'Red sea plume' alga may cut greenhouse gas emissions from cow manure nearly in half

July 13 2023, by Deborah Pirchner

Credit: AI-generated image (disclaimer)

Approximately a third of all anthropogenic methane is emitted by ruminant livestock. These animals get nutrients through fermenting food in four-chambered stomachs found in cows, sheep, and goats. They produce methane in two ways: through belching and from the decomposition of their manure under certain conditions.

Now, researchers in Sweden have examined if adding the tropical alga Asparagopsis taxiformis (AT), also known as red sea plume, to cow feces impacts greenhouse gas emissions from the manure of dairy cows. They have published their results in *Frontiers in Sustainable Food Systems*.

"We showed that adding AT to the feces of dairy cows significantly reduced methane production from the feces by 44% compared to feces without AT," said Dr. Mohammad Ramin, an animal science researcher at the Swedish University of Agricultural Sciences. "It also turned out that methane production from feces of cows that had been supplemented with AT in their diet was not lower than from the feces of cows that had not been fed the alga."

Red sea plume fighting green(house) gas

AT is a red algae species, with cosmopolitan distribution in tropical to warm waters. Its main compound is bromoform, which mitigates methane by blocking the process through which the gas is generated. To date it is the most promising natural methane inhibitor.

"There have been many studies using AT in dairy cows' diets to reduce enteric methane production. However, no studies have reported on the decrease of methane emissions from manure," Ramin pointed out.

Adding AT to cows' feed, however, is not entirely without side effects since AT contains high levels of iodine. Research has shown that if cow feed is supplemented with AT, iodine levels in milk, which is also consumed by humans, increase. Iodine is an essential nutrient but can be toxic in high concentrations. Heightened iodine levels can cause health issues such as thyroid problems. Researchers are currently working on growing AT containing less iodine in labs.

However, AT can also be used to reduce methane emissions from manure, not only from cows' enteric fermentation. This is the approach which Ramin and colleagues took.

Naturally less methane

The contribution of manure to greenhouse gas emissions depends on several factors, including storage conditions. Manure stored in the cool-temperate European climate is estimated to be responsible for approximately 12% of total methane emissions from the dairy system.

"Manure methane production does contribute to global greenhouse gas emission and needs to be reduced," Ramin said. "Our study showed a potential way how methane inhibitors could be utilized to do that."

Despite their promising results the researchers pointed out that they did a pilot study in which they used feces form just four cows. They recommended that future studies should increase the number of cows from which manure is collected. Further, more studies are necessary to investigate the interactions between the halogenated compounds of the alga and the fecal microbiome, they said.

More information: Reducing methane production from stored feces of dairy cows by Asparagopsis taxiformis, *Frontiers in Sustainable Food Systems* (2023). DOI: 10.3389/fsufs.2023.1187838 , www.frontiersin.org/articles/1 … fs.2023.1187838/full

Provided by Frontiers

greenhouse.html