Kowbucha™

Shalome Bassett

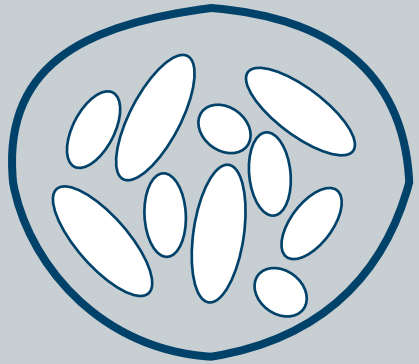
NZ Agricultural Climate Change Conference 2023

What is Kowbucha™?

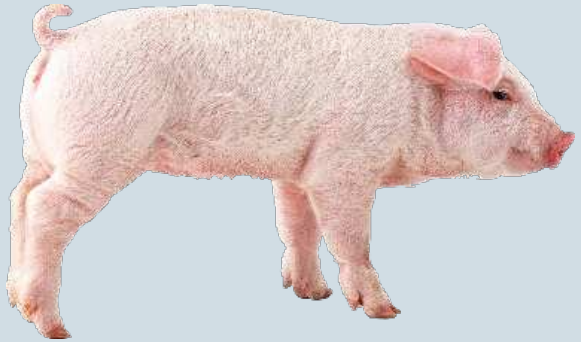
Kowbucha™ is a potential methane-busting probiotic solution

Why probiotics?

- Safe for animals
- Easy to implement
- Affordable
- No residue issues
- Easily scalable



It all started with a pig…



Piglets fed our commercialised probiotic strain *Lacticaseibacillus rhamnosus* HN001 had less methanogens in their gut

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Can we use our probiotics to reduce methanogens in cows?

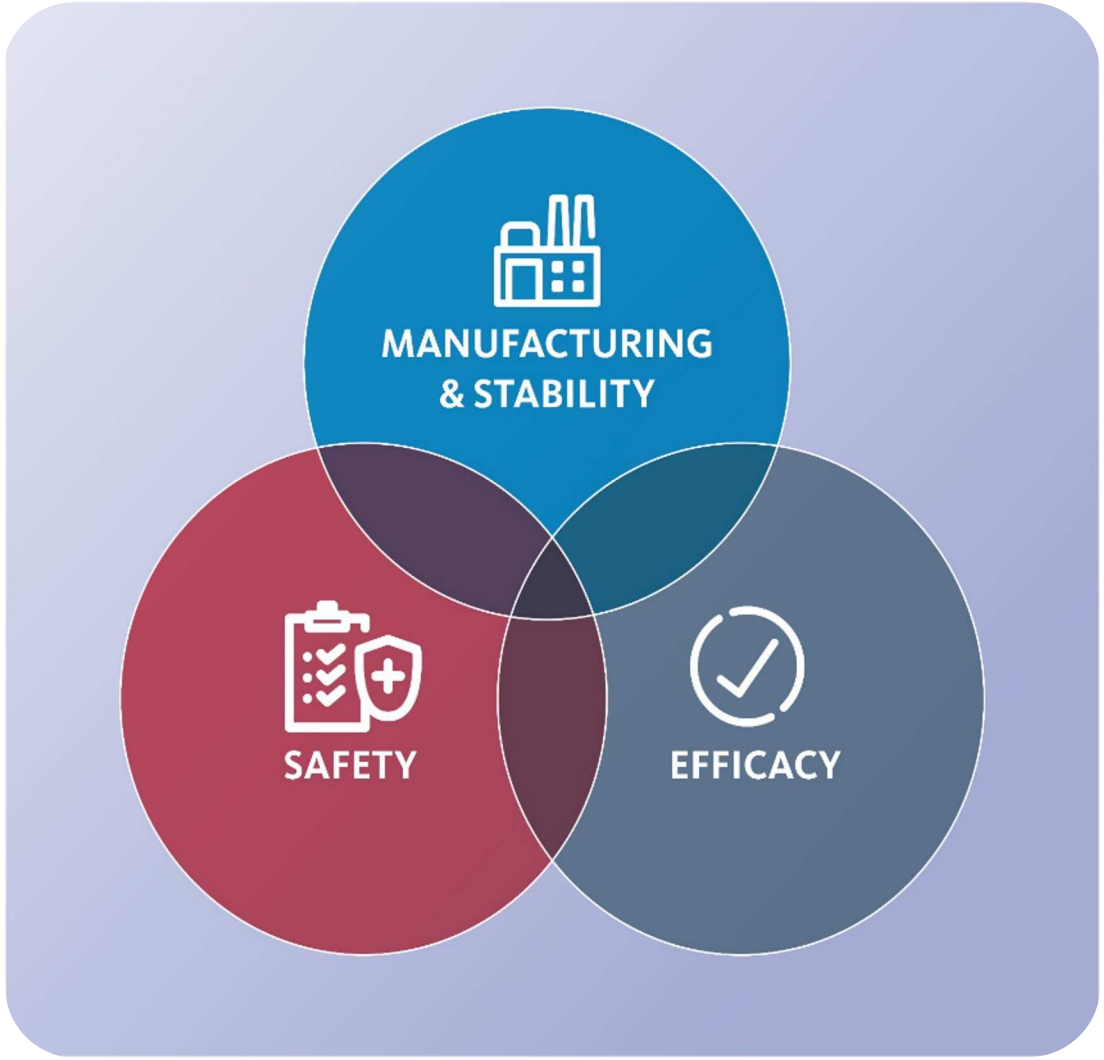
Breno Pereira de Paula,
Federal Center for Technological Education Celso Suckow da Fonseca, Brazil
John Walshaw,
Fera Science Ltd., United Kingdom

