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

2019/20 Annual Report

National Microbiological Monitoring Program and Food Safety Oversight Program

Canada

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Summary

The Canadian Food Inspection Agency (CFIA) develops and delivers programs and services designed to protect Canadians from preventable food safety hazards. The CFIA works to ensure that food safety emergencies are effectively managed, that the public is aware of and contributes to food safety, and that consumers and the marketplace are protected from unfair practices. Canada's food safety requirements apply equally to the domestic and imported food sectors.

The National Microbiological Monitoring Program (NMMP) is a food surveillance program managed by the CFIA to verify industry compliance with microbial standards, facilitate access of Canadian food products to international markets, provide information on the effectiveness of food safety control measures and interventions, and maintain consumer confidence in the safety of the food supply. Under the NMMP, a broad range of imported and domestic food products are sampled by CFIA inspectors. These food products are frequently sampled at federal licence holding establishments (i.e., those that produce food products that are exported or traded inter-provincially), which are inspected by CFIA inspectors, but samples may also be collected at other establishment types, such as warehouses, distribution centres, and wholesalers.

The Food Safety Oversight (FSO) Program is another food surveillance program that was introduced to complement the NMMP by increasing CFIA's oversight over fresh fruit and vegetables, fish and seafood and manufactured foods. Some FSO samples are collected by CFIA inspectors but the majority are collected at retail by contracted samplers.

Food products of the following commodities were tested under the NMMP and FSO programs in the 2019/20 fiscal year: red meat and poultry products, egg products, dairy products, fish and seafood, fresh fruits and vegetables, processed fruit and vegetable products, and manufactured foods. Food-hazard combinations deemed to pose the greatest potential health risks, recent outbreaks of foodborne illnesses, emerging food-hazard combinations and historical levels of compliance are taken into consideration when selecting foods for testing under NMMP and FSO monitoring sampling plans. Under the NMMP and FSO programs, environmental sampling was also performed at federal licence holding establishments to verify the producer's ability to control the presence of pathogens within the processing environment and confirm that food products are produced under sanitary conditions.

All product and environmental samples collected under the NMMP and FSO programs were tested at CFIA laboratories to verify industry compliance with food microbiological safety and quality standards. All samples were subject to follow-up actions by both industry and the CFIA. Such follow-up actions could include follow-up inspections, additional sampling, product disposal, corrective action requests, food safety investigations, product recalls, etc.

In the 2019/20 fiscal year, 11,234 tests were performed on 4,843 domestic and imported food products collected from under the NMMP to verify compliance with food safety standards. Specifically, 8,268

tests were performed on 3,837 domestic products and 2966 tests were performed on 1,006 imported products. Results indicated that domestic products were 99.2 % satisfactory whereas imported products were 99.0 % satisfactory. Overall, a 99.1 % satisfactory rate was observed for combined domestic and imported products. In addition, there were 1941 tests performed on 1,608 environmental samples, which were assessed as 97.4 % satisfactory.

In the 2019/20 fiscal year, 8,399 tests were performed on 2,736 domestic, imported, and unknown origin food products collected under the FSO Program to verify compliance with food safety standards. Specifically, 1,644 tests were performed on 589 domestic products; 6,706 tests were performed on 2,124 imported products; and 49 tests were performed on 23 food products of unknown origin. Results indicated that domestic products were 98.5 % satisfactory, imported products were 99.6 % satisfactory, and food products of unknown origin were 100 % satisfactory. Overall, a 99.1 % satisfactory rate was observed for domestic, imported, and unknown origin products. In addition, there were 52 tests performed on 52 environmental samples under the FSO program, which were assessed as 94.2 % satisfactory.

The results of the 2019/20 NMMP and FSO sampling activities indicated that the vast majority of food products available in Canada between April 1, 2019 and March 31, 2020 were compliant with food safety standards. The few non-compliant samples that were detected resulted in follow-up actions by the CFIA and industry. These actions allowed the CFIA to continue to safeguard Canada's food system and the health and well-being of Canadians.

Food safety is a collective responsibility of government, industry and consumers. All food producers/importers are responsible under Canadian law for the safety of the food they produce and distribute. In 2019/20, under the NMMP and FSO programs, the CFIA tested food and environmental samples to verify that they met their obligations. Follow-up actions taken by both industry and the CFIA acted to improve Canadian manufacturing processes and identify imported products that did not meet Canadian standards.

