

# Study reveals environmental impact of artificial sweeteners

July 8 2024, by Megan Winslow

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An image of Cyanobacteria, Tolypothrix. Credit: Wikipedia / CC BY-SA 3.0

The human body's inability to break down sucralose, an artificial sweetener found in many zero-calorie food and drink products, is well established by scientific research. The compound is so stable that it escapes wastewater treatment processing and is in drinking water and aquatic environments.

"We can't break down sucralose, and a lot of microorganisms can't break it down, either, because it's a really tough molecule that doesn't degrade easily. So there are a lot of questions about how it is affecting the environment and whether it's something that could impact our [microbial communities](#)," said Tracey Schafer, an assistant research scientist for the University of Florida's Whitney Laboratory for Marine Bioscience and the soil, water and ecosystem sciences department, part of UF's Institute of Food and Agricultural Sciences.

Schafer is a co-author of a recently published study demonstrating how sucralose affects the behavior of cyanobacteria—an aquatic photosynthetic bacteria—and diatoms, microscopic algae that account for more than 30% of the primary [food](#) production in the marine food chain. The paper is [published](#) in the journal *Environmental Monitoring and Assessment*.

Researchers collected soil and water from a freshwater site and a brackish water site in Marineland, Florida. Back at their St. Augustine lab, they exposed samples to different sucralose concentrations and measured photosynthesis and microbial respiration in two separate time studies: every four to six hours during a single day and every 24 hours over the course of five days.

Compared to a control group, the concentration of freshwater cyanobacteria increased when samples were exposed to sucralose, but the concentration of brackish cyanobacteria spiked and then crashed when dosed.

"There is the potential that the freshwater communities might be mistaking sucralose for a nutrient, for a sugar that they can use as food," said Amelia Westmoreland, the study's lead author and a scientific researcher who worked on the project while completing her undergraduate degree in chemistry.

Both freshwater and brackish diatoms exposed to sucralose displayed an overall decreasing trend in population compared to a control group. The difference between dosed samples and the control group was most profound, however, in the freshwater experiments.

Sucralose's ability to both increase and decrease microbial community populations could potentially threaten a naturally balanced ecosystem, Westmoreland said.

"Extreme examples of how this could play out are the diatom community could disappear, and the other extreme is this community could completely overtake everything else," she said.

Both Schafer and Westmoreland said more research is needed to fully understand sucralose and its impact on [aquatic environments](#).

"I think this study was a good first step in starting to look at how [sucralose](#) could impact our aquatic communities, and hopefully it will drive more research forward," Schafer said.

**More information:** Amelia G. Westmoreland et al, Sucralose (C<sub>12</sub>H<sub>19</sub>Cl<sub>3</sub>O<sub>8</sub>) impact on microbial activity in estuarine and freshwater marsh soils, *Environmental Monitoring and Assessment* (2024). [DOI: 10.1007/s10661-024-12610-5](https://doi.org/10.1007/s10661-024-12610-5)

Provided by University of Florida

Citation: Study reveals environmental impact of artificial sweeteners (2024, July 8) retrieved 8 July 2024 from <https://phys.org/news/2024-07-reveals-environmental-impact-artificial-sweeteners.html>

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