

EFFECT OF POLYETHYLENE GLYCOL AND POTASSIUM PERMANGANATE ON *IN-VITRO* FERMENTATION AND RUMEN DEGRADATION CHARACTERISTICS OF TANNIN RICH TREE FODDERS

N.D. SENEVERATHNE, V.P. JAYAWARDENA AND A.N.F. PERERA

Department of Animal Science, Faculty of Agriculture, University of Peradeniya, Peradeniya

Seasonal availability and fluctuating quality of traditional forages are two main constraints for ruminants' production in Sri Lanka. Tree fodders are valuable supplementary feed resources to overcome these constraints. However, some tree fodders contain high concentrations of tannins that can reduce the digestibility of protein and organic matter in the diet and can limit the availability of nutrients for ruminants. Addition of tannin binding agents such as potassium permanganate (KMnO₄) and polyethelene glycol (PEG) can be an attractive option to enhance the feeding value of the tannin-rich tree fodders. The objective of this study was to evaluate the *in-vitro* fermentation and rumen degradation characteristics of tannin-rich tree fodders by incubating them in the presence and absence of tannin-binding agents, PEG and KMnO₄

Leaf samples (1 kg) of *Artocapus heteropilus* (Jak), *Leucaena leucocephala* (Ipil Ipil) and *Caliandra callothyrsus* (caliandra) were obtained from the field of the Department of Animal Science, University of Peradeniya. The samples were dried (at 60 °C for 48 hours), ground and passed through 1 mm sieve. Their proximate composition and the cell wall components were determined. The forage samples (250 mg) were incubated with 20 ml buffered rumen fluid in the absence and presence (DM basis) of either 10% PEG, 20% PEG, 10% KMnO₄ and 20% KMnO₄. The incubation experiment was carried out in 100ml calibrated glass syringes. The incubations were performed in a water bath set at 39°C in four repeated runs (using duplicates/run). After 24 hours of incubation, gas production was recorded and *in-vitro* apparent organic matter degradability (IVOMD) was determined. The data were analyzed using GLM procedure of SAS. Differences between means in the absence and presence of PEG and KMnO₄ treatments on net gas production and IVOMD were compared using least significant difference (LSD) test.

The *in- vitro* gas production is a net result of fermentation of substrates during incubation and the indirect gas produced due to the buffering of short chain fatty acids. The net gas production values observed in the present study are quite low. These low values of *in-vitro* gas production could be due to the high concentration of structural carbohydrates, lignin and tannins present in these feeds. Addition of PEG or KMnO₄ appeared to increase ($P<0.05$) *in-vitro* gas production suggesting that these tannin binding agents can improve the rumen fermentation of tannin rich feeds. In the absence of tannin complexing agents, the IVOMD varied from 28.20% (*Leucaena leucocephala*) to 47.84% (*Artocapus heterophylus*). With the addition of PEG and KMnO₄, IVOMD increased in all tree fodders. An increase in the level of inclusion of PEG or KMnO₄ from 10% to 20% increased the IVOMD in all three-fodder species. The highest effect ($P<0.05$) was observed by adding 20% PEG. These results suggest that addition of PEG or KMnO₄ as tanning binding agents can increase the organic matter digestibility in ruminants fed with tanniferous tree fodders.