What Are The NMMP and FSO Programs?

The National Microbiological Monitoring Program (NMMP) is a food surveillance program managed by the CFIA to verify industry compliance with microbial standards, facilitate access of Canadian food products to international markets, provide information on the effectiveness of food safety control measures and interventions, and maintain consumer confidence in the safety of the food supply. Under the NMMP, a broad range of imported and domestic food products are sampled at federal licence holding establishments (i.e., those that produce food products that are exported or traded inter-provincially), which are inspected by CFIA inspectors, but samples may also be collected at other establishment types, such as warehouses, distribution centres, and wholesalers.

The Food Safety Oversight (FSO) Program was introduced to complement the NMMP by increasing oversight over fresh fruit and vegetables, fish and seafood, and manufactured foods. Some FSO samples were collected by CFIA inspectors, but the majority were collected at retail by contracted samplers.

All NMMP and FSO samples were tested at CFIA laboratories to verify industry compliance with food microbiological safety and quality standards. All samples were subject to appropriate follow-up actions by both industry and the CFIA e.g., follow-up inspection, additional sampling, product disposal, corrective action requests, food safety investigations, product recalls, etc.

In addition to the NMMP and FSO programs, the CFIA also manages the Targeted Survey Program, another food microbial surveillance program which operates at the retail level. While the NMMP and FSO monitor established food hazards, the purpose of Targeted Surveys is to generate baseline information on the occurrence of additional potential hazards in foods. Should a food-hazard combination be identified under these Targeted Surveys, the food product may be subsequently monitored under the NMMP.

What Was Sampled?

In the 2019/20 fiscal year, domestic and imported food products of the following commodities were tested: red meat and poultry products; egg products; dairy products; fresh and ready-to-eat (RTE) fresh-cut fruits and vegetables; processed fruit and vegetable products, fish and seafood products and manufactured products. For the purpose of this report, domestic food products included unprocessed or minimally processed food products that were grown/ raised in Canada and food products that were processed or manufactured in Canada. Imported food products included unprocessed or minimally processed food products that were grown/ raised outside of Canada and food products that were processed or manufactured outside of Canada.

Food products within these commodities were selected for testing on the basis of known food-hazard combinations. The number of samples that were taken for each product depended on various factors, including the number of establishments producing the food product, whether the food product would be consumed directly or would undergo further preparation, historical compliance levels, market access requirements, etc.

Sampling of imported food was performed at points of entry, distribution facilities and at retail, therefore test results of imported foods reflected the conditions the foods were exposed to during processing, handling and storage. Imported foods are required to meet the same safety standards as domestic products.

In addition to sampling domestic and imported food products, the CFIA also tested environmental samples collected from domestic food processing environments to verify the producer’s ability to

control the presence of pathogens within the processing environment and that food products were produced under sanitary conditions.

The CFIA's role is to provide oversight and verify that the industry is producing safe food and complying with standards in place. Industry is responsible for implementing controls and practices, which may include sampling and testing programs, to ensure that all food they produce or import into Canada is safe. Therefore, the CFIA does not test all imported or domestically produced lots of food. In the 2019/20 fiscal year, a randomized strategy was employed under the NMMP and FSO programs to test representative samples of these foods.

What Tests Were Performed?

Food and environmental samples collected under the NMMP and FSO programs were tested for microorganisms associated with known food-hazard combinations or manufacturing processes. Certain food samples were also tested for physicochemical properties or non-microbial indicators (see below). The majority of methods used for testing are found in Health Canada's Compendium of Analytical Methods (Health Canada, 2008a). Non-compendium or modified versions of compendium methods were also used when appropriate. These methods included both rapid screening and confirmatory methods.

Pathogens are microorganisms that can cause illness when consumed. Samples collected under the NMMP and FSO programs were tested for the following pathogens in the 2019/20 fiscal year: *Escherichia coli* O157:H7, *Staphylococcus aureus, Listeria monocytogenes, Salmonella* spp., *Cronobacter* spp., *Vibrio* spp., *Trichinella spiralis, Toxoplasma* spp., *Giardia* spp., *Cryptosporidium* spp., *Cyclospora* spp., Norovirus (Genotypes I and II) and Hepatitis A virus.

