

# Lactose improves gain through nursery period

*The benefit of lactose levels of up to 7.5% during the third and fourth week postweaning was demonstrated in three different environments with different pig sources.*

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It is known that providing lactose in diets the first few weeks postweaning improves pig feed intake and gain through the nursery period.

The importance of this response is the subsequent reduction in days to market and 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 the transition from sow's milk to dry feed much more easily when lactose is included in the diet, resulting in higher feed intakes, more gain and fewer starve-out pigs.

The obvious nutritional benefit of providing lactose is that it has 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 in pig feeds to provide lactose reached unprecedented levels and pressured feed manufacturers and nutritionists to lower the lactose levels of pre-starter and starter diets to bare minimums in order to optimize the economic return of lactose inclusion.

Many factors have contributed to a softening of the lactose market in 2008, and when prices are now, in many instances, 25% of the highs reached in mid-2007 (data not shown).

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 provides an opportunity to re-evaluate optimal lactose levels in starter programs and to take full advantage of the positive relationship between lactose level and pig performance.

## Gain

A recent cooperative effort by researchers at the University of Kentucky, the University of Missouri and The Ohio State University has reconfirmed the value of feeding aggressive levels of lactose to pigs during the third and fourth week postweaning.

At each of the three universities, a trial was conducted evaluating the response to 0, 2.5%, 5.0%, 7.5% or 10.0% lactose from day 14 to 28 postweaning.

Pigs were weaned at 15-20 days of age and averaged 13.7 lb. 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 level in the diets from 14 to 28 days postweaning were observed at each of the three university research sites.

Figure 1 illustrates the average daily gain (ADG) response when data were combined for the three trials. Although the analysis indicated a linear response, it appears that the response was maximized at 7.5% lactose.

The improvement in ADG as pigs were fed higher levels of lactose was a result of increased feed intake (Figure 2).

The economics of feeding the various lactose levels from 22 to 40 lb. are presented in the Table. The added gain from each inclusion of lactose was calculated by comparing the total amounts of gain during weeks three and four to the total gain for pigs fed 0% lactose during this period.

The pigs fed 7.5% lactose gained approximately 1 lb. more than pigs on the diet without lactose.

The cost of gain for each treatment was calculated from the reported feed efficiency numbers and calculated diet costs for each treatment using \$6/bu. for corn, \$375 per ton for soybean meal and \$400 per ton for whey permeate (lactose source) with realistic costs for other fixed ingredients.

## Economic comparison of feeding various lactose levels from days 14 to 28 postweaning

|  | Lactose, % |        |        |        |        |
|--|------------|--------|--------|--------|--------|
|  | 0          | 2.5    | 5.0    | 7.5    | 10.0   |
| Initial bodyweight (day 14), lb.                         | 22.89      | 22.60  | 22.51  | 22.65  | 22.78  |
| Final bodyweight (day 28), lb.                           | 39.10      | 39.05  | 39.40  | 39.84  | 40.00  |
| Total gain, lb. per pig                                  | 16.21      | 16.45  | 16.89  | 17.19  | 17.22  |
| Feed:gain  | 1.36       | 1.35   | 1.34   | 1.35   | 1.34   |
| Diet cost, \$/ton  | 374.17     | 378.36 | 382.83 | 387.22 | 391.86 |
| Total feed cost, \$/pig <sup>a</sup>                     | 4.16       | 4.22   | 4.32   | 4.48   | 4.53   |
| Added gain from lactose, lb./pig <sup>b</sup>            | —          | 0.24   | 0.68   | 0.98   | 1.01   |
| Cost of added gain in the nursery, \$/pig <sup>c</sup>   | —          | 0.06   | 0.16   | 0.32   | 0.37   |
| Estimated reduction in days to market <sup>d</sup>       | —          | 0.26   | 0.74   | 1.06   | 1.09   |
| Value of reduced yardage, \$/pig <sup>e</sup>            | —          | 0.03   | 0.09   | 0.13   | 0.13   |
| Cost of making up gain in finishing, \$/pig <sup>f</sup> | —          | 0.09   | 0.27   | 0.38   | 0.40   |
| Net benefit, \$/pig <sup>g</sup>                         | —          | 0.06   | 0.20   | 0.19   | 0.16   |

<sup>a</sup>Total gain x feed:gain x diet cost.

<sup>b</sup>Total gain from treatment minus total gain from 0% lactose.

<sup>c</sup>Total feed cost of treatment minus total feed cost of 0% lactose.

<sup>d</sup>Added gain from lactose x 2 (factor for nursery exit to market weight) ÷ by 1.85 (finisher ADG).

<sup>e</sup>Estimated reduction in days to market x 12 cents (yardage).

<sup>f</sup>Added gain from lactose x 2.80 (finishing feed conversion) x 14 cents (avg. cost of finishing feed).

<sup>g</sup>Value of reduced yardage + cost of making up gain in finishing - cost of added gain in nursery.

