POST-RUMINAL INFUSION WITH POLYETHYLENE GLYCOL DOES NOT ENHANCE NITROGEN DIGESTION IN SHEEP FED MULGA

S.M. MILLER[AB] and D.A. PRITCHARD[AC]

[A]Dept of Primary Industries, Charleville, Qld 4470
[B]Present Address: Dept of Agriculture, Stanley, Falkland Islands
[C]Present Address: Uralla, NSW 2358

Compounds that have abilities to chemically bind condensed tannins (CT) are beneficial when used as oral supplements for sheep fed mulga (*Acacia aneura*; Pritchard *et al.* 1992, Miller *et al.* 1997). In particular, polyethylene glycol (PEG) increases the quantity of protein available for digestion by preventing CT-protein complexes forming, and by releasing protein from pre-formed complexes. In order to better understand the effects of PEG on protein digestion, the sites at which PEG is effective *in situ* need to be identified. This experiment evaluated the post-ruminal effect of PEG on nitrogen (N) digestion by comparing duodenal infusions of PEG with control sheep receiving infusions of water. A further comparison was made using sheep infused with a protein source equivalent to the amount of protein estimated to be released from CT-protein complexes by the PEG supplement (Pritchard *et al.* 1992).

Six mature merino wethers fitted with duodenal cannulae were placed in individual metabolism cages, and fed *ad lib* mulga leaves daily. In addition, each sheep received a daily mineral supplement orally, providing 1.5 g/day N, 1.5 g/day phosphorus, and 1.1 g/day sulphur. After a 10 day acclimatisation period, the sheep were ranked on daily dry matter (DM) intake for the period, and allocated to three treatment groups of equal size. Thereafter, each group received continuous infusions of either water (control, 50 mL/day), PEG (24 g/day in 50 mL of water), or a supplement containing an equivalent amount of protein to that estimated to be released by PEG from CT-protein complexes (casein, 20 g/day in 50 mL of water). Infusions continued for 10 days, and faeces and urine were collected daily. N concentration was determined in feed, faeces and urine using the Kjeldahl technique (Faichney and White 1983).

Table 1. Dry matter intake (DMI), apparent nitrogen (N) digestibility and balance, and dry matter (DM) digestibility in sheep fed mulga and infused duodenally with water (control), casein or polyethylene glycol (PEG)

	Control	PEG	Casein	s.e.m.
DMI ($g/kg^{0.75}$)	34.0	34.4	23.7	2.94
N digestibility ($g/kg^{0.75}$)	41.3	25.5	41.9	4.69
N balance ($mg/kg^{0.75}$/day)	63	-57	163	99.7
DM digestibility ($g/kg^{0.75}$)	34.5	26.1	29.5	3.76

Unlike previous supplementation studies in which PEG was administered orally, providing PEG post-ruminally did not enhance DM intake or N digestion. Although preliminary in nature, this result suggests that the major effect of PEG in enhancing N digestion occurs before the duodenum. Increases in N digestion observed in sheep given PEG orally may therefore be attributed to increased microbial digestion of protein released from CT-protein complexes in the rumen.

We are grateful for assistance provided by P. Martin and M. Martin, and financial assistance provided by the wool growers of Australia, through a grant from the International Wool Secretariat.

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