Desmanthus: A tropical legume for reducing methane emissions in Northern Australian beef cattle

Bénédicte Suybeng A, D, Edward Charmley B, Christopher P. Gardiner A, Bunni S. Malau-Adul C and Aduli E.O. Malau-Adul A

A College of Public Health, Medical and Veterinary Sciences, James Cook University, Townsville, Qld 4811; B CSIRO Agriculture and Food, Townsville, Qld 4811; C College of Medicine and Dentistry, James Cook University, Townsville, Qld 4811; Corresponding author: benedicte.suybeng@my.jcu.edu.au

Introduction

Desmanthus is a tropical pasture legume that can persist in semiarid clay soil regions with a productivity of about 30% legumes and 70% grasses. Progardes Desmanthus has been sown in about 35,000ha of commercial paddocks across principally Queensland but also northern New South Wales and the Northern Territory. The legume showed promising results in decreasing methane emissions in vivo [1-7]. The objective of this study was to investigate the effects of supplementing incrementally beef cattle with two species of Desmanthus (D. leptophyllus cv. JCU1 and D. bicornutus cv. JCU4) on methane emissions and estimate the carbon credit unit that a northern Australian farm could earn by using Desmanthus as a supplement.

Materials & Methods

Fourteen Droughtmaster steers were allocated to JCU1 (N=7) and JCU4 (N=7) Desmanthus cultivars. Basal Rhodes Grass (Chloris gayana) was offered to the animals plus fresh Desmanthus at 0, 12, 24, 36 and 48 % of dry matter in each period. Every period lasted at least 14 days and methane production was measured by open-circuit gas exchange in the last 2 days of every period.

Results & Discussion

Results showed no differences in methane emissions between Desmanthus cultivars. However, a significant decrease in CH4 emissions with increasing level of Desmanthus (p=0.0144) was observed. The decrease in methane followed a linear pattern (Fig. 2) and showed a CH4 reduction of about 12% for 48% Desmanthus inclusion.

Conclusion

The study demonstrated that these two cultivars of Desmanthus can reduce in vivo methane emissions from cattle. An average beef farm in Northern Australia of 1,576 head [8] would generate a gross amount of $4,785/year of Australian carbon credit units (ACCU) with 48% Desmanthus inclusion (assuming a global warming potential of 25 for methane [9], a CH4 emissions per animal of 200g/d [10] and an average price of $13.87/ACCU [11]).

References


Fig 1. Experimental design

Fig 2. Preliminary results of methane emissions from tropical beef cattle in function of the Desmanthus treatment (12, 24, 36, 48%).