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PRESS RELEASE (2026/11/12)

Lipids from banana peels help cherry tomatoes stay fresh longer

Edible coating made from lipid-rich material extracted from discarded banana peels helps in postharvest preservation of cherry tomatoes

Fukuoka, Japan—Fruits and vegetables keep "breathing" even after they're picked. Respiration consumes sugars and organic acids that contribute to flavor, while moisture loss and continued ripening soften the fruit. These changes shorten shelf life and contribute to food waste. Thin edible coatings can be applied to regulate gas and water transfer and preserve fresh produce. Now, food scientists are exploring whether by-products we often discard could supply ingredients for these coatings.

In a study published in *Food Bioscience* on October 1, 2026, a team led by Professor Fumihiko Tanaka and Associate Professor Fumina Tanaka of Kyushu University's Faculty of Agriculture examined banana peels for this purpose. They added proteins, polysaccharides, or lipids extracted from the peels to an edible coating and compared their effects on cherry tomatoes. The lipid-containing coating was most effective at slowing moisture loss and keeping the tomatoes firm.

"We wanted to turn one source of waste into a way to reduce another," says Jiao Zeng, the paper's first author and a PhD student at Kyushu University. "Banana peels account for about a third of the fruit's weight, yet they are usually discarded despite containing valuable compounds. We explored whether these compounds could help cherry tomatoes stay fresh for longer."

The researchers extracted proteins, polysaccharides, and lipids from discarded banana peels and added each separately to a coating made from sodium alginate and cinnamaldehyde. Sodium alginate is a substance derived from brown seaweed that forms the coating's film structure. Cinnamaldehyde, a compound found in cinnamon, contributes antimicrobial activity.

The researchers found that the three components affected the coating in different ways. Polysaccharides helped form a more closely connected network within the coating, while proteins contributed to interactions between its components. Lipids, meanwhile, formed water-repelling regions. Among the tested formulations, the lipid-enriched coating showed the most effective preservation performance.

"Lipids enhanced the hydrophobicity of the coating and significantly improved its moisture-barrier properties, thereby reducing water loss during storage," explains Fumina Tanaka.

The team then tested the coatings on cherry tomatoes stored at 25 °C. By day 15, uncoated

tomatoes suffered over 30% weight loss and visible decay, whereas all coated variants mitigated deterioration. The lipid-based coating performed best, maintaining marketable quality for over 20 days. The researchers also observed lower respiration and reduced ethylene production, which acts as the primary chemical trigger for fruit ripening. Coated tomatoes also showed a slower loss of firmness and less juice leakage.

Sensory tests of appearance, texture, aroma, and taste showed a similar pattern. The uncoated tomatoes fell below the study's acceptable quality by day 15, while those treated with the lipid coating remained acceptable through day 20. They also maintained higher levels of soluble solids, including sugars that contribute to sweetness.

"Our study revealed how each component contributes to preservation," notes Fumihiko Tanaka. "We hope to develop this approach further to reduce food loss and support a circular bioeconomy, where agricultural by-products become valuable resources."

Although the coatings have so far been tested only on cherry tomatoes under specific storage conditions, the findings suggest promise for preserving fresh produce after harvest. The researchers plan to test fruits and vegetables with different ripening and storage characteristics to determine how widely they could apply the approach.

A banana peel's usefulness could extend beyond the fruit it once protected. That potential may also apply to other agricultural by-products, offering new ingredients for food preservation while reducing waste and environmental impact. With further development, coatings tailored to different types of produce could help maintain quality from farm to market, giving growers and retailers more time to sell their products and consumers more time to enjoy them.

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For more information about this research, see "Fraction-specific regulation of barrier properties and postharvest physiology in alginate/cinnamaldehyde edible coatings incorporating banana peel waste-derived biomolecules for cherry tomato preservation," Jiao Zeng, Xirui Yan, Fanze Meng, DongHui Luo, Reshaka Kavindi Malawara Arachchige, Saki Ishiko, Fumina Tanaka, and Fumihiko Tanaka, *Food Bioscience*, https://doi.org/10.1016/j.fbio.2026.109756

About Kyushu University

Founded in 1911, Kyushu University is one of Japan's leading research-oriented institutions of higher education, consistently ranking as one of the top ten Japanese universities in the Times Higher Education World University Rankings and the QS World University Rankings. Located in Fukuoka, on the island of Kyushu—the most southwestern of Japan's four main islands—Kyushu U sits in a coastal metropolis frequently ranked among the world's most livable cities and historically known as Japan's gateway to Asia. Its multiple campuses are home to around 19,000 students and 8,000 faculty and staff. Through its VISION 2030, Kyushu U will "drive social change with integrative knowledge." By fusing the spectrum of knowledge, from the humanities and arts to engineering and medical sciences, Kyushu U will strengthen its research in the key areas of decarbonization, medicine and health, and environment and food, to tackle society's most pressing issues.

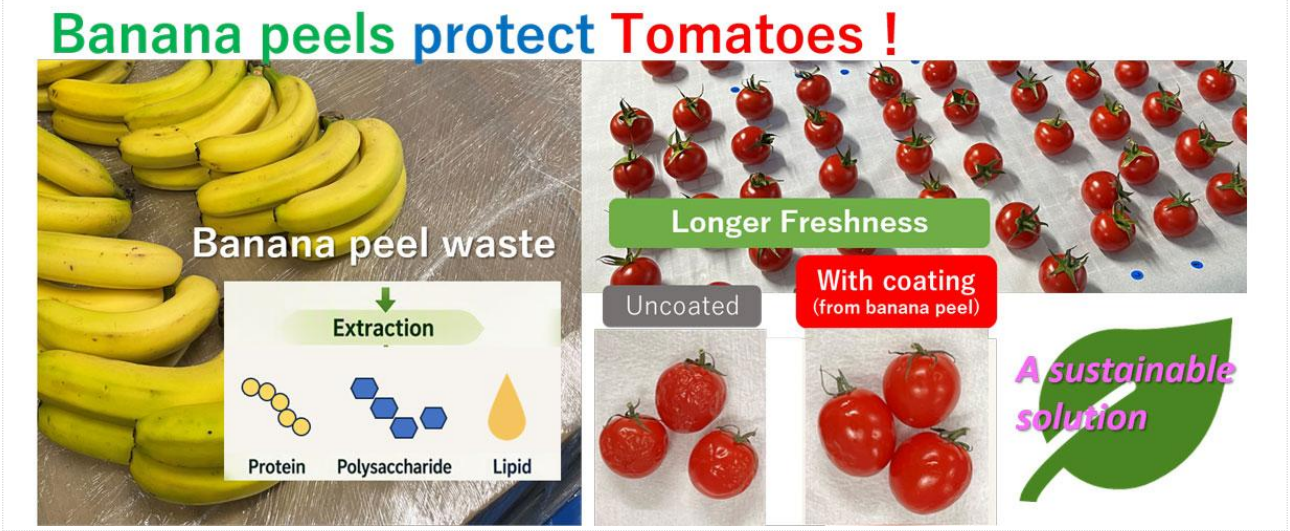


FIG.1. Upcycling banana peel waste into edible coatings that extend tomato freshness. Banana peel waste can be turned into edible coatings that help cherry tomatoes stay fresh longer. Cherry tomatoes coated with sodium alginate-based films containing different banana peel-derived components were evaluated during storage. The lipid-containing coating showed the strongest preservation performance, reducing weight loss and slowing respiration, ethylene production, softening, and other indicators of postharvest deterioration compared with uncoated tomatoes. (Fumihiko Tanaka/Kyushu University)

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