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The Most Popular and Dangerous Seafood You Can Buy

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STORY AT-A-GLANCE

- A new investigation by CBC News Marketplace found potentially harmful antibiotic-resistant bacteria in imported shrimp sold in various supermarkets in Canada
- Investigative reporters purchased 51 packages of shrimp imported from Vietnam, Thailand, China, India and Ecuador
- Investigators found 17% or 2 out of every 10 packages were contaminated with antibiotic resistant bacteria, also known as superbugs; of that 17%, 89% showed resistance to multiple antibiotics
- Superbugs, one of the greatest threats to human health, may kill more people than cancer by 2050
- The overuse of antibiotics in factory farm animals and the heavy spraying of pesticides on food crops is the No. 1 driver of deadly superbugs

This article was previously published July 27, 2019, and has been updated with new information.

Shrimp is a tasty dish that can be eaten for breakfast, lunch or dinner. It pairs well with a variety of foods including eggs, pasta, sushi and steak. But is shrimp safe to eat? Well, that depends on where it comes from and how it is raised.

An investigation by CBC News Marketplace[1] found potentially harmful antibiotic-resistant bacteria on imported shrimp sold in various supermarkets in Canada. While the

use of antibiotics on shrimp is banned in Canada, the majority of shrimp is imported, largely from Asia.

Investigative reporters with CBC News purchased 51 packages of shrimp sold in grocery stores in a variety of Canadian cities including Montreal, Saskatoon, Calgary and Toronto.

Canada imports shrimp from a number of countries including Vietnam, Thailand, China and India. Investigators purchased imported shrimp labeled "organic" as well as some with the "Best Aquaculture Practices" certification, which maintains that farmers only use antibiotics minimally.

They packaged up the shrimp and sent it to a special lab at the University of Saskatchewan to be tested for dangerous bacteria.

Microbiologist Joseph Rubin, an expert in antimicrobial resistance, tested the shrimp for different types of antibiotic-resistant bacteria and foodborne pathogens, including E. coli, Salmonella and Staphylococcus Aureus, potentially harmful bacteria that can develop a resistance to antibiotics. In other words, he was checking for superbugs that antibiotics cannot kill.

Rubin is an assistant professor in the department of veterinary microbiology who studies bacterial superbugs. He is working to prevent a potentially deadly epidemic and is particularly interested in the spread of superbugs from animals to humans through food contamination.[2]

Testing Finds Antibiotic Killers in Imported Shrimp

The first batch of imported shrimp tested positive for E. coli. The sample also contained antibiotics, leading Rubin to suspect that, based on the growth, the shrimp may also contain antibiotic-resistant bacteria. The lab ran a DNA test overnight to confirm. Sure enough, the sample contained Extended-Spectrum Beta-Lactamase-producing strains of bacteria (ESBLs).

This strain of bacteria is gram-negative, producing an enzyme that allows bacteria to break down commonly used antibiotics, such as penicillins and cephalosporins.[3] When this happens, the antibiotics don't work. The test results, to say the least, are alarming.

Rubin found that 17% or 2 out of every 10 packages he tested were contaminated with antibiotic-resistant bacteria. Of those, 89% contained bacteria resistant to multiple antibiotics, and of those, 33% tested positive for ESBL-producing bacteria. He also found an ESBL superbug on shrimp that came from Vietnam in a package labeled "organic."

Of the nine samples tested that contained resistant bacteria, six of those came from products that listed the "Best Aquaculture Practices"[4] certification.

The testing revealed that one country had more superbug-contaminated shrimp than the others. That country was India. Of the nine samples that tested positive for antibiotic-resistant bacteria, two of the packages were from China, one was from Vietnam, one was from Thailand and five were from India.

Products From One Country More Likely To Be Contaminated

Canada imports about $700 million worth of shrimp each year. The majority of it comes from countries like India, China, Thailand and Vietnam.[5] But, according to the film, most of the imported shrimp found in Canadian supermarkets is from India, which exports 15 million kilograms (30 million pounds) into the country each year.

