

BUSINESS

Is that really ginger in your gingerbread? Food fraud is flourishing — and experts worry Canada isn't doing enough to stop it

Investigators have found corn syrup in honey, olive tree leaves in oregano, peanut shells in cumin and toxic dyes in turmeric. Lab tests help, but Canadian fines are too low, some experts say.

By **Jake Edmiston** Business Reporter

Dec 23, 2023

Article was updated Dec 23, 2023



Ramon Ferreira Toronto Star Illustration

The shrivelled little beads looked and smelled like black peppercorns. But that wasn't enough to confirm they were, in fact, peppercorns — at least according to the scientist at a food testing lab in Guelph, Ont., who was about to grind them, shake them and test them with a giant magnet.

The scientist, Arun Krishnamurthy, said this sample of peppercorns — sent by a food manufacturer as part of a quality control program — could actually be papaya seeds, which look so much like peppercorns that fraudsters have made a business out of swapping the two.

"Until we analyze, until we look at its chemistry," he said, "we will never know if it's a pure sample."



Inside an Ontario lab that tests for food fraud

This lab and others like it are in business because of a startling truth: Food in Canada is not always what it seems.

In the past decade or so, investigators around the world have found corn syrup in honey, olive tree leaves in oregano, tomato skins in paprika, peanut shells in cumin, toxic dyes in turmeric, horsemeat in beef lasagna sold at U.K. supermarkets and, in a deadly 2008 case, chemicals in milk used for infant formula in China.

Occasional international crime busts can make food fraud feel like a faraway problem, not one that's lurking on the shelves of your local grocery store. But although the federal government has spent millions to build up our national defences, some experts worry government testing and penalties don't go far enough to keep fake or diluted food out of the domestic supply chain.

At this point, it's difficult to fully fathom the size of the problem in Canada. One thing experts know for sure, however, is that food fraud loves pressure. When crops die, war breaks out or there's a labour shortage, supply shrinks and prices jump. That's when it's likely

someone, or some criminal enterprise, will step in to fill the void. And after three years of a pandemic, war and inflation, the global food supply chain is under more pressure than it's seen in generations.

A week after Russia invaded Ukraine in 2022, John Spink, an assistant professor who specializes in food fraud at Michigan State University, started worrying about sunflower oil. Ukraine is the world's largest exporter of sunflower seeds and Spink suspected there'd be worldwide shortages and high prices, which would lead schemes to cash in on the crisis by diluting sunflower oil with cheaper, more available oils.

Fraudster playbook

Common adulterants and bulking agents used in spices, according to a 2021 report by the European Commission's Joint Research Centre.



Cumin

Fraudsters have historically cut cumin with peanut shells and almond husks. Reports also found traces of mahaleb.



Turmeric

Turmeric's vibrant colour has reportedly been illegally enhanced with dyes and inorganic materials including yellow chalk and lead chromate. Fraudsters have also used fillers like maize or rice flour.



Oregano

Historic fraud of oregano includes adding cheaper look-alikes, including olive leaves, sumac and myrtle.



Paprika

Fraud in paprika includes illegal red dyes, as well as "extension" of the product with tomato skins, according to the European Commission Report.



Pepper

Whole peppercorns and ground pepper have both been reportedly substituted with papaya seeds, as well as fillers.



Saffron

Common frauds include dyes and substitution with safflower, turmeric and other *Crocus* species.

Spink said he worked with food companies to ramp up testing on sunflower oil imports to scare off would-be fraudsters.

"Remember, this is a different type of criminal," he said.

Organized crime networks are getting into food fraud mostly because you can make a lot of money without risking the sort of jail-time associated with trafficking drugs or weapons. But it takes time and money to build facilities and technology. So once operations are up and running, no one wants to risk blowing up the works by failing a test.

"This is not a smash-and-grab criminal," Spink said. "They're organized. They're stealthy. They're often well-funded. Very intelligent. But they're also very skittish, because most of them have invested in the business."