*CORRESPONDENCE
Wayne Young
wayne.young@agresearch.co.nz

Hilary Dewhurst[1], Melanie van Gendt[1], Ryan N. Dilger[3], James Dekker[4], Neill Haggarty[4] and Nicole Roy[1,2]

[1]AgResearch, Te Ohu Rangahau Kai, Palmerston North, New Zealand, [2]Riddet Institute, Massey University, Palmerston North, New Zealand, [3]Department of Animal Sciences, University of Illinois, Urbana, IL, United States, [4]Fonterra Research and Development Centre, Palmerston North, New Zealand

Probiotics must meet three criteria



- **Safe**
- **Stable**
- **Effective**

Our approach

We've used a step-based approach to identify strains with the highest levels of methane inhibition in the lab before feeding these to animals

Plate screening

- Screened ~1800 strains from our extensive dairy culture collection
- 4 assays for inhibition of different methanogens

In vitro

Rumen fluid assays (RIVs)

- Identified strains that ↓ methane in rumen samples
- Compared different culture-derived samples

Ex vivo

Performance in animals

- 8 feeding studies (calves, sheep, pigs)
- Monitor animals over lifetime

In vivo

Fonterra Dairy for life

PGgRc PASTORAL GREENHOUSE GAS RESEARCH CONSORTIUM

agresearch āta mātai, mātai whetū

MASSEY UNIVERSITY TE KUNENGA KI PŪREHUROA UNIVERSITY OF NEW ZEALAND

DairyNZ

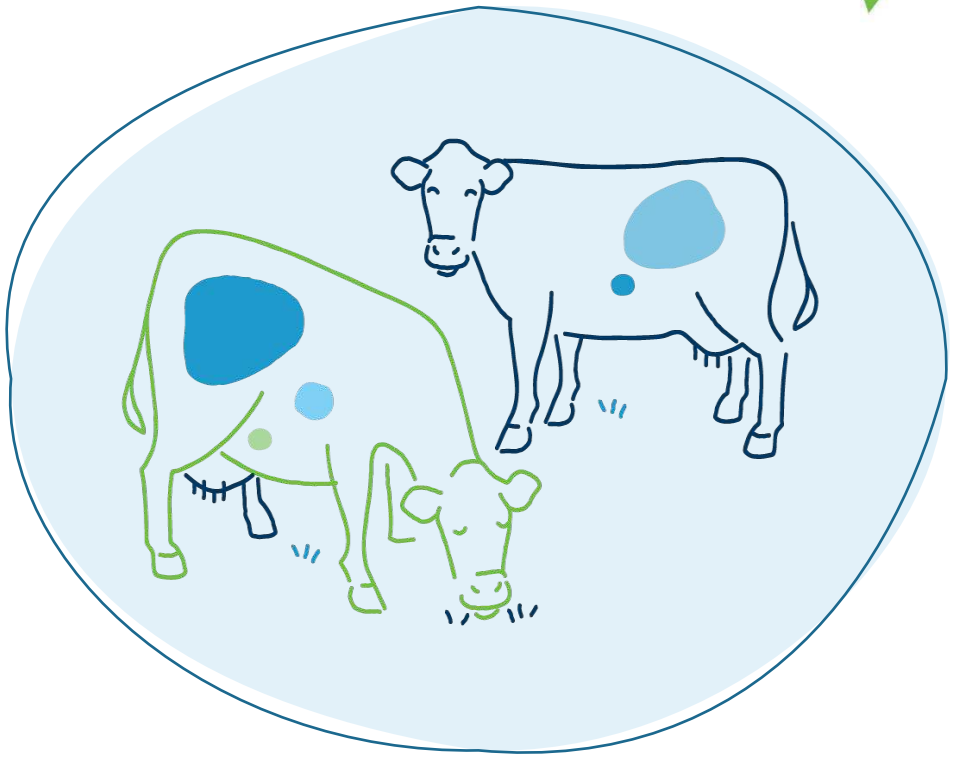
Why early life?

