

INFLUENCE OF A SOLUBLE NON-STARCH POLYSACCHARIDE (NSP) ON THE ILEAL DIGESTIBILITY OF AMINO ACIDS BY GROWING PIGS

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It is well established that the soluble non-starch polysaccharide (NSP) components of feed ingredients can have anti-nutritive effects in poultry diets (Choct et al. 1992). The NSP increases the viscosity of the digesta causing an inhibition of digestion of starch, protein and fat in the small intestine and impaired bird performance. The following study was undertaken to determine 1) whether protein digestion in the growing pig is depressed by viscous NSP (guar gum) and 2) whether the pig can adapt to high levels of viscous NSP in the diet.

Four sorghum-based diets (~0.47 g available lysine/MJ DE) were formulated to contain 0, 20, 40 or 60 g guar gum/kg respectively. Casein was used as an additional protein source and celite added as an acid-insoluble ash marker. Diets were allocated to 16 male pigs (40-45 kg) fitted with simple T-piece ileal cannulas, based on a randomised block design (four pigs/diet). Diets were offered dry, twice daily for two consecutive seven-day-periods with two days of continuous digesta collection at the end of each period. The ileal digestibility of essential amino acids in the diets (except methionine; %) were as follows:

NSP (g/kg)....	0		20		40		60		Statistics				
	1	2	1	2	1	2	1	2	D*C	Diet	C	Linear	SEM
Threonine	79	85	71	77	64	83	62	79	NS	NS	**	*	4.1
Valine	85	89	82	84	74	87	70	85	NS	NS	***	**	2.8
Isoleucine	86	89	81	83	73	87	69	85	*	NS	***	**	2.5
Leucine	85	88	80	82	69	86	64	85	*	NS	***	**	3.3
Phenylalanine	86	89	83	84	72	87	68	86	*	NS	***	**	3.0
Lysine	87	91	85	87	81	90	78	88	NS	NS	**	*	2.5
Histidine	85	89	80	82	72	87	69	85	NS	NS	***	**	3.0
Arginine	85	89	82	85	78	90	71	86	NS	NS	**	*	3.1

D, Diet; C, Collection; NS, Not significant; *, P<0.05; **, P<0.01; ***, P<0.001

There was a significant increase (P<0.01) in digestibility of all amino acids in diets containing guar gum between collection 1 and 2. Significant diet x collection interactions (P<0.05) occurred for isoleucine, leucine and phenylalanine. All amino acids showed a significant linear decrease (P<0.05) in digestibility with increasing levels of guar gum for the first collection.

The reduction in the anti-nutritive activity of guar gum at collection 2 may be due to the development of microflora in the small intestine which can cleave the guar gum and hence reduce its viscosity and anti-nutritive activity. Guar gum may also promote increased flow of pancreatic juice, enzymes and endogenous N. The results suggest that future digestibility studies investigating the effects of soluble NSP should follow an adaption period with diets high in soluble NSP. The results also suggest that diets high in soluble NSP from legumes and cereals may be limiting the efficiency of production of growing pigs.

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