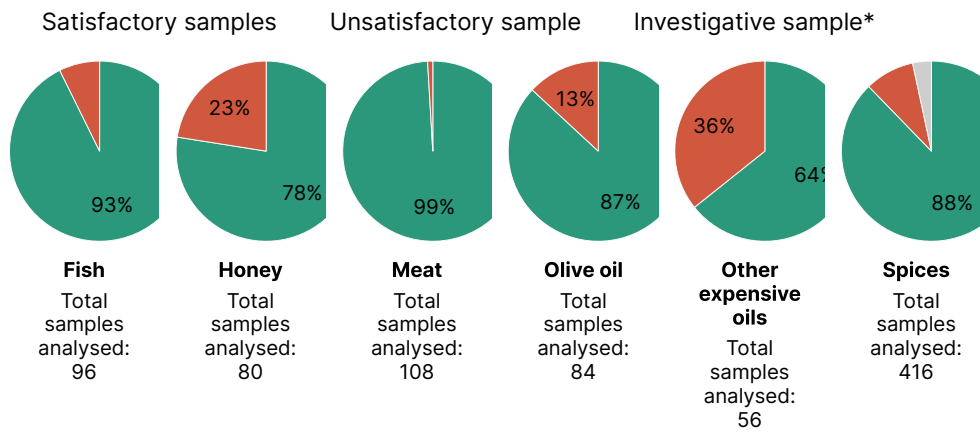
In the past year, the lab in Guelph, called Purity-IQ, has discovered genetically engineered sweet potatoes from China masquerading as non-GMO, American sweet potatoes. They've also discovered turmeric laced with a toxic dye known as Metanil Yellow, and so-called probiotic yoghurt without live probiotics.

Deleo de Leonardis, the former VP of private label products at Sobeys who co-founded the Purity-IQ food testing lab in 2019, said cost pressures and supply problems have pushed some food companies to change from a supplier they've used for years to a new, untested one.

"They're crossing their fingers," she said. "Sometimes they tell us: 'It just doesn't seem right. The price doesn't seem right. The spidey sense is going off.' "

Snapshot of food fraud in Canada

The Canadian Food Inspection Agency tested 844 samples of "high-risk" products for food fraud between 2021 and 2022. This is what they found.



The test results summarized in this report are for sampling that is targeted at areas of higher risk and are not representative of overall compliance rates within the Canadian marketplace. Risk factors include history of non-compliance, unusual trading patterns and gaps in preventive controls.

* Samples were assessed as "investigative" when either peanut or gluten protein was detected, and the package included a precautionary statement. In these cases, further inspection of company preventive controls may have been necessary.

It is important to note that some unsatisfactory spice sampling results were due to undeclared allergens that were present at low levels that are more indicative of cross-contamination than intentional adulteration or substitution.

The Canadian Food Inspection Agency (CFIA) said it works with companies in the food industry to make sure they're doing the right things internally to guard against food fraud. The Consumer Goods Forum — a global group of retailers and brands that includes Loblaw, Walmart, Amazon and PepsiCo — has its own food safety standards for companies to prevent fraud.

On top of that, CFIA screens shipments coming into the country and flags any cargo headed for "higher-risk" importers, which helps the agency narrow down what products to test for fraud. A CFIA spokesperson also said the agency can issue "a written notice, an administrative monetary penalty, recommendation for prosecution or suspension of their facility registration."

In its 2019 budget, the federal government earmarked roughly \$25 million over five years to build up CFIA's capacity to guard against food fraud. When the agency catches a mislabelled or diluted product, it can seize or destroy it, or force it to be relabelled.

The agency said its latest food fraud probe stopped 100,000 kilograms of "misrepresented" food from being sold in Canada. In one case, CFIA found traces of gluten in a sample of black pepper and forced a recall of

the brand, Arifoglu, from shelves.

Between 2021 and 2022, CFIA announced charges in two cases, including a North Vancouver company that pleaded guilty and was fined \$150,000 for selling beef as "certified organic" that wasn't organic, according to the North Shore News. In another case, a Chinese-owned lobster company in Nova Scotia was fined \$50,000 in 2021 for exporting American lobsters that had been mislabelled as Canadian, the CBC reported at the time.

Robert Hanner, a professor of integrative biology at the University of Guelph who has worked with CFIA on food inspections, said such penalties aren't high enough to act as a real deterrent.

