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

Bacterial Pathogens in Flavoured Butter - April 1, 2018 to March 31, 2019

Food microbiology - Targeted surveys - Final report

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Canada

Summary

Traditional butter has been consumed for centuries around the world. Recently, flavoured butter has seen an increase in popularity in North America, however, there is currently an absence of food safety data on this commodity. Traditional butter is considered to be a low risk food, however when it is modified by the addition of ingredients such as spices and/or flavourings, food safety risks could increase.

Considering the factors mentioned above and their relevance to Canadians, the Canadian Food Inspection Agency (CFIA) as part of its food microbiology surveillance program conducted a one year preliminary survey to investigate the microbiological quality and safety of flavoured butter.

Over the course of this study (April 1, 2018 to March 31, 2019), a total of 58 samples of flavoured butter were collected from retail locations in 11 cities across Canada. These samples were tested for the bacterial pathogens *Listeria monocytogenes* (*L. monocytogenes*), *Salmonella* species (spp.), and Staphylococcus aureus (*S. aureus*). The samples were also tested for generic *Escherichia coli* (*E. coli*) which is an indicator of the overall sanitation conditions throughout the food production chain.

In this study, all flavoured butter samples were assessed as satisfactory as *L. monocytogenes, Salmonella* spp., *S. aureus* (> 10^2 Colony Forming Unit (CFU)/g), and generic *E. coli* (>100 Most Probable Number (MPN)/g or CFU/g) were not found in any of the samples. Therefore it appears that the flavoured butter samples tested had been produced under sanitary conditions.

Overall, our survey results suggest that flavoured butter is safe for consumption. As the number of samples, product types and microorganisms tested in our study were limited; our results should be interpreted within that context. CFIA will continue to monitor the food supply to ensure all foods, including flavoured butter meets Canadian food safety standards. Additionally, as with all foods, safe food handling practices are recommended for producers, retailers and consumers.

What are targeted surveys

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 the CFIA's 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. CFIA works with federal, provincial, territorial and municipal governments and provides 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 did we conduct this survey

Flavoured butter is traditional butter to which flavourings such as garlic, spices and herbs[1] have been added. In general, butter is made from fresh cream that is separated from the fresh whole milk using centrifugal force. It is then pasteurised by heating it rapidly to a high temperature to eliminate pathogenic bacteria and other microorganisms to help the butter stay fresh longer. Once pasteurized, the cream is beaten vigorously in a churning cylinder until it thickens naturally into butter. The remaining liquid (buttermilk) is drained off, and the butter is mixed and blended. At this point salt and other additional flavourings such as garlic, lemon or maple can be added. The introduction of flavourings after the pasteurization process may lead to contamination of the final product[2] if the added flavour ingredients were contaminated or if during this additional processing step, there was a failure of the sanitation controls . Consequently, the CFIA decided to conduct a small scoping survey of 58 samples.

What did we sample

A sample consisted of a single or multiple unit(s) (individual consumer-size container(s)) from a single lot with a total weight of at least 250g. All samples were collected from national and local/regional retail stores located in 11 major cities across Canada. These cities encompassed 4 geographical areas:

- Atlantic (Halifax and Saint John)
- Quebec (Quebec City, Montreal)
- Ontario (Toronto, Ottawa)
- West (Vancouver, Kelowna, Calgary, Saskatoon and Winnipeg).

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

Sampling of refrigerated butter with spices or other flavouring ingredients was conducted evenly throughout the fiscal year (April 1, 2018 to March 31, 2019). No restrictions were placed on country of origin, brand, product type, packaging etc. In total, 58 domestic samples were collected.

What analytical methods were used and how were samples assessed

Samples were analyzed using analytical methods published in Health Canada's *Compendium of Analytical Methods for the Microbiological Analysis of Foods*[3] (table 1).

