Feeding canola meal or soy expeller at two dietary net energy levels to growing-finishing barrows and gilts

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Background

Solvent-extracted canola meal (CM) has relatively low energy value due to high dietary fibre content. Soy expeller (SE) is now locally produced in Canada and has greater energy value than imported soybean meal. These feedstuffs therefore offer opportunities to reduce or increase dietary net energy (NE) level at low cost. Lowering feed cost is important, as feed is the largest cost of pig production. Energy yielding feedstuffs account for 85 to 90% of feed cost. Therefore, nothing impacts the cost of pork production more than the dietary energy level of feed fed to growing-finishing pig.

Our objective

The objective of this trial was to compare growth performance and carcass traits of growing-finishing barrows and gilts fed low or high NE levels including either CM or SE to market weight.

What we did

- We conducted this commercial-scale pig trial at a contract grower barn set up as a test facility (Lougheed, AB).
- 504 barrows and 504 gilts (~33 kg BW) were housed in 48 pens by sex, 21 pigs per pen.
- Barrows and gilts were fed two NE levels: low (2.17 or 2.20 Mcal/kg for grower and finisher, respectively) or high (2.32-2.35 Mcal/kg). Within NE level, they were fed either CM (25% in grower and 20% in finisher) or SE (15-12.5%) with 6 pens per NE level x protein source x sex.
- For all 5 growth phases, diets were formulated to equal g SID Lys/Mcal NE.
- Low NE phase diets were based on barley grain, whereas high NE diets were based on wheat grain. Within NE level, the energy value of the CM diet was increased to match that of the SE diet by including canola oil.
- Pen BW and feed disappearance (ADFI) were measured at day 0, 12, 24, 33, 53, 74, weekly thereafter, and at slaughter weight (130 kg).
- Pigs were slaughtered at Maple Leaf (Brandon, MB). Individual warm carcasses were weighed and graded (Destron).

What we observed

Effects on growth performance

For the overall trial (d0-74), although hogs fed low NE diets consumed (P<0.001) 72 g/d more feed than those fed high NE diets, NE intake was 350 cal/d less (P<0.001; Figure 1). Intake was 209 cal/d greater (P<0.001) for hogs fed SE that grew 37 g/d faster (P<0.001) than those fed CM. G:F was 14 g/kg lower (P<0.001) for hogs fed low vs. high NE diets and 12 g/kg greater (P<0.001) for hogs fed SE vs. CM (Figure 1).

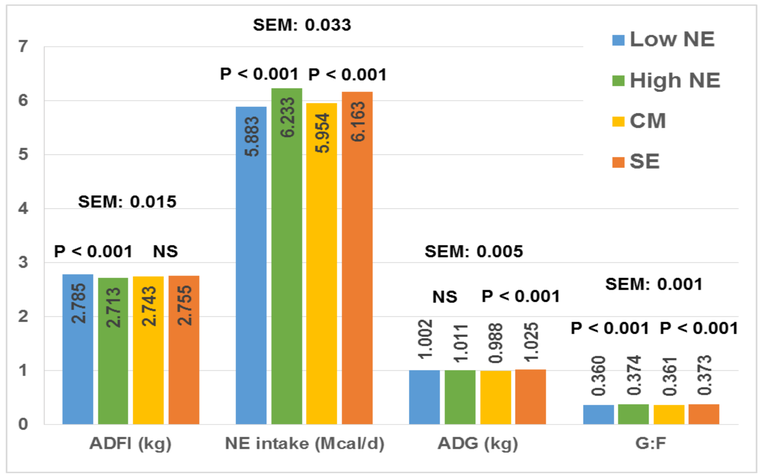

Figure 1. Effect of dietary NE level and protein source on growth performance (NS = not significant; SEM=Standard Error of the Mean)

Effects on carcass traits

Dressing was 0.6 %-points lower (P<0.001) feeding low vs. high NE diets and feeding CM vs. SE (Table 1). Carcass weight was 0.8 kg lower (P<0.050) for hogs fed low vs. high NE diets; 1.4 kg greater (P<0.001) for hogs fed SE vs. CM. Hogs fed SE averaged 2.3 mm larger (P<0.001) loin than those fed CM. Dietary energy level or protein source had no effect on backfat depth, pork yield or carcass index. Hogs fed CM stayed 2.6 d longer (P<0.001) in the barn than those fed SE (Table 1).

Effects on economics

Diet cost averaged $28.38 per tonne less (P<0.001) feeding low vs. high NE diet; $7.76 per tonne more feeding SE vs. CM. Income margin after subtracting feed cost (ISFC) per hog shipped was $2.75 greater feeding low vs. high NE diet; only $0.32 greater feeding SE vs. CM (Table 2).

Table 1. Effect of dietary NE level and protein source on carcass traits

	NE level		Protein source		SEM	P value	
	Low	High	CM	SE		NE	Protein
D74 to slaughter	23.2	23.4	24.6	22.0	0.5	0.779	<0.001
Ship weight, kg	130.1	130.2	129.7	130.6	0.3	0.925	0.081
% of pigs shipped	94.2	95.4	95.2	94.4	1.0	0.406	0.578
Carcass wt, kg	101.9	102.7	101.6	103.0	0.3	<0.050	<0.001
Dressing	78.3	78.9	78.3	78.9	0.1	<0.010	<0.010
Backfat, mm	18.4	19.0	18.5	18.9	0.2	0.064	0.172
Loin depth, mm	61.7	61.8	60.6	62.9	0.4	0.793	<0.001
Lean yield, %	60.8	60.5	60.7	60.6	0.1	0.061	0.755
Index	115.0	115.3	115.3	115.0	0.2	0.269	0.269
Carcass revenue, $	208.47	210.85	208.61	210.71	0.75	<0.050	0.052

Table 2. Effect of dietary NE level and protein source on feed cost and gross income margin subtracting feed cost (ISFC) in CA$ (Spring 2016)

	NE level		Protein source		SEM	P-value	
	Low	High	CM	SE		NE	Protein
Feed cost/tonne	265.86	294.24	276.17	283.93	0.07	<0.001	<0.001
Feed cost/ kg BW gain	0.80	0.84	0.82	0.81	0.01	<0.001	0.070
Feed cost/ shipped pig	78.54	82.87	79.96	81.46	0.75	<0.001	0.061
ISFC/shipped pig	68.84	66.09	67.46	67.78	0.68	<0.010	0.480

Take home message

Feeding lower net energy diets to hogs resulted in greater profitability. Abruptly introducing 25% canola meal in the grower phase diets was a challenge to pigs, which never caught up to those fed more palatable, lower fibre, soy expeller diets.

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