# THE EFFECT OF AUSTRALIAN PLANTS ON GAS PRODUCTION BY RUMEN MICROBES *IN VITRO*

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Antibiotics are used in livestock feed as growth promoters but will be discontinued in the future because of the increased risk of antibiotic resistance in microbes. This will have a major impact on the productivity of livestock because of the underperformance of rumen fermentation. Plants have the potential to modify rumen function (Hristov *et al.* 2004) and Australian native plants in particular are a rich source of antimicrobial compounds (Palombo and Semple 2001). The objective of the current study was to screen a panel of Australian plants and examine their effect on *in vitro* rumen fermentation to help identify candidates for natural replacements of in-feed antibiotics in livestock production.

Australian plants were selected based on their reported secondary compounds, fodder potential and/or their availability. A total of 33 plants were tested in an *in vitro* system that was designed to mimic the rumen environment. Dried and ground plant material was mixed with rumen fluid in test tubes, and incubated with shaking for 24 hours. Controls included rumen fluid (negative control) and rumen fluid plus oaten chaff (positive control). The accumulated gas pressure in the headspace was measured at the end of incubation period and used as an indicator of rumen fermentation.

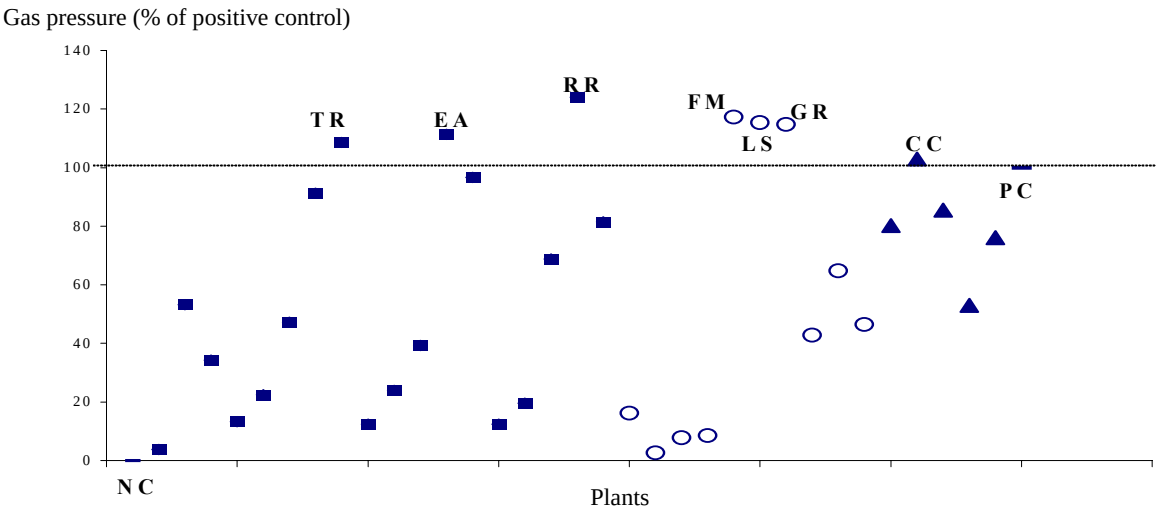


**Figure 1. *In vitro* gas production by rumen microbes incubated with different plants. (Note – only plants that had gas production comparable to the positive control are labelled: TR - *Templetonia retusa*, EA - *Eremophila alternifolia,* RR - *Raphanus raphanistrum,* FM - *Fumaria muralis*, LS - *Lavandula stoechas,* GR - *Gyrostemon ramulosus,* CC – *Codonocarpus cotinifolius,* NC – *negative control,* PC – *positive control*) Symbols: ■ plants with compounds and fodder potential; ○ plants with compounds but no fodder potential; ▲plants with unknown properties.**

In the present study only 7 plants produced gas volumes comparable to the positive control (Figure 1). Six of these are reported to contain secondary compounds and therefore have the potential to modulate rumen microbes, with 3 of them (*Templetonia retusa*, *Eremophila alternifolia*, and *Raphanus raphanistrum*) also having suitable characteristics for providing fodder. However, incorporation of these plants into feeding systems is likely to depend on many other attributes, such as nutritive value, grazing potential and potential toxicity. Another 3 candidates with known secondary compounds were also fermented, but there is no information about their suitability as animal food. Interestingly, some plants with relatively high grazing potential, for example some Acacia and Eremophila species, produced low and variable levels of gas. More suitable candidates for grazing systems may be identified by exploring the further great diversity of plant species within these groups.

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