Production Responses to Dehulling and Level of Inclusion of Australian Sweet Lupins (*Lupinus angustifolius*) in Weaner Pig Diets

J.C. Kim[1], J.M. Heo[2], B.P. Mullan[1] and J.R. Pluske[2]

[1]Department of Agriculture and Food WA, South Perth, WA 6151. [2]Murdoch University, Murdoch, WA 6150.

It is generally perceived that high quality energy and protein sources in diets for newly-weaned pigs, such as milk powders, lactose and cooked cereals, promote better performance after weaning. However, their higher cost and stability of supply sometimes requires nutritionists to explore potential for other ingredients for use in the formulation of weaner diets. Recent research in grower pigs demonstrated that lupins could be included at up to 350g/kg in place of soybean meal, without compromising growth, carcase composition or meat quality (Kim *et al.*, 2007). However, the use of lupins in a weaner diet to reduce or replace more expensive protein sources, such as milk products, has not been examined to date. The hypothesis tested was that increasing the concentration of whole or dehulled Australian sweet lupins in place of milk by-products such as skim milk powder and dried whey in a diet would reduce performance of weaner pigs.

A total of 180 entire male pigs weighing 6.4±0.1 kg at weaning were housed in pairs in a completely randomised block design having 9 dietary treatments (n=10 pens), with pigs blocked based on initial body weight. Two replicate studies were conducted with 90 piglets each to increase the number of observations. The diets were (i) a wheat-based control diet containing 240 g/kg of whey and skim milk powder, and (ii) 8 diets containing whole or dehulled lupins (*cv* Coramup) that substituted the milk products at 60, 120, 180 and 240 g/kg of diet. Digestible energy (DE) and ileal digestible amino acid contents were equalised using soy protein concentrate, canola oil, full fat soybean meal and meat meal. The diets were isoenergetic (15 MJ DE/kg), and were formulated to contain the same ileal standardised digestible lysine content (0.85 g/MJ DE) and ideal patterns of other essential amino acids. As lupins contain fewer sulphur amino acids, the dietary crude protein (CP) contents for diets containing 240 g/kg whole lupins and 180 g/kg and 240 g/kg dehulled lupins were 240, 234 and 245 g CP/kg, respectively. By comparison, the other diets contained 230 gCP/kg. Piglets had *ad libitum* access to feed and water for 3 weeks after weaning. Feed intake and body weight gain were measured weekly. Data were analysed using the analysis of variance (SPSS v. 16, SPSS Inc., Chicago, Illinois). As a significant block effect and replication effect were observed for feed intake and daily gain ($P<0.001$), initial body weights and replicates were used as covariates for subsequent statistical analysis.

Table 1. *Effects of dehulling and concentration of lupins on performance of weaner pigs.*

		Whole lupin (g/kg)				Dehulled lupin (g/kg)				
Item	Control	60	120	180	240	60	120	180	240	SEM
Gain (g/d)	330[a]	351[a]	342[a]	354[a]	344[a]	352[a]	359[a]	326[a]	305[b]	6.5
Intake (g/d)	495[a]	523[a]	524[a]	519[a]	498[a]	516[a]	502[a]	507[a]	424[b]	10.7
FCR (g/g)	1.45	1.46	1.55	1.43	1.43	1.44	1.36	1.52	1.49	0.03

[ab]Means in a row with different superscripts differ significantly ($P<0.05$). SEM, standard error of mean.

Piglets fed diets containing whole lupins up to 240 g/kg ate comparable amounts of feed, and had similar FCR and daily gains compared to piglets fed the milk-powder-based diet (Table 1). However, piglets receiving 240 g/kg of dehulled lupins ate less feed ($P<0.05$) and grew slower ($P<0.05$) than piglets fed the other diets. These data suggest that dehulled lupins in a weaner diet should be limited to less than 180 g/kg while whole lupins can be included up to 240 g/kg without deleterious effects on production. This result reinforces the previous finding that high levels of fermentable fibre, but not insoluble fibre, could have anti-nutritional effects for weaner pigs.

KIM, J.C., MULLAN, B.P., RICHOLLS, R.R., D'SOUZA, D.N. and PLUSKE, J.R. (2007). In "Manipulating Pig Production XI", P. 204, eds J.B. Patterson and J.B Barker (Australiasian Pig Science Assoc.: Werribee).

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