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THE CURIOUS COOK

## Organic, and Tastier: The Rat's Nose Knows

By HAROLD McGEE

IN any controversy it can be helpful to consider the views of disinterested parties. So, on the subject of agricultural policy and practice, it's worth noting that an unimpeachably neutral group has joined the ranks of those who prefer organic foods over foods produced with the help of synthetic chemicals. That group is 40 Swiss rats.

A team of Swiss and Austrian scientists recently concluded a 21-year study of organic wheat production. As an "integrative method" for assessing quality, they gave lab animals a choice of biscuits made from organic or conventional wheat. The rats ate significantly more of the former. The authors call this result remarkable, because they found the two wheats to be very similar in chemical composition and baking performance.

In fact, the rats were better at telling the difference between organic and conventional foods than many humans have been. In the handful of carefully designed taste-offs reported in the last few years, people were often unable to identify the organic foods, and often didn't prefer them.

This is puzzling, since organic produce generally does pack more antioxidants and other potentially healthful — and potentially flavorful — phytochemicals than conventional produce. Just last July, Professor Alyson Mitchell and colleagues at the [University of California, Davis](#) summarized 10 years of data from tomatoes grown in carefully controlled organic and conventional systems. The antioxidant contents varied from year to year, but were consistently higher in the organic tomatoes.

What do phytochemicals have to do with flavor? Phytochemicals are chemicals created by plants, and especially those that have effects on other creatures. Plants make many of them to defend themselves against microbes and insects: to make themselves unpalatable, counterattack the invaders and limit the damage they cause. Most of the aromas of vegetables, herbs and spices come from defensive chemicals. They may smell pleasant to us, but the plants make them to repel their mortal enemies.

Why should organic produce have higher phytochemical levels? The current theory is that because plants in organic production are unprotected by pesticides and fungicides, they are more stressed by insects and disease microbes than conventional crops, and have to work harder to protect themselves. So it makes sense that organic produce would have more intense flavors. For some reason, taste tests haven't consistently found this to be the case.

This puzzle remains unsolved. But a few pieces have come together to reveal a simple way of getting more flavor into some kinds of produce no matter how or where it's grown. And that includes backyards and windowsills.

Plants sense and respond to any kind of attack by means of chemical signals. Cells in the attacked area first

detect telltale molecules from the invader. Then they respond by releasing warning molecules that trigger the rest of the plant — and even neighboring plants — to start producing chemical defenses. Biologists discovered many years ago that they could induce the plant's defensive response without any live insect or fungus. All they had to do was supply the initial chemical signals — the invader molecules or the plant's warning chemicals.

At [Clemson University](#), Dr. Hyun-Jin Kim and Professor Feng Chen recently exploited this fact to intensify the flavor of basil plants. They induced a defensive response in the plants by exposing them to a material derived from chitin, a long chainlike molecule that fungi use to reinforce their cell walls. Insects and crustaceans also build their hard exoskeletons out of chitin. The chitin from crab and shrimp waste is processed industrially to make a shortened form called chitosan, and this is what the Clemson food scientists used.

They soaked basil seeds for 30 minutes in a chitosan solution, then soaked the roots again when they transferred the seedlings to larger pots. After 45 days, they compared the chemical composition of leaves from treated and untreated plants. They found that at the optimum chitosan concentration, the antioxidant activity in treated plants was greater by more than three times. The overall production of aroma compounds was up by nearly 50 percent, and the levels of clove-like and flowery components doubled.

Chitosan is readily available as a dietary supplement that supposedly encourages weight loss. When I asked Professor Chen by e-mail if chitosan capsules from the health food store dissolved in water would work as well as his lab-grade chemical, he replied, "I would guess they will have the same or similar effect." He added, "I would like to encourage master gardeners to try them for fresh aromas."

A few years ago I gave up my big garden for a few pots of dwarf citrus and herbs. I'm currently pseudostressing a pot of basil and cilantro seedlings, hoping for freshly intensified flavors that won't require a rodent's nose to appreciate.

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