Indicator organisms are microorganisms that do not cause illness but may be associated with pathogens or unsanitary practices. The presence of high levels of indicator organisms does not always imply the existence of a food-related health hazard but can expose unsanitary practices and conditions under which pathogens could contaminate food products. The following indicator organisms were tested by the NMMP and FSO programs in the 2019/20 fiscal year: generic *E. coli*, *Listeria* spp., Enterobacteriaceae, coliforms and Aerobic Colony Counts (ACC).

Physiochemical characteristics of foods are evaluated to assess the ability of such foods to support microbial growth. The physiochemical indicators tested for under the NMMP and FSO Program in the 2019/20 fiscal year were salt, pH and water activity.

Lastly, non-microbial indicators are not designed to determine the presence or absence of microorganisms. These criteria are used to obtain information pertaining to other aspects of food safety. Such tests may be performed to identify manufacturing processes that could support the introduction of potential food safety hazards. The following non-microbial indicators were tested for under the NMMP

and FSO programs in the 2019/20 fiscal year: presence of central nervous system tissue, meat species verification and phosphatase testing.

How Were Samples Assessed?

Microbial test results are assessed using assessment criteria specific to a food type and test of interest. These assessment criteria set clear limits in determining if food products are safe for consumption and/or produced under conditions compliant with food standards. In Canada, Health Canada's Standards and Guidelines for Microbiological Safety of Food – An Interpretive Summary (Health Canada, 2008b) contains microbiological assessment criteria based on current regulatory standards and guidelines. Additional information on assessment criteria is also found in Health Canada's Policies on *Listeria monocytogenes* in Ready-to-Eat Foods (Health Canada, 2011) and *E. coli* O157:H7 and *E. coli* O157:NM in Raw Beef (Health Canada, 2014). International standards, such as those outlined by the International Commission on Microbiological Specifications for Foods (ICMSF), may also provide information on microbiological assessment criteria when appropriate (ICMSF, 2011).

Microbial assessment criteria for *L. monocytogenes* in RTE food products in Canada are based upon Health Canada's Policy on *Listeria monocytogenes* in Ready-to-Eat Foods (Health Canada, 2011). This policy assigns a risk classification of RTE foods according to consumer risk. Category 1 RTE foods are those foods which can support the growth of *L. monocytogenes*. Category 2A RTE foods are those foods in which limited growth of *L. monocytogenes* to levels not greater than 100 CFU/g can occur throughout the stated shelf-life. Category 2B RTE foods are those foods in which the growth of *L. monocytogenes* cannot occur throughout the expected shelf-life of that food. As such, the assessment criteria specific to *L. monocytogenes* in RTE foods differ depending on the food category.

Samples collected and tested under the NMMP and FSO programs were assessed using assessment criteria based on information from these sources. Samples collected by CFIA inspectors typically consisted of multiple sample units, representatively sampled from the same lot of product. In contrast, contracted samplers collecting samples at retail could not representatively sample multiple units from the same lot due to limited product availability. For these samples, therefore, a single sample unit was collected. Because of these differences in sample collection, NMMP and FSO samples collected by CFIA inspectors were assessed using different assessment criteria than FSO samples collected at retail by contracted samplers (Appendix I and Appendix II, respectively) and their results are presented separately.

On the basis of these assessment criteria, samples tested were considered satisfactory, unsatisfactory or investigative. A satisfactory result indicated that there were no concerns identified with the food as all test results were considered acceptable by the assessment criteria. An unsatisfactory result indicated that one or more test results were considered unacceptable by the assessment criteria and the sample therefore did not meet regulatory standards and guidelines. An investigative result indicated that the

sample may be satisfactory but that further information was required to make this determination. Thus, appropriate follow-up actions were taken in response to both unsatisfactory and investigative samples.

At the time of writing this report, no assessment guidelines had been established in Canada for parasites and/or viruses in fresh or frozen produce. In addition, the analytical methods used to analyse these samples only detected the presence of parasite/viral genetic material and could not discriminate between viable (potentially infectious) and non-viable (non-infectious) parasites/viruses. The detection of parasite/viral genetic material was therefore assessed as investigative, indicating that further consideration was warranted to determine which follow-up actions would be the most appropriate.

The number of samples of each food type and analyte tested and their assessment results, including their % satisfactory levels, were reported. The significance of % satisfactory values derived from small numbers of samples/tests should be interpreted with caution. For this report, we considered that this included % satisfactory values derived from fewer than 50 samples.

