
# Dairy and Almond Groups Partner on Healthy Soils Research

**UC Davis evaluates use of compost pellets made from dairy manure and almond twigs.**

Building healthy soils has tremendous benefits. Increasing the amount of organic matter within the soil can improve water retention and protection, reduce erosion, sequester carbon, and improve crop yields. Increasing water scarcity and severe drought conditions make boosting soil resilience an even greater priority for California. Researchers are exploring how the environmental benefits of healthy soils initiatives can extend even further when readily available agricultural resources are used in regenerative ways.

*UC Davis researchers are evaluating the use of pelletized compost made from dairy manure and almond tree twigs, to create safe, pathogen-free, value-added amendments to boost soil health.*

A team of UC Davis researchers, led by Dr. Ruihong Zhang, has recycled dairy manure and almond twig waste into a nutrient-rich, safe, organic soil amendment. The new product was created and applied, and its effects continue to be studied. The idea is that the woody material can capture nutrients in the manure and slowly release them, as needed, into the soil. Because the product is also pelletized, it can be applied to croplands and orchards with standard farm equipment. Ultimately, the researchers hope to create a new model for using recycled agricultural resources to sequester carbon and provide benefits to the soil, crops, and the environment.

The partnership was a natural fit, as the Central Valley is home to many neighboring dairy farms and almond orchards, which have a long history of collaboration. Dairies are already major consumers of almond co-products, including hulls (used as a highly nutritious feed ingredient) and shells (used as a bedding material). With a goal of achieving zero waste by 2025, the California almond community has been actively investigating a wide variety of ways to utilize woody biomass, including twigs, pruned branches, and tree removals. Meanwhile, the dairy community has been exploring ways to expand use of manure nutrients across California's diverse agricultural landscape.

**"Together, we're piloting a new avenue to enhance the benefits of both manure and woody biomass."**

**- Denise Mullinax**
**California Dairy Research Foundation**

"Creating valuable manure-based soil amendments is an area that the dairy sector has been focusing on, but there are some challenges," said Denise Mullinax, Executive Director of the California Dairy Research Foundation (CDRF). "We know that farmers want a soil amendment with a consistent and reliable nutrient profile. It also needs to be easy to transport and apply. That's why we are thrilled to support this team of esteemed researchers and to partner with the almond industry on this project. Together, we're piloting a new avenue to enhance the benefits of both manure and woody biomass."

The initial project was funded by the California Department of Food and Agriculture (CDFA)'s Healthy Soils Program. As the project scope grew, the researchers were awarded additional funding from the demonstration category of CDFA's Alternative Manure Management Program. With supplemental support from the CDRF and the Almond Board of California, the research project developed to include a team of more than 20 individuals—including researchers, farmers, and industry collaborators—contributing throughout a three-year timeframe. The project includes two seasons of creating soil amendments and applying them to the orchard, and three years of studying effects on soil health, emissions, tree health, and crop yield, while ensuring food safety.

Using composted manure from Wickstrom Dairies, the study will shine a light for future research on expanding and improving manure utilization. Like many California dairies, the farm uses a separator system to remove solids from liquid manure streams. The solids are then sun dried in rows that are turned over periodically, as a form of composting. Dried manure solids are traditionally used for bedding or are applied to dairy forage fields. For this study, a portion of the finer manure solids were co-composted with twigs from almond production and then ran through a pelletizer. Pelletizing the compost is intended to provide a more consistent blend, while creating an easy-to-use product. The pelletized compost product has now been applied to the pilot orchard for two consecutive seasons. Four treatments were used to examine differences in manure-only verses manure-twig and pelletized versus non-pelletized compost products.

"We look forward to seeing the final results," said Mullinax. "Dr. Zhang and her team are demonstrating that it's possible to make a pelletized product that is safe and easy to use, while fully assessing the environmental benefits. It's projects like this that will pave the way for implementing advanced nutrient management on a larger scale, greatly enhancing soil health and further improving water conservation and protection."

The research team highlighted the project by providing a virtual field day, and they plan to host another outreach event this fall. Research is scheduled to conclude in March 2022. However, longer-term effects on soil health will continue to be studied. And the final report will only be the beginning of more learnings to come.

Potential research areas to be explored next include applications on different kinds of crops, comparing a pelletized versus granulated product, and using varying types of dairy manure solids (from different types of separators, settling basins, and lagoon solids). Additionally, the use of infrared technology versus composting will be explored prior to pelletization or granulation. All options will also need to be assessed for cost-effectiveness and potential scalability.

The manure-twig project is part of a broader, collaborative effort to expand manure's role in healthy soils. California dairy farmers will continue to work with researchers, state officials, and other agricultural professionals to find more ways to maximize manure's role in building healthy soils and protecting our air, water, and climate. The possibilities for sustainable solutions are bright when farmers and scientists come together to make new use of existing resources and technologies.

**California dairy farmers will continue partnering to help make an underutilized resource an important part of a healthy-soil future.**

*Dairy Cares is a statewide coalition supporting economic and environmental sustainability and responsible animal care. Our members include Bar 20 Dairy Farms, California Dairies Inc., California Dairy Campaign, California Dairy Research Foundation, California Farm Bureau Federation, Dairy Farmers of America-Western Area, Dairy Institute of California, F & R Ag Services, Hilmar Cheese Company, Joseph Gallo Farms, Land O'Lakes, Milk Producers Council, Ruan Transport Corp., Yosemite Farm Credit, Zenith Insurance Company, and others. For information, visit DairyCares.com or call 916-441-3318. To subscribe to the newsletter, contact news@dairycares.com.*

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