"If I'm going to make \$10 million in adulterated product and if I get caught I might pay a \$250,000 fine, well you might argue, 'Hell, that's just the cost of doing business,'" he said. "There's this tendency to think that a warning letter or a small fine is going to be a deterrent, but frankly it's not because we're still seeing a lot of this kind of fraud."

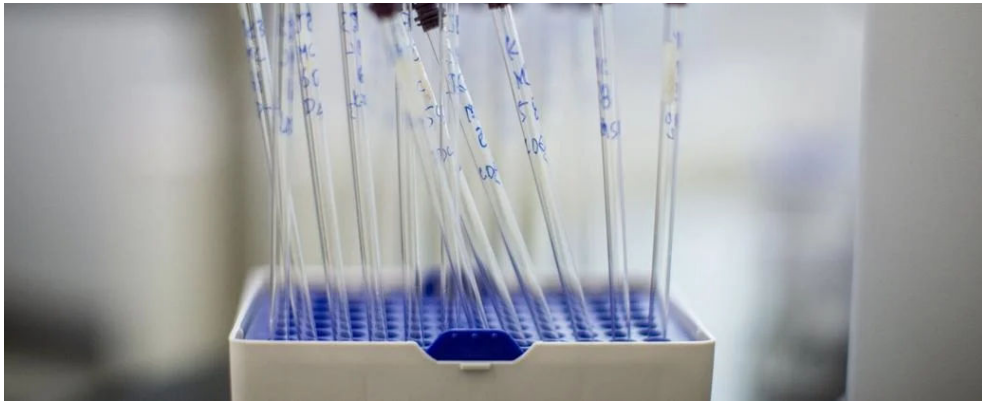
Hanner said the relatively lax regulatory approach to food fraud comes from a misconception that it's more of an economic concern rather than a danger to public health.

"This is where I get a little pissed off, this idea that food fraud is a low priority because it's not a health risk," said Hanner, who has worked on studies that found mislabelling of seafood species in Canada. "If I can't even trust some of my suppliers to sell me the right species, why would I believe their cold chains have remained intact?" he said, referring to the practice of keeping seafood shipments at a safe temperature throughout the supply chain.

In its latest annual study on food fraud for 2021-22, released earlier this year, CFIA tested 844 samples of fish, honey, meat, oils and spices and found signs of fraud in each. Of all categories, "other expensive oils" had the highest fail rate at 35.7 per cent, followed by olive oil at 13.1 per cent, spices at 9.2 per cent, fish at 7.3 per cent and meat at 0.9 per cent. CFIA said the study focused on high-risk areas, so it isn't representative of overall fraud in the Canadian market.

Hanner, however, said the 844 samples collected in CFIA's latest study was "kind of laughable."

"I could do that with some high school students in my lab in a week," he said. "You can't test everything. But we've got to be doing some regular amount of routine sampling."



Vials used in the testing of food products are seen at Purity-IQ in Guelph, Ont., In the past year, the lab has discovered genetically engineered sweet potatoes from China masquerading as non-GMO, American sweet potatoes. They've also discovered turmeric laced with a toxic dye known as Metanil Yellow, and so-called probiotic yoghurt without live probiotics.

Nick Kozak for the Toronto Star

CFIA said the 844 samples don't represent the "totality" of its testing. In addition to food fraud testing, a spokesperson said, the CFIA runs tens of thousands of tests on food each year to detect for microbiological and chemical hazards, as well allergens.

There are two basic ways to test for food fraud: targeted and untargeted. Targeted tests can give you a basic, yes-or-no answer to questions like is there horsemeat in my lasagna? But they can't tell you what else might be in it. You need to know what you're looking for, which means targeted tests aren't going to catch fraud techniques that are just starting to pop up in the market, said Yaxi Hu, who leads Carleton University's Food Analytical Chemistry and Technology Lab.

That's where non-targeted methods can help. It's newer technology, which can pull a fingerprint from the sample that can tell you whether it matches the real thing. The hitch is you need a library of fingerprints to know whether the sample is a match or not.

CFIA uses a mix of targeted and untargeted testing, depending on the product. In spices, for example, CFIA used targeted tests to look for allergens and dyes, since ground spices have historically been cut with nut shells and harmful dyes like Sudan Red. In honey, however, the agency uses non-targeted and targeted testing to look for adulterants like corn syrup.

