Wash-Resistant Bacteria Taint Foods

Foodborne microbes trigger some 81 million cases of disease in the United States each year, according to the General Accounting Office (GAO), an investigative arm of Congress. Moms—and the Food and Drug Administration—have long advocated washing fresh fruits and vegetables to evict any germs they harbor. However, it takes more than simple washing to eliminate all of the bacteria, new studies find.

Elizabeth Ehrenfeld of IDEXX Labs, a diagnostic testing service in Westbrook, Maine, examined 39 samples of fresh bean sprouts, all purchased from local grocers. On average, each gram of sprouts hosted more than 10 million coliform bacteria, she reported last week at an American Society for Microbiology meeting in Atlanta. Though not usually posing a disease risk themselves, these bacteria, also present in soil, point to the potential for coincident contamination of crops with pathogens that might be present in fresh manure or human feces. Both are common crop fertilizers throughout much of the world.

Moreover, Ehrenfeld found that 10 samples of the fresh sprouts harbored *E. coli*—some with around 7,000 of the bacteria per gram. The presence of such fecal bacteria indicates that the samples were tainted by dirty hands during harvesting or distribution, she says.

"The surprise for me," she told SCIENCE NEWS, "was that washing the sprouts did not drop the bacterial counts very much." After depositing up to 100 million *E. coli* or *Salmonella* on bacteriafree sprouts, she washed them three times in clean water. While this reduced the bacterial population, it still left up to 1 million microbes per gram of food—many thousands of times the number needed to sicken someone with a weakened immune system.

At the meeting, John Lopes of Microcide in Troy, Mich., reported finding an average of 63,000 *Listeria* and *Aeromonas* bacteria per gram of cauliflower from local groceries and 16 million per gram of radish. The bacteria detected do not cause human disease, but their presence shows that these foods can harbor live bacteria encountered in food handling—including deadly forms of *Listeria*.

Though fruits and vegetables enter the kitchen bearing germs, new rinses promise to thwart those pathogens.

Contributing to the problem of tainted foods, an April 30 GAO report argues, is the increasing share of U.S. produce coming from countries without strict laws governing hygiene in food production and handling. Though federal law bans the importation of meat from nations without food safety systems equivalent to those in the United States, no similar prohibition exists for other foods.

Lacking resources to inspect even 2 percent of nonmeat imports, FDA cannot be relied upon to keep pathogen-tainted products out of the U.S. food supply, the GAO report concludes.

Taken together, these data are fueling the development of antimicrobial agents safe enough for kitchen use on foods.

Susan S. Sumner of Virginia Polytechnic Institute in Blacksburg finds that washing tainted produce with water "is better than doing nothing—but not a whole lot better." Later this year, however, she and graduate student Jim Wright plan to report that they can infect apples with a deadly strain of *E. coli* at a concentration of 10,000 bacteria per gram, then eliminate them all by dipping the fruit in a nontoxic mix of vinegar and off-the-shelf hydrogen peroxide. This *E. coli*, known as O157:H7, has been implicated in the deaths of people who consumed tainted cider or hamburgers.

This week, Ecolab of Saint Paul, Minn., announced it had received approval from the Environmental Protection Agency to market a patented version of the disinfectant combo to food distributors for treating fresh vegetables, including mushrooms, lettuce, onions, and bell peppers.

Lopes says his company has EPA approval but is awaiting FDA approval of another chlorinefree, antibacterial product for kitchen use. "You just dissolve it in tap water, spray it on foods, and kill the germs," he says. —*J. Raloff*

Coral helps explain El Niño oddities

The radiation released by early, aboveground nuclear tests harmed people living in the shadow of the mushroom clouds but provided oceanographers with a research opportunity. Radioactive carbon-14 atoms that fell into the ocean from the tests, which ended in 1964, provide a way to track water currents. A new study of this radiocarbon may help explain recent quirks in El Niño behavior.

Thomas P. Guilderson of Harvard University and his colleagues measured the amount of carbon-14 taken up by coral living along the Galápagos Islands from 1956 to 1983. During part of each year, the coral was bathed in waters brought up from deeper layers by surface winds—a process called upwelling. The deeper layers have less carbon-14 than surface waters.

Not surprisingly, the coral shows that the concentration of radiocarbon in the upwelling waters increased slowly over most of the period. In 1976, though, the carbon-14 concentration in the coral jumped dramatically in the upwelling season, the researchers report this week at a meeting of the American Geophysical Union in Boston.

The timing is potentially significant because some meteorologists have suggested that 1976 marked a change toward more intense and frequent El Niño episodes, related perhaps to greenhouse warming. Since then, the central equatorial Pacific has produced six El Niño warmings, two of them reaching record intensities.

Guilderson and his coworkers see a link between El Niño and the radiocarbon data. They propose that the warm upper layer of water, enriched with carbon-14, suddenly extended deeper in the eastern Pacific in 1976; thus, during the upwelling season, winds pulled up smaller amounts of the water containing less carbon-14. The thicker warm layer, they say, also spurred El Niño activity.

"It suggests that this is a very sensitive part of the ocean that changed in 1976. We need to understand why," says Harvard's Daniel P. Schrag.

Nicholas E. Graham of the Scripps Institution of Oceanography in La Jolla, Calif., wonders whether the hypothesis is backward: Perhaps the frequent El Niño episodes thickened the warm surface layer. He also notes that some researchers don't agree that El Niño behavior has changed recently.

Oceanographers do agree that something unusual happened to the central equatorial Pacific in the mid-1970s. Sea surface temperatures shot up, trade winds slackened, and rainfall increased, says Graham. The coral data now deepen the mystery by showing that the changes extended below the surface of the ocean as well. —*R. Monastersky*