Nutritional Value of Zero-Tannin Faba Beans for Grower-Finisher Hogs

R.T Zijlstra [1], K. Lopetinsky [2], B. Dening [3], G.S. Bégin [4], and J.F. Patience [5]

Summary

Zero-tannin faba beans are a potential replacement of soybean meal in swine diets. The chemical characteristics, energy and amino acid (AA) digestibility, the content of DE and NE, and tannin content of zero-tannin faba beans were determined and indicate, together with the subsequent growth performance variables and carcass quality of grower-finisher pigs, that zero-tannin faba beans can replace soybean meal and result in similar performance in grower-finisher pigs.

Introduction

Faba bean (Vicia faba minor) production is not new to Alberta. Research was completed in the early 1970's; however, tannin and other anti-nutritional factors limited the use faba beans in swine diets. Presently, zero-tannin faba bean varieties are available. The general purpose of this project was to remove barriers, which were preventing increased production and use of zero-tannin faba beans in Alberta, especially in the Parkland and Peace regions. Analysis of the nutrient content of zero-tannin faba beans and a subsequent performance study confirming equal performance were thus needed. Objectives were (1) to determine chemical characteristics, energy and amino acid (AA) digestibility, the content of DE and NE, and tannin content of zero-tannin faba beans; and (2) to compare growth performance variables and carcass quality of grower-finisher pigs fed zero-tannin faba beans to soybean meal.

"Zero-tannin faba beans can replace soybean meal and result in similar performance in grower-finisher pigs."

Experimental Procedures

One sample of zero-tannin faba beans was collected in Alberta.

Exp. 1. Digestibility Study

Energy and amino acid digestibility was tested using cannulated 60-kg barrows. Energy digestibility was tested in a diet containing 96% faba beans. Amino acid digestibility was tested in a diet containing 62% faba beans and 35% corn starch. Diets were fed at 3 x maintenance. Faeces were collected for 2-d followed by 2-d collection of ileal digesta. Standardized AA, DE and NE contents were determined.

Exp. 2. Performance Study

100 grower-finisher pigs in 20 pens had free access to either a soybean meal or faba bean-based diet regime from 30 –115 kg. Diets were formulated to equal NE and SID (Grower (30-60 kg), 2.40/3.95; Finisher I (60-90 kg), gilts 2.38/3.15, barrows 2.38/2.76; Finisher II (90-115 kg), gilts 2.38/2.92, barrows 2.35/2.55; Mcal kg-1 NE/g SID lysine Mcal-1 NE, respectively), with up to 30% faba beans. Pigs were weighed, feed intake was measured, and carcass measurements were obtained.

Table 1. Characteristics of Zero-Tannin Faba Beans

Nutrient	% as Fed
Moisture	13.4
Crude Protein	27.5
ADF	9.6
NDF	19.8
Tannin	1.1
EE	1.0
Lysine	1.75
Threonine	0.88
Methionine	0.21
Total sulsphur AA	0.56
Trytophan	0.25

Table 2. Energy Profile of Zero-Tannin Faba Beans

Energy	As Fed
Ileal	
Digestibility (%)	60.2
DE content (kcal/kg)	2,362
Total Tract	
Digestibility (%)	88.5
DE content (kcal/kg)	3,471
NE content (kcal/kg)	2,267

Table 3. Amino Acid Profile of Zero-Tannin Faba Beans

Energy	% as Fed
Lysine	
App. Digestibility	85.9
SID	1.54
Threonine	
App. Digestibility	76.1
SID	0.70
Methionine	
App. Digestibility	74.1
SID	0.16
Tryptophan	
App. Digestibility	76.4
SID	0.20

[1] University of Alberta, Edmonton, AB, [2] Crop Development Centre North, Edmonton, AB; [3] Alberta Agriculture Food and Rural Development, Barrhead, AB; [4] Alberta Swine Diet Formulators Corp. Edmonton, AB. [5] Prairie Swine Centre Inc.

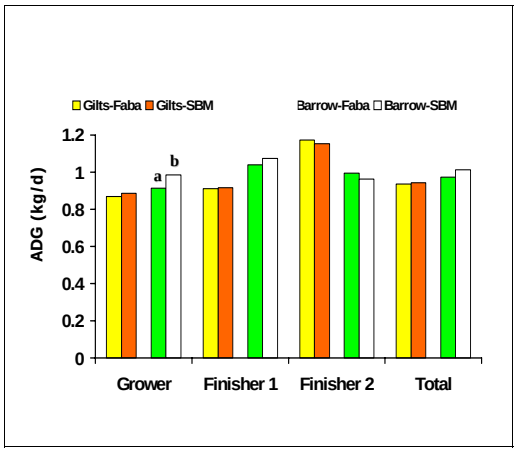

Figure 1. Average daily gain (ADG) of pigs fed zero-tannin faba beans or soybean meal

Results and Discussion

The chemical characteristics (Table 1) and energy (Table 2) and AA (Table 3) profiles suggest that zero-tannin faba beans have a desirable nutrient content (slightly better than peas; NRC 1998). Overall, ADG (Figure 1) and ADFI (data not shown) did not differ between zero-tannin faba beans or soybean meal ($P > 0.10$) suggesting that faba bean inclusion up to 30% might be possible without reducing ADG. The higher ADG for barrows during the Grower phase and higher lean depth for gilts fed soybean meal compared to zero-tannin faba beans (Figure 2) suggest that the available energy content needs further investigation.

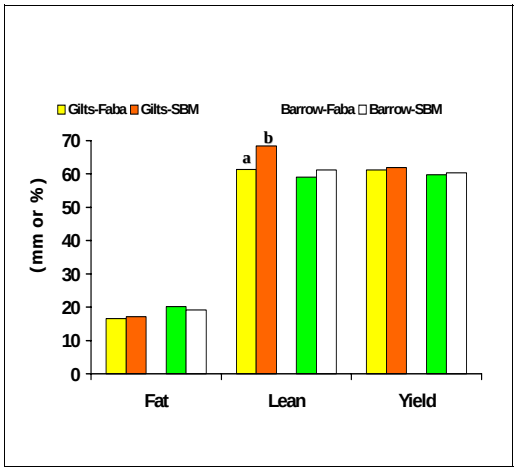

Figure 2. Carcass data of pigs fed zero-tannin faba beans or soybean meal

Conclusion

In conclusion, the zero-tannin faba bean is a worthwhile protein ingredient to consider as a replacement for soybean meal.

Acknowledgements

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