Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) in selected foods – April 1, 2013, to March 31, 2016

Food chemistry – Targeted surveys – Final report

Canada

Également disponible en français sous le titre :
Acide perfluorooctanoïque (APFO) et sulfonate de perfluorooctane (SPFO) dans certains aliments – 1er avril 2013 au 31 mars 2016

Published by the Canadian Food Inspection Agency (CFIA)
1400 Merivale Road
Ottawa, ON K1A 0Y9
inspection.canada.ca

Publication date: June 2026

Catalogue No.: A104-706/2026E-PDF
ISBN: 978-0-660-99400-0

This document is available in alternative formats upon request.

Summary

Targeted surveys provide information on potential food hazards and enhance the Canadian Food Inspection Agency's (CFIA's) routine monitoring programs. This survey provides evidence regarding the safety of the food supply, identify potential emerging hazards, and contribute new information and data to food categories where it may be limited or non-existent. They are often used by the agency to focus surveillance on potential areas of higher risk. Surveys can also help to identify trends and provide information about how industry complies with Canadian regulations.

Perfluorosulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are human-made chemicals that were widely used in food processing and packaging (water-resistant, fat-resistant, humidity-resistant, non-stick properties)[1,2,3]. PFOS has been identified as an environmental contaminant through the manufacture of water-, oil-, soil- and grease-repellents on fabrics, carpets, and paper products, fire suppression foams, and cleaning products[4]. It can enter the environment through the manufacture, use, and disposal of these products[4]. PFOA has been used in the manufacture of stain- and water-resistant coatings for textiles and carpets[4]. PFOA was also used in hoses, cables, and gaskets, non-stick coating in cookware, and personal hygiene products[4]. PFOS and PFOAs are resistant to environmental degradation, leading to their build-up in soil, air, and groundwater[2]. They can accumulate in food and lead to possible human health complications upon consumption[2]. Some human health concerns related to repeated exposure to PFOA and PFOS include a rise in blood cholesterol and liver enzymes, reduced antibody response to vaccination, low birth weight, and cancer[5,6].

The main objective of this evaluation was to generate baseline surveillance data on the levels of PFOS and PFOA in selected foods. A total of 1418 samples of cereals, fish/seafood products, flour, popcorn, potato and potato products, fresh root vegetables, and vegetable products on the Canadian market were collected and tested. All 1418 (100%) food samples did not contain detectable levels of PFOA and PFOS.

The levels of PFOS/PFOA observed in this survey were evaluated by Health Canada's Bureau of Chemical Safety who determined that none of the samples tested would pose an unacceptable human health concern. No product recalls were carried out.

What targeted surveys are

Targeted surveys are used by the CFIA to focus its surveillance activities on areas of highest health risk. The information gained from these surveys provides support for the allocation and prioritization of the agency's activities to areas of greater concern. Originally started as a project under the Food Safety Action Plan (FSAP), targeted surveys have been embedded in our regular surveillance activities since 2013. Targeted surveys are a valuable tool for generating information on certain hazards in foods, identifying and characterizing new and emerging hazards, informing trend analysis, prompting and refining health risk assessments, highlighting potential contamination issues, as well as assessing and promoting compliance with Canadian regulations.

Food safety is a shared responsibility. We work with federal, provincial, territorial and municipal governments and provide regulatory oversight of the food industry to promote safe handling of foods

throughout the food production chain. The food industry and retail sectors in Canada are responsible for the food they produce and sell, while individual consumers are responsible for the safe handling of the food they have in their possession.

Why the survey was conducted

PFOA and PFOS are synthetically manufactured chemicals that can make their way into food through food-packaging materials (due to their use as a surface protectant), and from the environment - through soil and water contamination (which come into contact with food)[1,2,3]. They were used in the food industry due to their range of preferable qualities such as heat resistance, humidity resistance, water-, lipid-, and grease- resistance, and their non-stick properties[1,2,3].

In Canada, the manufacture, use, sale, and import of PFOA and products that contain PFOA are prohibited under the Prohibition of Certain Toxic Substances, 2012 regulations[4]. PFOS was prohibited under the same conditions and regulations later on in 2016[4]. The prohibition of PFOA and PFOS was due to the determination that they are toxic to the environment under the Canadian Environmental Protection Act, 1999 (CEPA) and because they do not break down in the environment which can cause accumulation in organisms[2,4,5]. More recently, Health Canada and Environment and Climate Change Canada prepared an Updated Draft State of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) Report (SOPR)[4]. The SOPR concluded that PFAS, excluding fluoropolymers, but including PFOA and PFOS, are toxic to both human health and the environment under CEPA[4].

