Availability of lysine from *Lupinus angustifolius* and *Lupinus albus* fed to growing pigs and determined using a modified slope-ratio analysis

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Highly variable estimates of lysine availability in lupins have made it difficult to define the most appropriate values for use in diet formulations. The apparent ileal digestibility of lysine in the whole seed and kernels of *Lupinus angustifolius* cv Gungurru (LAG, 0.82 and 0.92, respectively) and *Lupinus albus* cv Kiev Mutant (LAK, 0.81 and 0.84, respectively) is high. In contrast, the availability of lysine in three samples of *L.angustifolius* cv. uniharvest for pigs has been reported to be low and highly variable (1), but the current recommended value for lysine availability in lupins of 0.55 is not supported by results achieved commercially (2). The aim of this experiment was to apply a modified slope ratio analysis to determine the availability of lysine in the whole seed and kernel of LAG and LAK when fed to growing pigs.

Pig response to added lysine from the whole seed and kernel of both LAG and LAK, respectively, was compared against the response to added lysine from soybean meal (SBM). Five diets were formulated to contain 0.40 g ileal digestible lysine/MJ digestible energy (DE) and were equalised at 14.5 MJ DE. Diets were wheat-based and all other indispensable amino acids were added to a 30% excess relative to lysine. One hundred boars were allocated to one of the five diets (based on SBM, LAG (whole and kernel) and LAK (whole and kernel), respectively) and one of four feeding levels (2.4, 2.7, 3.0 or 3.3 x maintenance) based on five pigs/treatment. An additional 5 pigs were offered the SBM diet at 2.1 x maintenance as the basal treatment. Pig response was assessed in terms of average daily gain from 25 to 50 kg.

		Statistics			
Sample	Availability	SD[1]	Intersection	Quadratic[2]	Cubic[3]
L. angustifolius cv Gungurru, Whole	0.75	0.005	NS	NS	NS
L. angustifolius cv Gungurru Kernel	0.79[4]	0.006	**	NS	NS
L. albus cv Kiev Mutant, Whole	0.67	0.005	NS	NS	NS
L. albus cv Kiev Mutant, Kernel	0.76	0.005	NS	NS	NS

[1]Standard deviation; [2] Quadratic curvature; [3]Cubic curvature; [4]Value invalid due to intersection, $P<0.01$.

The modified slope-ratio analysis generated lysine availability estimates that reflect apparent ileal digestibility measurements and commercial assumptions. The accuracy of estimation may be improved if the slope-ratio analysis was based on more accurate estimates of performance such as empty-body-weight gain or protein or energy deposition rates. Analysis on this basis may also generate a fundamentally valid estimate for LAG kernels.

1. Batterham ES, Murison RD, Andersen LM. British Journal of Nutrition 1984;51:85-99.
2. Standing Committee on Agriculture. Feeding Standards for Australian Livestock. Pigs. East Melbourne:CSIRO, 1987.