India uses more antibiotics than any other country in the world. It doubled its use in less than two decades. The reason for India's spike in the use of antibiotics, according to the Hindustan Times, is:[6]

> *"Rising incomes, over-the-counter sale, a poorly regulated private hospital sector, high rates of hospital infection, inexpensive antibiotics and frequent infectious disease outbreaks are driving consumption in India and other low- and middle-income countries."*

Ramanan Laxinarayan, who serves as director of the Center for Disease Dynamics, Economics & Policy, helped lead the analysis of antibiotic use in 76 countries and told the Hindustan Times:

> *"The background burden of bacterial infections, and misuse for all fevers regardless of whether they are caused by parasites, viruses or bacteria, is another major causal factor. Unless we improve regulation, we can expect that the resistance problem will get worse."*

Industrial Agriculture Is the Biggest Driver of Superbugs

While it's true the overprescribing of antibiotics is contributing to resistance, the biggest drivers of superbugs are the overuse of antibiotics in factory farm animals and the heavy spraying of pesticides on food crops. As reported by the Organic Consumers Association:[7]

> *"Nearly 80 percent of antibiotics in the U.S. are administered to conventionally raised cows, pigs and chickens to promote growth and treat disease. This means exposing healthy animals to antibiotics over long periods of time.*
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> *The result is antibiotic-resistant bacteria that can be passed on to humans through the consumption of animal products or direct exposure to animal manure, which is often generously applied to farmland as a means to cope with the vast amount of waste produced by concentrated animal feeding operations (CAFOs).*
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> *A study published in the journal JAMA found that people living near pig farms or cropland fertilized with pig manure are 30 percent more likely to contract methicillin-resistant Staphylococcus aureus bacteria or MRSA.*
>
> *In November 2018, Consumer Reports revealed that it detected a number of prohibited drugs in hundreds of samples of meat products sold in the U.S. Testing found ketamine, a hallucinogenic party drug, phenylbutazone, a*

dangerous anti-inflammatory, and chloramphenicol, a powerful antibiotic linked to potentially deadly anemia, in beef, poultry and pork products.

The findings highlight the need for stricter testing by regulatory agencies, as well as a transition away from drug-dependent factory farms to organic regenerative agriculture, which emphasizes soil health, holistic land management, animal welfare and farmworker fairness."

'Pandora's Box Is Open When It Comes to Resistance'

CBC News reporters spoke with biochemist Gerry Wright, director of the Michael G. DeGroote Institute for Infectious Disease Research at McMaster University in Hamilton, Ontario.[8] When asked about his opinion on the threat of antibiotic resistance, Wright admits he's absolutely "terrified by this stuff."

Anyone who has had a knee replacement or any kind of surgery, chemotherapy for cancer or a premature baby has a weak immune system and relies on antibiotics, he says. The rise in superbugs could have grave consequences for these somewhat common conditions, he adds.

Multidrug resistance is probably the greatest threat to modern medicine, says Wright. He acknowledges that the overuse of drugs in food in Canada and abroad is a major contributor to superbugs. When it comes to raising shrimp, they're often crammed in disease-prone pools and given antibiotics to keep them alive. As a result, the drugs end up in shrimp that's eaten by people.

When CBC News asked Wright how bacteria in the shrimp developed resistance to antibiotics, he explained that while there is always a low-level of resistance, the kinds of resistance that were found in the testing points to a connection to antibiotic use.

Antibiotics were either used on the shrimp or in the ponds for other organisms where the shrimp were raised, he said, adding that there has to be a way for those resistance genes to be there. "Pandora's box is open when it comes to resistance. We can't scrub the planet of this problem," he said.

Does Cooking Shrimp Eliminate the Threat of Superbugs?

When CBC News shared their results with the companies and certifiers whose shrimp tested positive for superbugs, they blamed the contamination on processing, shipping or some other environmental exposure. They also said that cooking shrimp thoroughly would kill any potentially harmful superbugs. CBC News put that claim to the test.

Researchers from the University of British Columbia coated some shrimp with an opaque, luminescent gel before inviting home cook Charlotte Lee to prepare a dish. Lee was unaware of the application of the gel, which was expected to stick to everything she touched. Using the gel was a way to show how easily bacteria on the shrimp could be spread.

Lee prepared a delicious shrimp dish. Despite carefully cleaning her hands and working space, once the lights were turned off, the luminescent gel showed up in a number of places, including on the containers of several ingredients she used. The gel was found on a box of corn starch, on an egg carton, the tap where she washed her hands, and even on the CBC News reporter's hand, who introduced himself with a handshake.

The experiment showed how easily potentially harmful bacteria can end up in your kitchen, including on surfaces where it can survive for months, and even grow again, given the right conditions. "It's a good reminder for us that even if we cook meat or shrimp really well, that there's still a way for bad stuff on it to get into us," reports CBC News.

