be greater than that currently used in commercial feeds (currently between 0.52 to 0.60 g available lysine/MJ DE, depending on sex and genotype). The most recent study by Moore *et al.* (2010) suggested an optimal lysine level of 0.70 g available lysine/MJ DE for female pigs between 65 and 80 kg bodyweight to maximise daily gain and feed efficiency. The results from this current investigation supported this recommendation, with a linear improvement in rate of gain and feed efficiency between 58 and 76 kg body weight (day 0 to day 21).

The economic impact associated with feeding a diet higher in lysine concentration during the finisher period is displayed in Table 8. The calculations take into account the higher diet costs associated with increasing lysine concentration as well as the impact on revenue from differences in the percentage of pigs that meet the premium grade carcase specification. Diet costs are assumed to range from $394/t (0.40 g/MJ DE) to $468/t (0.76 g/MJ DE), while the price for a premium grade carcase is assumed to be $2.90/kg (P2 back fat depth of 12 mm or less) and the price for a B grade carcase (P2 greater than 12mm) $2.60/kg. The analysis suggests that under these pricing conditions, the greatest profit was achieved when female finishers were offered 0.76 g av lysine/MJ DE and immunocastrated males 0.58 g av lysine/MJ DE. Profit was generally more variable in the females with increasing dietary lysine concentration, primarily due to the greater variation in the percentage of pigs with P2 measurements above 12mm. The relative benefits will vary for individual producers due to differences in feed costs, seasonal variations in feed intake and carcase composition as well as the target carcass specifications and pricing grid.

Table 8: Economic impact of increasing dietary lysine concentration during the finisher period

Treatments	HSCW (kg)	Feed cost ($/pig)	% pigs with P2 > 12mm	Revenue ($/pig)	Profit (Revenue – feed costs) $/pig
Females					
0.40	65.8	27.7	54.8	180.0	152.3
0.46	65.9	29.0	10.8	189.0	160.0
0.52	66.4	30.4	10.1	190.5	160.2
0.58	66.8	31.9	7.5	192.2	160.3
0.64	66.3	31.8	9.5	190.4	158.6
0.70	67.1	32.3	9.6	192.7	160.3
0.76	68.3	33.6	5.9	196.9	163.2
Improvac Males					
0.40	69.3	34.0	26.0	195.6	161.6
0.46	69.4	33.0	31.6	194.7	161.6
0.52	68.9	34.3	25.9	194.5	160.2
0.58	70	35.3	23.5	198.1	162.8
0.64	69.1	35.7	23.5	195.5	159.8
0.70	68.8	36.0	25.2	194.3	158.3
0.76	69.3	37.4	24.2	195.9	158.5

In conclusion, this study was not able to confirm or reject the recommendations of Moore *et al.* (2010) of 0.63 g available lysine /MJ DE for females between 60 and 100 kg body weight as the pigs in this investigation did not attain a pre-sale weight of 100 kg. The results do however indicate that between 58 and 76 kg (early finisher period) producers may achieve improvements in rate of gain and feed efficiency from increasing the current specifications closer to the 0.70 g available lysine: DE recommended by Moore *et al.* (2010). This may be particularly beneficial during the autumn period when carcase fatness becomes problematic. The lack of a quadratic response to any of the performance parameters measured in this study prevented a breakpoint analysis from being conducted to estimate the actual requirement over this weight range.