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Chemically separating manure wastewater eliminates methane during anaerobic storage

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Lead author Rylie Ellison collects manure wastewater from a dairy in the Central Valley of California. Photo by Susana Calderon. Inset: Dairy process wastewater with different amounts of coagulant added. Photo by Rylie Ellison.

On California dairies, manure is often collected by flushing, and the wastewater is stored in anaerobic ponds. These ponds are one of the largest sources of methane in the state, and when land managers eventually apply the wastewater to cropland, more greenhouse gases are produced. Plus, nutrient mineralization from the manure can be difficult to predict.

Solid–liquid separation is often employed to minimize these problems; however, physical methods alone are insufficient for separating dissolved and particulate organic matter. In a new *Journal of Environmental Quality* article, researchers report on studies of enhanced solid–liquid separation of dairy manure wastewater using five types of coagulants to determine how greenhouse gas emissions and nutrient cycling are affected in each fraction.

Under laboratory conditions, methane from manure wastewater was virtually eliminated during anaerobic storage when the coagulated solids were removed. The solids were then applied to soil in an aerobic incubation where the coagulated solids had a significant reduction in carbon mineralization and variable effects on nitrogen mineralization depending on the coagulant type.

This study provides a proof-of-concept for a technology that could be adapted from municipal wastewater treatment and applied to manure to help reduce greenhouse gas emissions and make nutrient management more predictable.

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Ellison, R.J., & Horwath, W.R. (2021). Reducing greenhouse gas emissions and stabilizing nutrients from dairy manure using chemical coagulation. *Journal of Environmental Quality, 50, 375–383.* **https://doi.org/10.1002/jeq2.20195**

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