What Were The 2019/20 NMMP Results for Red Meat and Poultry Products?

i) Ready-to-Eat Meat Products

Ready-to-eat meats are defined as meat products that have been subjected to a process sufficient to control and/or inactivate microorganisms so that they do not require further preparation before consumption except washing, thawing or exposing to sufficient heat to warm the products without cooking them. Ready-to-eat meats have been associated with foodborne illness due to recontamination from raw or undercooked products or exposure to environmental contaminants while being handled in processing establishments, catering establishments and in the home kitchen.

Under the NMMP in 2019/20, RTE meat products were sampled and tested for the following pathogens of concern: *Salmonella* spp., *L. monocytogenes,* and *E. coli* O157:H7 (only on fermented RTE products containing beef). Additional RTE meat products were tested for *L. monocytogenes* only. A total of 1,045 domestic samples were tested and determined to be 99.6 % satisfactory (Table 1). Two domestic Category 1 products, a capicollo and a smoked beef brisket, were assessed as unsatisfactory due to detection of *L. monocytogenes*. Additionally, two Category 2B products, a frozen chicken fried rice, and a frozen pre-cooked bacon product, were assessed as investigative due to the detection of low levels (≤100 CFU/g) of *L. monocytogenes.*

An additional 105 imported RTE meat products were tested (Table 1), the majority of which originated from Italy, Spain and the United States (Figure 1). The imported products tested were 98.1 % satisfactory. One Category 1 product, a dried pork product from Italy, was assessed as unsatisfactory due to detection of *L monocytogenes.* Additionally, one category 2B product, a spicy chorizo from

Spain, was assessed as investigative due to the detection of low levels (of (≤100 CFU/g) *L. monocytogenes*.

Table 1: Assessment of Domestic and Imported Ready-to-Eat Meat Products Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
L. monocytogenes	1045	1041	2	2	99.6
Salmonella spp.	426	426	n/a	0	100
E. coli O157:H7	8	8	n/a	0	100[b]
Total Domestic Samples	1045	1041	2	2	99.6
Imported					
L. monocytogenes	105	103	1	1	98.1
Salmonella spp.	104	104	n/a	0	100
E. coli O157:H7	5	5	n/a	0	100[b]
Total Imported Samples	105	103	1	1	98.1
Total Samples	**1150**	**1144**	**3**	**3**	**99.5**

[a] n/a = not applicable. The investigative assessment does not apply.
[b]Due to small sample/test number, the significance of the % satisfactory value should be interpreted with caution.

