

Tannins in *Acacia cyanophylla* Lindl. leaves : their effect on digestion by sheep fed alfalfa hay-based diets

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Acacia cyanophylla Lindl. is a leguminous fodder tree widely spread in Tunisia. It is characterised by a relative high crude protein content (12-15 % DM). It is reported in the literature (Reed *et al.*, 1990, Anim Feed Sci Technol, 30, 39-50 ; Ben Salem and Nefzaoui, 1993, 7th Meeting of the FAO European Sub-Network on Mediterranean Pastures and Fodder Crops, April 21-23, Crete-Greece, 118-121) that nitrogen in acacia is poorly digested by animals, probably due to its condensed tannins. In this experiment, the effect of increasing amounts of acacia on intake and digestion by sheep was studied.

Five sheep fitted with a permanent rumen cannula were housed in individual crates and each received 700 g DM of alfalfa hay and increasing amounts of air-dried *Acacia cyanophylla* leaves (0, 75, 150, 300 g DM or *ad libitum*). The five dietary treatments were tested according to a 5x5 Latin square design. Each diet was fed over 25-day periods in which 15 days were for dietary adaptation and 10 days for measurements. Diets were daily distributed in two equal meals, at 09.00 and at 17.00 h. Digestibility was measured by total faecal collection. Fermentation parameters (pH, ammonia nitrogen (N-NH₃)) in the rumen were measured on rumen liquid withdrawn for two consecutive days before (0 h) and 2, 4 and 8 h after feeding. Oat hay dry matter and soybean meal nitrogen degradabilities in the rumen were assessed by the nylon bag technique (Ørskov

et al., 1980, Trop Anim Prod, 5, 195-213).

Acacia leaves had high crude protein (14 % DM), lignin (ADL, 16 % DM) and condensed tannins (4.5 % DM catechin equivalent) contents as compared to alfalfa hay (17.6 and 0.1 respectively). Fibre bound nitrogen (N-ADF) in acacia leaves is about 20 % of total nitrogen. Acacia supply had no detrimental effect on diet intake. Voluntary intake of acacia was about 600 g DM. Increasing the amount of acacia to 300 g DM/day or more decreased organic matter (OM), crude protein (DP) and neutral detergent fibre (NDF) digestibilities. N-NH₃ concentration in rumen fluid was reduced when acacia was offered *ad libitum*. Cellulolytic activity decreased when the amount of acacia reached 300 g DM/day. However, proteolytic activity decreased slightly only when acacia was offered *ad libitum*. Such a decrease was not high enough to lower the N-NH₃ concentration. Acacia voluntary intake was relatively high when sheep received a good quality roughage (alfalfa hay). This was not the case with poor quality roughages (straw) as reported by Reed *et al.* (1990) and Ben Salem and Nefzaoui (1993). Therefore and in order to cover animal requirements, *Acacia cyanophylla* Lindl. should be associated with a good quality roughage. In this study, digestible organic matter intakes were improved by acacia supply (26 to 40 g/kg LW^{0.75} with 0 and 600 g DM of acacia, respectively).

Acacia (g DM)	0	75	150	300	<i>ad lib</i>	SEM
Diet intake (g DM/kg LW ^{0.75})	45.1 ^c	47.3 ^c	51.3 ^c	59.6 ^b	79.2 ^a	1.67
Diet digestibility (%)						
OM	66.5 ^a	66.3 ^a	67.3 ^a	60.4 ^b	57.6 ^b	1.45
CP	68.5 ^a	68.4 ^a	66.1 ^{ab}	60.5 ^b	54.0 ^c	1.35
NDF	56.3 ^a	54.6 ^{ab}	56.6 ^a	48.0 ^b	44.2 ^b	1.84
N-NH ₃ (mg/100 ml)	17.0 ^{ab}	18.0 ^a	18.0 ^a	16.2 ^{ab}	12.9 ^b	0.93
<i>In sacco</i> degradability (a + b, %)						
dry matter	76.2 ^a	72.8 ^b	70.0 ^{bc}	68.1 ^c	63.6 ^c	0.55
nitrogen	99.9 ^a	97.7 ^{ab}	93.3 ^{ab}	93.1 ^{ab}	91.2 ^b	1.38

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