

Effects of feeding alternative sources of crude protein on growth performance and carcass characteristics of late finishing pigs

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Introduction

Soybean meal (SBM) is the standard protein ingredient used in swine diets. Nonetheless, other vegetable protein sources such as pea protein and canola meal can be used to replace SBM. Research has suggested that significant reductions in performance and carcass characteristics occur when late finishing pigs are fed diets below 12% CP and that these impacts are not ameliorated when diets are formulated with all amino acids (AA) at or above minimum ratios relative to lysine using crystalline AA (Soto *et al.* 2016). Further research is needed to understand the reasons that pigs fed diets with seemingly adequate AA levels, but less than 12% CP, have reduced performance.

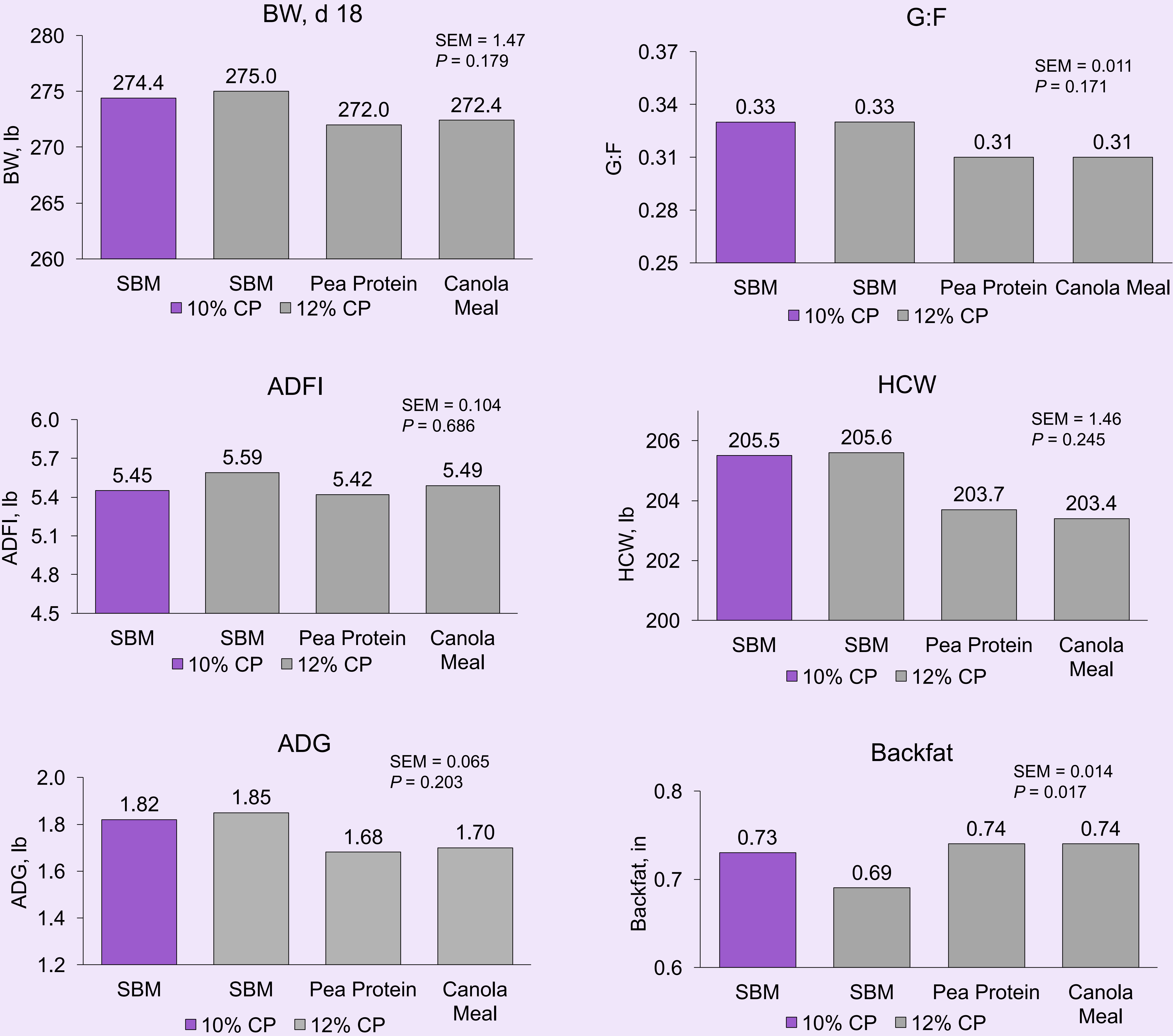
Objective

To determine whether SBM could be replaced with other vegetable protein sources without altering growth performance and carcass characteristics of late finishing pigs.

Experimental Design

- A total of 288 pigs (DNA 600 x 241, initially 240 lb) were used in an 18 d trial.
- Pigs were allotted by BW and randomly assigned to 1 of 4 dietary treatments:
 - 4.3% SBM and 10% dietary CP (negative control)
 - 10.7% SBM and 12% dietary CP (positive control)
 - 8.9% pea protein concentrate and 12% dietary CP
 - 14% canola meal and 12% dietary CP
- There were 8 pigs per pen and 9 replications per treatment.
- Individual pigs were weighed on d 0 and d 18 to determine BW, ADG, ADFI, and F/G.
- On d 18, pigs were transported to a commercial packing plant (Triumph Foods, St. Joseph, MO) for processing and carcass data collection.

Results



Discussion

