



Goal in sight: methane inhibitors have the potential to significantly reduce New Zealand's agricultural emissions. Photo: PGgRc and NZAGRC.

# Methane tools in the pipeline

Methane inhibitors are looking like one of the most promising tools to reduce New Zealand's greenhouse gas emissions from agriculture. Here's how your DairyNZ Levy is being used alongside other partner funding to contribute to the latest research.

The Pastoral Greenhouse Gas Research Consortium (PGgRc) aims to provide knowledge and tools for New Zealand farmers to mitigate greenhouse gas (GHG) emissions. The consortium works in collaboration with the New Zealand government and it's partly funded by farmer levies, including DairyNZ and Beef + Lamb New Zealand – two of eight funding partners.

PGgRc general manager Mark Aspin says the two problem greenhouse gases for New Zealand are methane and nitrous oxide.

"Methane inhibitors have the potential to reduce methane production by around 30 percent, so their widespread adoption by farmers would make a significant dent in reaching the country's reduction targets," he says.

"However, with New Zealand livestock eating grass 90 percent of the time, there are challenges to realising this potential, including how the inhibitor would be given to animals and ensuring the economics stack up."

## Methane production

Mark describes the rumen as a fermentation vat containing microbes that play a role in plant digestion and fermentation.

"Among those microbe species are methanogens. However, methanogens are not essential to the animal – in fact, they are opportunists. They use hydrogen gas, a by-product of fermentation, and combine it with carbon dioxide to produce methane and water. The methane is then released into the atmosphere when the animal belches."

## How methane inhibitors work

Scientists have identified chemical compounds that simply stop the methanogens from working, shutting down the process of methane production. A Dutch company is developing an inhibitor that works in a feedlot total mixed ration (TMR) system, where it can be mixed with feed and consumed continuously.

"This isn't practical in New Zealand's pasture-based system though," says Mark. "A practical delivery mechanism is therefore one of the challenges. Options, such as bolus capsules, are being investigated."

Conversations with potential commercial partners are underway. However, testing to rule out any impact on animals' health, welfare and productivity needs to be carried out, as well as ensuring there are no residue or food safety concerns.

## Methane vaccines

Meanwhile, New Zealand scientists are also working on a vaccine that stimulates the animal to produce antibodies that suppress key methane-generating microbes in the rumen of livestock.

"If widely adopted, an effective vaccine/inhibitor package could deliver emissions reductions of more than 20 percent – substantially larger than other mitigation options available presently," says Mark.

Both the inhibitor and vaccine approaches will require significant further development once they have established proof of concept, with delivery to the sector likely to be seven to eight years beyond that point.

## Key points



1. Methane inhibitors have the potential to reduce methane production by around 30 percent.
2. The challenge is identifying a practical delivery mechanism, such as bolus capsules, that will work in our pasture-based system.
3. Discussions with potential commercial partners for the development of the inhibitors are underway.