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Microplastics Are in Our Food, Too. How Worried Should We Be?

Story by Erin Bunch • 3mo • 10 min read

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Microplastics Are in Our Food, Too. How Worried Should We Be?
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Earlier this year, headlines screamed scary stats around just how much microplastic makes its way into the water we drink out of plastic bottles, and it's a lot. (An average of 240,000 particles per liter, to be precise.) Of course, plastic water bottles can be avoided, but as I read this news from my kitchen, where plastic was touching everything from the berries to the chips to the chicken breasts, I began to wonder just how much microplastic I was consuming daily with my food.

The answer, it turns out, is also "a lot." A 2024 study, for example, found microplastics in 16 different commonly consumed protein products purchased in the United States. Study co-author Madeline H. Milne says her research team looked at proteins with various levels of processing, from seafood fresh off the boat to chicken nuggets. Based on their findings, Milne and her fellow researchers estimated that Americans ingest more than 11,000 microplastic particles a year via their protein consumption alone, and that consumers on the higher end of protein consumption could be taking in as many 3.8 million plastic particles per year.

Milne points out two different findings of interest from this study. "The first is that we didn't see a significant difference between the contamination in products that were seafood, terrestrial meat, or plant-based proteins," says Milne. "When people think about microplastics, initially, they might think it's just a problem in the ocean, but what we found is that it's making its way into beef, chicken—all these land proteins." The second finding of note, she says, is that all of the products studied were contaminated, regardless of how close they were to their natural state. "This suggests that this is a bigger issue than 'pick this [e.g. fresh food], not that'," she says.

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Of course, you're not going to avoid microplastic consumption by shunning protein. According to Melissa Valliant, communications director for the nonprofit Beyond Plastics, microplastics have also been found in milk, fruits, vegetables, sugar, salt, honey—basically anything that's been studied.

How Plastic Winds Up In Our Food

It's not altogether surprising, to Milne's point, that plastic particles are found in seafood, nor is it a huge shock that they're in the foods we eat that don't resemble anything naturally derived from the Earth, like Oreos. But you might be wondering how they are ending up in foods such as fresh vegetables, which in theory should be relatively safe from contamination.

Unfortunately, says Valliant, microplastics are so prevalent in our environment that they're in the water used to water those vegetables, and they're in the soil used to nourish them. (Much of our food is actually grown on plastic mulch, which certainly isn't helping.) And for the same reason, live pigs and other livestock are found to have plastic in their bodies before they even reach a slaughterhouse, let alone the grocery store.

Processing only builds on this early contamination. "[In our study], we saw that highly processed products had more microplastic contamination than less processed products," says Milne. "So for example, a chicken nugget was more contaminated than its equivalent of a chicken breast." This added contamination, she says, could be coming from the time foods spend on a conveyor belt, or from the microfibers shedding from workers' clothing, or from whatever machinery is being used in the processing.

From there, packaging obviously doesn't help. While Milne's study didn't find that shedding from plastic packaging significantly contributed to the issue, she cautions that this may have to do with the size of the particles they studied. "Our study had a size cut off of 45 microns, and we couldn't look smaller than that given the methods we used," she says. "It's possible that packaging might be creating particles that are smaller."

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With that said, it's inevitable that some plastic is shedding into foods from its plastic packaging, whether it happens as that plastic breaks apart over time (for longer, shelf stable foods), or it happens when you rip, cut, or—God forbid—microwave the packaging. (Do not do this, she says!) "Much of the meat we buy in the supermarket, for example, is wrapped in plastic, and you have to cut the packet to get the meat out, or whatever it is you're eating," says Mark Patrick Taylor, Chief Environmental Scientist for EPA Victoria in Australia. "You're bound to yield some microplastics in that process."

According to Valliant, plastic is continuously being introduced into the environment. "A good way to think of it is to think of it like your skin. So just like your skin is constantly flaking off in tiny pieces, which is gross to think about, plastics are constantly shedding tiny bits that can end up in our food or in our drink." Taylor points out, for example, that plastic particles from your clothes may shed into your food, and says you can actually test this by leaving a glass of wine out on the counter overnight. When you look at the glass in the

morning, you'll see particles floating at the wine's surface. "Some of those can be microplastics that, for example, shed from clothing," he says.

Our food touches plastic in the cooking process as well, he says, whether that's through a heated plastic spatula or from nonstick pans. Taylor even points out that at the end of the day, when you brush your teeth, you're likely consuming even more plastic from your toothbrush—so you're eating it even when you're not eating at all.

And yet somehow, Valliant says all of this is the least of our worries when it comes to consuming plastic. "Experts say the plastic we consume is nothing compared to the plastic we inhale," she says. "It really is everywhere. It's in our food, our drink, our air, our soil. There's no getting away from it. And that's just going to get worse as plastic production increases, which it is expected to do," she says. Taylor agrees: "[Microplastic exposure] is inevitable. Inescapable. Our whole lifestyles are structured around plastic."

How Bad Is All of This Plastic for Our Health?

All this microplastic has to be killing us, right? The answer is that we don't yet fully understand the health impacts of microplastic exposure. Microplastics have been found everywhere researchers have looked in the human body—even the testicles—but Paul Anastas, Yale Professor in the Practice of Chemistry for the Environment, points out that identifying the presence of something is not the same as proving it's causing harm. And so far, he says, studies have only shown correlation between certain adverse health outcomes and microplastics, which is not the same as causation. (Correlation demonstrates a relationship between two variables, but it does not indicate that one causes the other.)

