

# 91 Foods Tested for Toxins; This Favorite Failed Miserably

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › Food testing by the U.S. Food and Drug Administration found PFAS chemicals in 10 of the 91 foods tested for 16 types of PFASs, some at levels far exceeding the advisory limit for PFOA and PFAS in drinking water; chocolate cake had the highest amounts – 250 times above the advisory limit
- › Per- and polyfluoroalkyl substances (PFAS) are widely used chemicals that make products water-, oil-, grease- and stain-resistant. The chemicals are also used in firefighting foam
- › PFAS chemicals take thousands of years to degrade, and are found in groundwater across the U.S.; PFAS chemicals used in food packaging can also migrate into the food
- › Health effects associated with older, long-chain PFASs such as PFOA, include liver toxicity and malfunction, neurobehavioral effects, reduced birth weight, disruption of immune- and endocrine systems, neonatal toxicity, kidney and testicular cancer, hypothyroidism and more
- › Research by the U.S. Centers for Disease Control and Prevention published in 2007 found PFAS chemicals in the blood of more than 98% of Americans tested

**This article was previously published June 18, 2019, and has been updated with new information.**

Per- and polyfluoroalkyl substances<sup>1,2</sup> (PFAS) are widely used chemicals that make products water-, oil-, grease- and stain-resistant. The chemicals are also used in

firefighting foam. One type, perfluorooctanoic acid or PFOA, is commonly found in older nonstick cookware.

PFOA and its cousin perfluorooctanesulfonic acid (PFOS) are associated with a wide array of health problems, including cancer, immune and thyroid dysfunction, low birth weight and more.<sup>3</sup> Disturbingly, because PFAS chemicals take thousands of years to degrade, and are found in groundwater across the country,<sup>4,5</sup> they've become a significant environmental threat.

Research<sup>6</sup> by the U.S. Centers for Disease Control and Prevention published in 2007 found PFAS chemicals in the blood of more than 98% of Americans tested. And, while concentrations of some PFAS (including PFOA and PFOS) declined by 10% to 32% between 1999 and 2004, another PFAS called PFNA doubled, resulting in a net increase.

The decline of PFOA and PFOS can be explained by the fact that both have been phased out, PFOS starting in 2000 and PFOA in 2006<sup>7,8</sup> Still, due to their persistence in the environment, they're still showing up in the strangest places.

Sharon Lerner, a reporting fellow at The Investigative Fund and an investigative journalist for The Intercept and other major media outlets, has written extensively about PFAS and the industry's attempts to cover up the damage.<sup>9</sup>

## **Testing Reveals PFAS in US Food Supply**

Research<sup>10,11</sup> published in 2017 revealed 33% of fast food wrappers and containers contain fluorine, which suggests perfluorinated chemicals (PFCs) were used to give the paper that slick surface, and earlier studies<sup>12,13,14</sup> have confirmed fluorinated chemicals can migrate from the packaging into the food.

Now, food testing by the U.S. Food and Drug Administration (performed in 2017 as part of its Total Diet Study<sup>15</sup> and presented<sup>16</sup> at the 2019 meeting of the Society of Environmental Toxicology and Chemistry) reveals PFAS chemicals are in the U.S. food supply,<sup>17,18,19,20,21</sup> and at levels far exceeding the advisory limit for PFOA and PFAS in drinking water (there's currently no limits in food).

Of the 91 foods tested for 16 types of PFAS, 10 were found to contain the chemicals.<sup>22</sup>

As reported by PBS:<sup>23</sup>

*"The levels in nearly half of the meat and fish tested were double or more the only currently existing federal advisory level for any kind of ... PFAS. The level in the chocolate cake was higher: more than 250 times the only federal guidelines, which are for some PFAS in drinking water ...*

*PFOS, an older form of PFAS no longer made in the U.S., turned up at levels ranging from 134 parts per trillion to 865 parts per trillion in tilapia, chicken, turkey, beef, cod, salmon, shrimp, lamb, catfish and hot dogs. Prepared chocolate cake tested at 17,640 parts per trillion of a kind of PFAS called PFPeA.*

