Color and flavor – pigments play a role in creating tasty tomatoes
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"Pigments like carotenoids have no taste," says lead author Professor Miyako Kusano, "but they are precursors for compounds called apocarotenoid-VOCs (AC-VOCs) which produce the fruity/floral smell of tomatoes and increase the perception of sweetness—characteristics that appeal to consumers."

Traditional methods for identifying and measuring pigments can be slow, so the researchers developed a simple method to rapidly analyze large numbers of samples. Using the new technique, the team measured the amounts of carotenoids and chlorophylls in 157 different varieties of tomato and then analyzed the flavors of each variety to find the links between pigments and flavor.

The results showed that tomato varieties with an abundance of chlorophyll also had a high sugar content, contributing to a sweet taste. They also found that the carotenoid profiles of the fruit reflected the appearance of the fruit, as well as AC-VOC levels.

"The pigment profile of one of the orange-colored varieties called ‘Dixie Golden Giant’ was particularly interesting," explains Professor Kusano. "It had very high levels of AC-VOCs, but the carotenoid content wasn't that high. We discovered that the pigment prolycopene was abundant in this variety, which explained the high AC-VOC levels."

The carotenoid content of fruit is influenced by growing conditions, like temperature and amount of light. By looking at the pigment profiles and AC-VOC content of fruits in different environments, it may be possible to find ways of improving AC-VOC production, which is good for both consumers and producers.

Given its speed, the new method developed by the team is a powerful tool for analyzing pigment concentrations in large numbers of samples and could also be used for other fruits and vegetables.

Provided by University of Tsukuba


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