Methane Superstars

How cattle producers are balancing emissions and meeting demand

By Jill Meador

Producers can face a new challenge when it comes to satisfying consumers: Are they making an effort to reduce the methane emissions from their cattle while continuing to produce a high-quality end product?

"The conversation of reducing gas emissions from cattle is a wonderful opportunity to educate consumers on what producers do every day," says Logan Thompson, Kansas State University beef sustainability researcher. "If consumers are interested in it, let's take the opportunity to tell them what our industry is about."

Methane exerted from cattle represents a loss of dietary energy, Thompson says. The animal could use this energy to benefit them elsewhere, he adds.

"Climate change was not why we started researching methane byproduct," Thompson says. "It was to improve the efficiency of converting a consumed diet into a usable end product [–beef]."

Initially respiration chambers measured animal gas emissions, by placing an animal in a large box, or respiration chamber, Thompson says. Now, a tool called GreenFeed is what is primarily used to measure the gas flux from cattle in pastures and feedlots.

"While the chambers are quite fun, it's also pretty laborious and time-consuming to do," Thompson says. "The GreenFeed allows us to measure it in a more natural setting than a respiration chamber.

"Because we have better genetic, feed and intake tools to measure gas production, I think we are going to see a lot of progress made on the efficiency aspect," he says.

By reducing methane emissions, animal performance and efficiency can be improved, which has been lost in the conversation among producers, Thompson adds.

“One of the things that’s been the holy grail in the beef cattle industry is how do we reduce maintenance costs with the goal of making cattle more efficient,” says Megan Rolf, Kansas State University genetic and livestock genomic researcher. “From a genetic perspective, this is where methane comes into the picture for us.”

The three big things being measured are carbon dioxide production, methane production and oxygen consumption, she adds. Those three traits are used to develop the backbone of a genetic evaluation and heat production.

“With this information we can start to understand the heritability of the traits,” Rolf says. “Most importantly, though, is we can see how they’re related to other traits of economic importance such as dry matter intake, mature weight in cows, or marbling, and then determine what is the magnitude of that correlation.”

Making traits better without influencing other traits is possible with the right tools, Rolf adds, and helps meet the producer’s goal of making animals more energetically efficient without sacrificing productivity.

“One way to adjust the amount of methane is changing the composition of their diet in a macro scale,” says Ryan Reuter, Oklahoma State University range beef cattle nutrition researcher. “The higher quality the diet is the less relative methane the cattle produce, and you also get a lot more production out of the animal, whether that is more meat or more weight gain.”

Cattle grazing on high-quality forage, like wheat pasture, will produce less methane because the bacteria in their rumen have adapted to fermenting that kind of forage, Reuter says.

Alternatively, for cattle grazing on low-quality forage, like native grasses, a higher percentage of the fermentation gases will go to methane, he adds.

"There are other ways to approach methane reduction from a diet perspective such as adding feed supplements," Reuter says. "A fat supplement can decrease methane emissions a little bit and also improve production up to a point."

Supplements are an opportunity for producers to get excellent performance out of their cattle from the nutrients they provide and simultaneously reduce methane, he adds.

Profitability and sustainability are two of the most important outputs for producers, Rolf says.

"It costs producers dollars to reduce methane emissions, and in the U.S., we don't have an established carbon market credit yet," she adds.

Because a carbon credit market does not exist yet, producers are not getting paid to reduce methane emissions, Reuter says.

"My advice for producers today would be to focus on what makes their operations sustainable and profitable in the long run," Reuter says. "While reducing methane is important, you're not getting paid for it today, so it's hard to spend a lot of money on reduction efforts."

Reducing methane is great for everybody, he adds, but the solution is not going to solve global warming, so producers should not lose sight of the bigger picture here.

"Methane sort of allows cattle to be superstars with converting forage into usable protein and nutrients," Rolf says, "nutrients which are vital to humans' nutrition."

Reducing methane to zero will never happen, but it is possible to reduce methane and still have good levels of productivity, she adds.

“If consumers are wanting producers to pay attention to this issue,” Rolf says, “let’s maybe try and look though a different lens of it being a win-win situation for producers and our consumers.”

SIDEBAR

Why do cattle produce methane?

“Beef cattle are ruminants, which means they have a specialized digestive tract with a four-compartment stomach.

“The largest of these compartments is the rumen. The rumen houses trillions of microbes (bacteria, protozoa, and fungi) that break down and digest the fiber and other carbohydrates that ruminants eat. The microbes and the animal have a mutually beneficial relationship – the microbes get a nice environment to live in and a constant supply of food, while the cattle receive the nutrients that the microbes liberate from the feed the cattle eat. Interestingly, without the microbes, the cattle would be just as unable to digest grass as humans.

“As the microbes break down carbohydrates (cellulose, starch, etc.), they release glucose molecules, and these simple sugars are then fermented into several products. Some of these fermentation products, namely volatile fatty acids, are absorbed by the animal and used as an energy source to eventually power growth and milk production. One of the waste products of fermentation is methane, which is a greenhouse gas. Methane produced directly from the digestive tract of these animals is known as enteric methane.”

SOURCE: National Cattlemen’s Beef Association