- Studies have shown that the presence of bacteria is important for development of the gut and immune system
- Feeding Kowbucha™ from birth could alter the developing rumen microbiome
- This may lead to long-lasting effects on methane production in the animal
- May be more effective than feeding adult animals

Results so far are promising, but we're doing more trials to validate the benefits

4 Kowbucha™ strains assessed in animal trials

Changes in VFAs and the rumen and faecal microbiome (calves) and caecal microbiome (pigs)



20% Less methane in calf trials

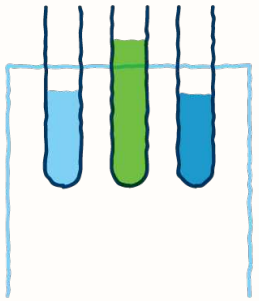
And we're continuing to see this methane reduction even after 12 months…

Our Achievements

Lab Results

~100 strains showed >50% inhibition of one or more methanogen species

Up to 50% less methane observed in some strains



~20 strains showed significant reduction in CH_4 in rumen fluid

Manufacturing & Stability

Can successfully manufacture strains at commercial scale

WGS and strain safety have been completed

Animal Trials

Reduced caecal methanogens in pig trial and up to

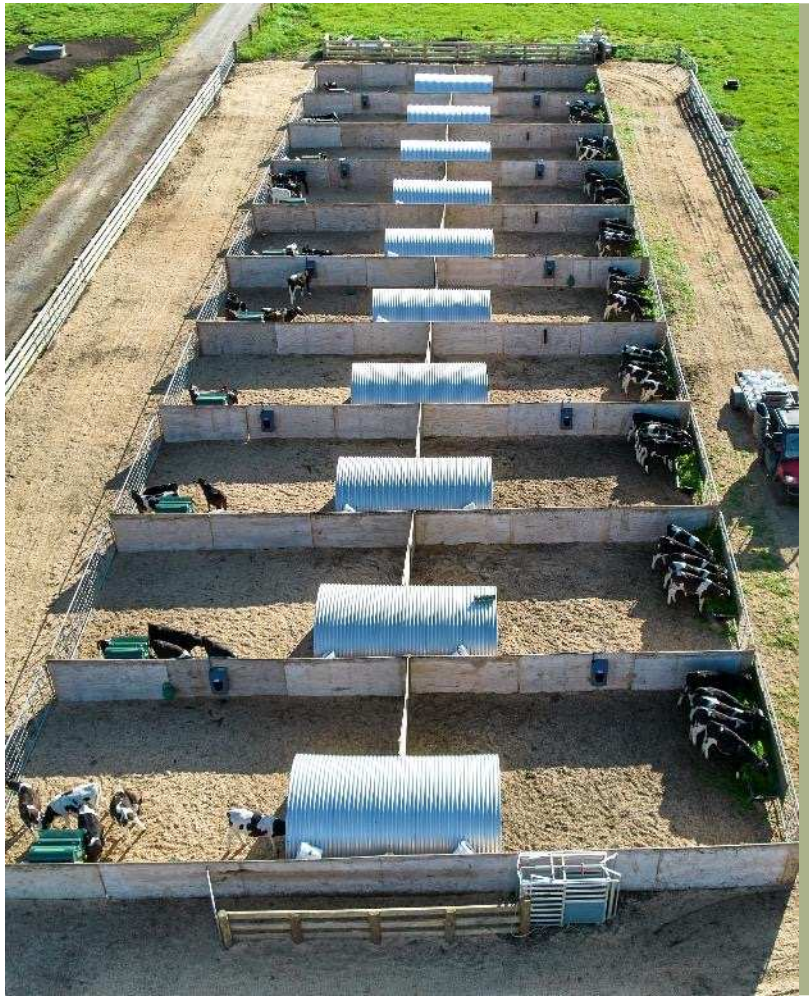
20%

Less methane in calf trials

IP Captured

- **Kowbucha™** registered
- **4** PCTs and **1** provisional patent

Next steps

