



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Bacterial pathogens and indicators in refrigerated fresh herb paste - April 1, 2021, to March 31, 2024

Food microbiology - Targeted surveys - Final report



© His Majesty the King in Right of Canada, as represented by the Minister of Health, 2026.

Catalogue No.: A104-683/2026E-PDF

ISBN: 978-0-660-97680-8

Aussi disponible en français

Summary

A targeted survey¹ analyzed 147 samples of refrigerated fresh herb paste over a 3-year period from April 1, 2021, to March 31, 2024, for the presence of the pathogens *Listeria monocytogenes* (*L. monocytogenes*), *Salmonella* spp., and *E. coli* O157. All samples were also tested for generic *E. coli* which is used as an indicator of the overall hygienic and sanitary conditions of the food supply chain from production to the point of sale.

All (100%) of the 147 samples tested were found to be satisfactory. *L. monocytogenes*, *Salmonella* spp., and *E. coli* O157 were not found in any of the samples. Generic *E. coli* at elevated levels ($>10^2$ most probable number (MPN)/g) were not found in any of the samples.

Overall, our survey results indicate that refrigerated fresh herb pastes sold in Canada are generally safe for consumption. However, as with all foods, and especially those that are ready-to-eat (RTE), good hygienic practices are recommended for producers, retailers, and consumers.

Why the survey was conducted

This survey was conducted to generate information on the quality and safety of refrigerated fresh herb paste sold at retail in Canada.

Herb paste is a mixture of fresh herbs blended with other ingredients like oil, garlic, nuts, or spices to form a smooth, thick paste. It is commonly used as a base for sauces, dressings, marinades, or spreads, and it can also enhance the flavor of soups, stews, and meats. Herb paste helps intensify the flavors of herbs and makes it easier to incorporate them into various dishes.

The use of refrigerated fresh herb pastes as cooking ingredients have grown in popularity as they are a convenient and healthy means of adding nutrients and flavours to foods. As a result, an increasing variety of refrigerated fresh herb paste products have appeared on the Canadian retail marketplace in recent years.

Contamination with bacterial pathogens can occur at any step in the food supply chain such as during primary production, harvest, processing, and/or packaging. Consequently, if pathogens are present, there is a potential for foodborne illness as refrigerated fresh herb pastes are RTE.

When the survey was conducted

The survey was conducted over a 3-year period from April 1, 2021, to March 31, 2024.

Where the samples were collected from

Samples were collected from national retail chains and local/regional grocery stores located in the following 6 major cities across Canada:

- Quebec City
- Montreal
- Ottawa
- Toronto
- Calgary
- Vancouver

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 147 refrigerated fresh herb paste samples were collected. A sample consisted of a single or multiple consumer sized packages of the same lot weighing at least 200g.

What the samples were tested for

All samples were tested for *L. monocytogenes*, *Salmonella* spp., *E. coli* O157, and generic *E. coli*. *L. monocytogenes*, *Salmonella* spp., and *E. coli* O157 are pathogenic bacteria while generic *E. coli* is an indicator of the overall hygienic and sanitary conditions under which the samples have been produced, 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 for the Microbiological Analysis of Foods*² that were suitable for the testing of refrigerated fresh herb pastes.

How the samples were assessed

The samples were assessed using criteria based on the principles of the following Health Canada documents: *Health Products and Food Branch Standards and Guidelines for Microbiological Safety of Food – An Interpretive Summary*³, *Food and Drugs Act*⁴ (Section 4(1)), and *Policy on Listeria monocytogenes in Ready-to-Eat Foods*⁵.

Table 1 - Assessment criteria

Bacteria	Satisfactory	Investigative	Unsatisfactory
<i>L. monocytogenes</i>	Not detected / 25g	Not applicable (category 1 ^a) Detected and $\leq 10^2$ colony-forming units (CFU)/g (category 2 ^a)	Detected / 25g (category 1 ^a) > 10^2 CFU/g (category 2 ^a)
<i>Salmonella</i> spp.	Not detected / 25g	Not applicable	Detected / 25g
<i>E. coli</i> O157	Not detected / 25g	Not applicable	Detected / 25g
Generic <i>E. coli</i>	$\leq 10^2$ MPN/g	> 10^2 and $\leq 10^3$ MPN/g	> 10^3 MPN/g

No assessment guidelines had been established in Canada for the presence of *Salmonella* spp., *E. coli* O157, or indicator organisms in refrigerated fresh herb paste at the time of writing this report.

As *Salmonella* spp., and *E. coli* O157 are considered pathogenic to humans, the presence of either organism might be considered a violation of the *Food and Drugs Act*⁴ Section 4(1)a and therefore assessed as unsatisfactory.

Unlike bacterial pathogens, most strains of generic *E. coli* are harmless. Generic *E. coli* is considered to be an indicator organism as their levels present in a food product are used to assess the overall sanitation conditions throughout the food chain from production to the point of sale. Their presence at some levels is tolerated, however elevated levels were assessed as investigative, possibly resulting in further follow-up actions. High levels of generic *E. coli* were assessed as unsatisfactory as it may indicate a breakdown in sanitation controls and therefore warranting follow-up actions.

Survey results

^a The pH and water activity of the sample were used to determine the product category

All 100% of the samples tested were found to be satisfactory. *L. monocytogenes*, *Salmonella* spp., and *E. coli* O157 were not found in any samples. Generic *E. coli* at elevated levels (>10² MPN/g) was not found in any of the samples.

Table 2 – Analysis assessment results

Bacterial analysis	Number of samples tested	Satisfactory	Investigative	Unsatisfactory
<i>L. monocytogenes</i>	147	147	0	0
<i>Salmonella</i> spp.	147	147	Not applicable	0
<i>E. coli</i> O157	147	147	Not applicable	0
Generic <i>E. coli</i>	147	147	0	0

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

Table 3 - Assessment results by production practice

Production practice	Number of samples tested (%)	Satisfactory
Conventional	110 (74.8)	110
Organic	37 (25.2)	37
Total	147 (100)	147

Table 4 - Assessment results by country of origin

Origin	Number of samples tested (%)	Satisfactory
Australia	66 (44.9)	66
Unknown ^b (Prepared in Canada from domestic and imported ingredients)	67 (45.6)	67
Unknown ^b (Prepared in Canada)	14 (9.5)	14
Total	147 (100)	147

Table 5 - Assessment results by product type

Product type	Number of samples tested (%)	Satisfactory
Basil	54 (36.7)	54
Cilantro	43 (29.3)	43
Dill	26 (17.7)	26
Italian	21 (14.3)	21
Mixed	1 (0.7)	1
Parsley	1 (0.7)	1
Thai	1 (0.7)	1
Total	147 (100)	147

^b Country of origin could not be assigned from the product label or available sample information.

What the survey results mean

No previously published studies on the microbiological quality or safety of fresh herb paste were found at the time of writing this report.

Overall, our survey results indicate that refrigerated fresh herb paste sold in Canada is generally safe for consumption. However, as with all foods, and especially with those that are RTE, good hygienic practices are recommended for producers, retailers, and consumers.

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. Health Canada, [Compendium of Analytical Methods](#). 2011.
3. Health Canada, [Health Products and Food Branch \(HPFB\) Standards and Guidelines for Microbiological Safety of Food - An Interpretive Summary](#). 2008.
4. Health Canada, [Food and Drugs Act, RSC 1985 c F-27](#). 1985.
5. Health Canada, [Policy on Listeria monocytogenes in Ready-to-Eat Foods](#). 2011.