

**BUSINESS DAY**

Private Eyes in the Grocery Aisles

By KAREN STABINER APRIL 4, 2015

Mansour Samadpour makes his way through the supermarket like a detective working a crime scene, slow, watchful, up one aisle and down the next. A clerk mistakenly assumes that he needs help, but Mr. Samadpour brushes him off. He knows exactly what he's doing.

He buys organic raspberries that might test positive for pesticides and a fillet of wild-caught fish that might be neither wild nor the species listed on the label. He buys beef and pork ground fresh at the market. He is disappointed that there is no caviar, which might turn out to be something cheaper than sturgeon roe. That's an easy case to crack.

Civilian shoppers see food when they go to the market. Mr. Samadpour, the chief executive of IEH Laboratories (short for Institute for Environmental Health), sees mystery, if not downright fraud. On this visit, he is shopping for goods he can test at his labs to demonstrate to a reporter that what you see on market shelves may not be what you get.

While he's out of the office, he receives a call and dispatches a team on a more pressing expedition: They need to buy various products that contain cumin, because a client just found possible evidence of peanuts, a powerful allergen, in a cumin-based spice mix. The client wants a definitive answer before someone gets sick.

Suppliers, manufacturers and markets depend on Mr. Samadpour's network of labs to test food for inadvertent contamination and deliberate fraud, or to verify if a product is organic or free of genetically modified organisms. Consumers, the last link in the chain, bet their very health on responsible practices along the way.

The annual cost of food-borne illnesses in the United States is \$14.1 billion to \$16.3 billion, according to a 2013 analysis by the Agriculture Department. The federal government has called for a shift from reaction, which usually means a large recall after people have fallen ill or died, to prevention, to reduce the number of such episodes. Wary customers want their food to be safe and genuine, and food retailers, who rely on a global array of suppliers, are looking for ways to protect their brands.

Food testing sits at the intersection of those desires. Mr. Samadpour, who opened IEH's first lab in 2001 with six employees, now employs over 1,500 people at 116 labs in the United States and Europe. He refers to his company,

one of the largest of its kind in the country, as “a privately financed public health organization.”

The Promise of DNA Tests

The two low-slung wooden buildings that house IEH’s labs at its base in Seattle feel more like a high school chemistry lab than the center of a national food security network; there’s an acrid smell, and the counters are crammed with vials of various shapes and colors, centrifuge machines and lined notebooks full of data entries.

This is where analysts coax DNA out of a tiny sample of whatever is being tested. For lethal threats, like *E. coli* O157 in ground beef, the detection process involves a grim recipe of ground beef and a broth infused with nutrients that *E. coli* likes to eat, put in a warm place to rest for 10 hours — at which point a single *E. coli* cell, if it exists, will have spawned one million easy-to-detect siblings. For fraud cases, the process is somewhat simpler; lab technicians run a DNA test or chemical analysis to confirm a sample’s identity.

Cheap technology has made this kind of testing possible. “Ten years ago, it would have taken millions of dollars to sequence a genome,” Mr. Samadpour says. “Now it takes \$100. We do thousands a year.”

Business is booming — partly because IEH clients consider testing to be a gatekeeper defense in a multitiered food economy without borders. “We’re a lot more concerned about imports,” Mr. Samadpour says, because of “lack of accountability, lack of infrastructure, lack of a culture of food safety.” He says episodes like the 2008 discovery of the toxic chemical melamine in infant formula from China have contributed to a gradual shift in food manufacturers’ attitudes toward imports.

While the lab focuses primarily on safety issues like the cumin-and-peanut inquiry, there are enough fraud calls to support specialties among the lab technicians, like Kirthi Kutumbaka, referred to by his colleagues as “the emperor of fish” for his work on a seafood identification project. Once a fish is filleted, genetic testing is the only way to confirm its identity, making it a popular category for fraud.

IEH’s clients are primarily vendors who supply retailers and manufacturers, and they generally prefer to remain anonymous for fear of indicating to consumers that they have a specific worry about safety.

Costco is one of the retailers that use IEH’s services, and the company doesn’t mind talking about it.

“We have to inspect what we expect,” says Craig Wilson, the company’s vice president for quality assurance and food safety, meaning that products have to live up to their labels, particularly items in Costco’s own Kirkland Signature line.

Costco has a smaller margin of error than most food retailers; the company stocks only about 3,500 so-called S.K.U.s, or stock keeping units, while most retailers offer as many as 150,000. A single misstep is a far greater percentage of the whole. That’s why, in addition to retaining IEH, it operates its own 20-person testing lab.