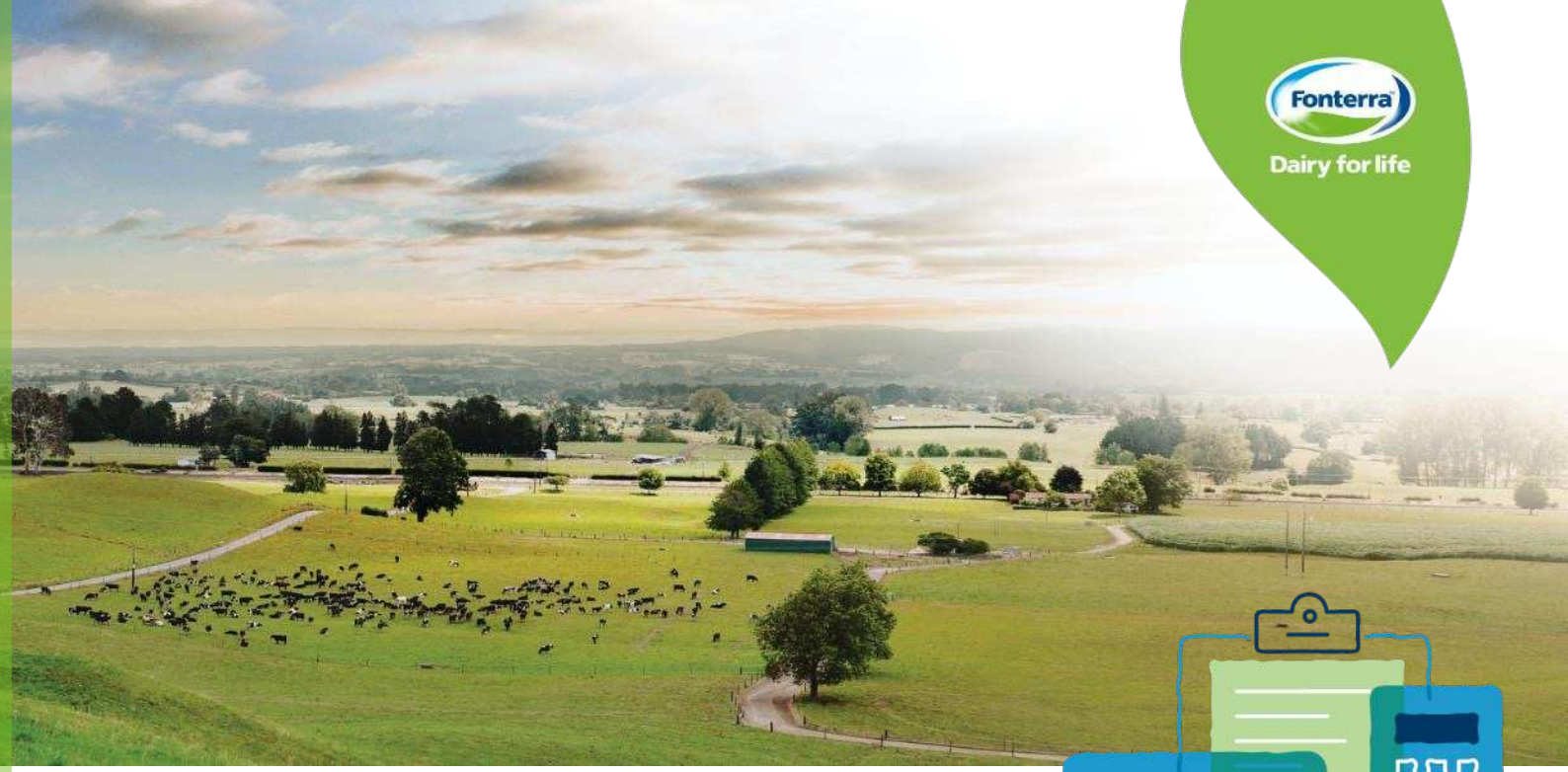


- We’re working with AgResearch to:
  - Develop new and faster ways to screen our culture collection to identify promising strains
  - Understand the key mechanisms
- We’re ensuring our current strains perform consistently across different farming systems
- We’re working on our go-to market plan

Summary

If successful, Kowbucha™ has the ability to be a game changer not only for our farmers but also for the New Zealand and global dairy industry

- We've seen an ongoing reduction in methane of up to 20% in calves
- We can successfully manufacture it
- We've captured IP through trademarks and patent filings
- We're ensuring we meet regulatory approval



And we've crunched the numbers…

Kowbucha™ is an extremely affordable solution and easily scalable

Thanks to our wider team:

Fonterra: Jeremy Hill, Charlotte van der Lee, Andy Millar, Andrew Patrick, James Dekker, Andrew Fletcher, James Harnett, Leanne Bird, Vicki Lander and the MFU Production Team, Nyssa Hewitt, Shane Bowling, Ash Keown, Greg Cait, Wayne Douche, Paul McJarrow, Gareth Scarfe, Mary Lane and Olga Coster

Regs: Julia McNab (Intuit Consulting)

And our collaborators at AgResearch, Massey and Dairy NZ

We also acknowledge the support of the PGgRc

Thank you.