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Energy or nitrogen supply to sheep fed *Acacia cyanophylla* Lindl. leaves-based diets : effects on intake and digestion

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Recent works done in our laboratory showed that the nutritive value of *Acacia cyanophylla* Lindl. leaves is low. High content of condensed tannins in acacia (3 to 7 %) seems to be the causative factor.

In this paper, we report preliminary results of a study dealing with the effect of energy (spineless cactus) or nitrogen (urea) supply on intake and digestion by sheep fed acacia-based diets. Four diets were tested according to a 4x4 Latin square design on rumen fistulated sheep (initial liveweight 47 kg). All diets included air-dried acacia leaves *ad libitum*, 176 g DM barley, 30 g mineral and vitamin supplement (control, D1) and supplemented with 15 g urea (D2), or 300 g DM cactus (D3), or 15 g urea and 300 g DM cactus (D4). Each experimental period lasted 25 days (15 days for adaptation and 10 days for measurements). Diet digestibility was measured by total faecal collection technique. Rumen fluid was sampled before morning meal and thereafter at 2, 4 and 8 h and analysed for pH, ammonia nitrogen ($N\text{-}NH_3$), and volatile fatty acids (VFA). Acacia degradability in the rumen was measured by the nylon bag technique (Ørskov *et al*, 1980, Trop Anim Prod, 5, 195-213). Two grams samples of acacia (dried at 50°C and ground to pass through 3 mm screen) were introduced in nylon bags (6.5 cm x 9 cm, pore size 50 µm). DM and nitrogen disappearance rates of incubated acacia were fitted against incubation times (4, 8, 16, 24, 48, 72 and 96 h) by the model of Ørskov and McDonald (1979, J Agric Sci, 92, 499-503).

Voluntary intake of acacia is low for all diets. It was not affected by urea supply (D2) but tended to decrease with cactus supply (D3). Highest intake of acacia was recorded with D4. Diet digestibilities of OM and CF were not significantly different ($P>0.05$). As expected, CP digestibility of the diet increased by urea supply. Digestible OM intake for D1 was lower than the reported value needed for adult sheep (liveweight, 40 kg) maintenance (23 g/kg $LW^{0.75}$; INRA, 1978). It was not affected by urea supply (D2) but increased when cactus was supplied alone (D3) or with urea (D4). Such increases may be explained by the low proportions of acacia in the diets associated with increases of total DM intakes. Urea supply (D2 and D4) resulted in an increase of $N\text{-}NH_3$ concentrations in the rumen fluid but did not affect neither the pH nor microbial activity measured by VFA concentrations and *in sacco* degradability of acacia. Likewise cactus supply (D3) did not affect the microbial activity.

It can be concluded that neither cactus (source of energy) nor urea (source of nitrogen) is an efficient supplement for improving the nutritive value of *Acacia cyanophylla* Lindl. leaves.

Diets	D1	D2	D3	D4	SEM
DM intake (g/kg $LW^{0.75}$)					
acacia	35.2^{ab}	35.0^{ab}	29.0^{b}	40.2^{a}	1.1
diet	46.0^{c}	45.8^{c}	57.3^{b}	68.3^{a}	1.1
Acacia/diet (%)	76.5	76.4	50.6	58.8	-
Diet digestibility (%)					
OM	51.0	52.9	53.8	54.4	0.7
CP	31.9^{b}	52.5^{a}	39.1^{b}	43.3^{b}	2.4
CF	28.3	32.7	27.8	32.5	2.0
Digestible OM intake (g/kg $LW^{0.75}$)	21.2^{c}	21.5^{c}	26.2^{b}	31.7^{a}	0.62
Rumen parameters					
pH	6.86	6.82	6.86	6.81	0.01
$N\text{-}NH_3$ (mg/100 ml)	8.7^{b}	13.3^{a}	6.1^{b}	15.3^{a}	0.6
Total VFA (mmol/l)	62.0^{b}	61.1^{b}	66.1^{b}	83.8^{a}	2.5
C_2/C_3	6.0^{a}	5.4^{a}	3.4^{b}	4.0^{b}	0.1
In sacco degradability of acacia (a + b, %)					
dry matter	47.0	45.0	47.5	48.9	1.3
nitrogen	24.4	28.7	30.1	32.7	1.2

$^{a, b, c}$: data in the same line with different superscripts differ ($P<0.05$)