*The FDA presentation also included what appeared to be previously unreported findings of PFAS levels – one spiking over 1,000 parts per trillion – in leafy green vegetables grown within 10 miles (16 kilometers) of an unspecified eastern U.S. PFAS plant and sold at a farmer's market."*

## **Dairy Farm Near Air Force Base Forced to Ditch Toxic Milk**

The FDA also reported that samples of drinking water and milk from cows raised on a farm near a U.S. Air Force base that uses PFAS-containing firefighting foam were found to contain disturbing amounts of the chemicals.

Drinking water contained 35 times more PFAS than the current health advisory level set by the U.S. Environmental Protection Agency (EPA), which is 70 parts per trillion (ppt).<sup>24</sup> The milk contained high enough amounts it was deemed a human health concern, resulting in all milk from the farm being discarded.

In humans, the serum elimination half-life of PFOA ranges between 2.3<sup>25,26</sup> and 3.8 years,<sup>27</sup> and for PFOS between 4.8 to 5.4 years.<sup>28</sup> Similarly, it takes a long time for exposed cows to start producing clean milk. As reported by CNN Health:<sup>29</sup>

*"The FDA noted that even after the cows are no longer exposed to the PFAS contaminated water or feed, the accumulated chemicals can remain in the cow. Just 30 days of eating and drinking contaminated food and water would require 1.5 years for a cow to rid their system of the chemicals."*

April 25, 2019, the EPA released draft interim guidance for groundwater contaminated with PFOA/PFOS above 70 ppt, which is a "key component of the agency's PFAS Action Plan," according to the press release.<sup>30</sup> While that's great news, it seems clear we also need regulations for PFAS contamination in food and not just drinking water.

## **Sewage Sludge – A Major Source of PFAS on Farms**

As recently reported by The Intercept,<sup>31</sup> sewage sludge appears to be another major source of these toxic, persistent chemicals. Documents<sup>32</sup> obtained by The Intercept reveal 44 samples of sewage sludge tested by the Maine Department of Environmental Protection all contained at least one PFAS chemical, and "In all but two of the samples, the chemicals exceeded safety thresholds for sludge that Maine set early last year."

Maine's tolerance levels for PFAS are set at 2.5 parts per billion (ppb) for PFOA, 5.2 ppb for PFOS, and 1,900 ppb for PFBS. Mike Belliveau, executive director of the Environmental Health Strategy Center in Portland, told The Intercept these levels are "probably about 10 times weaker than they should be," adding, "Even low parts-per-billion levels of PFAS in sludge can threaten the health of the food supply."

## **How Do PFAS Get Into the Food Supply?**

At present, authorities do not know exactly how the chemicals are entering the food supply, but there are several possibilities, and it's likely to be a combination of factors. One is that the chemicals are leaching from food packaging.

Another theory is that when biodegradable packaging in which PFAS are used are composted, the chemicals enter the food chain via the compost.<sup>33,34</sup> As noted in study<sup>35</sup> published online May 29, 2019:

*"The loads and leachability of 17 perfluoroalkyl acids (PFAAs) were analyzed in nine OFMSW [organic fraction of municipal solid waste] commercial composts and one backyard compost.*

*PFAA loads ranged from 28.7 to 75.9 micrograms/kilo for OFMSW compost that included food packaging and from 2.38 to 7.6 micrograms/kilo for composts that did not include food packaging.*

*Perfluorooctanoic acid (PFOA) and perfluorooctanesulfonate (PFOS) were detected in all composts; however, OFMSW composts were dominated by short-chain PFAAs (>64%) and perfluoroalkyl carboxylates (PFCAs, >68%), particularly the C6 PFCA."*

A third hypothesis is that they're entering the food chain via contaminated groundwater. According to the U.S. Department of Defense, 90 military bases have groundwater contaminated with PFAS at levels exceeding the EPA advisory level,<sup>36</sup> and PFAS have been found in local water systems across the country as well.<sup>37,38,39</sup> When contaminated groundwater is used to irrigate crop fields, the chemicals then enter the food chain.

