UTILIZATION OF ILEAL DIGESTIBLE ISOLEUCINE FROM DIFFERENT PROTEIN SOURCES BY GROWING PIGS

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Previous work indicated that values for the ileal digestibility of lysine, threonine, methionine and tryptophan in heat-damaged proteins were unsuitable in formulating diets (see Andersen and Batterham 1991). It appeared as if these four amino acids were digested and absorbed in a form/s that were inefficiently utilized. The aims of this experiment were to determine 1) whether ileal digestible values for isoleucine were similarly affected and 2) the retention of ileal digestible isoleucine by growing pigs.

Three sugar-based diets containing 370 g/kg cottonseed meal (CSM), 350 g/kg lupinseed meal (LSM), or 180 g/kg soyabean meal (SBM) as the only source of protein were formulated to 0.23 g ileal digestible isoleucine/MJ digestible energy (DE). Other essential amino acids were added to ensure a 30% surplus relative to isoleucine. An additional three diets were supplemented with free isoleucine to demonstrate that isoleucine was in fact limiting in the first three diets. The pigs were fed frequently, at a feeding scale of three times maintenance, over the 20-45 kg growth phase. The pigs were then slaughtered and the nitrogen content in the empty bodies determined. Isoleucine content in the protein of the empty bodies was estimated from previous determinations at 3.3 g/16 g N.

	Protein source			SEM
	CSM	LSM	SBM	
Gain (g/day)	590	613	594	13.0
Feed conversion ratio	2.4	2.1	2.1	0.04
Crude protein deposition (g/day)	84	87	91	2.3
Estimated isoleucine retention: ileal digestible isoleucine intake	0.63	0.63	0.67	0.014

Growth rates, protein deposition and the estimated retention of ileal digestible isoleucine were similar for pigs given all three diets.

These results indicate that 1) ileal digestible isoleucine from cottonseed meal is utilized with similar efficiency as isoleucine in soyabean meal and 2) the availability of isoleucine in these meals is unaffected by processing conditions. This is in contrast to lysine, methionine, threonine and tryptophan. It suggests that isoleucine, a branch chain amino acid, may be less susceptible to damage from processing conditions than the other amino acids. Information on the availability of all the essential amino acids from different protein concentrates is therefore needed for dietary formulations.

The similar retentions of isoleucine from lupinseed and soyabean meals also indicates that its availability is similar in these meals. This contrasts to lysine, where the availability is 0.57 in lupinseed meal and 0.88 in soyabean meal (Standing Committee on Agriculture, 1987). The present response indicates that there was no growth depressing factor in the lupinseed meal, but that the availability of individual amino acids within the meal may vary.

ANDERSEN, L.M. and BATTERHAM, E.S. (1991). In "Manipulating Pig Production III", p. 112, ed. E.S. Batterham. (Australasian Pig Science Association: Attwood).

STANDING COMMITTEE ON AGRICULTURE (1987). 'Feeding Standards for Australian Livestock Pigs' (Standing Committee on Agriculture: East Melbourne).

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