

Bean starch concentrates as home grown alternative to soya bean meal in grower and finisher pig diets

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Implications Bean starch concentrates derived from air classified faba beans has the potential to reduce reliance on soya bean meal and wheat in growing and finishing pig diets.

Introduction Air classification of finely ground, dehulled faba bean (*Vicia faba*) produces a starch-rich co-product with moderate levels of crude protein (CP). Here, we have tested the hypothesis that such bean starch concentrate (BSC) can replace soya bean meal (SBM) in growing and finishing pig diets.

Material and methods We included BSC at 0, 60, 120, 180, 240 and 300 g/kg, gradually and completely replacing SBM from grower and finisher pig diets containing SBM at 140 and 120 g/kg, respectively. The BSC used had a CP level of 222 g/kg dry matter. Using previously established BSC digestible energy and standardised ileal digestible (SID) amino acid levels (Houdijk and Olukosi, 2014), iso-energetic diets were formulated (NE 9.3 and 9.0 MJ/kg for growers and finishers, respectively), at similar SID lysine (8.1 and 7.1 g/kg). To meet minimum requirements of methionine, threonine, tryptophan, calcium and digestible phosphorus (BSAS, 2003), levels of soya oil, pure amino acids and macro-minerals were modified. BSC replaced SBM on a SID Lysine basis, and wheat was gradually reduced from 283 to 116 g/kg and from 264 to 79 g/kg for grower and finisher diets, respectively. Barley, molasses, rapeseed meal, wheatfeed and trace element / vitamin premix levels were kept constant. Each diet was fed *ad libitum* to two groups of three male and two groups of three female terminal line grower (30 to 60 kg) and finisher (60 to 100 kg) pigs (LW × L), for three weeks, after a one-week adaptation period. Weekly live weights for individual pigs, and pen feed intakes were recorded to assess body weight gain (BWG, g/pig/day), average daily feed intake (ADFI, g/pig/day) and feed conversion ratio (FCR as ADFI/BWG). Data was analysed for feeding treatment and sex effects using a 6×2 factorial ANOVA, with initial body weight as covariate and pen as experimental unit. Contrast statements were used to locate linear and quadratic effects of dietary BSC level.

Results There were no feeding treatment effects on grower BWG, ADFI and FCR or finisher ADFI and FCR (Table 1). However, BSC quadratically affected finisher BWG; pigs grew less on 120 to 240 g/kg but not on 300 g/kg diets. There were no overall sex effects on grower or finisher performance or interactions with feeding treatment for grower BWG, ADFI and finisher performance (data not shown). However, sex and feeding treatment interacted for grower FCR (P=0.03), where FCR gradually increased from 2.21 to 2.77 in male pigs but decreased from 2.70 to 2.22 in female pigs (P=0.001).

Table 1 Effect of replacing soya bean meal with bean starch concentrates on performance of grower and finisher pigs.

BSC inclusion levels (g/kg)	Grower Pigs			Finisher Pigs		
	BWG (g/pig/day)	ADFI (g/pig/day)	FCR	BWG (g/pig/day)	ADFI (g/pig/day)	FCR
0	796	1873	2.46	1093	2867	2.61
60	805	1913	2.57	1111	2895	2.53
120	805	1951	2.51	988	2850	3.04
180	818	1923	2.36	1000	2833	2.80
240	809	2143	2.66	989	2744	2.71
300	782	1872	2.47	1079	2832	2.61
s.e.d.	42	111	0.13	52	117	0.23
P-value for BSC inclusion effect						
Linear	0.85	0.34	0.84	0.19	0.36	0.85
Quadratic	0.44	0.26	0.92	0.03	0.87	0.13

Conclusion Although we observed a biologically unclear quadratic relationship between BSC and finisher BWG, there was no effect on ADFI and FCR. This was consistent with effects of whole faba beans on finisher pig performance (Smith *et al.*, 2013), and suggests that feeding pigs BSC based diets during the grower and finisher phase combined is unlikely to affect overall pig performance, indicating that BSC may be a viable home-grown alternative to SBM in pig diets.

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References

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