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Nutrient Content of *Camelina Sativa* and Feeding Trials in Turkeys

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Introduction

Camelina sativa (L.) Crantz (camelina) is an oilseed producing plant in the family Brassicaceae (Cruciferae) originating from the Mediterranean to Central Asia [1]. Camelina meal (CM) is the by-product of camelina oil extraction and has a crude protein content similar to canola meal [2].

There is increasing interest in converting waste cooking oil and oil produced from oilseed crops, such as camelina, into biofuels in order to decrease dependence on petroleum products for fuel sources. The interest for growing oilseed crops in Utah is on the rise as well. The cold dry climate in the high elevation of central Utah limits ability for growing a wide variety of crops. This area, however, is also where the Utah commercial meat turkey production occurs. If growing camelina becomes a viable crop in central Utah, the integration of the resultant meal into local turkey diets would further increase the value of the crop.

The objective of this fact sheet is to summarize our findings of using CM in turkey diets. The results obtained come from trials conducted at the Utah Agricultural Experiment Station (Turkey Research Facility) in Ephraim, Utah.

Nutrient Content of Camelina Meal

Our tests show that CM is a viable feed ingredient for turkeys if cost and availability are feasible. Tables 1 and 2 summarize the nutrient content of CM[a] and compare them to some other feed ingredients. Analysis of the CM was done at the University of Arkansas Poultry Science Central Analytical Laboratory, Fayetteville, AR; values for the other ingredients were obtained from a variety of sources [3, 4, 5, 6, 7].

Performance of Feeding CM to Turkeys

Poults. Two trials [8] were conducted feeding various levels of CM to poults from hatch to four weeks of age. Treatment diets were rebalanced to equivalent levels in control diet of minerals, protein, and limiting amino acids; metabolizable energy (ME) was estimated as closely as possible, but the actual ME for the CM was unknown (gross energy value was determined to be 4931 kcal/kg). Summarizing both trials, we found that feeding a moderate amount of CM (5% of diet) only marginally affected weight gain; however, as more CM was integrated into the diet, decreased weight gain could be expected (Table 3). We do not recommend the use of CM in poult starter diets unless economically feasible, and particularly at levels above 5%.

Market-age hen turkeys. A follow up trial was conducted feeding a diet containing 10% CM to commercial large white turkey hens from 9 weeks of age through processing (13.5 weeks old). Integrating the CM into the diet did not significantly alter weight gain. Feed conversion ratios were similar (Table 4). Results of this trial suggest that CM can be integrated into the diet of hen turkeys approaching market age at a level of 10% without compromising performance.

[a]Source of camelina meal: Great Northern Growers, Montana Producer Cooperative, Box 99, Sunburst, Montana 59482.

Table 1. Selected nutrient and mineral content of various feed ingredients compared to camelina meal.

(%)	Camelina meal	Canola meal	DDGS*	Soybean meal
Dry Matter	98.0	90.0	91.0	90.0
Protein	(32.6, 33.4) **	37.7	28.1	48.0
Fat	(16.8, 18.9)	1.5	10.0	0.60
Calcium	(0.19, 0.28)	0.65	0.20	0.20
$Phosphorus_{(tot)}$	(0.61, 1.41)	1.17	0.70	0.67
Potassium	(1.24, 1.56)	1.45	0.92	2.55
Sodium	(0.001, 0.003)	0.09	0.09	0.05
Chloride	0.002	0.05	0.17	0.05

* DDGS = distiller's dried grains with soluble.
** Numbers in parentheses represent the lower and upper 95% confidence interval of the mean (n = 4).

Table 2. Selected amino acid profile of various feed ingredients compared to camelina meal.

(%)	Camelina meal	Canola meal	DDGS*	Soybean meal
Arginine	(2.65, 2.85)**	2.18	1.25	3.60
Cystine	(0.89, 1.12)	0.61	0.50	0.79
Lysine	(1.49, 1.58)	2.21	0.83	3.10
Methionine	(0.76, 1.00)	0.69	0.50	0.72
Threonine	(1.20, 1.25)	1.72	1.15	1.96
Tryptophan	(0.33, 0.35)	0.50	0.24	0.71

* DDGS = distiller's dried grains with soluble.
** Numbers in parentheses represent the lower and upper 95% confidence interval of the mean (n = 4).

Table 3. Four-week-old body weight (g) of large white tom turkey poults fed the treatment diets from day 1 through 28 days of age.

Treatment	Four-week weight (g)
Control (CM 0%)	840
CM (5%)	785
CM (15%)	719
CM (20%)	627

Table 4. Live production results of hens: Ending weight at processing age, weight gain between 9 weeks and processing age (13.5 weeks), and feed conversion between 9 and 13.5 weeks of age.

	Ending weight (kg)	Weight gain (kg)	Feed conversion ratio
Control	7.7	3.4	2.40
CM (10%)	7.6	3.3	2.36

Conclusions

- According to our findings, high concentrations of CM in poult diets inhibited growth. We do not recommend levels greater than 5% of diet.
- Camelina meal at a level of 10% of diet was fed to older hens approaching market age without significantly altering weight gain ($p < 0.05$) or increasing feed conversion ratio.

Summary/Discussion

If *Camelina sativa* becomes a viable crop for oilseed production, there will be an increasing need to utilize the by-product, CM. We have shown that CM may be cautiously used in poult starter diet at a level of no more than 5% and may be integrated into hen finisher diet at a level of 10% without detrimental effects. Future studies in toms approaching market age would be valuable in assessing the utility of CM in their finisher diets.

References

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