PFAS, which include PFOS, PFOA, and Perfluorohexane Sulfonate (PFHxS), were found in the blood of 98% of Canadians, but levels of these substances have been decreasing over the years[4]. Exposure to PFAS can affect multiple organs and systems. The main targets include the liver, immune system, kidney, reproduction, development, endocrine disruption (thyroid), nervous system, and metabolism (lipids, glucose homeostasis, body weight). Effects on most of these endpoints have been observed in both animal and human studies[4]. Based on 'sufficient' evidence for cancer in experimental animals and 'strong' mechanistic evidence that PFOA exhibits key characteristics of carcinogens, the International Agency for Research and Cancer (IARC 2025) concluded that PFOA is 'carcinogenic to humans.' Based on 'limited' evidence for cancer in experimental animals, and 'strong' mechanistic evidence for key characteristics of carcinogens, IARC (2025) concluded that PFOS is 'possibly carcinogenic to humans.' According to IARC (2025), the evidence for cancer in humans for PFOA and PFOS were 'limited' and 'inadequate,' respectively[7]. Due to these potential health risks and the ways PFOA and PFOS can get into food, the CFIA deemed it important to test for levels of PFOA and PFOS in both fresh and processed food products available on the Canadian retail market.

What was sampled

Domestic and imported cereals (breakfast and infant), fish/seafood products, flour, popcorn, potatoes and potato products, root vegetables (potatoes, parsnips, rutabagas, celeriac, radishes, and turnips), and mixed vegetable products were sampled from April 1, 2013 to March 31, 2016. Samples of products were collected from local/regional retail locations located in 6 major cities across Canada.

These cities encompassed 4 Canadian geographical areas:

- Atlantic (Halifax)
- Quebec (Montreal)
- Ontario (Ottawa and Toronto)
- West (Calgary and Vancouver)

The number of samples collected from these cities was in proportion to the relative population of the respective areas.

Table 1. Distribution of samples based on country type and origin

Product type	Description	Number of domestic samples	Number of imported samples	Numbers of samples from unknown[a] origins	Total number of samples
Cereals	Breakfast cereals, infant cereals	41	193	65	299
Fish/seafood products	Canned and jarred fish/seafood (tuna, sardines, salmon, herring, pilchards, kipper, oysters, clams, crab)	7	43	0	50
Flour	White, wheat, semolina, all-purpose, whole wheat, cake/pastry flour	126	26	47	199
Popcorn	Microwaveable and non-microwaveable popcorn (plain, buttered, organic, flavoured, kettle corn, gourmet)	11	77	12	100
Potatoes	Fresh potatoes (fingerling, new, organic, red, russet, white, yellow), potato chips, potato products (canned potatoes, dehydrated potatoes, fries and hash browns, potato pancake mix, potato gnocchi)	181	236	104	521
Root vegetables	Fresh/frozen/canned celeriac, parsnip, radish, rutabaga, or turnip	86	44	71	201
Vegetable products	Fresh/frozen/pickled mixed vegetables	19	27	2	48
Total	**All product types**	**471**	**646**	**301**	**1418**

Table notes:

[a] Unspecified refers to those samples for which the country of origin could not be assigned from the product label or available sample information

How samples were analyzed and assessed

Samples were analyzed by an ISO/IEC 17025 accredited food testing laboratory under contract with the Government of Canada. These food samples were analyzed for the presence of PFOA and PFOS. The Level of Detection (LOD) was 0.25 parts-per-billion (ppb) for all samples. The results represent finished food products as sold and not as they would be consumed, whether the product sampled is considered an ingredient or requires preparation prior to consumption.

Results of the survey

A total of 1418 food samples were tested for levels of PFOA and PFOS. All 1418 (100%) samples tested were below the level of detection (LOD = 0.25 ppb) for PFOA and PFOS.

What the survey results mean

The main objective of this targeted survey was to generate baseline data regarding the levels of PFOA and PFOS in selected foods available in Canadian retailers. Results show that 100% of the 1418 food samples tested from 2013 to 2016 did not contain detectable levels of PFOA and PFOS.

The levels of PFOA/PFOA observed in this survey were evaluated by Health Canada's Bureau of Chemical Safety who determined that none of the samples tested would pose an unacceptable human health concern. No product recalls were carried out.

How to access the survey data

The data will be accessible on the Open Government Portal.

References

1. Per- and polyfluoroalkyl substances (PFAS) and your health. (Modified 2025-02-28). Health Canada.

2. Technical Fact Sheet – Perfluorinated Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA). (2017). United States. United States Environmental Protection Agency.

3. Ramírez Carnero, A., Lestido-Cardama, A., Vazquez Loureiro, P., Barbosa-Pereira, L., Rodríguez Bernaldo de Quirós, A., Sendón, R. (2021). Presence of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in Food Contact Materials (FCM) and Its Migration to Food. Foods, Volume 10(7), Article 1443.

4. State of per- and polyfluoroalkyl substances (PFAS) report. (March 2025). Environment and Climate Change Canada, Health Canada.

5. Human Health Toxicity Assessment for Perfluorooctanoic Acid (PFOA). (Updated December 29, 2025). United States. United States Environmental Protection Agency.

6. Human Health Toxicity Assessment for Perfluorooctane Sulfonic Acid (PFOS). (Updated December 29, 2025). United States. United States Environmental Protection Agency.

7. Perfluorooctanoic Acid (PFOA) and Perfluorooctanesulfonic Acid (PFOS). IARC Monographs on the Identification of Carcinogenic Hazards to Humans. Volume 135. (2025). International Agency for Research on Cancer.