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Salsa hack: 50% recycled glass mix boosts cilantro, pepper, jalapeño plant growth

Preliminary results suggest that recycled glass not only accelerates plant growth but also prevents fungal growth.

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Tortilla chips and fresh salsa are staples of tasty snacks, but their ingredients might soon come from a more sustainable source. Researchers have found that cilantro, bell pepper, and jalapeño can thrive when cultivated in recycled glass from discarded bottles, such as those from beer or soda.

This new approach, which involves partially substituting soil with pulverized glass fragments, not only accelerates plant growth but also combats fungal issues.
Julie Vanegas, a nanomaterial scientist at The University of Texas Rio Grande Valley (UTRGV), and her team have pioneered this sustainable farming method. Vanegas was paired with ecologist Teresa Patricia Feria Arroyo, who has extensive experience in food security and sustainability.

Their collaboration began with Vanegas's work on using recycled glass for coastal restoration projects, such as growing willow trees. This led Feria to question whether glass could also be used for growing produce. Together, they devised experiments to test this hypothesis using common garden vegetables ideal for container and backyard gardens, such as those needed for pico de gallo.

Benefits and findings of recycled glass cultivation

The researchers sourced recycled glass particles from a company specializing in diverting bottles from landfills. The glass is crushed and smoothed to ensure safety for both users and plants. Initial tests evaluated the soil-like properties of different glass fragment sizes, including their compaction, water retention, and oxygen permeability. The study found that fragments resembling coarse sand grains were particularly effective in providing optimal conditions for plant growth.

Andrea Quezada, a chemistry graduate student in the Nanoworld Vanegas lab, is presenting the team's findings at the American Chemical Society (ACS) Fall 2024 meeting, held from August 18-22. The research suggests that glass-based soils could transform agricultural practices, particularly in the Rio Grande Valley and beyond.

Quezada notes, "We're trying to reduce landfill waste at the same time as growing edible vegetables. If this is viable, then we might be able to introduce glass-based soils into agricultural practices for people here in the Rio Grande Valley and across the country."
In their experiments, the researchers found that a glass-to-soil ratio exceeding 50% significantly enhanced plant growth. In an interaction with *Interesting Engineering* (*IE*), Vanegas explains, "The optimal ratio of recycled glass to soil for maximizing plant growth and water retention was determined through a pilot study. This study prepared several samples with varying percentages of soil and recycled glass."

details cannot be disclosed, I can share that those concentrations exceeding 50% recycled glass showed the most substantial growth."

Vanegas also points out that a forthcoming paper will detail how the shape and chemical composition of the recycled glass, including elements like sodium and iron, contribute to plant growth. This research initially focused on Gulf Coast restoration but has significant agricultural applications.

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Challenges and future prospects

The research team encountered several challenges during their experiments. Maintaining plant health and managing fungal growth were key issues.

"During our pilot tests, we encountered several key challenges related to maintaining plant health and managing fungal growth. One of the main issues was ensuring that the recycled glass did not introduce any harmful effects on the plants, such as altering the pH levels of the soil or affecting nutrient absorption. Additionally, we observed instances of fungal growth, which posed a risk to the overall health of the plants," Vanegas told *IE*.

To address these issues, the researchers closely monitored soil pH and nutrient levels and implemented antifungal treatments. Explaining it to *IE*, Vanegas added, "We introduced specific antifungal treatments and improved soil aeration techniques to create an environment less conducive to fungal proliferation."
As a result, the scientists able to mitigate the risks associated with fungal infections and maintain the health of the plants throughout the experiments. This ultimately led to the positive results the team have achieved so far.

Quezada is currently testing the effectiveness of recycled glass as a soil substitute in a greenhouse. Preliminary results suggest that plants grown in a mixture with more than 50% glass exhibit faster growth and better water retention than those in 100% traditional soil.

of this research, particularly for agricultural communities.

“I think it’s really important to try to minimize the usage of any chemicals that can negatively affect our health,” she says in the press release. “If we are able to reduce them, and help the community by collecting recyclables, then we can give people a better quality of life.”
In the future, the team intends to broaden their research and conduct additional field trials. Their objective is to establish glass-based soils as a widely accepted and sustainable agricultural solution. They aim to improve soil health, conserve resources, and support a circular economy by advancing innovative recycling practices.

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ABOUT THE EDITOR

Sujita Sinha A versatile writer, Sujita has worked with Mashable Middle East and News Daily 24. When she isn't writing, you can find her glued to the latest web series and movies.

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