- Differences in final BW, ADG, ADFI, G:F, and HCW were not observed between pigs fed any of the treatment diets.
- Pigs fed the 12% CP diet containing 10.7% SBM had a decreased ($P = 0.017$) backfat compared to pigs fed the other diets.
- Differences in these results compared to previous research which found decreased performance when pigs were fed diets lower than 10% CP could be due to factors such as genetic differences between trials and resulting differences in dietary AA requirements.
- Thus, diets in this experiment may have been formulated over the pig's AA requirements.

Experimental Diets

	Treatments			
	SBM	SBM	Pea Protein	Canola Meal
Ingredients, %	10% CP	12% CP	12% CP	12% CP
Corn	91.3	84.6	88.2	80.2
Soybean Meal	4.3	10.7	--	--
Pea Protein	--	--	8.9	--
Canola Meal	--	--	--	14.4
Choice White Grease	1.1	2.1	--	3.0
Monocalcium phosphate	0.8	0.7	0.7	0.5
Limestone	1.0	0.9	1.0	0.8
Sodium chloride	0.4	0.4	0.4	0.4
L-Lys-HCL	0.5	0.3	0.3	0.4
DL-Met	0.1	0.1	0.1	0.01
L-Thr	0.2	0.1	0.1	0.1
L-Trp	0.1	0.02	0.1	0.03
L-Val	0.1	--	0.1	0.02
L-Ileu	0.2	0.1	0.1	0.1
Trace mineral premix	0.1	0.1	0.1	0.1
Vitamin premix	0.1	0.1	0.1	0.1
HiPhos 2700	0.02	0.02	0.02	0.02
TOTAL	100	100	100	100

Calculated analysis ¹				
SID Lysine	0.66	0.66	0.66	0.66
Total lysine, %	0.73	0.75	0.78	0.79
ME, kcal/lb	1,534	1,549	1,541	1,553
NE NRC, kcal/lb	1,201	1,201	1,201	1,201
SID Lysine:NE, g/Mcal	2.49	2.49	2.49	2.49
CP, %	10.0	12.0	12.0	12.0
Ca, %	0.51	0.51	0.51	0.51
P, %	0.43	0.45	0.46	0.47
¹ AA ratios were the following for all diets: 64.0% Met + Cys:Lys, 65.0% Thr:Lys, 18.8% Trp:Lys, 67.0% Val:Lys, and 65.0% Ile:Lys.				

Conclusion

These results suggest different dietary protein sources do not affect growth performance or carcass characteristics. Further research is needed to determine optimal lysine levels for DNA 600 x 241 pigs.