“We’re not typical,” Mr. Wilson says. “We have one ketchup, one mayonnaise, one can of olives, Kirkland Signature olive oils and a couple of others.” Since 2003, the United States Department of Agriculture has required the testing of beef used for ground beef, resulting in a 40 percent reduction in cases of E. coli traced to beef consumption. Costco, which processes 600,000 to 700,000 pounds of ground beef daily, does extensive micro-sampling of the meat at its California facility, Mr. Wilson says.

The company expects its suppliers to absorb testing costs and gets no resistance, given the size of the resulting orders. Costco sells 157,000 rotisserie chickens a day. As Mr. Wilson put it: “If vendors get a bill for a couple hundred bucks on a \$1 million order, who cares? They don’t.”

The sheer volume also enables Costco to demand action when there is a problem. After a 2006 outbreak of E. coli tied to Earthbound Farm’s ready-to-eat bagged spinach, in which three people died and more than 200 became ill, Mr. Wilson, one of Earthbound’s customers, instituted what he calls a “bag and hold” program for all of Costco’s fresh greens suppliers. He required the suppliers to test their produce and not ship it until they had the results of the tests.

Earthbound responded to the outbreak with a “multihurdle program that places as many barriers to food-borne illness as we can,” says Gary Thomas, the company’s senior vice president for integrated supply chain. Earthbound now conducts 200,000 tests annually on its ready-to-eat greens.

Not everyone was as quick to embrace change; some growers were concerned about losing shelf life while they waited for results. Mr. Wilson was unmoved by that argument. “If you can test and verify microbial safety, what do I care if I lose shelf life?” he says.

The Food Safety Modernization Act of 2011, intended to improve food safety practices, has been mired in missed deadlines, which have been attributed to food-industry concerns about overregulation and to an unrealistic timeline given the scope of the overhaul. The delays led to a lawsuit by the Center for Food Safety and the Center for Environmental Health, two advocacy groups. The F.D.A. and the Office of Management and Budget now operate under a court-ordered schedule that requires regulations to be issued in late 2015 and 2016.

The F.D.A. currently stops short of requiring produce tests, although it conducts its own “surveillance sampling,” according to Juli Putnam, an agency spokeswoman. The agency sees two drawbacks to mandatory tests: “A negative product test result does not necessarily indicate the absence of a hazard,” Ms. Putnam wrote in an email, because contamination might show up in another part of a field, and conducting more tests would increase the costs that are passed on to the consumer.

The agency is focused instead on defining minimum safety standards for “potential sources of microbiological contamination such as agricultural water, worker health and hygiene and animals in the growing area,” she wrote (though

some preventive testing is conducted on sprouts).

Mr. Wilson says he uses government guidelines “as a minimum standard, and I always try to go above and beyond that.”

DNATrek, a newcomer to the field, sees opportunity in another aspect of food safety testing: the need to quickly pinpoint the source of a pathogen outbreak, to avoid delays and unnecessarily broad recalls. Anthony Zografos, the company’s chief executive, says it soon plans to introduce a test called DNATrax, which will be able to identify the source of contaminated produce within an

hour, narrowing recall efforts “to a specific field or packer or distributor.” The test relies on tracer DNA that is dissolved in the liquid coating applied to many types of produce after harvest or added to prepared foods; it provides a unique genetic fingerprint.

George Farquar, a chemist and Mr. Zografos’s partner in the company, was looking for ways to trace airborne contaminants as part of a national security project financed by the Defense Department when he realized that the work could be applied to food safety. He and Mr. Zografos licensed the technology from the Lawrence Livermore National Laboratory, where he was conducting the research, and it will receive royalties from sales of the test. Mr. Zografos says that DNATrax will offer traceability for most types of field produce at a price of about \$1 for 1,000 pounds.

Tracking Down Fraud

Food safety is a yes-or-no proposition — either there is a contaminant or there isn’t. Food fraud, a smaller segment of the universe of problem foods, is harder to detect because it can take so many forms. Fish from a country whose imports have been banned might arrive at the market labeled with a different country of origin, honey might be cut with cheaper extenders, and saffron might not even be saffron.

When asked if fake food has ever crossed the threshold at Costco, Mr. Wilson smiles and says, “I’m going to go with ‘no,’ but you’re not going to believe me entirely. Yes, there have been egregious things, and we’ve taken care of them, and that’s that.”

Olive oil is a popular target for fraud because there are several ways to charge more for less. Compliance with United States Department of Agriculture quality standards for extra-virgin olive oil is voluntary. Unless a supplier pays for testing, passes and puts a U.S.D.A.-certified sticker on the bottle, consumers have no way to know whether they got extra-virgin olive oil. Any grade of olive oil can be doctored with cheap filler oils like canola, because they have no flavor. And the country of origin listed on the label isn’t always where the contents are from.

