

Grazing Saltbush May Cause Mineral Deficiencies

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Saltbush (*Atriplex*) species have the potential to be a high quality feed because their foliage is high in nitrogen, moderately digestible and low in fibre (Arieli *et al* 1989). However, saltbushes accumulate large amounts (20-30% dry matter) of salt in their leaves as a method of coping with soil salinity (Beadle *et al* 1957). Most of this salt is sodium chloride (NaCl) and potassium chloride (KCl), but saltbushes also contain many other minerals, including magnesium (Mg), calcium (Ca) and phosphorus (P). While most of these minerals are present in concentrations above the recommended daily intake for sheep (SCA 1990), the complex interactions between minerals means that livestock grazing saltbush alone may be predisposed to mineral imbalances (Masters *et al* 2007).

The aim of this experiment was to assess the apparent absorption of macro-minerals in sheep fed old man saltbush (*Atriplex nummularia*). Five merino wethers (43 ± 0.7 kg) were penned individually and fed dried saltbush on its own for four weeks. The sheep were fitted with faecal harnesses for the final 10 days of the experiment. Faecal samples were collected for the final seven days. Approximately 10% of the daily faecal output was retained, weighed and oven dried at 60 °C to determine dry faecal output. Ground sub samples of saltbush and faecal samples from each animal were sent to a commercial laboratory (CSBP Soil and Plant Laboratory, Bibra Lake, W.A.) for mineral analysis. Apparent mineral digestibility was calculated as (mineral intake – mineral faecal output)/mineral intake and apparent absorption as mineral intake – mineral faecal output.

With the exception of P, the concentration of all minerals was in excess of the recommended dietary mineral concentrations (Table 1). Apparent digestion and absorption of Na, K and Cl were high, but there was a net loss of Mg, Ca and P from all sheep.

Table 1. Recommended dietary mineral concentrations (SCA 1990), mineral concentration in saltbush leaves, and average apparent digestibility and absorption (±SE) of minerals in saltbush eaten by sheep

	Recommended concentration (g/kg DM)	Concentration in saltbush (g/kg DM)	Digestibility (%)	Absorption (g/day)
Na	0.7 – 0.9	54.5	95 ± 0.9	37 ± 3.6
K	5.0	23.8	95 ± 0.9	16. ± 1.6
Cl	1.0	78.3	96 ± 0.5	54 ± 5.3
Mg	1.2	6.65	-20 ± 7.0	-0.8 ± 0.2
Ca	1.5 – 2.6	4.01	-24 ± 7.9	-0.6 ± 0.2
P	1.3 – 2.5	1.60	-46 ± 16.4	-0.5 ± 0.1

Sheep grazing saltbush for an extended period of time without supplementation could develop Mg, Ca and P deficiencies. These minerals are stored in the skeleton, and may be mobilised when dietary intake and absorption is inadequate. The bone reserves of Mg, Ca and P are approximately 14, 590 and 290 g for a 43 kg sheep (Grace 1983). Sheep are unlikely to exhibit deficiencies in Ca or P for a considerable period of time due to the size of their bone reserves, but if sheep continued to lose 0.8 g of Mg/day their bone reserves would be exhausted in 18 days (Table 1). This is a serious issue as sheep often graze saltbush for several weeks at a time. Deficiencies in Mg can reduce milk yield and feed intake, and cause bone disorders, muscle spasms, convulsions and death (SCA 1990). These results indicate that saltbush as a sole source of feed may be unsuitable for sheep with high nutritional demands, such as ewes during pregnancy and lactation. Further research is required to assess the mineral balance of sheep grazing saltbush in a field situation and to identify the mechanism by which minerals are lost into the digestive tract.

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