

# Powerful pumpkins, super squash

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A broad range of carotenoid content represents a spectrum of color in winter and summer squash. Credit: Photo by Rachel Itle

Carotenoids, the family of yellow to red pigments responsible for the striking orange hues of pumpkins and the familiar red color of vine-ripe tomatoes, play an important role in human health by acting as sources of provitamin A or as protective antioxidants. Pumpkins and squash, available in a wide range of white, yellow, and orange colors, are excellent sources of dietary carotenoids, particularly lutein, alpha-carotene, and beta-carotene. The colors of these nutritional vegetables are determined by their genetic makeup -- the concentration and type of carotenoids they contain -- which are influenced by both genetic and environmental factors.

The good news: this wide range of carotenoids in pumpkins and squash

provides fertile ground for genetic improvement. When breeders have reliable information about carotenoid types and concentrations, they can work to improve the vegetables' nutritional value and create new varieties of antioxidant-packed offerings for consumers.

But identifying and quantifying carotenoids hasn't been simple; scientists traditionally use a method called "high-performance liquid chromatography", or HPLC. HPLC is highly sensitive and reproducible, but can be expensive and time-consuming. To determine if carotenoid content of [pumpkin](#) and squash could be accurately measured using a less-expensive and simpler method, Rachel A. Itle and Eileen A. Kabelka from the University of Florida's Horticultural Sciences Department designed a research study using colorimetric analysis to correlate color space values with carotenoid content in pumpkins and squash. The study appeared in a recent issue of HortScience.

Pumpkins and squash with white, yellow, and orange flesh color were grown at multiple locations for the study. The flesh of each specimen was evaluated using both HPLC and colorimetric analysis. According to the research, "strong correlations between colorimetric values and carotenoid content were identified."

Interestingly, the researchers found a "nine-fold increase in total carotenoids provided within orange-red and yellow-orange colored cultigens versus yellow colored cultigens."

The research determined that colorimetric analysis can aid breeders interested in increasing carotenoid content in pumpkins and squash. The method, Kabelka concluded, "will be successful, easy to implement, and inexpensive".

[More information:](#) The complete study and abstract are available on the ASHS HortScience electronic journal web site:

[hortsci.ashspublications.org/c ... nt/abstract/44/3/633](https://hortsci.ashspublications.org/content/abstract/44/3/633)

Source: American Society for Horticultural Science

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