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Estimates of the relationship between differences in the nursery exit weight and the impact on market weight were variable; however, it is generally accepted that a 1 lb. advantage in weight at the end of the nursery will increase through the subsequent grow-finish period.

For this example, an estimate of reduced days to market was made by assuming that 1 lb. of extra weight out of the nursery would result in a 2 lb. heavier pig at marketing and that ADG in the finishing period would be 1.85 lb. per day.

A cost of 12 cents per day for yardage and a finishing feed conversion of 2.80 were used with an average cost of a medium-energy finishing feed that was assumed to be \$280 per ton.

When the cost of gain in finishing and yardage costs were considered, the additional weight out of the nursery for pigs fed 7.5% lactose from days 14 to 28 resulted in a 19 cents-per-pig benefit compared to having no lactose in the diet during this period.

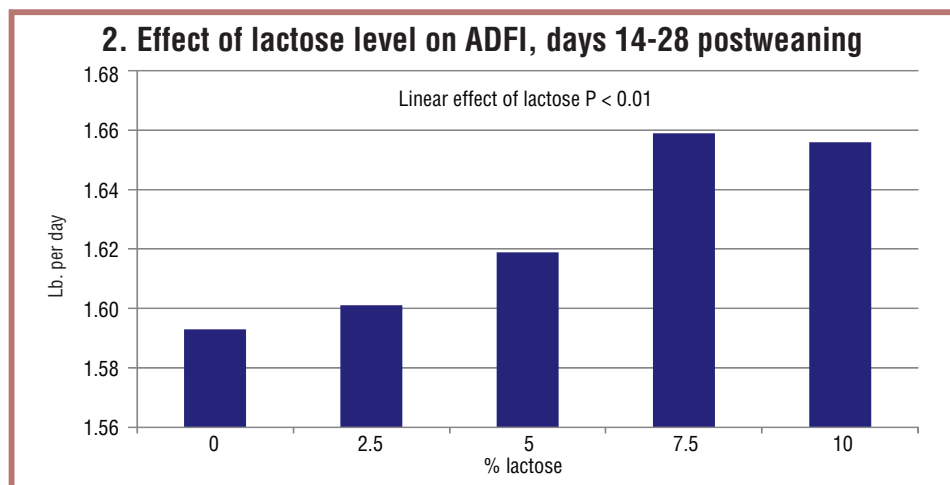
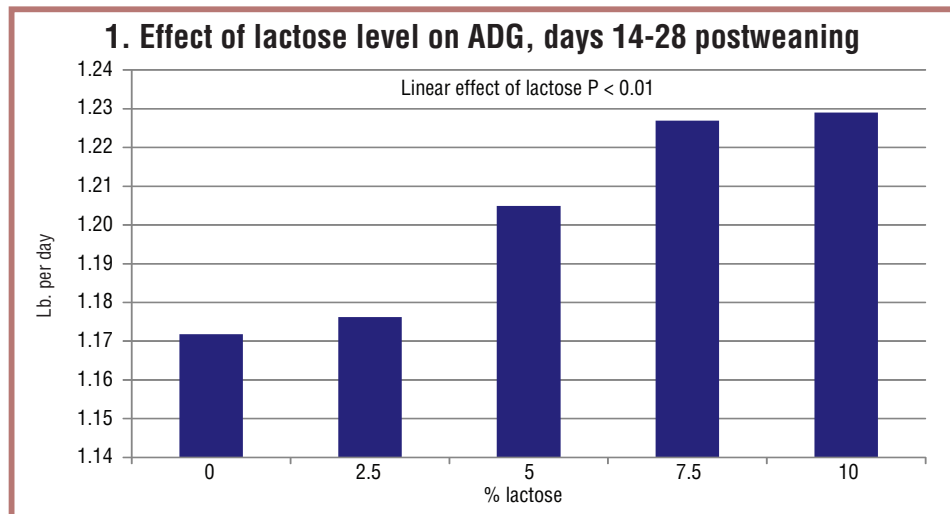
## Payoff

In conclusion, the benefit of lactose levels of up to 7.5% during the third and fourth week postweaning for pigs that averaged 13.7 lb. at weaning and 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 per sow per year and a net benefit of 19 cents per pig by feeding 7.5% lactose from day 14 to day 28 postweaning, the net return to the producer would be \$45,600 for every 10,000 sows in production.

The above calculation assumes feeding to a constant market weight and fewer days to achieve that weight due to feeding lactose longer in the starter period.

Using another scenario, if barn days are fixed, the additional 1 lb. out of the nursery would result in selling an additional 2 lb. of market weight, and the



economics are even more favorable.

Using August 2008 lean hog prices and factoring in the added feed cost, the benefit would be more than 50 cents per pig (more 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

to be aggressive with lactose levels in starter diets to maximize performance through the nursery period and improve production efficiencies to market.

## Reference

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