Table 1 – Analytical methods and assessment criteria for samples of butter with spices or other flavourings

Bacterial analysis	Method identification number[a]	Satisfactory	Investigative	Unsatisfactory
L. monocytogenes	MFLP-28 MFLP-77	Absent in 25g (category 1[b] and 2[b])	Not applicable (N/A) (category 1[b]) ≤ 10^2 CFU/g (category 2[b])	Present in 25g (category 1[b]) >10^2 CFU/g (category 2[b])
Generic *E.coli*	MFHPB-19 MFHPB-34	≤10^2 MPN/g or CFU/g	> 10^2 MPN/g or CFU/g	N/A
***Salmonella* spp.**	MFLP-49	Absent in 25g	N/A	Present in 25g
S. aureus	MFHPB-21	≤10^2 CFU/g	>10^2 and ≤ 10^4 CFU/g	>10^4 CFU/g

[a] The methods used were the published versions at the time of analysis.
[b] The pH and water activity of the sample were used to determine the product category.

At the time of writing this report, no assessment guidelines had been established for the presence of indicator organisms or pathogenic bacteria in flavoured butter. As *Salmonella* spp. is considered pathogenic to humans its presence was considered to be a violation of the *Food and Drugs Act* (FDA) Section 4(1)a[4] and therefore in the absence of assessment guidelines, was assessed by the CFIA as unsatisfactory. The assessment guidelines for *L. monocytogenes* are based on Health Canada's Policy on *Listeria monocytogenes* in RTE foods[5] and are dependent upon the sample type analysed (Category 1, 2A or 2B).

S. aureus is commonly found in the environment and are bacteria that may produce toxins capable of causing foodborne illness. Therefore, an investigative or unsatisfactory assessment which may result in further follow-up actions is associated with elevated (>10^2 and ≤ 10^4 CFU/g) and high levels (>10^4 CFU/g) of the bacteria respectively (table 1). As the results are based on the analysis of one unit (n=1), further sampling might be required to verify the levels of the bacteria of the lot.

Unlike harmful bacterial pathogens (e.g. *Salmonella, E. coli* O157:H7), generic *E. coli* is commonly found in the intestines of animals and humans and most strains are harmless. It is considered to be an indicator organism and levels of generic *E. coli* found in a food product are used to assess the overall sanitation conditions throughout the food chain from production to the point of sale. An investigative assessment is associated with elevated levels of generic *E. coli* (>10^2 MPN/g or CFU/g) (table 1), which may result in further follow-up actions. As the results

are based on the analysis of one unit (n=1), further sampling might be required to verify the levels of generic *E. coli* of the lot.

What were the survey results

Over the course of this study (April 1, 2018 to March 31, 2019), a total of 58 samples were collected. All 58 samples of flavoured butter were assessed as satisfactory (table 2). *L. monocytogenes, Salmonella* spp., S. aureus and generic *E. coli* were not found in any of the samples tested.

Table 2 - Assessment results of flavoured butter samples

Bacterial analysis	Number of samples tested	Satisfactory
L. monocytogenes	58	58
Generic *E. coli*		
Salmonella spp.		
S. aureus		
Total	**58**	**58**

A variety of flavoured butter product types were tested (table 3). All samples were produced in Canada.

Table 3 - Assessment results by flavoured butter product types

Product type	Number of samples tested	Satisfactory
Garlic Butter	35	35
Honey & Cinnamon Butter	1	1
Lemon Butter	11	11
Maple Butter	4	4
Tomato Basil butter	7	7
Total	**58**	**58**

What do the survey results mean

In this preliminary survey, all flavoured butter samples were assessed as satisfactory. *L. monocytogenes*, *Salmonella* spp., *S. aureus* (> 10^2 CFU/g) and generic *E. coli* (>100 MPN/g or CFU/g) were not found in any of the samples, therefore it appears that the flavoured butter samples tested had been produced under sanitary conditions. No previously published studies on the microbiological quality and safety of flavoured butter were found at the time of writing of this report. It should be noted however that traditional unflavoured butter is generally considered safe for consumption as it is usually made with pasteurized[6] cream. In addition, its' inherent properties such as high fat[7] and low water content do not provide a favourable environment for the growth of bacterial pathogens.

As the number of samples, product types and microorganisms tested in our study were limited; our results should be interpreted within that context. CFIA will continue to monitor the food supply to ensure all foods, including flavoured butter meets Canadian food safety standards. Additionally, as with all foods, safe food handling practices are recommended for producers, retailers and consumers.

References

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