

Lactose Improves Pig Diets

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It is well understood that providing lactose in the diet the first few weeks post-weaning improves pig feed intake and gain through the nursery period. The importance of this response is the subsequent reduction in days to market and the increase in throughput that results by making sure pigs get off to a good start and by adding weight in the nursery. Research and field experience clearly demonstrate that pigs make an easier transition from sow's milk to dry feed when lactose is included in the diet, resulting in higher feed intakes, increased gain and fewer starve-out pigs. The obvious nutritional benefit of providing lactose is its improved digestibility compared to starches from cereal grains, due to the pig's natural state of development of digestive enzymes after weaning. However, enhancement of feed palatability and improvements in intestinal health are likely equally important in explaining the observed response to lactose.

In 2007, the price of dairy products used to provide lactose for pig feed reached unprecedented levels. This pressured feed manufacturers and nutritionists into lowering the lactose levels of pre-starter and starter diets to bare minimums in order to optimize the economic return of lactose inclu-



sion. Many factors have contributed to a softening of the lactose market in 2008 and whey prices are now in many instances at 25% of the highs reached in mid-2007. During this same time period, the price of corn and other cereal grains has soared. These market swings have resulted in some of the smallest price differentials between the cost of corn and lactose ever observed in the swine feeding industry. This situation presents an opportunity to re-evaluate optimal lactose levels in starter programs and take full advantage of the positive

relationship between lactose level and pig performance.

A recent cooperative research effort by researchers at the University of Kentucky, the University of Missouri and Ohio State University has reconfirmed the value of feeding aggressive levels of lactose in the third and fourth week post-weaning. At each of the three universities, a trial was conducted to evaluate the response to 0, 2.5, 5, 7.5 and 10% lactose increase from day 14 to 28 post-weaning. Pigs were weaned at the age of 15 to 20 days and averaged 6.2 kg. After one week of a common phase 1 diet containing 20% lactose and one week of a common phase 2 diet containing 15% lactose, pens of pigs were administered treatment diets.

Responses to increasing the lactose in diets from day 14 to 28 post-weaning were observed at each of the three university research sites. Figure 1 illustrates the average daily gain (ADG) response when data from the three trials were combined. Although the analysis indicated a linear response, it appears that the response was maximized at 7.5% lactose. The improve-

Figure 1. Effect of Lactose Level on Average Daily Gain, days 14-28 Post-Weaning

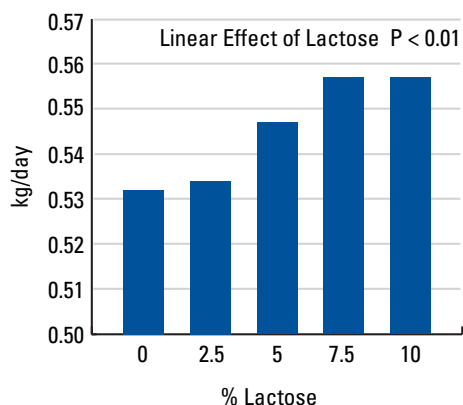
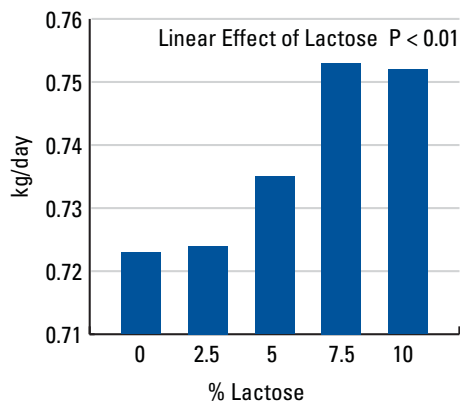


Figure 2. Effect of Lactose Level on Average Daily Feed Intake, days 14-28 Post-Weaning



ment in ADG as pigs were fed higher levels of lactose was a result of increased average daily feed intake (ADFI) (Figure 2).

The economics of feeding the various lactose levels for pig weights from 10.0 to 18.1 kg are presented in Table 1. The added gain from each inclusion of lactose was calculated by comparing the total amounts of gain during weeks 3 and 4 to the total gain for pigs fed 0% lactose during this period.

