Stalking a killer in our greens
Earthbound Farm processed the tainted spinach that left three dead last year. The firm is on a safety crusade but knows that threats always lurk.

By Marla Cone, Los Angeles Times Staff Writer
August 13, 2007

Going beyond the call for safety/From farm to fork

SAN JUAN BAUTISTA, CALIF. -- On a hot, bone-dry afternoon -- not unlike the one last summer when something went horribly wrong here -- Will Daniels stands on the edge of a field, its neat rows of seeded soil stretching toward the horizon. Any day now, the first glossy leaves of a new crop will sprout, and within weeks, tons of fresh salad greens will be harvested, processed and sent to market.

Daniels wishes he could rewind the clock to Aug. 15, 2006. Stop workers from picking that lethal crop. Shut down his processing lines. Drive the trucks straight to a landfill and dump the entire load. Do something, anything, to avoid sending to market bags of baby spinach that killed three people, including a 2-year-old boy, and sickened at least 200 others, many with kidney failure.

Before that outbreak, whenever Daniels visited the fertile fields of the Salinas Valley or watched his production lines, he saw a wholesome, nutritious product he was proud to provide.

"We thought we were the best, but clearly that wasn't enough," said Daniels, who oversees food safety at Earthbound Farm.

Earthbound, the nation's largest producer of gourmet salad greens, founded and owns Natural Selection Foods, which processed the bagged spinach that caused one of the worst food-poisoning outbreaks in recent years.

Days after the tragedy unfolded in mid-September, the company hired food safety microbiologist Mansour Samadpour. Right off the bat, Samadpour told Daniels and Earthbound Farm President Charles Sweat that they were delusional if they thought it wouldn't happen again.

"Another bullet is coming your way," he warned. "The question you have to answer is, will the processing eliminate the hazard? The answer for this industry is no. You can reduce; you cannot eliminate."

Under the scientist's guidance, Earthbound rapidly put in place the most aggressive testing and safety program in the industry. All its greens are now checked for pathogens, from seed to sale. Each lot is tested twice -- upon arrival from a farm, and again when packaged products roll off processing lines.

The testing has confirmed what Samadpour already suspected: Inevitably, some crops are still contaminated with disease-causing bacteria. The challenge for the company is to make sure none reaches consumers. Hunting down pathogens in produce has become a personal crusade at Earthbound Farm. In the year since the E. coli outbreak, the company has subjected about 120 million pounds of salad greens to new testing methods at a cost of several million dollars. Other companies have mounted costly safety efforts, but no one else tests all greens.

"We're not going to rest until we explore every possible safety improvement," said Daniels, vice president of food quality and safety.

For consumers, there's more at stake than one company's obsession to make amends for a tragedy. It's a question of whether pre-cut, bagged salads, consumed in increasing volumes, can ever be rendered safe -- as pathogen-free as, say, a glass of pasteurized milk.

The phone call that changed Daniels' life came last Sept. 14.

Daniels was meeting with organic growers when the Food and Drug Administration and state health officials called to break the news: People around the country were getting sick from E. coli, and many had eaten Dole baby spinach processed by Natural Selection Foods.

As the investigation unfolded, 13 bags with E. coli O157:H7were discovered, all processed at the company's south plant in San Juan Bautista on a single day, Aug. 15. The trace-back shocked many, since Earthbound is an industry pioneer -- not only the nation's largest organic produce supplier, but the first to launch pre-washed salads back in 1986.

"I was devastated," Daniels remembered. "It was an immediate feeling of, 'How could I have let the company down? Where did we go wrong? What did we miss?' "

With more than two decades in the business, Earthbound had a sanitary system that followed industry conventions. Greens were kept in cold storage and double-washed in chlorinated rinses before packaging.

Daniels immediately reviewed his records for Aug. 15. The system seemed to be functioning. The temperature and chlorination were on target.

Daniels was relieved. But then he realized that if nothing was broken, then their whole system had failed.

That's when Earthbound Farm hired Samadpour, a former assistant professor of environmental health at the University of Washington who had helped the beef industry develop an E. coli detection program after a lethal 1993 outbreak at Jack in the Box restaurants.

