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How one researcher is fighting cow farts - and climate change - by feeding the gassy beasts seaweed

By Zane Schwartz

Cows' methane-filled burps and farts make them the largest animal contributors to climate change. But feeding them seaweed could cut the methane by...

Changing how cows burp could dramatically reduce greenhouse gas emissions. Dr. Rob Kinley, a Dalhousie-educated researcher working in Australia, found that feeding artificial cow stomachs seaweed reduces the amount of methane produced by up to 99 per cent. His next step is taking the experiment out of the lab and testing seaweed on cows themselves, the largest animal contributors to climate change. While he's hopeful, miracle cures have been promised before. Researchers have tried everything from keeping cows in glass bubbles to feeding them vast quantities of garlic. Some things work but, so far, none of the supposed cure-alls have been widely adopted. Kinley spoke with the National Post *about why he thinks his research can buck the trend and change the world.*

Q How much methane do cows produce and how does that contribute to climate change?

On average one cow produces about as much greenhouse gas as one car. Cows produce methane at a rate of about 300g a day for dairy cows, 150g for beef cows. It varies with their diet.

Q What is it about methane that's particularly problematic?

It's a greenhouse gas that's about 28 times more potent in terms of global warming potential than carbon dioxide.

Q Before testing the seaweed on live cows you built a fake cow stomach and tested it in a lab. How do you build a fake cow stomach?

The cow's first stomach, where the gas is digested, is more like a fermentation tank than a stomach. So if you supply that system with all the things that a cow would give it, say: temperature maintenance, pH maintenance, a steady flow of nutrients and waste removal, then you can duplicate that system in the laboratory. Then you can play with it by feeding it anything you want to and you can do that ethically.

Q Do they actually look like a stomach?

No, they're glass. There are a number of forms of them. The ones I was working with in Nova Scotia are double wall glass. The temperature is maintained by running the precise degree of water between the walls and the inside of the tank where the fermentation is going on. So they look like suspended bottles.

Q You tested twenty types of seaweed and found that a red seaweed off the coast of Queensland, Australia produced the best results. What's special about this seaweed?

That particular seaweed has one chemical that it uses as a natural defence against predation in the ocean. We've discovered that it works quite well in the process of methane production.

Q Do cows like eating the seaweed?

Well, they don't even know that they're eating it. You put it in pellet form or mix it with molasses and they gobble that down. We haven't actually fed it to cows at any level yet, we've fed it to sheep. Sheep are smaller and require a lot less

feed and are easier to manage. We are going to feed cattle very soon.

Q When you gave it to sheep you saw an 85 per cent reduction in methane. Are you expecting a similar result with the cows?

We are. The seaweed that we're going to be giving the cows is actually of a much better quality. When we did the sheep study we took the seaweed that we had at the time. It had been sitting around for a while so it had lost some of its potency, but it still worked really well at low levels. I'm expecting even better results with the cattle.

Rob Kinley The artificial cow stomachs used to test the seaweed from P.E.I. in an earlier experiment

Rob Kinley Growing seaweed in Ireland. The team tested 20 different types

Rob Kinley An open path laser measures methane in the field.

Q In 2015 you published a paper in the Journal of Applied Phycology looking at cows eating seaweed on Prince Edward Island, which found a 20% reduction in methane. What makes you think the reduction is going to be so much higher for cows in Queensland, Australia?

It's because of this particular seaweed. Part of your previous question was that we'd tested 20 different types of seaweed. Well I'd tested twenty in Queensland but I'd tested others when I was back in Nova Scotia.

Q What part of the cow contributes most of the methane output?

It's the burping at about 90 plus per cent. Farting accounts for the other ten per cent or so.

Q How do you plan on scaling this project? What kind of funding are you hoping for and what would you do with it?

Our number one barrier to making a commercial product for this is to supply enough seaweed for cows. We need the money to continue with the research but also to develop technology to cultivate this stuff at large scale. We need seaweed farms to come on board with this.

Q How much seaweed would you need for, say, all the cows in Australia?

10% of the beef feedlot and dairy industry in Australia would require about 30,000 tonnes per year. So if we were to move into the American market, then you can multiply that by ten. If we had 100 per cent uptake globally we would need one million tonnes. That level of seaweed is already being produced for other purposes.

Q For human consumption?

Yeah.

Q The type of seaweed that's being mass produced, is it the red seaweed that you're working with?

No. There's very little cultivation of it going on. But we expect in the next couple of years that it will be grown in a few places. Right now all that's being grown is being used for research purposes or cosmetic purposes. It's available on the market in Hawaii for human consumption under the name Limu Kohu.

Q In 2015 a Dutch company found that a mix they were putting in cows feed could reduce methane production by 30 per cent. Unfortunately, farmers didn't want to pay for it. How are you going to get farmers to buy the seaweed?

The social licence to operate for all industries is getting more and more difficult. It's becoming increasingly important to be aware of global climate change and what's contributing to that. Ultimately, it is much more consumer friendly to be environmentally friendly.

This interview has been lightly edited for clarity and length.

Rob Kinley Batch culture testing in Townsville, Australia.

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