Variations in nutritive values of two different desert forage plants growing in the United Arab Emirate environment

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Introduction Forage plants in desert environments have to withstand both shortages in resources and over-grazing during most years. This variation in resource availability is associated with variation in the nutritive values of the plant species. Moreover, these differences are not only seasonal but also vary between plant parts. Variations in nutritive values in key species, therefore, need to be better understood in order to sustainably feed livestock (Abdurazak *et al*., 2000), because effective management requires adequate knowledge of the interaction between the animal, the pasture and the environment (Kassilly, 2002). Forage toxicity could, however, cause irreparable damage to production. In the Gulf region, and especially in the United Arab Emirates (UAE), *Acacia tortilis* and *Prosopis cineraria* are considered important sources of feed for livestock. The aims of the present study were (1) to improve our understanding of variations in the nutritive values of *Acacia tortilis* and *Prosopis cineraria* grown in the UAE and (2) to quantify differences between parts of the two species.

Materials and methods Three composite samples of the above-ground plant parts of each of the two species were collected from several stands around Al-Ain, UAE (25°N 56°E) between October 2003 and May 2004. Samples were kept in paper bags and brought to the laboratory shortly after collection. Analysis for P, Ni, Cr, Na, Ca, K, Mg, N and total carbohydrates was carried out following the procedure of Allen *et al*. (1974). Total nitrogen was estimated using the Kjeldahl method and ash was estimated by ignition at 500 °C for about 24 hours. Nitrogen concentration was multiplied by 6.25 to estimate crude protein (CP). A 2-way (species and plant part) analysis of variance was used to compare means.

Results Mean concentration of each element analysed and carbohydrates, ash and CP for leaves and stems for *A. tortilis* and *P. cineraria* are given in Table 1. *A. tortilis* leaves had higher Al, Ni, Cr, Na, Ca, Mg and N contents than those of *P. cineraria* ($P<0.05$). The high levels of aluminium in *A. tortilis* leaves may be a cause of toxicity in livestock. Crude protein was lowest for *P. cineraria* stems and was between 11.9 and 14.6% for *P. cineraria* stems and *A. tortilis* leaves, respectively. These results are higher than the average reported by Vercoe (1986). The pronounced variations in chemical content among these two species is an indication of how unpredictable nutrient supply can be in arid environments.

Table 1 Mean chemical composition of stems and leaves of *A. tortilis* and *P. cineraria* growing in the UAE

Species	Part	Al	P	Ni	Cr	Na	Ca	K	Mg	N	CHO	Ash	CP
Acacia	Leaf	2816	858	26.2	9.5	0.17	3.5	0.45	0.73	2.3	34.1	20.3	14.6
Acacia	Stem	257	1096	6.6	2.2	0.05	1.6	0.37	0.12	2.1	33.7	13.0	13.4
Prosop.	Leaf	584	856	7.4	3.6	0.04	2.7	0.47	0.50	1.9	37.0	17.9	11.9
Prosop.	Stem	156	761	3.0	1.4	0.11	1.1	0.59	0.20	1.1	37.0	8.5	6.9

Conclusions The results of the present study show that *A. tortilis* leaves have very high levels of aluminium which may lead to toxicity in livestock. Stems of *P. cineraria* had the lowest level of CP, which suggests that supplements may be needed if the ration contains a high proportion of stems.

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