Samadpour told Earthbound that the spinach outbreak wasn't a fluke. Pathogens are everywhere, he said. After all, food isn't born in a laboratory; it's grown outdoors, where cows, wildlife and water all carry bacteria from feces. About 20 outbreaks already had been linked to leafy greens since 1995.

Federal and state investigators found that last year's tainted spinach bags contained bacteria that genetically matched cow manure at a pasture near a field in San Benito County.

Samadpour advised Sweat and Daniels to immediately begin checking all greens for pathogens, which no one in the industry was doing.

Almost overnight, the company erected a laboratory with state-of-the-art equipment.

On Oct. 2, just 18 days after the spinach outbreak was discovered, the company launched its "test and hold" system in San Juan Bautista. Upon their arrival from farms, each truckload of greens was tested for pathogens.

Two days later, Daniels got a phone call from the lab. A contaminated batch of frisee had turned up from a field in the Salinas area.The whole load of gourmet greens, almost a ton, was packed onto a truck and hauled to a garbage dump.

It wouldn't be the last.

Straight from a farm, a refrigerated truck pulls into Earthbound's dock in San Juan Bautista early on a summer morning. The pallets of organic arugula are unloaded in a cavernous warehouse kept at a near-freezing 34 degrees.

A worker named Sonia, wearing sanitized gloves, a hard hat and a face mask, rolls a cart to the towering stacks of pallets. With forceps, she randomly pulls out three to five arugula leaves at a time. For each 1,600-pound lot of greens, Sonia plucks 60 of these "grab" samples, about 3 ounces total, then drops the leaves into a plastic bag labeled with a bar code identifying the farm and the date harvested.

Since the outbreak, Sonia and other Earthbound employees have extracted several million samples from the 40 truckloads that arrive daily, carrying enough salad greens to fill more than half a million bags every day. Each sealed bag is delivered to a trailer, where microbiologists are waiting to look for two strains of E. coli -- including O157:H7, the virulent one that caused last year's illnesses -- and salmonella.

A lab worker adds nutrients and heats the leaves to 109 degrees for eight hours. Then he inserts a pink stick -- a lateral flow device that resembles a drugstore pregnancy test -- while another technician extracts DNA.

If those dual tests are positive, the lot is held four hours for two more sophisticated genetic tests that confirm the results.

Once cleared, greens are moved onto conveyor belts, where they are trimmed and triple-washed in chlorinated rinses. (After the outbreak, Earthbound added a third wash.) Then they are zapped with lasers to detect foreign objects. At the end of the line, packaged greens are held 12 hours and tested again.

Once a week, on average, a load of raw greens from a farm fails the tests.

Since the test-and-hold program began last October, 58 out of about 76,000 lots entering Earthbound's plants in San Juan Bautista and Yuma, Ariz., have tested positive for pathogens, a rate of 0.0008%. That amounts to about 93,000 pounds of greens destroyed out of about 122 million pounds that growers sent to Earthbound in the last 10 1/2 months. They came from many farms -- most in the Salinas area, but also in Arizona and the Coachella Valley. Investigators were dispatched to the fields the next day, but the sources remain a mystery.

Tests for finished products were added in February, and so far no packaged greens have failed. But odds are, pathogens will soon be found after processing. Chlorinated washes can reduce bacteria counts but not kill them all.

Samadpour predicts that four of Earthbound's finished lots, nearly 4 tons, will test positive every year, most often in summer. If -- or when, Samadpour says -- that happens, Earthbound will dump it all in the trash, shut down the line and re-sanitize the plant.

Like most processors, Earthbound has also implemented pathogen-prevention measures in fields and plants, including inspections of harvest equipment, workers, compost and water.

Now the ultimate goal is to invent something that has eluded the industry: a full-proof method of sanitizing produce.

Testing is not the cure," Sweat said, "but it's another hurdle for that product to clear before it goes to market. What we learned is we can't always explain how something got contaminated. So we better put in more controls to detect it."

In the lab he runs for Earthbound, Samadpour jots down the fatal formula for an E. coli outbreak. Every 15 minutes, one cell turns into two, then two into four -- and before you know it, 24 hours later, millions of deadly microbes lurk on a spinach leaf.

