



Feeding diets with increasing camelina cake levels to nursery and grow-finish hogs

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Background

Camelina sativa, also known as false flax or gold-of-pleasure, is an oilseed crop (~42% oil) related to canola (Brassica family). In addition to several favorable agronomic characteristics, camelina also possesses oil rich in poly-unsaturated fatty acids, which makes it particularly well suited as biofuel and for human nutrition. To create a market for the leftover coproduct cake, it must be approved for feeding to livestock in Canada. First, research needs to show the safety and efficacy of feeding camelina cake to hogs.

Our objective

To evaluate the effects of increasing camelina cake levels in nursery (0, 6, 12, 18%) and grow-finish (0, 5, 10, 15%) diets on growth performance, carcass traits and safety indicators, such as gross pathological examination and organ weights.

What we did

- We conducted the trial at the Swine Research & Technology Centre, UofA, Edmonton, AB.
- 64 barrows and 64 gilts (9.4 kg BW) were housed in 32 nursery pens (4 pigs/pen by sex), and then moved to 16 grow-finish pens (7 pigs/pen, mixed sex).
- Pigs were fed one of four dietary camelina cake levels (0, 6, 12, 18% in nursery or 0, 5, 10, 15% in grow-finish) over 4 growth phases (starter d0-28, grower d28-56, developer d56-84, finisher d84-slaughter).
- Pigs BW and feed disappearance (ADFI) were measured at d 0, 28, 56, 84, weekly thereafter and at shipping for slaughter (~121 kg).
- 16 pigs were necropsied on d28 and 16 others on d105.
- Pigs were slaughtered at Olymel (Red Deer, AB). Individual warm carcasses were weighed and graded (Destron).

What we observed

Effects on growth performance

For the entire trial, ADFI, daily weight gain (ADG) and feed efficiency (G:F) linearly decreased ($P<0.001$) with increasing camelina cake inclusion (Figure 1). ADFI was 21% lower, ADG 32% lower and G:F 11% lower in hogs fed 18/15% camelina

cake compared with controls. Increasing cake inclusion resulted in lower BW throughout the trial ($P<0.001$, Figure 2)), linearly reduced ship weight ($P<0.01$), greater proportion of hogs remaining in pens after start of shipping for slaughter ($P<0.001$), and increased days to slaughter weight ($P<0.001$). It took hogs fed 18/15% camelina cake 28 days longer to reach slaughter weight than controls (146 vs. 118 days, respectively).

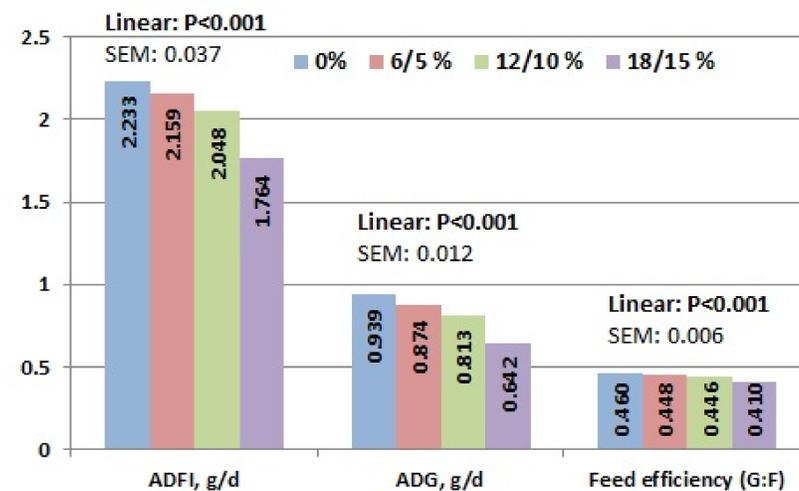


Figure 1. Effect of dietary camelina cake level on growth performance.

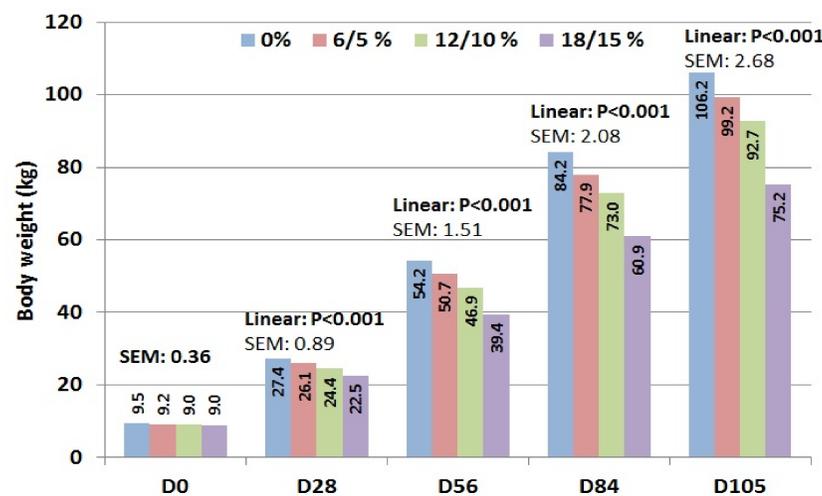


Figure 2. Effect of dietary camelina cake level on body weight.

Effects on carcass traits

Increasing dietary camelina cake level linearly decreased carcass weight ($P<0.001$), dressing % ($P<0.05$), backfat depth ($P<0.01$) and revenue per hog ($P<0.05$), linearly increased lean yield ($P<0.05$), but did not affect loin depth and index (Table 1).

Table 1. Effect of dietary camelina cake level on carcass traits

	0%	6/5%	12/10%	18/15%	SEM	Linear
Carcass weight, kg	99.8	96.1	93.8	95.7	0.8	<0.001
Dressing, %	79.7	78.6	78.3	78.3	0.6	<0.05
Backfat, mm	19.14	18.07	18.16	15.66	0.88	<0.01
Loin depth, mm	63.34	56.89	56.82	58.26	2.96	0.272
Lean yield, %	60.51	60.54	60.57	61.86	0.48	<0.05
Index	113.8	112.1	110.1	112.1	1.14	0.176
Calculated price, \$	181.49	172.46	165.54	171.61	2.67	<0.05

Safety of feeding camelina cake

Gross pathological exams of necropsied hogs did not show any abnormalities. However, liver weight linearly increased ($P<0.001$) and spleen weight linearly decreased ($P<0.010$), both as % of BW, suggesting a greater metabolic burden in hogs fed high camelina cake levels. Heart, thyroid, kidney and pancreas weights were not affected by camelina cake levels in the diet (Table 2).

Table 2. Effect of dietary camelina cake level on organ weights as % of BW

	0%	6/5%	12/10%	18/15%	SEM	Linear
Liver weight	23.90	31.04	32.17	37.59	1.56	<0.001
Heart weight	4.85	4.87	4.48	4.52	0.16	0.064
Kidney weight	4.328	4.270	3.866	4.509	0.210	0.818
Spleen weight	1.73	1.710	1.618	1.366	0.082	<0.01
Pancreas weight	1.581	1.408	1.583	1.650	0.083	0.314
Thyroid weight	0.098	0.091	0.121	0.102	0.009	0.348

Take home message

Feeding camelina cake to hogs up to 18/15% seemed safe, but hogs did not like to eat it resulting in decreased gain to market weight. Producers will be unlikely to stock camelina cake if it can only be fed at 5% in hog diets.

Acknowledgements

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