TANNINS REDUCE IN VITRO DRY MATTER DIGESTIBILITY OF TROPICAL LEGUMES

R. O. BALOGUN, R. J. JONES*, B. J. HOSKING and J. H. G. HOLMES

Tannins are a group of compounds which include hydrolysable and condensed forms (CT), the latter being either extractable (ECT) or bound to protein or fibre. Tannins may interfere with ruminal fermentation and digestion to improve or reduce protein supply. Polyethylene glycol (PEG) binds to CT and dissociates or prevents formation of tanninprotein complexes (Jones and Mangan 1977) and can be used experimentally to eliminate the effect of CT. Four tropical legume shrubs (*Acacia currassavica, Calliandra calothyrsus, Leucaena pallida* and *Lysiloma watsonii)* and one tropical grass which contains no condensed tannin (Hamil grass, *Panicum maximum*) were oven-dried or freeze-dried after harvest. In vitro digestibilities were measured by the rumen liquor-pepsin and the pepsin-cellulase methods. Polyethylene glycol was added to each sample at rates of 0, 80, 160, 320 and 640 mg/g DM.

Pepsin-cellulase digestibilities of freeze-dried samples, without PEG, were: *Panicum* 76%, *Acacia* 60%, *Calliandra* 57%, *Leucaena 59%* and *Lysiloma* 33% ($P<0.001$). Digestibility of *Panicum* was not affected by drying method or PEG. Freeze-dried legumes were more digestible than oven-dried ($P<0.001$) and PEG increased in vitro digestibility ($P<0.001$), to 74% for*Acacia,* 73% for *Leucaena* and 45% for *Lysiloma* at 80 mg/g inclusion and to 73% for *Calliandra* at 160 mg/g inclusion. Higher levels of PEG caused no further significant increases in digestibility. Digestibility by rumen liquor-pepsin was lower for all legumes ($P<0.001$), being only 16% for *Lysiloma* without PEG. The response to addition of PEG was significantly correlated with ECT measured by the butanol-HCl ($r=0.71$; $P<0.001$) and vanillin methods ($r = 0.55$; $P<0.001$) but not with protein-bound CT and poorly with fibre-bound CT ($r=0.29$; $P<0.0l$)

The response to PEG indicates the direct effect of tannins on DM digestibility; while tannins may enhance protein nutritional status, energy yield is significantly reduced. The action of CT appears to be due more to the effect of ECT, presumably on bacterial enzymes, than of CT which are bound to protein and fibre. Laboratory assessment of feeding value of tannin-containing species may yield different results depending upon level and nature of tannin, drying method and in vitro technique employed.

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Department of Agriculture, University of Melbourne, Parkville, Victoria 3052
*CSIRO Division of Tropical Crops and Pastures, Davies Laboratory, Aitkenvale, Queensland 4814