

Digestibility of amino acids in pigs fed cottonseed or soybean meal is lower when assessed by the slaughter technique using carbon dioxide stunning instead of halothane anaesthesia

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Collection of ileal digesta under halothane anaesthesia prior to euthanasia is an accurate technique for measuring amino acid digestibilities (1). However, the carcass of the anaesthetised pig is unsuitable for human consumption. An alternative technique, assessed in the present study, which does not render the carcass unsaleable is the commercial slaughter technique which uses carbon dioxide (CO₂) stunning combined with careful removal of the ileal digesta during evisceration.

Twenty-four male pigs (37.3 ± 2.7 kg) were housed individually and randomised to either cottonseed meal (CSM) or soybean meal (SBM) diets. The diets contained 40% of the protein meals in a wheat starch:sucrose (1:1) base with chromium oxide as an indigestible marker. Pigs were acclimated to their new diets over a 3 d period and on d 4 through to d 14 were offered 1800 g/d of the diets. Diets were offered 3 meals/d from d 4 to 12 and 8 meals/d on d 12 to d 14. After the eighth meal on d 14, half of the pigs were anaesthetised with halothane and the remaining pigs were CO₂ stunned and commercially slaughtered. Ileal digesta was collected from a 150 cm portion of the terminal ileum of each pig and analysed for amino acids and marker.

Digestibility (%)	Carbon dioxide		Halothane		sed	Significance ^{1,2}
	CSM	SBM	CSM	SBM		
Threonine	30.4	50.7	50.8	64.5	9.22	D*; S*
Valine	42.8	52.2	62.6	69.6	8.56	S**
Methionine ³	45.5	60.4	63.3	79.6	6.74	D**; S***
Isoleucine	37.0	60.1	60.2	72.1	7.94	D**; S**
Leucine	36.8	59.4	59.9	71.2	8.19	D**; S**
Lysine	27.5	59.7	55.4	75.3	8.01	D***; S***
Tyrosine	34.8	56.2	56.1	69.0	9.49	D*; S*
Phenylalanine	60.6	62.5	74.5	72.7	5.84	S**
Histidine	48.5	55.6	66.5	73.8	6.93	S**

¹D= Diet; S= Slaughter techniques; ²*= P<0.05; **= P<0.01; ***= P<0.001; ³not acid-hydrolysed

These data indicate that ileal digestibility of amino acids in CSM and SBM was lower when digesta was collected using the CO₂ stunning technique than when digesta was obtained under halothane anaesthesia. Sloughing of intestinal cells, which have significant amounts of protein, during the slaughter process post-CO₂ stunning may be responsible for the poor apparent amino acid digestibility. Furthermore, under both halothane anaesthesia and CO₂ stunning techniques, the amino acid digestibility of CSM was consistently lower than SBM. The CO₂ stunning technique is not recommended for studies of amino acid digestibility.

1. Moughan PJ, Smith WC. A note on the effect of cannulation of the terminal ileum of the growing pig on the apparent ileal digestibility of amino acids in ground barley. *Anim Prod* 1987;4:319-21.