## **Researchers Experiment With PFOA as Cancer Treatment**

Curiously, while PFOA has been implicated in certain cancers, particularly kidney and testicular cancer, a 2018 study<sup>40</sup> details a human experiment to test the chemical's chemotherapeutic properties. According to this paper:

*"The International Agency for Research on Cancer (IARC) categorized PFOA as a possible human carcinogen for testicular and kidney cancer (group 2B).*

*In light of this IARC qualitative hazard index listing and the presence of PFOA in the general population, it is highly unusual that an environmental toxicant such as PFOA would ever be considered for its chemotherapeutic properties.*

*Interestingly, PFOA has been shown to cause endoplasmic reticulum stress in tumor cells, activity against PIM kinases, and activity in 5 xenograft models of*

*solid tumors.*

*Because PIM kinases can be overexpressed in many cancers that involve cell survival, cell cycle progression, and cell migration, inhibitors of PIM kinases have become a focus for drug discovery research, including APFO [ammonium perfluorooctanoate].*

*Based on APFO's antitumorigenicity profile, a phase 1 trial was sponsored by CXR Biosciences, Ltd ... to determine the safety, dose limiting toxicity, and maximum tolerated dose (MTD) of APFO ...*

*The purpose of this paper is to describe this APFO phase 1 trial and the time-dependent relationships that were observed over the course of this study between administered doses of APFO, plasma concentrations of PFOA, and several clinical markers, including cholesterol, in the participating subjects."*

In all, 49 "primarily solid-tumor cancer patients who had failed standard therapy" received a weekly dose of APFO — an ammonium salt of PFOA — ranging between 50 milligrams and 1,200 mg for six weeks.

It's worth noting that three of the researchers have declared conflicts of interest, having received grants from or been employed by 3M Company, a former manufacturer of PFOA.

I bring that up, seeing how they propose that health concerns over environmental PFOA exposure may be overblown, as they could find "no evidence of any major effects other than a decrease in total cholesterol (but not HDL) and an increase in fT4 (but not TSH) for increasing levels of PFOA plasma concentration," despite reaching "levels of PFOA more than four orders of magnitude higher than the levels observed in general populations." Only one subject exhibited signs of "dose-limiting toxicity."

**It's Doubtful PFOA Is Helpful Rather Than Harmful**

I wouldn't shrug off concerns about PFOA (or any other PFAS) based on that study, however. There's a far more robust body of evidence showing PFAS chemicals can cause harm even in minute doses.

In 2005, the EPA fined DuPont \$16.5 million for violating the Toxic Substances Control Act by withholding decades' worth of information about health hazards associated with PFOA. That same year (2005), a panel of scientists was convened to determine PFOA's effect on human health.

The results of this seven-year investigation, which was completed in November 2013, are detailed in more than three dozen peer-reviewed papers, and link PFOA to:<sup>41</sup>

- Ulcerative colitis
- High cholesterol
- Pregnancy-induced hypertension
- Thyroid disease
- Testicular- and kidney cancer

Its health effects were deemed to be widespread and occurred even at very low exposure levels. In 2015, a woman who sued DuPont, blaming her kidney cancer on PFOA-contaminated drinking water, was awarded \$1.6 million in damages.<sup>42</sup>

This and other legal processes against DuPont uncovered internal documents showing the company was fully aware of the chemical's danger to the public and employees, yet continued using it and hid contamination problems.

