EFFECT OF LUPIN NON-STARCH POLYSACCHARIDES (NSP) ON NUTRIENT DIGESTION AND MICROBIAL ACTIVITY IN GROWING PIGS

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The nutritive value of lupins has proved difficult to define for growing pigs. It has been suggested that variable production responses to lupins may be due to the high levels of lupin NSP interfering with the action of digestive enzymes and influencing microbial activity (van Barneveld and Hughes 1994). The aim of this experiment was to use a lupin NSP isolate to examine the effects of NSP inclusion level on the digestion of nutrients and microbial activity in growing pigs.

Four sorghum-based diets (~0.47 g available lysine/MJ DE) were formulated to contain 0, 5, 10 or 15% NSP from a lupin NSP isolate (diets 1-4 respectively). The NSP levels were chosen to reflect the NSP contribution from whole lupins *(L. angustifolius)* if they were included in diets at 0, 12, 24 or 36%, respectively. Casein was used as an additional protein source and celite added as an acid-insoluble ash marker. Nutrient digestibility and digesta viscosity were determined with digesta from 16 male pigs (40-45 kg) fitted with simple T-piece ileal cannulas, based on a randomised block design (four pigs/diet). At the end of the experiment, exactly one hour after feeding, the pigs were euthanased and samples from the small intestine (SI), caecum and large intestine (LI) collected for ATP analysis which is used as an indicator of microbial activity.

		Digestibility (proportion of total)				ATP (μg/g digesta)		
Diet	Viscosity (mPa.s)	Energy	Lysine	NSP	DM	SI	Caecum	LI
1	1.43^{a}	0.85^{a}	0.91^{a}	0.05	0.81^{a}	0.72	4.78	1.97
2	2.28^{a}	0.71^{b}	0.90^{a}	0.12	0.66^{b}	0.61	5.73	1.66
3	2.33^{a}	0.50^{c}	0.82^{b}	-0.31	0.37^{c}	0.88	7.14	1.98
4	4.89^{b}	0.58^{c}	0.85^{b}	-0.07	0.52^{d}	0.47	5.45	3.38
Diet	***	***	**	NS	***	NS	NS	NS
SEM	0.304	0.031	0.014	0.104	0.030	1.185	1.185	1.185

SEM= mean standard error; DM= dry matter; NS= not significant; **= P<0.01; ***= P<0.001
Values in a column with different superscripts differ (P<0.05)

Dietary lupin NSP contributions exceeding 10% resulted in a significant increase in digesta viscosity and a decrease in the ileal digestibility of energy, lysine and dry matter. NSP digestion was minimal and there was no significant difference between diets. NSP inclusion levels had no significant effect on the ATP content of the digesta in any part of the digestive tract.

Increased digesta viscosity appears to cause a reduction in the ileal digestibility of lysine and energy when dietary lupin NSP exceeds 10%. This may be due to interference with the action of digestive enzymes. Lupin NSP does not effect microbial activity in the digestive tract.

VAN BARNEVELD, R.J. and HUGHES, R.J. (1994). In 'Proceedings of the First Australian Lupin Technical Symposium' p. 49, eds M. Dracup and J. Palta (West Australian Department of Agriculture: Perth).

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