

In sacco degradation of eight tropical forages

BP Widyobroto, S Padmowijoto, R Utomo, M Soejono

Faculty of Animal Husbandry Gadjah Mada University, Yogyakarta 55281, Indonesia

The experiment was conducted to compare the protein degradation of eight Indonesian tropical forages in the rumen.

Three adult cows weighting about 350-400 kg, and fitted with a rumen cannula were used. They were fed at maintenance level with *Pennisetum purpureum* (CP 9 %) and concentrate (CP 17 %) in ratio 70 : 30. Nitrogen degradation of *Pueraria phaseoloides* (Pp), *Centrosema pubescens* (Cp), *Calopogonium muconoides* (Cm), *Gliricidea sepium* (Gs), *Leucaena leucocephala* (Ll), Peanut straw (Ps), Soybean straw (Ss) and Cassava straw (Cs) were studied according to the method described by Michalet Doreau *et al* (1987, Bull Tech, CRZV Theix, INRA, 69, 5-7) with 6 replications for each feed. The CP concentrations were 17.7 %, 22.0 %, 14.7 %, 19.1 %, 22.3 %, 14.5 %, 14.1 % and 27.9 % respectively. Nitrogen degradations kinetics were adjusted to the single exponential model of Ørskov and McDonald (1979, J Agric Sci, Camb, 92, 499-503) as follows : $D(t) = a + b(1 - \exp^{-ct})$. The effective protein

degradation was calculated for a rumen outflow rate (kp) of 0.06/h by using the formula $DT = a + bc / (c + kp)$.

The results showed that a, b, c parameters and DT were significantly different ($P < 0.01$). The Gs had the lowest DT (50.08 %) and the degradation rate was slow ($c = 0.09$), it might be explained by the content of condensate-tannin binds carbohydrate and protein which are very stable and insoluble complex compounds. DT of Ps and Cm were not significantly different (65.06 % vs 65.75 %). However, DT of these two forages was significantly higher ($P < 0.01$) compared to the other forages. Ps and Cs have high DT, this might be explained by the high rapidly soluble fractions (a) and degradation rates (c). The results with Ll, Gs and Ps also confirmed the DT reported by Hartutik *et al* (1995, Proceeding ISTAP, in press).

These results show that protein degradation varies greatly among tropical forages.

Model parameters	a (%)	b (%)	c (%/h)	DT (%)
<i>Pueraria phaseoloides</i>	21.20 ^e	66.35 ^b	11.76 ^{bc}	65.06 ^c
<i>Centrosema pubescens</i>	27.24 ^d	48.93 ^d	10.96 ^{cd}	58.87 ^e
<i>Calopogonium muconoides</i>	34.34 ^c	52.58 ^d	8.96 ^d	65.75 ^c
<i>Gliricidea sepium</i>	4.58 ^f	75.33 ^a	9.34 ^d	50.08 ^f
<i>Leucaena leucocephala</i>	19.40 ^e	68.92 ^b	9.53 ^d	61.67 ^d
Peanut straw (<i>Arachis Hypogaea</i>)	46.92 ^a	41.27 ^e	13.92 ^b	75.65 ^a
Soybean straw (<i>Glycine max</i>)	41.86 ^b	43.05 ^e	13.65 ^b	71.65 ^b
Cassava straw (<i>Manihot spp</i>)	30.01 ^d	30.06 ^c	17.07 ^a	75.54 ^a

Means with different superscripts on a same row were significantly different ($P < 0.01$).