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Effect of chestnut tannin on the fermentability of soyabean meal nitrogen in the rumen

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Natural tannins combine with proteins to form very stable complexes, protecting them against bacterial deamination in the rumen (Zelter *et al,* 1970). In the present study, we used tannins extracted from chestnut wood shavings which were autoclaved at 110°C at a pressure of 2 bars. The solution of tannins (4% in dry matter) was then atomized.

Using an *in vitro* technique (Jouany and Thivend, 1986) the fermentability of soyabean meal (SM) nitrogen was calculated by comparing the production of N-NH_3 over a 6-h period in the fermentors without SM with that of fermentors fed with SM. The end-products of microbial fermentation were also measured: volatile fatty acids (VFA), gases, N-NH_3 uptake by bacteria. The dry extracts containing 77% tannins were added to fermentors in powder form just before inoculating them at different doses: 0.2, 1.1 and 5.3% of SM dry matter.

Doses of 0.2 and 1.1% SM dry matter significantly decreased the fermentability of the nitrogen in the meal, but had no effect on microbial metabolites (table I). The dose at 5.3% did not decrease nitrogen fermentability any more than this, but greatly reduced the production of microbial metabolites and the ammonia nitrogen uptake by the bacteria.

In conclusion, we can assume from these results that the addition of such tannins to a diet will reduce the fermentability of protein nitrogen in the rumen. Consequently, the flow of dietary amino acids into the duodenum of ruminants could be increased, as well as the total duodenal amino acid flow if N-NH_3 requirements for microbes are met by supplementation of urea or ammonia salts.

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Table I. Effect of tannins on nitrogen fermentability and on the major end products of rumen fermentations ($n = 8$).

Parameters	*Tannin extracts (% DM soyabean meal)*				*SDM* [1]
	0	*0.2*	*1.1*	*5.3*	
Fermentability of soyabean meal nitrogen *	36.8 [a]	14.7 [b]	5.7 [c]	6.8 [c]	5.3
Production of total VFA **	69.9 [a]	67.0 [a]	64.7 [a]	37.4 [b]	3.4
Production of gases ***	2405 [a]	2360 [a]	2201 [a]	2033 [b]	156
N-NH_3 [2] uptake by bacteria (mg/ferm/6 hr)	168.9 [a]	157.5 [a]	147.7 [a]	94.0 [b]	11.1

Means with different superscripts on the same line are significantly different ($P < 0.05$); [1] standard deviation of means; [2] ammonia nitrogen; * % of N fermented for 6 hr; ** mMol/fermentor/6 hr; *** ml/fermentor/6 hr.