Breeding better broccoli

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Carotenoids—fat-soluble plant compounds found in some vegetables—are essential to the human diet and reportedly offer important health benefits to consumers. Plant carotenoids are the most important source of vitamin A in the human diet; the carotenoids lutein and zeaxanthin, found in corn and leafy greens vegetable such as kale, broccoli, and spinach, are widely considered to be valuable antioxidants capable of protecting humans from chronic diseases including age-related macular degeneration, cancer, and cardiovascular disease.

Vegetables in the cabbage family (such as kale, cauliflower, and broccoli) have long been known as especially good sources of dietary carotenoids. Recently, broccoli has emerged as the stand-out member of the species, providing more carotenoids to American consumers than any of its cabbage-family relatives. Yet, little has been understood about the carotenoid make-up of this popular green vegetable—until now.

Mark W. Farnham of the U.S. Department of Agriculture, Agricultural Research Service, Charleston, South Carolina, and Dean A. Kopsell from the Plant Sciences Department, University of Tennessee, Knoxville, designed a research study aimed at finding out more about the carotenoid content of field-grown broccoli and determining the effects of genetics and the environment on carotenoid levels. The duo's research confirmed that broccoli heads contain abundant levels of lutein, an antioxidant commonly thought to provide nutritional support to eyes and skin. Other carotenoids like beta-carotene, violaxanthin, neoxanthin, and antheraxanthin were also found in broccoli heads, but lutein was clearly the most significant, accounting for about half of all carotenoids

measured.

The researchers also discovered that when it comes to breeding broccoli, lutein levels were linked to the plants' genetics; the environment in which the vegetables were grown had little effect on carotenoid production.

The full study, published in a recent issue of *HortScience*, includes recommendations for vegetable breeders interested in producing vegetables that feature higher lutein levels. "Ultimately," reported Farnham and Kopsell, "this research indicates that breeding cultivars with increased levels of this particular carotenoid may be feasible."

More information: The complete study and abstract are available on the ASHS *HortScience* electronic journal web site: hortsci.ashspublications.org/c … t/abstract/44/5/1248

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