

There may be another reason to discourage farmers from feeding antibiotics to livestock: global warming.

A study published this week finds that when cattle were fed a common antibiotic, their manure produced even more methane than normal — a potent global warming gas.



California rancher Nathan Carver delivers hay to feed his herd of beef cattle on his ranch on the outskirts of Delano, in California's Central Valley, on Feb. 3, 2014. (FREDERIC J. BROWN / AFP - Getty Images)

The antibiotics do this by killing off bacteria that compete with methane-producing microbes, the researchers report in the Proceedings of the Royal Society B.

"To the best of our knowledge, this is the first report of antibiotics increasing methane emissions," the team wrote.

Farmers have already been asked to stop feeding so many antibiotics to their livestock. The drugs make the animals grow faster and bigger — for reasons that are not fully understood. But many studies have now shown that the practice has helped drive the rise of antibiotic-resistant "superbugs."

"We know that there are negative consequences of antibiotics, particularly this effect of antibiotic resistance," said Tobin Hammer of the University of Colorado at boulder, who helped conduct the study.

"THIS IS THE FIRST REPORT OF ANTIBIOTICS INCREASING METHANE EMISSIONS."

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"But this was a pretty unexpected link between antibiotics and this other important environmental issue that we care about — greenhouse gases."

Hammer and colleagues were actually trying to find out if the antibiotics affected dung beetles. They fed antibiotics to 10 cows in Finland, then tested what happened to their cow pats in a pasture. They also put dung beetles on site to see what happened to them.

Hammer got the enviable job of testing the microbes from the manure and from the dung beetles.

"Working with dung is pretty messy," he said.



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Hammer's team found that after the cattle got tetracycline, a broad-spectrum antibiotic that kills a range of bacteria, their manure produced more methane.

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The guts of all animals, including people, are loaded with microbes that help digest food. They include bacteria, fungi and organisms called archaea. Archaea can produce a lot of methane, and they are not easily killed by tetracycline.

"We propose that by specifically suppressing bacteria in the gut and subsequently in dung, antibiotic treatment enables methanogens to outcompete bacteria for hydrogen, increasing their concomitant methane output," the team wrote.

Tetracycline is not used much in animal production, so Hammer says it will be important to test other drugs. He also noted that cattle produce way more methane in their belches than they do in manure.

"I would never have expected to write a paper with the word 'belching' in it," Hammer said.

There was another surprise. Hammer's team thought the antibiotics might hurt the dung beetles. It did change the makeup of the bacteria inside the beetles, a population called the microbiome.

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"We showed that it changed the microbiome within the dung beetles," Hammer said. "We measured the size of the beetles and number of beetle offspring that been produced and survived. Neither were affected by antibiotic treatment."

There's an environmental reason to study dung beetles, for the record. Other studies have shown they can reduce the methane-producing effects of cow manure by tunneling into the cow patties, Hammer said. 🌍



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