

133. Effects of different purified condensed tannins on ruminal fermentation *in vitro* (Einfluss unterschiedlicher gereinigter kondensierter Tannine auf die Pansenfermentation *in vitro*). H. D. Hess*, T. T. Tiemann, C. E. Lascano and M. Kreuzer – Posieux/Calvi/Zürich

Condensed tannins from tropical shrub legumes may vary in their chemical characteristics which in turn could affect the capacity of tannins to form complexes with other molecules and hence the feeding value of tanniferous feeds (1). The present experiment was conducted to assess the effect of extracted tannins from three different widely used shrub legume species on ruminal fermentation *in vitro*.

Methods: A mixture of a tropical grass (*Brachiaria humidicola*) and a tropical herbaceous non-tanniferous legume (*Vigna unguiculata*; 2:1 on dry matter [DM] basis) was incubated alone or with the addition of increasing levels (25, 50, 75 and 100 mg/g DM) of purified tannins. Extraction of tannins was performed with an aqueous solution of acetone (700 ml/l), formic acid (5 ml/l) and ascorbic acid (5 g/l), and tannins were purified on an Sepadex LH-20 gel column. Tannins were obtained from *Calliandra calothyrsus* 22310 (CIAT accession number), *C. calothyrsus* 22316, *Flemingia macrophylla* 17403 and *Leucaena leucocephala* 734. Triplicate samples of the test mixtures were incubated for 168 h employing the gas transducer technique (2). The solid fermentation residues were analyzed for dry matter and nitrogen content and the fermentation fluid was analyzed for volatile fatty acids.

Results: Independent of the origin of the tannins, apparent DM degradation decreased with increasing level of tannin addition. However, the extent of the decrease varied ($P < 0.05$) among tannins. The largest decrease was observed with tannins from *Calliandra* 22310, followed by tannins from *Calliandra* 22316 and *Flemingia* 17403. The smallest decrease was found with tannins from *Leucaena* 734. The apparent crude protein (CP) degradation was drastically decreased with increasing level of tannins ($P < 0.001$). With the highest tannin level, CP degradation was almost completely inhibited. Although the effect of tannins on CP degradation was more pronounced than the effect on DM degradation, the differences among types of tannins were smaller. The decrease in CP degradation was slightly larger ($P < 0.05$) with tannins from *Calliandra* 22310 than with tannins from the remaining legumes. Concentrations of acetate, propionate and butyrate in the fermentation fluid decreased ($P < 0.001$) with increasing tannin addition and the decrease varied with the origin of the tannins. Acetate concentration was less affected by tannins from *Flemingia* 17403 than by any other tannins ($P < 0.05$). Propionate concentration was higher ($P < 0.05$) with tannins from *Flemingia* 17403 or *Leucaena* 734 than with tannins from both *Calliandra* accessions. Butyrate concentration was highest ($P < 0.05$) with tannins from *Flemingia* CIAT 17403, intermediate with tannins from *Leucaena* 734 and lowest ($P < 0.05$) with tannins from both *Calliandra* accessions.

Conclusions: These results confirm that there exist differences in the effects of condensed tannins from different legume species on ruminal fermentation. The results further indicate that tannins obtained from the tested accessions of *Leucaena* and *Flemingia* were less effective in decreasing ruminal nutrient degradation and volatile fatty acid production than tannins from both *Calliandra* accessions. There were even clear differences between the two accessions of *Calliandra*, indicating plant genotype effects apart from known site and climate effects.

- 1) LASCANO, C., AVILA, P. and STEWART, J. S. O. (2003): Arch. Latin. Prod. Anim. 11:21–28.
- 2) THEODOROU, M. K., WILLIAMS, B. A., DHANOA, M. S., McALLEN, A. B. and FRANCE, J. (1994): Anim. Feed Sci. Tech. 48:185–197.

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