For example, says Anastas, a recent study showed that people who had microplastics present in their carotid arteries (the main blood vessels to the neck, face, and brain) when they underwent surgery for plaque removal were 4.5 times more likely to experience a heart attack, stroke, or death in the approximately 34 months post-surgery. "But even that is simply a correlation," he says. "The authors go out of their way to say, 'We're not suggesting that this causes this'."

But there's good reason to expect that microplastic will not one day be absolved of all harm. While Anastas says most plastic particles pass through our bodies and are excreted as waste, recent studies have raised concerns around the potential of these particles to cause inflammation or even puncture cells. "We should all be calling for aggressive scientific research to be conducted to actually understand what the nature and degree of the potential hazard is for microplastic particles," he says.

What's more, the experts agree that when it comes to the health impacts of microplastics in our bodies, the concern is less so the particles themselves and more so our exposure to the chemicals they contain. "There are about 16,000 different chemicals used in various

combinations to make different types of plastic. Thousands of those have been studied and found to be toxic to human health, and even more have not been studied at all for their toxicity, so we don't even know what those could be doing to our health," says Valliant.

One of the most common types of plastic, for example, is PVC, and its primary building block is a chemical called vinyl chloride, which is a known carcinogen. Examples of other chemicals of concern found in plastics include BPA, PFAS, and phthalates, all of which are associated with health impacts such as increased risk of cancer, thyroid disorders, fertility issues, metabolic disorders, and neurological and behavioral issues.

Given this, it's not a stretch to assume that consuming microplastic particles containing these chemicals is bad for our health—but this remains little more than an assumption at present. As Taylor points out, "the dose makes the poison," and we don't yet know if the dosages at which we're ingesting these chemicals via microplastic exposure are sufficient to cause harm.

He acknowledges, however, that microplastic exposure could be adding to the overall "burden of toxicity" we're experiencing from the everyday chemical exposures that have become a feature of modern life, and says that these cumulative exposures could, in turn, be contributing to negative health trends such as increased burden of disease (e.g. rising cancer rates in young people) and reduced fertility. But this remains speculative at this time; science does not yet support any conclusions around the causes of those trends, let alone any ties they may have to microplastic.

And to offer some words of comfort on the matter, Taylor insists there's no logical reason to *panic* about microplastic exposure. He points out that in addition to the "gazillion" other chemical insults our bodies endure in the modern world, we've been exposed to rapidly increasing amounts of plastics since the 1950s. "But we haven't seen any detriments to lifespan," he says. "In fact, we're living longer than ever before," as modern life expectancy continues to surpass what it was before plastics became ubiquitous in our environment.

What to Do If You're Worried About Microplastic Exposure

Even if we don't need to panic about our plastic consumption, that doesn't mean, says Taylor, that we don't need to act. "I'm not trying to minimize plastics as a pollutant. They're a nightmare—a complete environmental disaster," he says. "It's unclear what specific harm they're having on people, but we should seek to reduce our exposure to them."

You can not consciously consume your way out of this mess, says Valliant. While certain choices can certainly help reduce your microplastic exposure—opting out of plastic packaging whenever possible, wearing natural fibers, drinking tap water instead of bottled water, and eating fewer processed foods, for example—when it's in the air you breathe, the water you drink, and all of the food you

consume, there's only so much control you can ultimately exert over the problem. "There is no chance anyone is consuming a diet that is plastic-free," says Valliant.

Significant change can only be made on the policy level, and Valliant says our lawmakers aren't currently doing enough. She suggests anyone concerned vote for policymakers who care about the environment and public health: "Use the power of your ballot to create change." Beyond Plastics also regularly updates their website with specific anti-plastic actions to support.

Hands-on involvement at the community level can have more significant impacts on this issue than you might think as well, says Valliant. She cites the trajectory of microbead bans as evidence of the ways in which local policies can trickle upwards to ultimately impact government policies at the national level—such bans were first enacted at county and state levels, she says, which helped the nationwide ban eventually sail through congress. "The more municipalities, towns and counties and cities that, for example, pass single-use plastic bans, the more likely it is that we're going to get something passed on the federal level," she says. If you want to get involved within your own community, Beyond Plastics has local groups and affiliates that help communities advocate for local policy change.

Ideally, companies will have the right incentives to design products and packaging from more sustainable materials, such as the bio-based plastic alternatives Anastas has spent his career developing. "For the past 50 or 60 years, people have been saying, 'Don't tell us to change the way we make our plastics. Just go ahead and recycle it'," says Anastas. "They've put all of the burden on the individuals, the towns, the municipalities. And how's that worked out for us? We're up to 9% recycling of plastic at best."

Ultimately, Anastas says, microplastics aren't even the worst exposures we're enduring—they're just the latest in a long line of chemicals and compounds we're inexplicably tolerating. "All kinds of things are going into our bodies, and none of us signed a waiver saying, 'It's okay if you design things so that they're going to bioaccumulate and be persistent in my body'," he says.

Anastas points out that the medicines we take, for example, go through extensive testing to ensure their safety, and that these are compounds "doing something important" in that they're helping us treat disease. "What about the 99% of chemicals that aren't treating disease? Do we make them go through the same hurdles? No," he says. Instead, we seem to be tolerating the idea that people are making money off of the production of these chemicals and their associated products without having to prove they're safe. "The idea that we accept products that harm us is somewhere between an absurdity and an obscenity," he says. "We've got to demand that our products don't harm us."

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