

Study suggests nutrient decline in garden crops over past 50 years

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AUSTIN, Texas—A recent study of 43 garden crops led by a University of Texas at Austin biochemist suggests that their nutrient value has declined in recent decades while farmers have been planting crops designed to improve other traits.

The study was designed to investigate the effects of modern agricultural methods on the nutrient content of foods. The researchers chose garden crops, mostly vegetables, but also melons and strawberries, for which nutritional data were available from both 1950 and 1999 and compared them both individually and as a group.

The study, based on U.S. Department of Agriculture data, will appear in the December issue of the *Journal of the American College of Nutrition*. Its lead author is Dr. Donald Davis of the university's Biochemical Institute in the Department of Chemistry and Biochemistry. His coauthors are Drs. Melvin Epp and Hugh Riordan of the Bio-Communications Research Institute in Wichita, Kan., where Davis is a research consultant.

According to Davis, establishing meaningful changes in nutrient content over a 50-year time interval was a significant challenge. The researchers had to compensate for variations in moisture content that affect nutrient measurements, and could not rule out the possibility that changes in analytical techniques may have affected results for some nutrients.

"It is much more reliable to look at average changes in the group rather than in individual foods, due to uncertainties in the 1950 and 1999 values," Davis said. "Considered as a group, we found that six out of 13 nutrients showed apparently reliable declines between 1950 and 1999."

These nutrients included protein, calcium, phosphorus, iron, riboflavin and ascorbic acid. The declines, which ranged from 6 percent for protein to 38 percent for riboflavin, raise significant questions about how modern agriculture practices are affecting food crops.

"We conclude that the most likely explanation was changes in cultivated varieties used today compared to 50 years ago," Davis said. "During those 50 years, there have been intensive efforts to breed new varieties that have greater yield, or resistance to pests, or adaptability to different climates. But the dominant effort is for higher yields. Emerging evidence suggests that when you select for yield, crops grow bigger and faster, but they don't necessarily have the ability to make or uptake nutrients at the same, faster rate."

According to Davis, these results suggest a need for research into other important nutrients and foods that provide significant dietary calories, such as grains, legumes, meat, milk and eggs.

"Perhaps more worrisome would be declines in nutrients we could not study because they were not reported in 1950—magnesium, zinc, vitamin B-6, vitamin E and dietary fiber, not to mention phytochemicals," Davis said. "I hope our paper will encourage additional studies in which old and new crop varieties are studied side-by-side and measured by modern methods."

NOTE: For a color photo of Dr. Davis, contact Lee Clippard at lclippard@mail.utexas.edu or 512-232-0675.

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Dr. Donald Davis, a member of the university's Biochemical Institute, led the crop-nutrient study.

Photo: Marsha Miller