

In situ ruminal dry matter and crude protein degradation of various forbs

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Forb plants contribute in great proportion of protein and energy to small ruminants in northeastern Mexico (Ramirez *et al*, 1993, J Appl Anim Res, 3, 113-122). However, the nutritional value of many of the palatable forbs is still unknown. This study was conducted with the objectives to determine the nutritional profile, effective degradability and rate of digestion of dry matter (DM) and crude protein (CP) of 13 commonly available native forbs.

Forbs evaluated were *Coldenia greggii*, *Dyssodia pentachyata*, *Zephyranthes arenicola*, *Cynanchum barbigerum*, *Palafoxia texana*, *Lantana macropoda*, *Ruellia corzoi*, *Oxalis dichandraefolia*, *Dalea pogonatera*, *Sida filicaulis*, *Happlopapus spinulosus*, *Heliotropium angiospermum* and *Polianthes maculosa*. Duplicate nylon bags (pore size of 52 μ) containing 3 g of each of the 13 forbs were incubated for 0, 4, 8, 12, 24, 48 and 72 hours in two mature sheep fitted with ruminal cannulae. Dry matter and CP remaining after specified incubation times were determined. Residual after 72 hours incubation was subtracted from the fractional residues at all times, and the natural log of these corrected fractions plotted against time, the anti log of the intercept is the slowly degraded fraction (B) and the additive inverse of the slope is the rate of degradation (C) of fraction B. The rapidly degraded fraction is expressed as A. Effective degradability (ED) of DM and CP was calculated as follows $ED = A + [(B \times C) / (C + k_1)]$. Where k_1 was the

passage rate of 0.025/h (Singh *et al*, 1989, J Dairy Sci, 72, 3233-3239).

The CP (%) in forbs varied from 10 (*D. pentachyata*) to 21 (*Z. arenicola*), ash (%) content ranged from 11 (*D. pogonatera*) to 27 (*R. corzoi*), cell wall (%) in forage of forbs varied from 24 (*P. maculosa*) to 54 (*D. pentachyata*), and acid detergent fiber (%) ranged from 20 (*P. maculosa*) to 42 (*C. greggii*). Effective degradability of DM (EDDM, %) was highest ($P < 0.05$) in *P. maculosa* (91), *Z. arenicola* (85), *C. barbigerum* (75), *P. texana* (76) and *S. filicaulis* (74). Dry matter digestion rate (/h) was also highest ($P < 0.05$) in *P. maculosa* (0.17), *Z. arenicola* (0.13), *P. texana* (0.11), *C. barbigerum* (0.09), *S. filicaulis* (0.08) and *D. pentachyata* (0.08). Ash and acid detergent fiber content in the forage affected negatively ($r = -0.43$, $P < 0.05$; $r = -0.95$, $P < 0.01$, respectively) EDDM. Effective degradability of CP (EDCP, %) was highest ($P < 0.05$) in *P. maculosa* (91), *Z. arenicola* (91), *S. filicaulis* (83) and *C. barbigerum* (80). Crude protein digestion rate (/h) was highest in *P. maculosa* (0.17), *S. filicaulis* (0.12), *Z. arenicola* (0.11) and *C. barbigerum* (0.11). Ash and acid detergent fiber in the forage affected negatively ($r = -0.57$, $P < 0.01$; $r = -0.77$, $P < 0.01$, respectively) EDCP.

In conclusion, Forbs such as *P. maculosa*, *Z. arenicola*, *C. arenicola* and *S. filicaulis* are good energy and protein sources for small ruminants under grazing conditions.