## **Madrid Statement Details Health Effects of PFAS**

In May 2015, more than 200 scientists from 40 countries signed the so-called Madrid Statement on PFASs,<sup>43,44</sup> which warns about the harms of all PFAS chemicals, both old and new. According to the Madrid Statement, health effects associated with the older, long-chain PFASs such as PFOA, include:<sup>45</sup>

Liver toxicity	Disruption of lipid metabolism, and the immune- and endocrine systems
Adverse neurobehavioral effects	Neonatal toxicity and death
Tumors in multiple organ systems	Testicular and kidney cancers
Liver malfunction	Hypothyroidism
High cholesterol	Ulcerative colitis
Reduced birth weight and size	Obesity
Decreased immune response to vaccines	Reduced hormone levels and delayed puberty

The Madrid Statement also points out the problem with replacing PFASs known to be harmful with other similar, but less scientifically evaluated, compounds, saying:

*"Although some of the long-chain PFASs are being regulated or phased out, the most common replacements are short-chain PFASs with similar structures, or compounds with fluorinated segments joined by ether linkages.*

*While some shorter-chain fluorinated alternatives seem to be less bioaccumulative, they are still as environmentally persistent as long-chain substances or have persistent degradation products.*

*Thus, a switch to short-chain and other fluorinated alternatives may not reduce the amounts of PFASs in the environment. In addition, because some of the shorter-chain PFASs are less effective, larger quantities may be needed to provide the same performance."*

## How to Avoid PFAS Chemicals



The Madrid Statement recommends avoiding any and all products containing or manufactured with PFASs, noting they include products that are stain-resistant, waterproof or nonstick. More helpful tips can be found in the EWG's "Guide to Avoiding PFCS."<sup>46</sup> Other suggestions that will help you avoid these dangerous chemicals include avoiding:

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**Items that have been pretreated with stain-repellants**, and opt out of such treatments when buying new furniture and carpets

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**Water- and/or stain-repellant clothing** — One tipoff is when an item made with artificial fibers is described as "breathable." These are typically treated with polytetrafluoroethylene, a synthetic fluoropolymer

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**Items treated with flame retardant chemicals**<sup>47</sup> — This includes a wide variety of baby items, padded furniture, mattresses and pillows. Instead, opt for naturally less flammable materials such as leather, wool and cotton

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**Fast food and carry out foods** — The wrappers are typically treated with PFCs

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**Microwave popcorn** — PFCs not only may present in the inner coating of the bag, but they also may migrate to the oil from the packaging during heating. Instead, use "old-fashioned" stovetop popcorn

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**Nonstick cookware and other treated kitchen utensils** — Healthier options include ceramic and enameled cast iron cookware, both of which are durable, easy to clean and completely inert, which means they won't release any harmful chemicals into your home.

A newer type of nonstick cookware called Duralon uses a nonfluoridated nylon polymer for its nonstick coating. While this appears to be safe, your safest bet is still ceramic and enameled cast iron.

While some recommend using aluminum, stainless steel and copper cookware, I don't for the following reasons: Aluminum is a strongly suspected causal factor in Alzheimer's disease, and stainless steel has alloys containing nickel, chromium, molybdenum and carbon.

For those with nickel allergies, this may be a particularly important consideration. Copper cookware is also not recommended because most copper pans come lined with other metals, creating the same concerns noted above. (Copper cookware must be lined due to the possibility of copper poisoning.)

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**Oral-B Glide floss and any other personal care products containing PTFE or "fluoro" or "perfluoro" ingredients** – The EWG has an excellent database called Skin Deep<sup>48</sup> you can peruse to find healthier options

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**Unfiltered tap water** – Unfortunately, your choices are limited when it comes to avoiding PFASs in drinking water. Either you must filter your water or obtain water from a clean source. Both solutions can be problematic and/or costly.

While many opt for bottled water, it's important to realize that PFASs are not regulated in bottled water, so there's absolutely no guarantee that it'll be free of these or other chemicals. Bottled water also increases your risk of exposure to hazardous plastic chemicals such as bisphenol-A, which has its own set of health risks.

Most common water filters available in supermarkets will not remove PFASs. You really need a high-quality carbon filtration system. The New Jersey Drinking Water Quality Institute recommends using granulated activated carbon "or an equally efficient technology" to remove PFC chemicals such as PFOA and PFOS from your drinking water.<sup>49</sup> Activated carbon has been shown to remove about 90% of these chemicals.

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