

THE MINERAL STATUS OF CATTLE GRAZING TAGASASTE

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The mineral status of sheep and cattle in various tagasaste (*Chamaecytisus prolierus*) grazing systems in Western Australia (Edwards *et al.* 1996) has received little attention despite indications of trace element deficiencies (McGowan *et al.* 1988; Borens and Poppi, 1990; Wiley *et al.* 1994). Advice on mineral supplementation is currently based on 'typical' mineral levels in this leguminous shrub and it is essential that measures be made of the actual mineral status of animals, as in this work. The aim was to develop strategies for mineral supplementation.

As part of an experiment at 'Dunmar', near Badgingarra 230 km north of Perth, to investigate the response of tagasaste to phosphatic fertiliser, we examined the seasonal variation in mineral status of cattle with continual access to tagasaste. Twenty six, 9 month old mixed breed heifers weighing 186 ± 2.6 kg were introduced in pairs to 13 x 2.6 ha plots of tagasaste in May 1995. Blood (via venipuncture), liver (via biopsy) and saliva samples were collected from the animals in May, August and November 1995 and January and April 1996. Plasma was analysed for Mg, Ca, phosphate, sulphate, Cu and Zn, erythrocytes for glutathione peroxidase (GSHPx) activity, liver for Cu and Co levels and saliva for Na and K concentration. No mineral supplements were offered to the animals during the experiment.

Table 1. Seasonal concentrations of macro- and micro-minerals in the blood, liver and saliva of cattle grazing tagasaste (values in brackets indicate % of animals below normal range)

	Normal range	May 95	Aug 95	Nov 95	Jan 96	Apr 96	s.d.
Blood Mg (mmol/L)	0.7-1.0	0.95	0.95	0.92	0.97	0.98	0.08
Ca (mmol/L)	2.0-2.5	2.35	2.48	2.61	2.35	2.39	0.11
Phosphate (mmol/L)	1.2-2.3	2.04	2.39	2.15	1.84	1.70 (17)	0.35
Sulphate (mmol/L)	N.A.	0.59 (44)	0.76 (15)	0.41 (67)	0.42 (57)	0.29 (87)	0.29
GSHPx (IU/g Hb)	>30	N.D.	175	66	56	73	37.6
Cu (mmol/L)	0.6-1.1	0.92	0.83	0.97	0.75	0.77 (13)	0.14
Zn (mmol/L)	0.8-1.3	0.99	0.88 (31)	0.93 (21)	0.89 (23)	0.98	0.14
Liver Cu (mg/g fresh)	>15	N.D.	19.7 (27)	31.1 (16)	38.5	31.5	12.3
Co (mg/g fresh)	>0.02	N.D.	0.02 (54)	0.04 (36)	0.04 (9)	0.05	0.02
Salivary Na:K (molar ratio)	>14	N.D.	8.2 (46)	13.0 (13)	8.3 (37)	6.2 (43)	6.0

N.A. = Not Available; N.D. = Not Determined

Mean concentrations of most minerals were within normal ranges expected by the Agriculture WA Animal Health Laboratories, but in many individual animals low values for blood sulphate (based on sheep values) and zinc, liver copper and cobalt, and salivary Na:K ratio were detected. Concentrations of most minerals varied between seasons, with blood phosphate, sulphate and GSHPx peaking in August (winter).

These data are from only one site through a single year but they support the assertions of Wiley *et al.* (1994) and McGowan *et al.* (1995) that low levels of S, Na, Cu, Zn, Co and Se could result in deficiencies in animals grazing tagasaste. Further work is needed to establish whether the results apply at other sites, in different years, and when different inter-row species are available.

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