

New hope for extending fresh-cut vegetable storage

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ARS scientists evaluated different types of peppers for attributes that prolong the shelf life of fresh-cut peppers. Credit: Scott Bauer

Fresh-cut peppers are handy for snacking and in reducing meal-

preparation time for consumers. But sometimes that freshness is short-lived.

Though considerable research has been conducted to develop pepper varieties with greater yield and disease resistance, additional research is needed to develop varieties suitable for retail and food-service markets that require fresh sliced-and-diced product.

Plant geneticist and research leader John Stommel and his research team with the Genetic Improvement of Fruits and Vegetables Laboratory, and food technologist Yaguang (Sunny) Luo with the Food Quality Laboratory, both in Beltsville, Maryland, evaluated a diverse collection of peppers for attributes that prolong the [shelf life](#) of fresh-cut pepper.

"Extensive genetic diversity is present in the Capsicum gene pool, which includes cultivated peppers," states Stommel. "This diversity has been utilized to improve pepper [disease resistance](#), fruit quality, and yield."

The fresh-cut fruit and vegetable industry has expanded rapidly during the past decade due to the convenience and nutrition that fresh-cut produce offers to consumers.

To help producers respond to the increased demand, the team identified varieties that were resistant to deterioration over 14 days of cold storage. "The results provide opportunities for plant breeders to incorporate attributes that contribute to fresh-cut quality into elite varieties that will benefit the food industry and consumers," Stommel says.

It is important to note that the very action of cutting fresh produce results in damage to plant tissues, increases respiration, and shortens postharvest shelf life. The loss of fluid from tissues is closely related to the quality and shelf life of fresh-cut produce. This leakage is indicative of cell damage and is responsible for the cascade of adverse changes in

fresh-cut product color, texture, flavor, and microbial growth.

The team looked at 50 pepper varieties obtained commercially and from the ARS collection—sweet bell, large elongated peppers, jalapeno, and serrano—to find those that can stand up to prolonged cold storage. Fresh-cut sweet bell and elongated peppers exhibited signs of deterioration, such as fluid leakage, after 10 to 14 days of storage, whereas jalapeno and serrano peppers didn't lose fluids until 14 days of storage.

"We identified some peppers of each type that showed exceptional maintenance of fluid beyond 14 days, meaning the peppers stay firm and don't exhibit tissue breakdown," Stommel says. "These results demonstrate that extensive genetic variation exists in [peppers](#), which can lead to improved fresh quality via traditional breeding."

Lettuce, the base of salads everywhere, is also being targeted for improvement. Plant geneticists Ryan Hayes and Ivan Simko in the Crop Improvement and Protection Research Unit in Salinas, California, and Luo in Beltsville found several gene markers that will allow lettuce breeders to confer a longer shelf life on salad-cut lettuce. "Lettuce with a gene that results in rapid decay becomes unusable in 1 to 2 weeks," Hayes says. "By contrast, lettuce with a slow-decay gene lasted 1 month or more. This would be greatly beneficial to growers, packers, processors, and consumers."

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