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Camelina sativa cake in practical layer diets: Effects of high dietary inclusion

Matt Oryschak[1], Miranda Smit[1] and Eduardo Beltranena[1,2]

[1]Alberta Agriculture and Rural Development; [2]Department of Agricultural, Food and Nutritional Science - University of Alberta

Background

Camelina sativa (a.k.a. false flax) is an oilseed (35 - 40% oil) belonging to the *Brassica* family and is closely related to mustard, canola and rapeseed. There is recent interest in its oil as a food source of omega-3 fatty acids, as well as for bio-fuel production.

The major obstacle to expansion of camelina production is that the cake and oil resulting from crushing the seed are not registered in Schedule IV of the Canadian *Feeds Act* as feedstuffs for livestock or poultry. To obtain listing as a feedstuff, the SAFETY and EFFICACY of the product must first be demonstrated. Camelina is known to contain anti-nutritional compounds, which could adversely impact the health and/or productivity of poultry. These include glucosinolates, erucic acid, sinapine and condensed tannins.

The objective of the present study was therefore to determine the effect of increasing dietary inclusion of expeller-pressed *Camelina sativa* cake on layer performance, egg quality, egg fatty acid profiles and signs of toxicity (i.e., safety). We report here the results relating to feed consumption and layer performance.

Our approach

In a 36-week experiment, 288 laying hens housed 4 to a test cage (668 cm^2/hen) in a commercial battery were assigned to be fed one of 6 dietary regimens. Dietary regimens consisted of practical, corn-wheat based diets containing 0, 5 10, 15, 20 or 25% expeller-pressed camelina cake (CC). Diets within each layer phase were formulated to contain the same level of dietary energy (AME) and similar levels of digestible amino acids across all treatments.

Egg production for each test cage was measured daily; individual egg weight and egg mass production was determined weekly; and feed consumption and feed efficiency were determined at 4-week intervals (4 weeks/phase) throughout the study.

What we observed

Increasing CC inclusion did not affect feed intake in 5 of the first 7 phases of the experiment (**Figure 1a**). In the last 8 weeks of the study (last 2 phases), increasing dietary inclusion of CAM linearly reduced feed intake. For the overall 36-wk experiment, there was a small linear reduction in feed intake with increasing dietary inclusion of CC (9 g/d difference between 0% and 25%).

With the exception of phase 6, egg-to-feed ratio (g:g), did not differ among CC inclusion levels for any phase or for the overall 36-wk study (**Figure 1b**). In phase 6 (wk 20-24), increasing CAM inclusion linearly increased egg-to-feed ratio.

Daily egg mass production differed among dietary CC inclusion levels in several weeks of the study, however there was no clear linear trend (**Figure 1c**). In many weeks where differences were observed, egg mass production was generally lowest for hens fed no CC. For the overall 36-wk study, a quadratic trend was observed such that egg mass production of hens fed 0 and 25% CC regimens was lower than for the other CC inclusion levels.

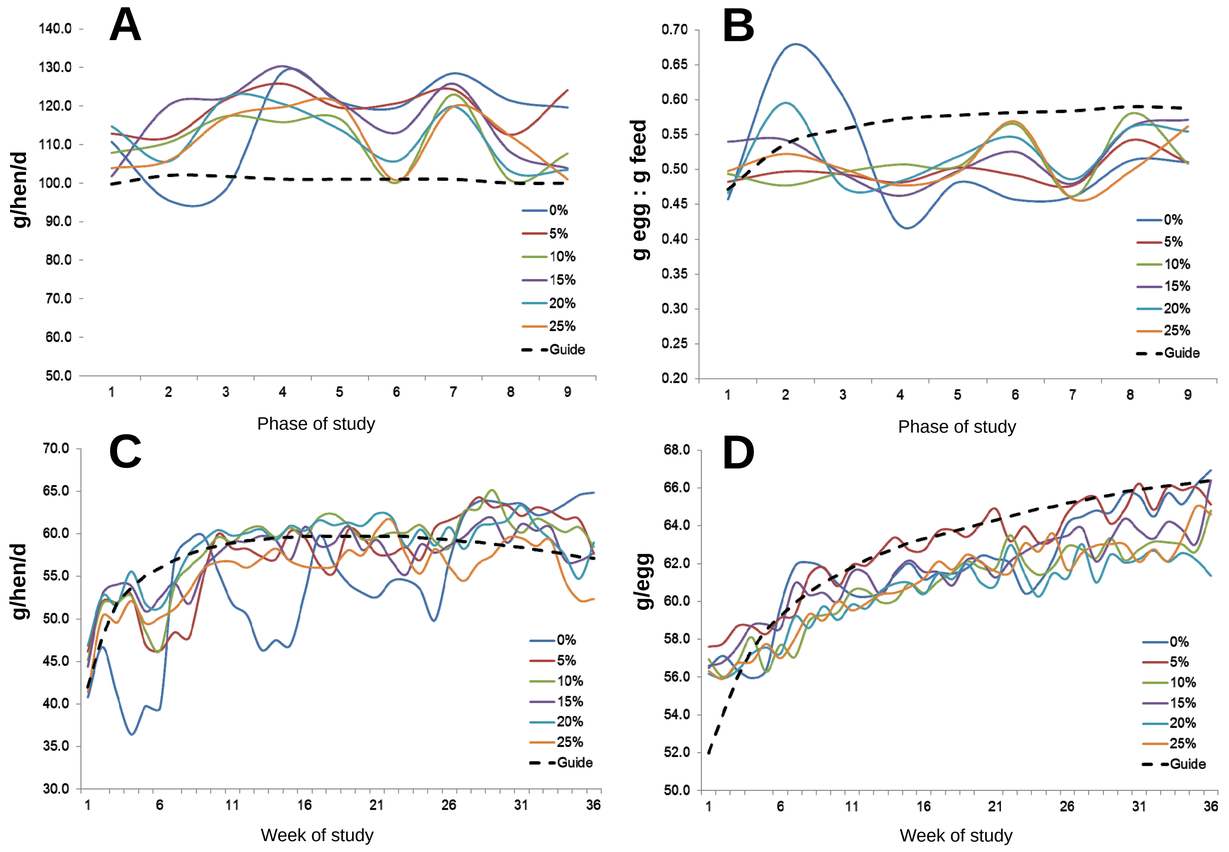

Figure 1. Effect of increasing dietary inclusion of expeller-pressed camelina meal on a) feed intake; b) egg-to-feed ratio; c) daily egg mass production; and, d) average egg weight. *(Note: the black dashed line indicates expected performance for this hen strain)*

Few differences in average egg weight among treatments were observed in any individual week of the experiment (**Figure 1d**). For the overall 36-wk experiment, increasing CC inclusion linearly reduced average egg weight (though the maximum difference between CC inclusion levels was less than 1.5 g per egg).

Implications

- ⇨ Laying hens can be fed up to 25% expeller-pressed camelina cake without adversely impacting feed intake or productivity.
- ⇨ Expeller-pressed camelina cake was safe to feed at levels up to 25% inclusion in laying hen diets.

Contact information

For more information about this project, please contact:

Dr. Eduardo Beltranena
Alberta Agriculture and Rural Development
e-mail: **eduardo.beltranena@gov.ab.ca**
Tel: **(780) 427-4567**

UNIVERSITY OF ALBERTA
DEPARTMENT OF AGRICULTURAL, FOOD & NUTRITIONAL SCIENCE

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