Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Bacterial pathogens and indicators in powdered infant formula - April 1, 2024, to March 31, 2026

Food microbiology - Targeted surveys - Final report



Canada

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Bactéries pathogènes et organismes indicateurs dans les préparations en poudre pour nourrissons - Du 1er avril 2024 au 31 mars 2026

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Summary

Under a 2-year (April 1, 2024, to March 31, 2026) targeted survey[1], 745 samples of powdered infant formula were analysed for the presence of the pathogens *Cronobacter* spp, and *Salmonella* spp. All samples were also tested for Enterobacteriaceae, which is used as an indicator of the hygienic and sanitary conditions of the food supply chain from production to the point of sale.

All (100%) of the samples tested were found to be satisfactory. No *Cronobacter* spp., *Salmonella* spp., or Enterobacteriaceae were detected in any of the samples.

Overall, our survey results indicate that powdered infant formula sold in Canada is generally safe for consumption. However, as with all food products, especially those intended for infants, good hygienic practices should be followed by producers, retailers, and consumers to minimize the risk of contamination.

Why the survey was conducted

This survey, which started in 2015, was conducted to provide enhanced oversight of the quality and safety of powdered infant formula sold at retail in Canada. This report includes survey results from April 1, 2024, to March 31, 2026. Survey results from previous years (April 1, 2015, to March 31, 2024) are available[2,3]. Starting April 1, 2026, surveillance of powdered infant formula will be carried out under the Canadian Food Inspection Agency's National Microbiological Monitoring Program[1].

Powdered infant formula is commonly consumed by newborns and infants in Canada[4]. Unfortunately, the consumption of reconstituted powdered infant formula has been associated with recalls[5,6] and outbreaks[7,8,9,10] of foodborne illnesses in Canada and worldwide, with the main pathogens of concern being *Cronobacter* spp., and *Salmonella* spp. While rare, infections with these pathogens in babies can be fatal. Unlike liquid infant formula (i.e. ready-to-feed and liquid concentrates), powdered infant formula is not sterile, therefore, steps must be taken to prepare it properly[11]. Contamination can occur at any point in the food production chain, such as during production, packaging, and/or during preparation for consumption. Previous food safety investigations traced back contamination events to the production facility and equipment used to prepare the infant formula.

Newborns and infants are considered a vulnerable population as their immune systems are still developing; thus, they are at an increased risk for foodborne illnesses. Consequently, if pathogens are present in the foods they consume, there is an increased potential for foodborne illness to occur.

When the survey was conducted

The survey is part of a longer survey. The results reported herein are for samples collected over a 2-year period from April 1, 2024, to March 31, 2026.

Where the samples were collected from

Samples were collected from national retail chains and local/regional grocery stores located in the following 11 major cities across Canada:

- Halifax
- Moncton
- Quebec City
- Montreal
- Ottawa
- Toronto
- Winnipeg
- Saskatoon
- Calgary
- Vancouver
- Victoria

The planned number of samples to be collected from each city was based on the population of the province in which the city was located relative to the total population of Canada.

Total number and description of samples collected

A total of 745 powdered infant formula samples were collected. Samples were limited to those labelled for newborns and infants, aged 0 to 6 months, and 0 to 12 months, respectively. A sample consisted of one or more consumer sized packages from the same lot, with a total weight of at least 250 g.

What the samples were tested for

All samples were tested for *Cronobacter* spp., *Salmonella* spp., and Enterobacteriaceae. *Cronobacter* spp., and *Salmonella* spp. are pathogenic bacteria while Enterobacteriaceae is an indicator of the overall hygienic and sanitary conditions under which the samples have been processed, stored, and transported.

Methods used to test the samples

Samples were analyzed using analytical methods published in Health Canada's *Compendium of Analytical Methods*[12] and the International Organization for Standardization[13] that were suitable for the testing of powdered infant formula.

How the samples were assessed

The samples were assessed using criteria based on the principles of Health Canada's *Good manufacturing practices for infant formula*[14].

Table 1 - Assessment criteria

Bacteria	Satisfactory	Investigative	Unsatisfactory
Cronobacter spp.	Not detected in 125 g	Not applicable	Detected in 125 g
Salmonella spp.	Not detected in 125 g	Not applicable	Detected in 125 g
Enterobacteriaceae	Not detected in 10 g	Detected in 10 g	Not applicable

Survey results

All (100%) of the samples tested were found to be satisfactory. No *Salmonella* spp., *Cronobacter* spp., or Enterobacteriaceae were detected in any of the 745 samples tested.

