

## SALTBUSH INCREASES METHANE PRODUCTION

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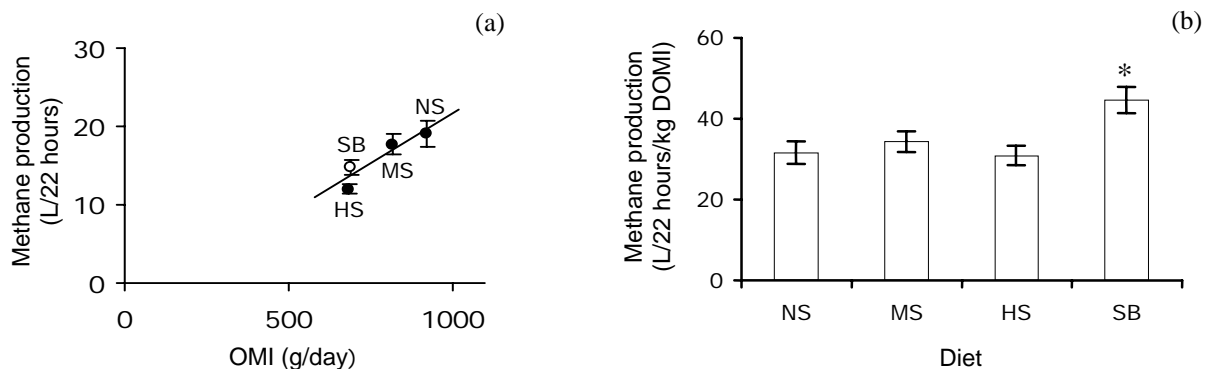
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In a preliminary experiment (Mayberry, unpublished data), *in vitro* methane production in rumen fluid from sheep fed saltbush was approximately 4 times higher than methane production in rumen fluid from sheep fed straw or a mixed oaten hay and lupin ration. To understand this result further we tested the hypotheses that *in vivo* methane production would be higher in sheep fed saltbush compared to sheep fed a traditional forage and that the increase in methane production would be due to the high level of salt in saltbush.

Forty, 18-month-old merino wethers were selected from the flock at Yalanbee Research Station, Bakers Hill. They were individually penned in the animal house at CSIRO, Floreat, and were fed control pellets of wheaten chaff, barley, oats and lupins at maintenance for 6 weeks. During this period, methane production was measured for each animal over a 22-hour period using open-system respiration chambers. The animals were then allocated to 1 of 4 diets based on this methane production. The 4 diets fed to the sheep were; control pellets (NS), control + 10% salt (MS), control + 20% salt (HS), and air-dried old man saltbush (*Atriplex nummularia*) containing approximately 16% salt (SB). The sheep were gradually introduced to the experimental diets over 2 weeks, and then fed 100% of the experimental diets for a further 5 weeks. They were offered a maintenance ration, but did not consume it all on the MS, HS and SB diets. Methane production was measured for a second time after the sheep had been fed the experimental diets for a minimum of 2 weeks.

Average methane production was positively correlated with organic matter intake (OMI) of the experimental diets (Figure 1a). As the amount of salt in the pellets increased, the organic matter digestibility (OMD) and OMI of the diets decreased, causing a reduction in methane production. Methane production by sheep fed saltbush was also related to OMI, but not OMD. The OMD of the saltbush was 48%, compared to 58, 63 and 66% for the HS, MS and NS diets. According to Pelchen and Peters (1998), methane production from sheep fed saltbush should have been significantly lower than that from sheep fed any of the other diets due to its low OMD. Instead, methane production from sheep fed saltbush was similar to methane production from sheep fed MS. When methane production over 22-hours was corrected for differences in OMI and OMD between the 4 diets, methane production (expressed per unit of digestible organic matter intake (DOMI)) from sheep fed saltbush was significantly higher than that from sheep fed any of the pellets ( $P < 0.05$ ) (Figure 1b). The concentration of salt in the pellets had no effect on methane production when expressed per unit of DOMI.



**Figure 1. (a) Effect of organic matter intake (OMI) on methane production (mean  $\pm$  SE) by sheep fed pellets (●) or saltbush (○), (b) methane production (mean  $\pm$  SE), corrected for digestible organic matter intake (DOMI). \* $P < 0.05$**

We conclude that the increase in *in-vivo* methane production per unit of metabolisable energy by sheep fed saltbush, found here and in the preliminary experiment, is not related to the concentration of salt in the feed. Alternate explanations could include the effects of secondary compounds on the rumen, or the amount and type of fibre in the feed.

PELCHEN, A. and PETERS, K.J. (1998). *Small Rum. Res.* **27**: 137-50.

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