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Taste, nutrients decline as size of crops grows

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When it comes to eating fruits, vegetables and grain, bigger is not better for you.

A report issued this week examined several recent studies by food scientists, nutritionists, growers and plant breeders. It found clear evidence that as the produce we eat gets larger, its vitamins, minerals and beneficial chemical compounds significantly diminish, as do taste and aroma.

Growing bigger tomatoes and ears of corn leads to a bigger yield for the producer, but the trade-off is the lower nutritional value.

Some say the gutting of the nutritional value of what we eat could affect public health, particularly in poorer countries. "There is no sinister villain behind this," said Chuck Benbrook, chief scientist for the Organic Center, which commissioned the report. "Increasing the amount of food grown per acre, by itself, is a good thing.

"The problem is that until recently, no one ever checked to see what was happening to the nutritional value of these much larger tomatoes, bigger grapefruit and the rest of the crops.

"Now we're in trouble. Not just the U.S. but almost every Western country that is using improved growing methods," Benbrook said.

Because of the work of plant scientists and crop breeders, farmers have doubled or tripled the yield per acre of most major fruits, vegetables and grains over the past 50 years.

Agriculture's "almost single-minded focus on increasing yields created a blind spot" in nutritional content, said Brian Halweil, author of the Organic Center's report, "Still No Free Lunch."

"Almost more alarming, this decline has escaped the notice of scientists, government and consumers," wrote Halweil, a senior researcher at the Worldwatch Institute and a member of the Organic Center's scientific advisory board.

The report said studies found:

- The more a tomato weighs, the lower its concentration of lycopene, a natural anti-cancer chemical that makes tomatoes red. There is also less vitamin C and beta carotene, a nutrient linked to vitamin A.
- Milk from high-production dairy cows has lower concentrations of fat, protein and other nutrition-enhancing components than the milk from dairy operations of 20 years ago or more.
- Sweet corn, potatoes and whole-wheat bread show double-digit declines in iron, zinc and calcium. The time span of the decline varies depending on the product studied but generally ranges from 20 to 100 years.

Over the years, improvements in seeds and plant stock not only grew larger plants but permitted them to be grown closer together and crop yields soared.

"Of course we're now capable of feeding more people, but what's happened is that unintentionally, the nutritional value of our food supply has been eroded," Benbrook said.

Nutrient decline is also found in some organic crops.

"I wish I could say that there is no loss in organically grown crops, but that's just not the case," Benbrook said.

"Organic farmers face the same laws of nature and economic pressures as conventional growers, and pushing yields upward often increases profits."

Vital chemical missing

Donald Davis, a senior researcher at the University of Texas, did some of the most illuminating research into the disappearing nutrients.

He compared Agriculture Department figures on nutrient content for 43 common fruits and vegetables.

Davis says historical data spanning 50 to 70 years show apparent declines of 5 percent to 40 percent or more in minerals, vitamins and proteins in groups of foods, especially vegetables.

Higher-yield crops also decrease the concentrations of cancer-fighting chemicals and anti-toxins -- known as phytonutrients or phytochemicals. Food scientists have identified the benefits of only a few of these.

"We are beginning to understand how valuable these phytochemicals actually are," Davis said. "We can only guess what the loss of these from high-yield farming will mean to the health of the consumer."

Surprise in the wheat fields

Washington State University professor Stephen Jones and researcher Kevin Murphy, who are involved in the school's century-old wheat-breeding program for Northwest farmers, decided to see how the grain's nutritional value has changed in 100 years.

"Kevin's research showed that today's modern wheat has less nutritional value," Jones said. "It is a concern, and the differences are easy to understand.

"You would have to eat twice as many slices of modern bread as you would of the older variety to get the same nutritional value. How did this happen? The breeders and growers and all the rest of us never looked at whether the nutritional content stayed the same as the yield increased."

Instead, researchers focused on "how good a cookie the wheat made, how nice a loaf of bread it produced or how the pizza dough acts," Jones explained.

"That's all related to protein," he said. "It's not related to iron and zinc and selenium and other essential vitamins and minerals."

Jones and Murphy are concerned because 25 percent of the wheat in the world comes from the United States.

"None of that has ever been bred for nutritional value," he said. "In this country we get our nutrients by spreading on the peanut butter or a cheeseburger, and we call it good.

"In many countries that import our wheat, the mainstay of the diet may be bread alone. The lack of nutrients becomes a far more serious issue."

Solutions by accident

In July, at the annual meeting of the American Society for Horticultural Science, international horticulturalist and plant breeders gathered for the first time to discuss the problem.

They realized there is a way to reverse the decline in some, if not all crops, food researcher Davis said. It's already happening, albeit by accident.

Consumers want their carrots bright orange, he says, so breeders found a way to intensify the color to sell more carrots. With the new brighter color came an unexpected increase in vitamin A.

Marketing experts said pineapple should be sweeter. So growers bred for added sweetness, and with it came a higher level of vitamin C.

Meddling to make watermelons a brighter red was accompanied by an increase in lycopene, which may have cancer-fighting properties and help control macular degeneration, which can cause blindness.

"All these just happened as a side effect to making crops more marketable," Davis said. "If the consumers demand that nutritional content be added to their favorite food, it will happen."

Jones says his wheat growers are already discussing breeding wheat that has the vitamins, minerals and protein of the past.

"There would be a good market for their wheat with a greater nutritional value in the Seattle and Portland area. Small millers and bakers would work together to produce a more nutritional bread that consumers could get excited about."

Davis acknowledges that the findings are troublesome but says consumers should not be discouraged.

"Vegetables are still our very best sources of many nutrients and phytochemicals. Just eat more!"

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