The gel also showed up on a bunch of green onions that Lee used to prepare the shrimp dish. If someone were to make a salad with those green onions, resistant bacteria could end up in your gut, where it has the potential to share resistance genes with other gut bacteria, said Rubin, adding that antibiotic resistance can build up over time.

Imported Foods Present a Loophole in Canada

Ensuring food in Canada is safe to eat is the job of the Canadian Food Inspection Agency. CBC News tried to get an on-camera interview with CFIA but had no such luck.

So, they traveled to Quebec City to ask Canada's Minister of Health, Ginette Petitpas Taylor, why CFIA isn't testing for antibiotic-resistant bacteria on imported shrimp. The agency currently tests for traces of antibiotic residue, but that test does not determine if superbugs are making their way into the country, as noted in the film.

CBC News asked Taylor if the Canadian government is concerned about antibiotic-resistant bacteria on shrimp. "Canada is concerned, but we're confident the CFIA is doing the work needed to protect our nation's food supply," she said.

The Canadian government maintains it is taking action to reduce medically important antimicrobials in animals.[9] But the challenge is dealing with food imported from other countries that don't have the same regulations.

"There is a gap and we need to close it," Wright told CBC News. "The problem is that right now, other than your 'little study,' we just don't know how much of this stuff is ending up on imported shrimp, as well as other popular foods," he added.

Quality Shrimp From Local Producers

The beginning of the film features award-winning chef Robert Clark. He prepares scrumptious dishes without using sauce or strong spices. His secret? Sourcing quality shrimp.

"The more you maintain the integrity of a product, the easier it is," he told CBC News. "It's tough to buy quality shrimp at the supermarket, where a lot of it is grown in cesspools and contains things like antibiotics, pesticides and insecticides," Clark said. That's why he sources his shrimp from a local producer who avoids antibiotics.

The Berezan Shrimp Company, a Canadian owned and operated family business based in Langley, British Columbia, was one such producer that was dedicated to producing sustainable seafood. Nicknamed the "shrimp spa," the Berezan Shrimp Co. was

passionate about protecting the planet's natural ecosystems.[10] It used the most technologically advanced land-based farm to produce shrimp without antibiotics and does so in a way that doesn't affect our oceans or environment.

They were hoping to boost production and become a major supplier in the Canadian market. The indoor facility was able to control the engineered air and water, thus keeping the water clean and the shrimp healthy, which meant no need for antibiotics.

CBC News checked that claim and tested its shrimp and found no antibiotic-resistant bacteria. Cleanliness has a cost, however. Shrimp from the Berezan Shrimp Co. cost about 30% more than imported shrimp. But food, especially high-quality food, shouldn't be cheap, Clark said.

"Our priorities in North America are wrong. It's more important that we have the right car than it is to feed our children the right food," he said. When CBC asked if our demand for cheap food has caused us to live in the world we now live in, he replied, "You get what you pay for."

So what happened to Berezan Shrimp Co.? It closed in late 2019 when it couldn't contain a virus in imported shrimp it received from a farm in Texas, and the cost of production soared so high the company buckled and closed.

The Cost of Cheap Food

You may think this means that producing expensive foods just aren't worth it, but cheap food also has a cost. The overuse of pesticides on food crops and antibiotics in livestock is taking a toll on human health, as well as the health of our planet. Pesticides, antibiotics and other drugs are polluting our waterways, air and soil, affecting our ability to produce clean, healthy food.

Antibiotic resistance has quickly turned into a worldwide health threat of massive proportions. According to the U.S. Centers for Disease Control and Prevention,[11] 2 million American adults and children become infected with antibiotic-resistant bacteria each year, and at least 23,000 of them die as a result.

Superbugs are multiplying so quickly that the number of deaths caused by drug-resistant infections could outpace those caused by cancer by 2050, according to a study funded by the British government.[12]

Fortunately, there are ways to protect you and your family from drug-resistant bacteria. When it comes to purchasing shrimp, look for shrimp that is wild caught or locally produced.

Second, be sure to cook your shrimp carefully and thoroughly, to avoid cross-contamination. Finally, when it comes to other types of food, try to buy most of it locally and choose organic as much as possible. Small producers are less likely to misuse antibiotics and eating organic foods can reduce your exposure to harmful pesticides.

Sources and References

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