



Increasing inclusions of canola seed in laying hen diets: Effects on productivity, egg quality and carbon intensity

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Summary

The present study demonstrated that canola seed can be included at to 24% of the diet for laying hens to support high productivity and egg quality.

The Problem

Despite its widespread availability, there is little evidence that feeding canola seed to laying hens is widespread among egg producers in Western Canada. Further, there is little empirical data in support of feeding canola seed to layers.

There are potential logistical, environmental and economic benefits to be realized by producers by simply feeding their own seed rather than refined/cold pressed oil and solvent extracted meal derived from canola.

Our Approach

A standard Alberta layer ration was formulated based on the survey data collected by Alberta Agriculture. Test diets were then formulated to contain 8, 16 or 24% rolled canola seed and to meet recommended energy density and digestible AA levels based on the Lohmann LSL-Lite management guide (Table 1).

Ingredient prices used to formulate diets were reflective of those in

Table 1. Ingredient composition, target nutrient density, calculated cost and carbon intensity of test diets.

Item	Inclusion level of canola seed, %			
	0%	8%	16%	24%
Wheat	59.88	58.39	56.90	55.41
Canola seed	0.00	8.00	16.00	24.00
Canola meal	14.90	10.23	5.55	0.88
Soybean meal	6.03	5.98	5.94	5.89
Canola oil	5.38	3.59	1.79	0.00
Limestone	11.17	11.22	11.26	11.31
Dicalcium phosphate	0.93	0.89	0.85	0.81
Choline premix	0.50	0.50	0.50	0.50
Layer premix	0.50	0.50	0.50	0.50
Salt	0.40	0.40	0.41	0.41
L-Lysine	0.09	0.09	0.08	0.08
D,L-methionine	0.12	0.12	0.11	0.11
L-threonine	0.05	0.05	0.06	0.06
CBS Superzyme plus	0.05	0.05	0.05	0.05
AME, Mcal/kg	2.80	2.80	2.80	2.80
Calcium	4.70	4.70	4.70	4.70
Available phosphorus	0.43	0.43	0.43	0.43
AID Lysine, %	0.73	0.73	0.73	0.73
Cost, \$CAD/T	303.34	312.12	320.90	329.69
Carbon intensity, kg CO ₂ eq/T	609.19	592.82	576.45	560.09

Central AB at the time of the study. Carbon intensity estimates for ingredients were derived from the ECOALIM database

Test diets were fed beginning at 40 wks of age to hens (n=128; Lohmann LSL-Lite) housed in conventional battery cages for a 16-week experiment.

Our Observations

Increasing dietary inclusion of canola seed in laying hen diets linearly reduced feed disappearance and daily egg mass production, but did not affect egg:feed ratio (Table 2).

Table 2. Effects of increasing dietary inclusion of rolled canola seed in laying hen diets on hen productivity, egg attributes, economic indicators and feed attributable carbon intensity of eggs.

	Inclusion level of rolled canola seed, %				P-values
	0%	8%	16%	24%	
Hen productivity					
Feed disappearance, g/hen•day	114.4 ^a	111.6 ^{ab}	109.4 ^b	108.9 ^b	0.007
Body weight (55 wks of age), g	1944 ^a	1825 ^b	1737 ^b	1807 ^b	0.000
Lay percentage, eggs/100 hen•days	95.15	95.81	94.35	94.86	0.335
Egg mass production, g/hen•day	58.81 ^a	58.73 ^a	56.12 ^b	56.48 ^b	< 0.001
Egg:feed ratio	0.510	0.525	0.516	0.521	0.406
Egg attributes					
Average egg weight, g	62.13 ^a	61.35 ^b	59.47 ^c	59.54 ^c	< 0.001
Egg shell thickness, mm	0.466	0.469	0.475	0.479	0.264
Specific gravity	1.085	1.086	1.087	1.087	0.079
Albumen height, mm	7.5	7.4	7.4	7.3	0.490
Haugh units, HU	85.8	85.8	85.9	85.4	0.978
Albumen, % of egg weight	55.59	56.05	55.67	55.51	0.251
Shell, % of egg weight	14.16 ^{bc}	14.09 ^c	14.49 ^a	14.40 ^{ab}	0.011
Yolk, % of egg weight	30.23	29.76	29.87	30.08	0.303
Economic indicators					
Feed cost, ¢/hen•day	3.47	3.48	3.51	3.59	0.149
Income, ¢/hen•day	16.56	16.55	16.21	16.44	0.153
Income over feed cost, ¢/hen•day	13.07	13.03	12.71	12.85	0.114
Feed-attributable carbon intensity					
g CO ₂ eq/kg egg mass produced	1201 ^a	1136 ^b	1124 ^b	1079 ^c	< 0.001
kg CO ₂ eq/30 doz large eggs	25.08 ^a	23.71 ^b	23.46 ^b	22.53 ^c	< 0.001

^{abcd} Different superscripts within rows denote statistically different (P<0.05) least-squares means based on 8 experimental units (cage of 4 hens) per treatment.

Dietary inclusion level of canola seed had little impact on any egg attribute other than average egg weight.

Despite increasing formula cost (\$/Tonne), increasing dietary inclusion of canola seed had no effect on economic indicators. Further, increasing dietary inclusion of canola seed reduced feed-attributable carbon intensity by as much as 10%.

What This Means

Canola seed should be considered as feedstuff for laying hens and holds the potential to reduce carbon intensity of egg production without adverse impacts on profitability or egg quality.

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