

What are the effects of a high salt diet on sheep?



Salty Diets

How much salt can sheep eat?

The CRC Salinity *Salty Diets* project is examining the effect of feeding diets with high salt concentrations on voluntary feed intake, appetite, diet selection, and the consequences for rumen function.

Much of the saline land in Australia is best suited for revegetation with a shrub based system. These shrubs are usually halophytes (e.g. saltbush and blue bush) that can grow at salinity levels in excess of seawater. Their establishment may help to manage the water table and provide an environment where less tolerant understorey plants can also grow during some times of the year. A characteristic of many of these shrubs is that they accumulate large amounts of salt in stems and leaves. At the extreme, 30 per cent (300 g in every kg) of the dry leaves is salt.

The salt is usually sodium chloride but may include other minerals such as potassium and magnesium as chlorides or sulfates.

From a grazing sheep's point of view these shrubs as the sole feed supply present a major nutritional challenge. As salt in the feed increases, appetite is suppressed, intake decreased and digestion disrupted (as shown over). Sheep cope well with less than 10% of the diet as salt or with a total salt intake of less than 100 grams per day. At salt intakes between 150 and 250 g/d sheep will reach an upper limit in their ability to process and excrete salt (see figure 1).

For sheep to cope with high levels of salt in the diet they should have an unlimited supply of high quality drinking water.

Strategies to reduce salt intake

Sheep will select a diet that balances the need for high nutrient intake against the cost of managing a salt load. Salt, protein and energy content of a feed all interact to drive diet selection. Therefore feeding value of a high salt diet can be improved by offering low salt alternatives and sheep will actively select quantities of high and low salt feeds that improve the feeding value of their diet. An example is shown in table 1 (over) - when sheep were offered a low salt alternative to a high salt diet, intake and growth both improved.

These results have implications for both the selection of supplements or growth of a low salt understorey in the field to complement a high salt diet.

Highlights

> sheep cope well with salt intake less than 100 g/d

> offer low salt alternatives and sheep will balance their own diet

> high energy supplements effective for optimum production



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Masters D (2007) 'Salty Diets'
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What it means

Salty Diets information will be used to recommend pasture systems that incorporate salt tolerant plants such as saltbush, while providing a total ration that maintains salt intake below the critical threshold, and meets the energy and protein requirements of the animal.

This will necessitate the use of appropriate combinations of high salt plants and complementary low salt alternatives. The studies to date have indicated that, provided combinations are made available sheep will select a diet to improve production. To optimise production, high energy supplements (fed at restricted levels) will be most effective. If poor quality supplements are used sheep may choose to eat little of the supplement.

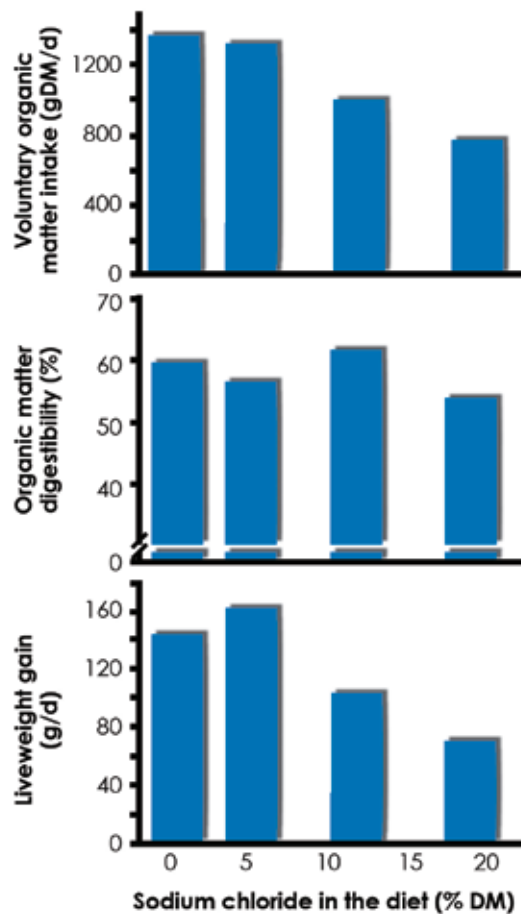


Figure 1: Animal responses to high salt

Table 1: Voluntary intake of organic matter and salt when sheep are offered a high salt diet alone or a high salt diet with a low salt alternative (g/d)

Diet choices	Intake of high salt diet	Intake of low salt, low digestibility diet	Intake of low salt, high digestibility diet	Total intake	Total salt intake	Growth rate
High salt diet only	805	-	-	805	183	40
High salt or low salt, low digestibility diet	723	417	-	1140	170	100
High salt or low salt, high digestibility diet	142	-	1137	1278	45	160

Further reading:

1. Masters, D.G., Rintoul, A.J., Dynes, R.A., Pearce, K.L., and Norman, H.C. (2005) Feed intake and production in sheep fed diets high in sodium and potassium. *Aust. J. Agric. Res.* 56, 427-434
2. Thomas, D.T., Rintoul, A.J., and Masters, D.G. (2006) Sheep select combinations of high and low sodium chloride, energy and crude protein feed that improves their diet. *Appl. Anim. Behav. Sci.* In press

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