"If 10 soldiers are well-armed against 20 attackers, you can hold them off. But if you have thousands attacking you, you're in trouble," he said. "Food safety is that way. One highly contaminated load will make history."

For greens -- and for ground beef, the leading cause of E. coli outbreaks -- there is no "kill step," or sanitizing system, that eliminates 99.99% of pathogens. Today's best technology, triple washing, kills 99%. That means if a handful of leaves from a farm carries 10 million bacterial cells, 100,000 could remain -- enough to make people sick.

Like an oddsmaker, Samadpour calculated the risk and came up with a mathematical formula designed to ensure that Earthbound sampled a big enough fraction of greens to prevent an outbreak, but not so big it would delay production and sacrifice freshness. The tests add 12 hours to the time it takes for the greens to reach consumers.

The company is now pushing for federal rules mandating testing. The rest of the industry's "don't test, don't tell" approach is a potentially deadly and costly mistake, Samadpour said. A recall can cost the industry tens of millions of dollars.

"Companies that don't test their products are putting themselves 100% at the mercy of their wash system, which everyone admits will not remove bacteria that is tightly attached or internalized," he said.

But the industry is skeptical. Many question the accuracy of the testing because the technique has not been scientifically verified, and they worry about lab errors -- false positives and negatives. They say it offers no quick fix and may give producers a false sense of security.

Fresh Express, the nation's largest supplier of bagged greens, says "test and hold" is unnecessary at its plants because it has rigorous safety measures, including the largest buffers between cows and crops, and its food has never been involved in an outbreak.

"The ultimate goal is we don't want anyone sick from our product," said Kathy Means of the Produce Marketing Assn. "But there's a variety of paths to get there. One size does not fit all."

Trevor Suslow, a UC Davis microbial food safety specialist, has mixed feelings about whether extensive testing should occur at every plant. More important, he said, is to ensure that growers, processors, truckers and stores all have well-designed programs to minimize pathogens.

"I think we simply have to engage in pathogen testing at some level. But you can't test yourself out of any or all contamination," Suslow said. "Due to the low probability of catching something, it has limited real value. But it may be an essential step to prevent an egregious mistake."

Earthbound's tests aren't foolproof. Because they are likely to miss some tainted leaves, people could occasionally still get sick. But they could stop big outbreaks, said Robert Mandrell, a U.S. Department of Agriculture research leader who specializes in genetic pathogen testing.

"Large outbreaks are the critical events to stop, so testing might help. Only time will tell," Mandrell said. "As long as processors and buyers do not try to oversell a 'not detected' result, there is no downside, except the expended effort and resources."

The new safety controls have cost Earthbound Farm "in the millions" over the last year, adding perhaps pennies per bag, Sweat said. The company, which produces $168 million in packaged salads annually -- 6% of the market -- has not raised prices to cover its costs, he said. Its greens are marketed mostly under the organic Earthbound Farm label, but also other names, including some Dole, Ready Pac and Trader Joe's products.

Michael Doyle, the industry's most vocal critic, said Earthbound "has made major strides in making products safer."

"I believe that Earthbound is now the industry leader in providing food safety interventions to fresh-cut salads," he said. "The rest of the industry would be well-advised to follow Earthbound's lead."

Nevertheless, Doyle, who is director of the University of Georgia's Center for Food Safety, still won't eat Earthbound's food, or any pre-cut, bagged fruits and vegetables, because they are more prone to contamination than whole produce.

"The problem is they don't have a bulletproof intervention," Doyle said. "I still feel they have a ways to go. But I also think they are committed to have a product as safe as pasteurized milk."

Sweat's ultimate goal is to make bagged greens so safe that Doyle will accept his invitation to have a salad for lunch.

Earthbound employees are motivated -- and still haunted -- by victims of the food poisoning, particularly a 2-year-old Wisconsin boy who died after his mother made him a spinach smoothie.

"When I got word of that, it took me to my knees. Each one is devastating, but that was absolutely the most heart-wrenching thing I have ever gone through," Sweat said. "For me to sit down at the table with a consumer who is going to eat one of our products, I need to be able to look them in the eye and tell them we are doing everything we can."

marla.cone@latimes.com