EFFECT OF DEHULLING LUPIN SEED ON THE DIGESTIBLE ENERGY AND ILEAL DIGESTIBILITY OF AMINO ACIDS FOR GROWING PIGS

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There has been considerable interest in the potential feeding value of dehulled lupins for pigs. If this process is shown to improve nutritive value, the kernel and hulls will become more valuable to growers and feed formulators as individual feed ingredients.

A dehulled and normal sample of *Lupinus angustifolius* cv. Gungurru was obtained from the Benalla district of Victoria, and the digestible energy (DE) and apparent ileal digestibility (ID) of lysine determined. Three sugar-based diets containing dehulled lupin-seed meal (kernel), lupin-seed meal (lupin) and soya-bean meal (soya) were formulated. In each case the test protein was the only source of protein in each diet. The soya-bean meal diet was included as a positive control. Diets containing kernel and lupin were supplemented with small amounts of L-lysine HCl and DL-methionine to improve protein quality.

DE determinations were made using a 7 day collection of all faeces, and apparent ID of lysine was determined by analysis of digesta sampled from the terminal ileum of anaesthetised pigs (Table 1).

TABLE 1 DE, digestibility of gross energy (GE) and apparent ID of lysine in kernel, lupin, and soya for growing pigs

	Kernel	Lupin	Soya	SEM	Weight of pig (kg)
DE (MJ/kg air-dry)	15.4	12.3	15.1	0.27	32.7
GE (digestibility)	0.81	0.68	0.86	0.015	32.7
Lysine	0.74	0.67	0.83	0.036	43.5

These results indicate that nutrient digestibility is improved by dehulling. However, the absolute digestibilities reported here are lower than have been found in similar experiments at Wollongbar (Fernandez and Batterham, 1992) with samples of Gungurru (DE: kernel 16.6; lupin 13.3)(Apparent ID of lysine: kernel 0.87; lupin 0.81/0.86). They are also outside the DE range (13.1-15.3) reported in SCA (1987), but are similar to the Rhone-Poulenc (1989) estimate for lysine digestibility (0.66). The DE and ileal digestiblity of lysine in soya-bean are typical of values reported by SCA (1987)(DE range 14.8-15.9) and Rhone-Poulenc (1989)(ID of lysine 0.85), lending a high degree of confidence to the data generated for both the kernel and lupin.

Several factors may be implicated by these lower estimates of DE. Taverner (1983) found 32% of the gross energy of lupins disappeared in the hindgut of finisher pigs (approximately 65kg liveweight). Our pigs were smaller (average 32.7kg) and may have had a lower capacity for hindgut fermentation. If so, this could have contributed to the lower GE digestibility reported in Table 1.

In our experiments, both the kernel and lupin were coarsely crushed. Taverner (1983) however used finely ground (<2mm) lupins. Additional experiments are warranted to determine whether the degree of grinding has any influence on the DE or apparent ID of amino acids in lupins.

The wide range in digestibilities presented in the literature for lupins are a concern for commercial feed formulators. Further studies are in progress to determine amino acid utilisation and performance of growing pigs, and to more closely identify sources of variability which may be associated with lupin samples grown in different regions.

SCA (1987). Feeding Standards for Australian Livestock. CSIRO, Australia.
FERNANDEZ, J.A. and BATTERHAM, E.S. (1992). Pig Industry Seminar. WAI, Wollongbar NSW 2477.
RHONE-POULENC ANIMAL NUTRITION (1989). Nutrition Guide. Commentry, France.
TAVERNER, M.R. et *al.* (1983). J. Sci. Food Agric. 34, 122-128.

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