Feeding diets with decreasing net energy value to hogs

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Background

Feed is the largest cost of hog operations (>70%). In a farrow-to-finish operation, more than 80% of feed is consumed by growing-finishing pigs. Energy yielding feedstuffs account for 85-90% of feed cost. Therefore, nothing impacts the cost of pork production more than the dietary energy level of growing-finishing pig feed. There is surprisingly little information on the responses of growing-finishing pigs to dietary net energy (NE) density. This study evaluated feeding lower than conventional, constant NE levels throughout to market weight with the aim of comparing small grain-based dietary regimens that would provide similar growth performance to corn-soybean meal diets.

Our objective

To compare the growth performance, dressing, and carcass characteristics of barrows and gilts fed one of four dietary regimens that provided decreasing, but constant NE levels to market weight.

What we did

- We conducted the trial at a commercial contract pig grower farm set up as a test facility (Drumloche, Lougheed, AB).
- 504 barrows and 504 gilts (~30 kg BW) were housed in 48 pens (21 pigs/pen) by sex.
- Pigs were fed one of four dietary net energy (NE) regimens (2.4, 2.3, 2.2, or 2.1 Mcal/kg and equal SID Lys/Mcal NE) over 5 growth phases in a 2 x 4 factorial design resulting in 6 pens per NE level x sex.
- High NE diets (2.4 Mcal/kg) were based on wheat grain and field pea with decreasing canola oil inclusion by phase. Low NE diets (2.1 Mcal/kg) were based on barley and oats. Diets with 2.2 and 2.3 Mcal/kg NE were 0.67:0.33 and 0.33:0.67 blends of the 2.1 and 2.4 Mcal/kg NE diets, respectively.
- Pigs BW and feed disappearance (ADFI) were weighed on a pen-basis at d 0, 21, 42, 56, 70, weekly thereafter and at shipping for slaughter (~120 kg).
- Pigs were slaughtered at Maple Leaf (Brandon, MB). Individual warm carcasses were weighed and graded (Destron).

What we observed

Diets

Dietary NE values calculated based on results of laboratory analysis were close to formulated NE values. Decreasing energy level in phase diets by 0.1 Mcal/kg decreased starch content by 1.2 %-points (P=0.13), CP by 0.6 %-points (P=0.07), and EE by 0.4 %-points (P<0.01), and increased NDF by 2.0 %-points (P<0.001), ADF by 1.2 %-points (P<0.001), and ash content by 0.2 %-points (P=0.001). Decreasing dietary NE level linearly decreased apparent total tract digestibility (ATTD) of GE overall (P<0.001) and for individual periods (P<0.05).

Effects on growth performance

For the entire trial (d 0-70), decreasing dietary NE by 0.1 Mcal/kg linearly increased (P<0.001) ADFI by 43 g and linearly decreased (P<0.001) feed efficiency (ADG:ADFI) by 0.007. Neither BW nor daily weight gain (ADG) was affected by NE level (Figure 1). The proportion of pigs remaining in pens after the start of shipping for slaughter (d70) was greatest (P<0.05) for pigs fed 2.1 Mcal/kg.

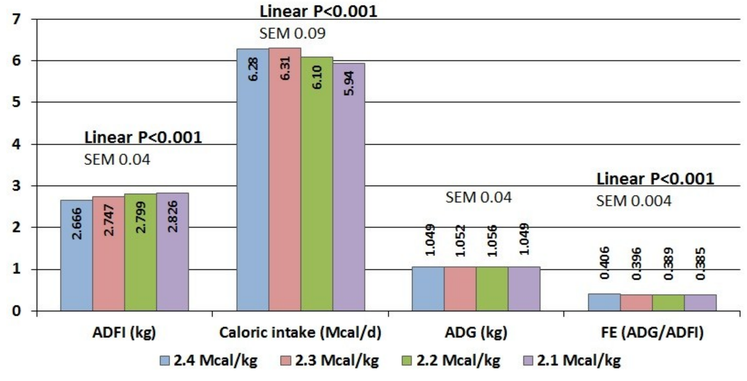

Figure 1. Effect of dietary NE value on growth performance

Effects on carcass traits

For the entire trial, decreasing dietary NE by 0.1 Mcal linearly decreased (P<0.01) carcass dressing by 0.25%-points. Carcass backfat, loin depth, lean yield, index, and carcass lean gain (CLG) were not affected by dietary NE level. Decreasing dietary NE by 0.1 Mcal linearly increased (P<0.001) caloric efficiency by 1.5 g CLG/Mcal NE and lysinic efficiency by 0.5 g CLG/g SID lysine (Figure 2).

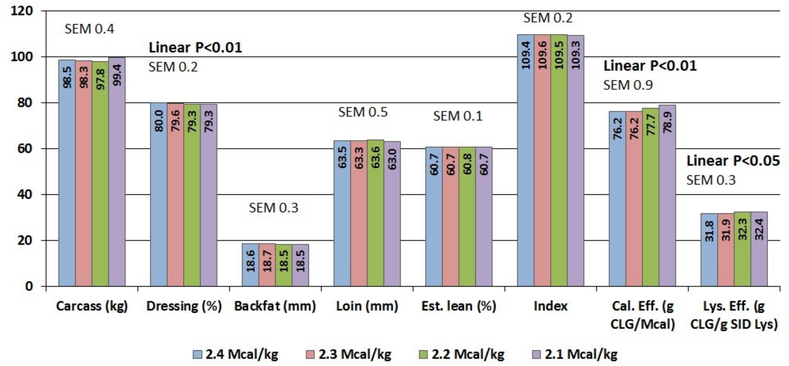

Figure 2. Effect of dietary NE value on carcass traits

Effects on economics

Decreasing dietary NE linearly decreased (P<0.001) feed cost per tonne, per kg gain, and per pig, and increased income-over-feed-cost (IOFC) by more than $10,- (Table 1).

Table 1. Effect of dietary NE value on feed cost (CA$, Fall 2013)

Mcal/kg	2.4	2.3	2.2	2.1	SEM	Linear
Feed cost/tonne	249.51	233.13	216.22	198.81	0.35	P<0.001
Feed cost/kg BW gain	0.67	0.63	0.60	0.57	0.01	P<0.001
Feed cost/pig	62.50	59.58	56.72	54.66	0.53	P<0.001
IOFC/pig	61.02	63.50	65.93	71.43	0.85	P<0.001

Take home message

Grower-finisher barrows and gilts can be fed diets with reduced (≤2.3 Mcal/kg) NE value instead of traditionally fed energy levels (≥2.4 Mcal/kg NE) likely as long as pigs sustain feed intake. The most economically optimal dietary NE level was 2.1 Mcal/kg, which is lower than current existing feed energy recommendations for growing-finishing pigs. Whether lower NE diets are economically optimal depends on the costs of lower NE ingredients like oats relative to wheat and barley.

Acknowledgements

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