About five years ago, Mr. Wilson decided it was time to send an employee to Tuscany to collect leaves from Tuscan olive trees. Costco now has an index of DNA information on “all the cultivars of Tuscan olive oil, about 16 different ones,” he says. “When they harvest and press, we do our DNA testing.”

A group of undergraduates at the University of California, Davis, has developed the OliView, a biosensor that can detect rancid or adulterated olive oil. They expect to have the device ready for sale, at \$60 to \$80, in 18 months to two years. “At the supermarket level, we found that a lot of times the oil was just old and rancid,” says Selina Wang, research director at the U.C. Davis Olive Center and one of the students’ advisers, “but there were also samples labeled extra virgin that were actually a little bit of virgin olive oil mixed with refined olive oil.”

Adulterated oil, more common among imports, can stump even food professionals. Ms. Wang says that at the center, they “have seen samples with as much as 70 percent canola oil.”

DNATrek has also developed a test for products where fraud is a temptation — “high-value stuff, truffles, saffron, premium juices, honey, seafood and olive oil,” Mr. Zografos says.

Mr. Samadpour says that in multi-ingredient products, the source of trickery is usually hidden further down the food chain than the name on the package. “It’s not the top people who get involved in economic adulteration,” he says. “It’s someone lower down who sees a way to save a penny here or there. Maybe it’s 2 or 3 cents, but if you sell a million units, that’s \$20,000 to \$30,000.”

Consumer Vigilance

As with most expanding technologies, there are believers and skeptics. David Gombas, senior vice president for food safety and technology at the 111-year-old United Fresh Produce Association, echoes the position of the Food and Drug Administration: Testing is not a sufficient answer for his members, who include anyone engaged in the fresh produce industry, “from guys who come up with seeds to growers, shippers, fresh-cut processors, restaurants and grocery stores, everyone from beginning to end,” from small organic farms to Monsanto.

Their common ground, he says, is a commitment to food safety — but members disagree on how to achieve it, including Mr. Gombas and Mr. Samadpour, who are both microbiologists. “Microbiological testing provides a false sense of security,” Mr. Gombas says. “They can find one dead salmonella cell on a watermelon, but what does that tell you about the rest of the watermelon in the field? Nothing.”

Testing has its place, he says, but as backup for “good practices and environmental monitoring,” which includes things as diverse as employee hygiene and site visits. “I’m a fan of testing,” he says, “if something funny’s going on.” Otherwise, he has taken on the role of contrarian. “People think testing means something. When I say it doesn’t, they smile, nod and keep testing.”

Mr. Samadpour says sampling “can reduce the risk tremendously but can never 100 percent eliminate it,” but he will take a tremendous reduction over a food crisis any day. The government’s “indirect” stance, which mandates safety but does not require testing, allows companies to interpret safe practices on “a

spectrum,” he says, “from bare minimum to sophisticated programs,” and he worries about safety at the low end of that range.

He says consumer vigilance is the best defense against the selling of groceries under bare minimum standards.

IEH tested the contents of Mr. Samadpour’s grocery cart:

The organic raspberries showed 0.12 parts per million of spinosyn A, an insecticide with a tolerance limit of 0.035 p.p.m. on organic crops and 0.7 p.p.m. on nonorganic berries. Mr. Samadpour assumed that was the result of an errant breeze from a nearby nonorganic field.

The beef and pork were cross-contaminated — each had amounts of the other — a common occurrence, he says, when markets grind first one batch of meat and then the other. These were small amounts as well, but their presence could upset a Muslim or Jewish customer who does not eat pork, or a Hindu who does not eat beef. The fish was what the label said it was.

As for the cumin and the peanuts, the F.D.A. posted a handful of product recalls, all of them involving cumin and peanuts, including Kellogg’s MorningStar Farms chipotle black bean burgers, which Mr. Wilson removed from Costco’s shelves.

The recalls continued for weeks, until the F.D.A. issued a blanket statement “advising people who are highly allergic to peanuts to consider avoiding products that contain ground cumin or cumin powder, because some shipments of these products have tested positive for undeclared peanut protein. People who are highly allergic or sensitive to peanuts may be at risk of a serious or life-threatening allergic reaction.”

Inside the labs, reaction was more world-weary than panicked; this was business as usual.

“Other than the label somebody’s written,” Mr. Farquar says, “you really have no idea where your food’s coming from.”

Mr. Samadpour, having been at this far longer, is more philosophical. “I eat street food when I travel,” he says. “One can’t become a microbe-phobe.”

A version of this article appears in print on April 5, 2015, on page BU1 of the New York edition with the headline: Private Eyes in the Grocery Aisles.