Australian Government
Department of Agriculture, Fisheries and Forestry

Future Drought Fund

SA DROUGHT HUB

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Methane reduction in beef cattle in commercial production systems

LEAD ORGANISATION: University of Adelaide

PARTNER ORGANISATIONS INVOLVED: Mackillop Farm Management Group, Barossa Improved Grazing Group

INDUSTRY COLLABORATOR: Sea Forest

Outcomes

Short term

- Increased collaboration and partnerships among organisations working in research, development, extension, adoption and commercialisation (RDEA&C)
- Hubs seen and utilised as key regionally focused institutions for defining and delivering RDEA&C services (relating to drought resilience).

Medium term

- Increased availability and accessibility of, and capacity to use and adopt, knowledge that can be applied to improve drought resilience.
- Technologies and practices adopted are effective in improving drought resilience.

Project activities

To meet the global target of limiting temperature increase to 1.5°C, agricultural methane emissions need to be cut significantly. In Australia, livestock farming alone accounts for about 70% of these emissions.[1] Mitigating these emissions is essential in fighting climate change.

In recent years, seaweed (specifically *Asparagopsis taxiformis* and *Asparagopsis armata*) has gained industry interest as a feed supplement for cattle due to its level of bromoform and other halogenated metabolites,[2] which can reduce methanogenesis by up to 98%. [3]

Farmers, their advisers and industry need clear information on dosage, approach to supplementation, and feed management to ensure the health and wellbeing of their cattle, while reducing their emissions.

The University of Adelaide and partners investigated the dosage and best practice approach of seaweed supplementation. They prioritised supplementing pregnant cows on poor-quality feed – typical of low-rainfall grazing systems – to reduce methane emissions, which tend to be higher with lower feed quality.

Project findings

Supplementation

The research improved understanding of the efficacy of using a low-dose bromoform bioactive feed supplement in reducing methane emissions in pregnant cows grazing on low-quality feed, providing valuable insights on dosage and approach, emissions, and animal health and wellbeing.

The findings will be used to make recommendations for the livestock industry nationally and internationally. Specific results on dosage rates, emissions, and cow health and performance will be shared following upcoming publication in a peer-reviewed scientific journal.

[1] Panchasara H, Samrat NH & Islam N. 2021. Greenhouse gas emissions trends and mitigation measures in Australian agriculture sector – A review. *Agriculture* 11:85.
[2] Muizelaar W *et al.* 2023. Evaluation of 3 northwest European seaweed species on enteric methane production and lactational performance of Holstein-Friesian dairy cows. *Journal of Dairy Science* 106:4622-4633.
[3] Glasson CRK *et al.* 2022. Benefits and risks of including the bromoform containing seaweed *Asparagopsis* in feed for the reduction of methane production from ruminants. Algal Research 64:102673.

New approach to measuring methane on-farm

The research produced exciting insights into the effectiveness of using hand-held units to measure gas emissions of black Angus cows.

The team validated that the low-cost, hand-held 'BoseanK-600' device is a reliable tool for monitoring emissions on-farm and in the livestock industry. While more data needs to be collected, this represents a significant advance to the computer models producers have previously relied upon to predict methane emissions.

More research will further validate the potential of this approach for adoption by the livestock industry as an on-farm tool to measure methane emissions, and to improve the overall sustainability of the sector.

Dr Mariana Caetano

Department of Animal and Veterinary Bioscience, University of Adelaide



The project formed a unique collaboration to conduct innovative and new research. It needed to bring together the academic research capabilities and tools through the university, but also needed the applied knowledge and extension network offered by farming systems groups.

The SA Drought Hub's ability to bring in MacKillop Farm Management Group and Barossa Improved Grazing Group was essential. This provided a direct link with farmers, farming systems and the cattle industry. Just as crucial was the involvement of our industry collaborator Sea Forest, who provided the SeaFeed™ *Asparagopsis* supplement.

There were four key things the research team needed to understand:

- The effectiveness of using low-dose bromoform in reducing methane emissions in pregnant livestock;
- The overall health and wellbeing of livestock fed the supplements;
- Supplement dose rates and impact on emissions; and
- How low-cost, handheld devices could be used on-farm to measure methane emissions real-time.

We found some real positives with seaweed supplementation, but the research also identified some challenges, such as cost and availability, that could limit widespread implementation and adoption.

It was exciting to validate the use of the BoseanK-600, which means growers and industry now have access to a real-time, accurate emissions monitoring device. It means they can change or modify a feeding strategy or system, and then monitor the methane or gas outputs. This enables better, and more adaptive, on-farm decision making.

What's next?

This project represents a significant advance in knowledge on how to best monitor and manage emissions, considering the health and wellbeing of livestock.

The team are continuing the research through funding from the Australian Government's 'Methane Emissions Reduction in Livestock: Research Grants'.

More partners are joining, including Australian Sustainable Seaweed Alliance, Department of Primary Industries and Regions South Australia, Regional Development Australia, Charles Sturt University, Agripartner Consulting, JT Johnsons & Sons, Agscent.

The second phase will further investigate bromoform supplementation of pregnant cows and the long-term effects on methane, rumen microbiota and growth performance of the progeny. The research team will evaluate different doses of bromoform and combinations with other anti-methanogenic feeds, duration of supplementation, and the influence of the physiological stage of animals. Three devices will be compared to explore alternative methods for measuring methane emissions in livestock and facilitate on-farm adoption.

The project ultimately aims to provide efficient feed strategies and recommendations for seaweed as a safe anti-methanogenic supplement for livestock.

Dr Caetano and her team are also investigating the impact of seaweed on colostrum and how seaweed impacts neonatal development.

MORE INFORMATION

Producers wanting more information can contact Dr Mariana Caetano at mariana.caetano@adelaide.edu.au.

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