The pigs fed 7.5% lactose gained approximately 0.45 kg more than pigs on the diet without lactose. The cost of gain for each lactose fortified feeding was calculated from the reported feed efficiency numbers and calculated diet costs for each treatment using \$6/bushel for corn, \$413/MT for soybean meal and \$441/MT for whey permeate (lactose source) with realistic costs for other fixed ingredients.

Estimates of the relationship between the differences in nursery exit weight and the impact on market weight are variable; however, it is generally accepted that a 0.45 kg advantage in weight at the end of the nursery will increase through the subsequent grow-finish period. For this study an estimate of reduced days to market was made by assuming that 0.45 kg of extra weight out of the nursery would result in a 0.9 kg heavier pig at marketing, and that the average daily gain in finishing would be 0.84 kg/day. A cost of \$0.12/day for yardage and a finishing feed conversion of 2.80 were used with average cost of medium energy finishing feed assumed to be \$309/MT. When the costs of gain in finishing and yardage are considered, the additional weight out of the nursery for pigs fed 7.5% lactose from day 14 to 28 would result in a \$0.19/pig benefit compared to the pigs having no lactose in the diet during this period.

Benefits

In conclusion, the benefit of lactose levels up to 7.5% in the third and fourth week post-weaning for pigs that averaged 6.2 kg at weaning and

Table 1. Economic Comparison of Feeding Various Lactose Levels from Day 14 to 28 Post-Weaning

Measure	Lactose %				
	0	2.5	5	7.5	10
Initial body weight (d-14), kg	10.38	10.25	10.21	10.27	10.33
Final body weight (d-28), kg	17.74	17.71	17.87	18.07	18.14
Total gain, d 14-28, kg/pig	7.36	7.46	7.66	7.80	7.81
Feed:gain, d 14-28	1.36	1.35	1.34	1.35	1.34
Diet cost, d 14-28, \$/MT	412.52	417.14	422.07	426.91	432.03
Total feed cost, d 14-28, \$/pig ^a	4.16	4.22	4.32	4.48	4.53
Added gain from lactose, kg/pig ^b	--	0.109	0.308	0.445	0.458
Cost of added gain in the nursery, \$/pig ^c	--	0.06	0.16	0.32	0.37
Estimated reduction in days to market ^d	--	0.26	0.74	1.06	1.09
Value of reduced yardage, \$/pig ^e	--	0.03	0.09	0.13	0.13
Cost of making up gain in finishing, \$/pig ^f	--	0.09	0.27	0.38	0.40
Net benefit, \$/pig ^g	--	0.06	0.20	0.19	0.16

^a Total gain x feed/gain x diet cost.

^b Total gain from treatment – total gain from 0% lactose.

^c Total feed cost of treatment – total feed cost of 0% lactose.

^d Added gain from lactose x 2 (multiplication factor for nursery exit weight to market weight) divided by 1.85 (finisher average daily gain).

^e Estimated reduction in days to market x \$0.12 (yardage).

^f Added gain from lactose x 2.80 (finishing feed conversion) x \$0.14 (average cost of finishing feed).

^g Value of reduced yardage + Cost of making up gain in finishing – Cost of added gain in the nursery.

were fed diets with pharmacological levels of copper, 6% fish meal and antibiotics was demonstrated in three different environments with different pig sources.

Assuming 24 pigs/sow/year and a net benefit of \$0.19/pig by feeding 7.5% lactose from day 14 to 28 post-weaning, the net return to the producer would be \$45,600 for every 10,000 sows in production.

This calculation assumes feeding to a constant market weight and fewer days to achieve that weight due to feeding increased lactose in the starter period. Using another scenario, if barn days are fixed the additional 0.45 kg out of the nursery would result in selling an additional approximate 0.9 kg of market weight, and the economics is even more favorable. Using August 2008 lean hog prices and factoring in the added feed cost, the

benefit would be greater than \$0.50/pig (greater than \$120,000 per 10,000 sows).

Regardless of how the economics are calculated, the bottom line is that current lactose pricing provides an opportunity for the swine industry to be aggressive with lactose levels in starter diets to maximize performance through the nursery period and improve production efficiencies to market.

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Reference

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