



Association pour la santé environnementale du Québec
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Forever chemicals – Part III

What to do to reduce exposures?

With reference to parts 1 and 2: Polyfluoroalkyl substances (PFAS), or forever chemicals, are very difficult to disintegrate in the environment, easily migrate into surroundings through the air, soil and water and have the potential for bioaccumulation in many organisms. The two most common of them are perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS). In humans, these chemicals can be found in blood, kidneys and liver. For example, you can also be exposed to PFAS through contaminated food or if you work in an environment that uses them.

Some studies, done in laboratory animals, indicate that PFOA and PFOS can cause effects on reproductive and development, liver and kidneys, and can also cause immunological effects. Human epidemiological studies, conducted by the EPA in 2016, showed: tumors, increased cholesterol levels

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and effects on the immune system were the most common effects. But scientists are still learning about the health effects of exposures to mixtures of PFAS.

Take note that PFOS was restricted in production and use since 2009 when the Stockholm Convention on Persistent Organic Pollutants added the substance to Annex B. The same thing was proposed for listing in 2015 with PFOA. According to the Environmental Working Group, more than 1500 drinking water systems that serve 110 million Americans may be contaminated with the chemicals. But technologies can be used to treat these two chemical substances. The most common groundwater treatment used is extraction and filtration through granular activated carbon. Also, incineration of the concentrated waste (or firefighting foams) would be needed for the complete destruction of PFAS. But the soot that results of this procedure piles up in landfills and created new contaminated places (in incinerators, for example). So, incineration is an “unproven” method of their destruction and EPA search a better way to completely destroy PFAS.

There are many other polyfluoroalkyl substances that are used by industries. Among these are the GenX chemicals that correspond to a technology that is used to make high-performance fluoropolymers without the use of PFOA. The major chemicals associated with this technology are hexafluoropropylene oxide (HFPO) dimer acid and its ammonium salt. You can be potentially exposed to GenX chemicals through a number of different pathways, including drinking water and inhaling air. But there are indications that suggest that they are less toxic than PFOA and PFOS.



Recently, Rice University researchers have discovered a powerful new tool that could help neutralize these chemicals. Here are their observations: take a quantity of contaminated water with PFOA and put it in a sealed container with oxygen of ambient air and some boron nitride powder (a catalyst). After four hours of exposure to UV-C light, the obtained result is that the majority of the chemical has been transformed in simpler molecules. So, with this example, you can see the difficulty of eliminating PFAS from the environment.

Since forever chemicals are found almost everywhere, the best way to reduce exposure to them is to read labels, ask questions, buy and use only organic products for everyday living—such as organic food, natural or organic clothing and other household items. By doing this, you will have more control on what you bring into your home and be less exposed to these man-made chemicals.

Online links:

What are the health effects? , Agency for toxic substances and disease registry, US department of health and human services, <https://www.atsdr.cdc.gov/pfas/health-effects.html>

Basic information on PFAS, US environmental protection agency, <https://www.epa.gov/pfas/basic-information-pfas>

Technical fact sheet – PFOS and PFOA, US environmental protection agency, https://www.epa.gov/sites/production/files/2017-12/documents/ffrrofactsheet_contaminants_pfos_pfoa_11-20-17_508_0.pdf



Fact sheet: Draft toxicity assessments for GenX chemicals and PFBS, US environmental protection agency, https://www.epa.gov/sites/production/files/2018-11/documents/factsheet_pfbs-genx-toxicity_values_11.14.2018.pdf

Report: Up to 110 million Americans could have PFAS-contaminated drinking water, David Andrews, Environmental working group, article written on May 22th 2018, <https://www.ewg.org/research/report-110-million-americans-could-have-pfas-contaminated-drinking-water>

Destroying forever chemicals ignite N.Y. town's worst fears, Sylvia Carignan and Keshia Clukey, Environment and energy report, Bloomberg law, article written on June 25th 2020, https://news.bloomberglaw.com/environment-and-energy/destroying-forever-chemicals-ignites-n-y-towns-worst-fears?utm_source=EHN&utm_campaign=b87e17888e-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_8573f35474-b87e17888e-99576185

Boron nitride catalyst destroy toxic PFAS "Forever chemicals", Nick Lavars, Environment, New atlas of Rice University, article written on July 8th 2020, <https://newatlas.com/environment/boron-nitride-catalyst-toxic-pfas-forever-chemicals/>