Spink, the Michigan State researcher, said it would be too costly and time-consuming for a government agency to run exhaustive tests on everything entering the country, especially since the true point of testing is to deter bad actors, not catch them.

"We want to hassle them out of business," he said.

Since 2011, police agencies Interpol and Europol have been conducting annual operations around the world to break up food fraud rings, as part

of Operation Opson. One report this fall said Operation Opson had uncovered a scheme that was "trafficking ham" with a manipulated expiry date.

Last year, Europol confiscated 750,000 euros worth of "molecularly modified" gardenia extract that was allegedly destined to be sold as saffron. Then in November, police in Italy and Spain raided an allegedly illegal olive oil outfit, arresting 11 people and seizing 260,000 litres of olive oil that had been allegedly diluted with lampante oil, a low grade of olive oil with a "distinctly unpleasant odour" that was historically used as fuel in oil lamps. And this week, a spokesperson with the U.S. Food and Drug Administration (FDA) told **CBS News** that investigators are looking at whether "economically motivated adulteration" ended up contaminating cinnamon used in applesauce with dangerous levels of lead.

As high inflation drove an affordability crisis around the world this year, retailers were under pressure to keep prices down, and food companies are under pressure to find ways to manage their own costs without making consumers pay more, either by shrinking their package sizing or finding cheaper ingredients or methods to make their products.

In response, CFIA warned the industry this month that changing the recipe or the size of a product without properly updating the label amounts to food fraud, since the agency considers food fraud to be the "deliberate misrepresentation of a food."

At the lab in Guelph, Krishnamurthy, ground his sample of alleged peppercorns into a fine powder then diluted it in solvent and spun it in a countertop vortex machine that shook so vigorously it almost hurled itself onto the floor.

There was a large tank at the far end of the room, with a danger zone marked off in red tape around it. It was a nuclear magnetic resonance spectroscopy (NMR) machine, which uses an intensely powerful magnet to look at the molecular makeup of food — part of the new generation of untargeted testing. If you got too close, it could wipe your credit cards, destroy your phone and rip the keys out of your pocket, right through the fabric of your pants.

The lab charges clients \$400 per sample for the NMR tests, which produce a report that shows the profile, or fingerprint, of the food, which to an untrained eye look like squiggly lines on a graph.

Krishnamurthy pointed to a squiggle in results from a sample of turmeric tested earlier this year. A section of the squiggly line, he said, showed authentic turmeric. But another section didn't match his reference fingerprint for turmeric. It matched a signature for a toxic yellow dye.

"This is definitely not good," he said, tracing the line with his finger.



Arun Krishnamurthy, a spectroscopist at food testing lab Purity-IQ in Guelph, Ont., transfers a solution for testing into a vial. "Until we analyze, until we look at its chemistry," he said, "we will never know if it's a pure sample."

Nick Kozak for the Toronto Star

When the lab in Guelph catches a fraud, Krishnamurthy, in his white coat, has to report it up the chain.

"I run to Amber," he said.

Amber Thelen runs the lab and acts as the company's go-between with clients, since she can speak the language of the lab and translate it to the food executives who pay for tests. Before she started at Purity-IQ, she briefly worked at a factory that raised black soldier flies as feed for poultry and fish, and before that, ran quality assurance for the commissary kitchen at the Fortinos grocery chain.

This fall, Krishnamurthy came running with test results showing a sample of the supplement maral root was almost entirely made up of a processed starch called maltodextrin.

"Obviously I have the dread in my stomach," Thelen said, "because I'm the one that needs to talk to the client about it."

In some cases, she said, the client expected there was a problem, which is why they were paying for the testing in the first place. In other cases, the manufacturer's product is already on shelves when the lab calls with a bad test.

"That is the scary truth," she said.

But on a recent visit, after Krishnamurthy had ground and diluted and spun and tested his sample of black peppercorns, the NMR machine reported back with a "positive identification."

According to the report, the squiggles of the sample's fingerprint matched the real thing, so Krishnamurthy could relax. It was pepper.

Jake Edmiston is a Toronto-based business reporter for the Star. Reach him via email: jedmiston@thestar.ca