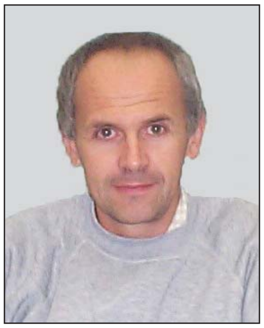
Digestible and Net Energy Content of Toasted and Non-Toasted Canola Meals of Yellow- and Black-Seeded Brassica napus and Brassica junceae in Growing Pigs

C.A. Montoya, Kathryn Neufeld, Pam Kish & Pascal Leterme



Pascal Leterme

SUMMARY

The project aimed to generate reliable information on the digestible and net energy (DE and NE) content of different canola meals (CM) in growing pigs, differing in treatment (toasted or not) and in origin (yellow-seeded Brassica junceae and yellow- or black-seeded Brassica napus). The yellow-seeded Brassica napus CM presented the highest dry matter and energy digestibility and DE and NE content. No difference was observed for toasting. It is concluded that yellow CM could have higher interest for swine than black varieties.

"The digestible energy and net energy content of the black-seeded canola meal of Brassica napus was lower than the yellow-seeded canola meal of Brassuca napus and Brassica. junceae"

INTRODUCTION

Canola meal (CM) is a valuable source of essential amino acids for pigs, although the digestibility of these nutrients is limited by both composition (high dietary fibre level) and processing (toasting). Its low energy value is probably the most limiting factor for its use in swine nutrition and is explained by the absence of digestible carbohydrates and oil and by the relatively high level of dietary fibre.

A breeding program has been initiated in Canada to develop canola seeds with lower fibre content. It is based on cultivars of Brassica napus and Brassica junceae carrying the yellow-seed colour genes.

On the other hand, with the progress obtained in terms of levels of antinutritional factors in the seed, research scientists are wondering if the toasting process is still required. Non-toasted meals are yellow but toasting can have a negative impact on the availability of the amino acids.

The present project aimed at evaluating the digestible and net energy content (DE and NE) of non-toasted and toasted canola meals obtained from yellow- and black-seeded B. napus and yellow-seeded B. junceae.

MATERIALS AND METHODS

Canola meal samples were prepared at POS pilot plant (University of Saskatchewan) to grind, extract oil and apply heat treatment to simulate commercial canola meal production. A total of 42 barrows (28 kg on average) were used. The pigs were randomly allocated to one of 7 experimental diets (limit feed), these consisted of a basal diet, composed of wheat, soybean meal and a mineral/vitamin premix, and six CM-based diets composed of 1/3 CM and 2/3 basal diet. After an adaptation period to the diet of 10 days, the faeces were quantitatively collected for 10 days. The samples were then pooled per animal, freeze-dried and analysed at the University of Saskatchewan. The digestibility and DE/NE content of the diets were calculated. The digestibility and DE/NE content of the CM alone were then also calculated (Table 1).

RESULTS

The composition of the six CM samples is detailed in Table 1. The crude protein content ranged from 46 to 52% of the DM, and the NDF content from 16 to 23%. All the CM were very low in fat.

The results of digestibility and energy content are detailed in Table 1. No effect of toasting was observed ($P>0.05$). On the contrary, differences were observed between the canola types. The DE and NE content of the black-seeded CM of Brassica napus was lower ($P<0.01$) than that of the yellow-seeded CM of Brassica napus and Brassica junceae.

CONCLUSION

Yellow-seeded canolas, thanks to their lower fibre content, have a better DE and NE content in pigs than black-seeded canolas. Thanks to low antinutritional factors found in the new canola cultivars, the toasting step does not seem to be required anymore to improve the nutritional value.

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Table 1. Digestibilities and energy values of different toasted and non-toasted canola meals in growing pigs.

Treatment	Toasted			Non-Toasted			P			
Brassica	*junceae* yellow	*napus* black	*napus* yellow	*junceae* yellow	*napus* black	*napus* yellow	RSD[1]	CM	Treatment	CM*T
Composition										
DM	884	894	895	907	915	912				
Crude Protein	499	456	519	480	464	516				
Ash	73	73	69	72	73	70				
Fat	12	16	19	17	17	13				
ADF	115	170	100	121	162	98				
NDF	166	228	170	167	205	156				
Gross energy [2]	4.73	4.75	4.78	4.75	4.79	4.74				
Dry Matter	0.81[a]	0.75[b]	0.82[a]	0.78[ab]	0.76[b]	0.84[a]	5.0	0.004	0.879	0.568
Protein	0.87	0.82	0.87	0.86	0.84	0.87	5.2	0.129	0.911	0.762
Energy	0.81[a]	0.76[b]	0.83[a]	0.78[b]	0.76[b]	0.84[a]	5.1	0.006	0.875	0.662
DE (Mcal/kg)	3.83[a]	3.60[b]	3.95[a]	3.71[b]	3.65[b]	4.00[a]	243	0.006	0.875	0.662
NE (Mcal/kg)	2.63[a]	2.47[b]	2.72[a]	2.55[ab]	2.50[b]	2.74[a]	170	0.006	0.880	0.669

[1] RSD: residual standard deviation. 2 in Mcal/kg DM

[a,b] Values with different letters in the same row differ significantly at $P < 0.05$.

Canola field in bloom