Table 2 - Analysis assessment results

Bacteria	Number of samples tested	Satisfactory	Investigative	Unsatisfactory
Cronobacter spp.	745	745	Not applicable	0
Salmonella spp.	745	745	Not applicable	0
Enterobacteriaceae	745	745	0	Not applicable

Survey results are also presented by origin (table 3), production practice (table 4), and product type (table 5).

Table 3 - Assessment results by country of origin

Country of origin	Number of samples tested (%)	Satisfactory	Investigative	Unsatisfactory
Canada[a]	27 (3.6)	27	0	0
England	46 (6.2)	46	0	0
France	43 (5.8)	43	0	0
Germany	12 (1.6)	12	0	0
Ireland	61 (8.2)	61	0	0
Netherlands	82 (11.0)	82	0	0
New Zealand	14 (1.9)	14	0	0
Poland	6 (0.8)	6	0	0
Spain	4 (0.5)	4	0	0
United States	423 (56.8)	423	0	0
Unknown[b] foreign country	27 (3.6)	27	0	0
Total	**745 (100)**	**745**	**0**	**0**

Table 4 - Assessment results by production practice

Production practice	Number of samples tested (%)	Satisfactory	Investigative	Unsatisfactory
Conventional	710 (95.3)	710	0	0
Organic	35 (4.7)	35	0	0
Total	**745 (100)**	**745**	**0**	**0**

Table 5 - Assessment results by product type

Product type	Number of samples tested (%)	Satisfactory	Investigative	Unsatisfactory
Hypoallergenic	36 (4.8)	36	0	0
Milk-based	666 (89.4)	666	0	0
Rice-based	6 (0.8)	6	0	0
Soy-based	37 (5.0)	37	0	0
Total	**745 (100)**	**745**	**0**	**0**

What the survey results mean

Previous Canadian[2,3] studies on the microbiological quality and safety of powdered infant formula showed similar prevalence rates of *Salmonella* spp., and higher prevalence rates of *Cronobacter* spp., and Enterobacteriaceae. *Salmonella* spp. was not detected in this study (0/745) nor in either of the previous studies[2,3] (0/2965, 0/479). *Cronobacter* spp. was not detected in this study (0/745), nor in the study from 2015 to 2018[2] (0/997); however, it was

[a] Made in Canada from locally sourced milk, domestic and imported ingredients.

[b] The product origin could not be assigned from the product label, or available sample information; however, the product was imported into Canada.

detected in 0.1% (1/898) of the samples in the study from 2018 to 2024[3]. Enterobacteriaceae was not detected in this study; however, it was detected in both previous Canadian studies[2,3] in 0.05% (2/3962) and 0.2% (2/898) of the samples.

Overall, our survey results indicate that powdered infant formula sold in Canada is generally safe for consumption. However, as with all food products, especially those intended for infants, good hygienic practices should be followed by producers, retailers, and consumers to minimize the risk of contamination.

What is done with the survey results

All results are used to:

- inform risk management decisions.
- support program design and re-design.

Where to access the survey data

The data will be accessible on the Open Government Portal.

References

1. Canadian Food Inspection Agency, Food microbiology.
2. Canadian Food Inspection Agency, Bacterial Pathogens in Powdered Infant Formula – April 1, 2015, to March 31, 2018. 2019.
3. Canadian Food Inspection Agency, Bacterial pathogens and indicators in powdered infant formula – April 1, 2018, to March 31, 2024. 2026.
4. Public Health Agency of Canada, Foodbook Report. 2015.
5. Canadian Food Inspection Agency, Enfamil brand Nutramigen A+ LGG Hypoallergenic (infant formula) recalled due to possible presence of Cronobacter sakazakii. 2023.
6. Canadian Food Inspection Agency, Nestlé Good Start – Soothe (infant formula) recalled due to possible presence of Cronobacter sakazakii. 2023.
7. Norberg, S., et al., Cronobacter spp. in Powdered Infant Formula. Journal of Food Protection, 2012. 75(3): p. 607-620.
8. Cahill, S.M., et al., Powdered Infant Formula as a Source of Salmonella Infection in Infants. Clinical Infectious Diseases, 2008. 46(2): p. 263-73.
9. Jourdan-Da Silva, N., et al., Ongoing nationwide outbreak of Salmonella Agona associated with internationally distributed infant milk products, France, December 2017. Eurosurveillance, 2018. 23(2).
10. Centers for Disease Control and Prevention, Cronobacter Outbreak Linked to Powdered Infant Formula. 2024.
11. Health Canada, Preparing and handling powdered infant formula. 2022
12. Health Canada, Compendium of Analytical Methods. 2011.
13. International Organization of Standardization, Standards catalogue, in 07.100.30 - Food Microbiology Including microbiology of animal feeding stuffs.
14. Health Canada, Good manufacturing practices for infant formula. 2021.