Q&A: PFAS are toxic 'forever chemicals' that linger in the environment—how to keep them out of your drinking water

June 12 2024, by Jessica Ray

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Close to half of America's tap water contains PFAS, or perfluoroalkyl and polyfluoroalkyl substances. These "forever chemicals" are in thousands of products, from clothing and cosmetics to cleaning products, and are linked to cancers, liver damage, high cholesterol and asthma.

Dr. Jessica Ray, assistant professor of civil and environmental engineering at the University of Washington, explains what PFAS are, how scientists are trying to remove them from the environment, and what you can do to reduce the impact of PFAS on your own health.

The Conversation has collaborated with SciLine to bring you highlights from the discussion, which have been edited for brevity and clarity.

What are PFAS, and how are they used?

PFAS are a class of thousands of synthetic chemicals originally manufactured and heavily used in the 1950s. They were the active ingredient in fire suppressant foams that were used at military bases on aircraft fires.

Since then, they've been used in many applications and consumer products—shampoos, dental floss, nail polish. They've been used in waxy coatings found in food containers. They have also been applied as nonstick coatings; for example, in cookware. They've been used in outerwear to help with rain protection.

Why are PFAS called 'forever chemicals?'

It is difficult for PFAS to degrade naturally in the environment or even during processes like water treatment.

How do PFAS move through the environment?

Unfortunately, PFAS like to stick to solid surfaces like soils. They can dissolve in water and enter the Earth's atmosphere. And because PFAS can permeate air, water and soil, humans and animals can be exposed to them in a multitude of ways.

For example, if PFAS are present in ocean water, and then the fish ingest and become contaminated with PFAS, and then we consume those fish, then we are exposed to PFAS. And unfortunately, researchers have detected PFAS in many, many different drinking water sources worldwide. Not just surface water and groundwater, but bottled water as well.

What are the health impacts of PFAS?

PFAS have been linked to liver tissue damage and kidney cancer. If a fetus is exposed to PFAS during pregnancy, that can lead to low birth weight and accelerated puberty. PFAS have also been linked to impairments of the immune system.

How can we reduce personal exposure to PFAS?

You can do a number of things. If you're cooking, you could purchase and use stainless steel or cast iron cookware, very tried and true cookware that should not contain PFAS.

Also, look for products that explicitly state they are PFAS-free. And you could buy organic products; those should have lower PFAS loads. Finding ways to reduce PFAS loads to the environment and to drinking water will be important given the Environmental Protection Agency ruling in April 2024 to regulate several PFAS in drinking water.

How can we remove PFAS from our drinking water?

A handful of companies are selling essentially a version of a Brita water filter that are targeted for PFAS. Generally though, just using something like a Brita or Pur water filter at home should help reduce exposure to not only PFAS, but other contaminants that might persist even in drinking water that's distributed to your tap at home.

What about your research on removing PFAS from water?

My research group is exploring two different approaches for treating PFAS in water. One approach is to remove or separate PFAS from water . The other is to destroy PFAS in water.

For the separation approaches, we're looking at existing water treatment processes used in drinking water and wastewater treatment, and then trying to modify those processes to selectively target PFAS in water apart from other contaminants that might be in the water.

How is your group trying to improve PFAS filtration?

If you are filtering your water at home using a filtration cartridge, then that can help to remove a wide variety of contaminants. These contaminants can include heavy metals or other dissolved contaminants in water.

But often, PFAS in drinking water sources tend to exist in very, very low concentrations, while other contaminants exist at much higher ones. Filters only have so many adsorption sites available where contaminants are bound. And so there is a strong likelihood the adsorption sites will be occupied before the PFAS can be removed from the water.

One approach that we've been using is to develop new adsorbents that help target PFAS. My group has been developing this material for the last couple of years. And we've been talking to people who can help commercialize this technology so consumers can apply these kinds of point-of-use treatments to help protect them from PFAS. It's hard to say exactly how long it will be until the treatments will be commercially available—maybe in one or two years.

Are there alternatives to PFAS that are safer to use?

Researchers are looking into what's called green chemistry—designing chemicals that behave similarly to PFAS but aren't as toxic and will break down in the environment. So there is hope for the future.

Watch the full interview to hear more.

Provided by The Conversation

Citation: Q&A: PFAS are toxic 'forever chemicals' that linger in the environment—how to keep them out of your drinking water (2024, June 12) retrieved 18 June 2024 from https://medicalxpress.com/news/2024-06-qa-pfas-toxic-chemicals-linger.html