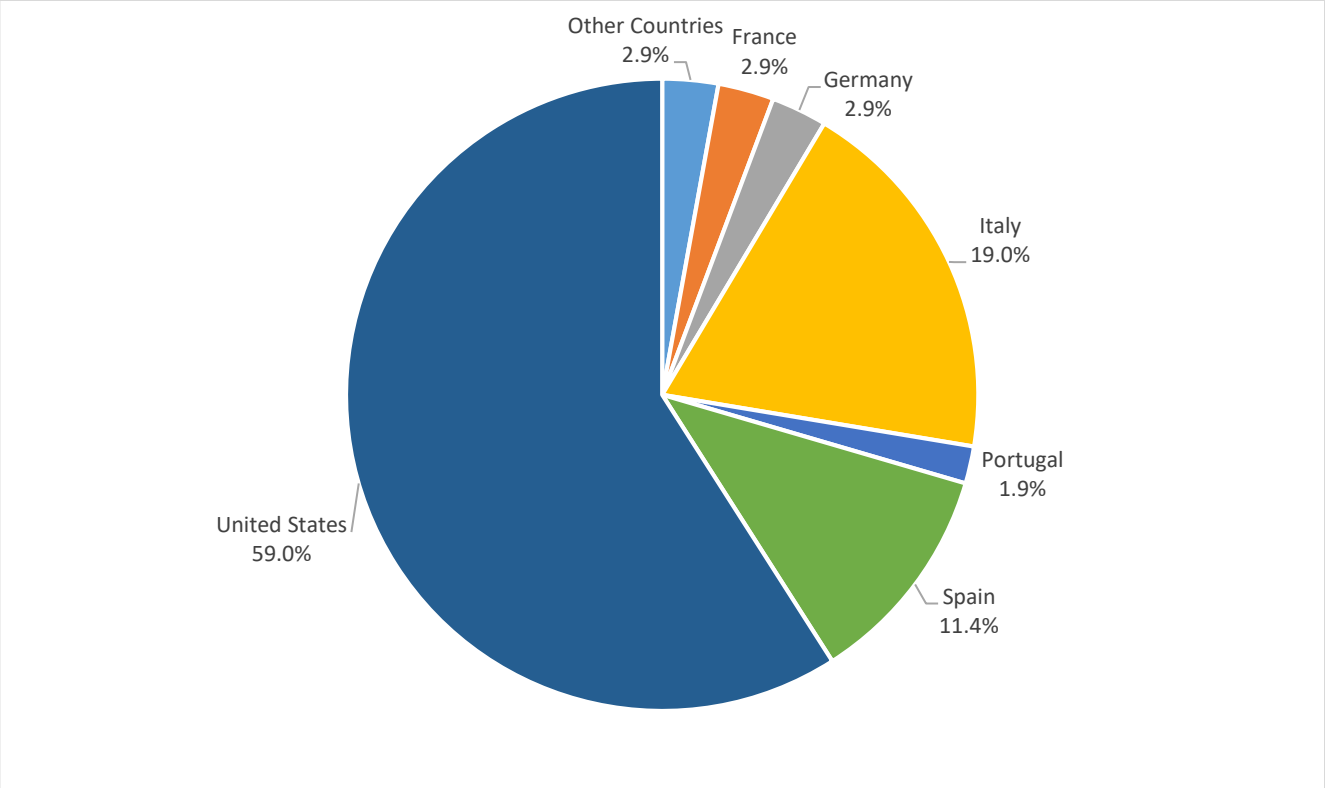

Figure 1. Percent Distribution of Imported Ready-To-Eat Meat Products Analyzed by Country of Origin (n=105).

ii) Precursor Materials and Raw Ground Beef/Veal

Precursor materials include any raw beef or veal products intended to be used for production of finished raw ground beef/veal products (i.e., raw ground beef/veal). This includes, but is not limited to, trims, bench trims, boneless beef, course ground beef, hearts, head meat, cheek meat, tongue roots and weasand meat. It also includes primal cuts, such as chucks, if they are intended to be used for production of finished raw ground beef/veal products. Pathogens, such as *E. coli* O157:H7 can contaminate the outer surfaces of whole intact pieces of precursor materials during slaughter and this contamination may be introduced into raw ground beef/veal during grinding. Illness due to *E. coli* O157:H7 have occurred in ground beef/veal products that were not fully cooked.

Under the NMMP in 2019/20, precursor materials and raw ground beef/veal were sampled and tested for *E. coli* O157:H7 and generic *E. coli*. A total of 699 domestic precursor material samples and 614 domestic raw ground beef/veal samples were tested with a combined satisfactory rate of 98.9 % (Table 2). Of the domestic samples, four precursor material samples and ten raw ground product samples were assessed as investigative due to the detection of elevated levels of generic *E. coli* (>100 CFU/g).

An additional 38 imported precursor material samples and 12 imported raw ground beef/veal samples from Australia, Chile, Germany, Italy, Mexico, Netherlands, New Zealand, Spain, the United Kingdom, the United States and Uruguay were tested (Figure 2). No generic *E. coli* or *E. coli* O157:H7 was detected in any of the imported products. All samples were determined to be satisfactory (Table 2).

Table 2: Assessment of Domestic and Imported Precursor Material and Raw Ground Beef/Veal Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory[b]	% Satisfactory
Domestic Precursor Material					
E.coli O157:H7	699	699	n/a	0	100
Generic *E.coli*	699	695	4	n/a	99.4
Domestic Raw Ground Beef/ Veal					
E.coli O157:H7	614	614	n/a	0	100
Generic *E.coli*	614	604	10	n/a	98.4
Total Domestic Samples	1313	1299	14	0	98.9
Imported Precursor Material					
E.coli O157:H7	38	38	n/a	0	100[c]
Generic *E.coli*	38	38	0	n/a	100[c]
Imported Raw Ground Beef/ Veal					
E.coli O157:H7	12	12	n/a	0	100[c]
Generic *E.coli*	12	12	0	n/a	100[c]
Total Imported Samples	50	50	0	0	100
Total Samples	**1363**	**1349**	**14**	**0**	**99.0**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] n/a = not applicable. The unsatisfactory assessment does not apply.
[c] Due to small sample/test number, the significance of the % satisfactory value should be interpreted with caution.

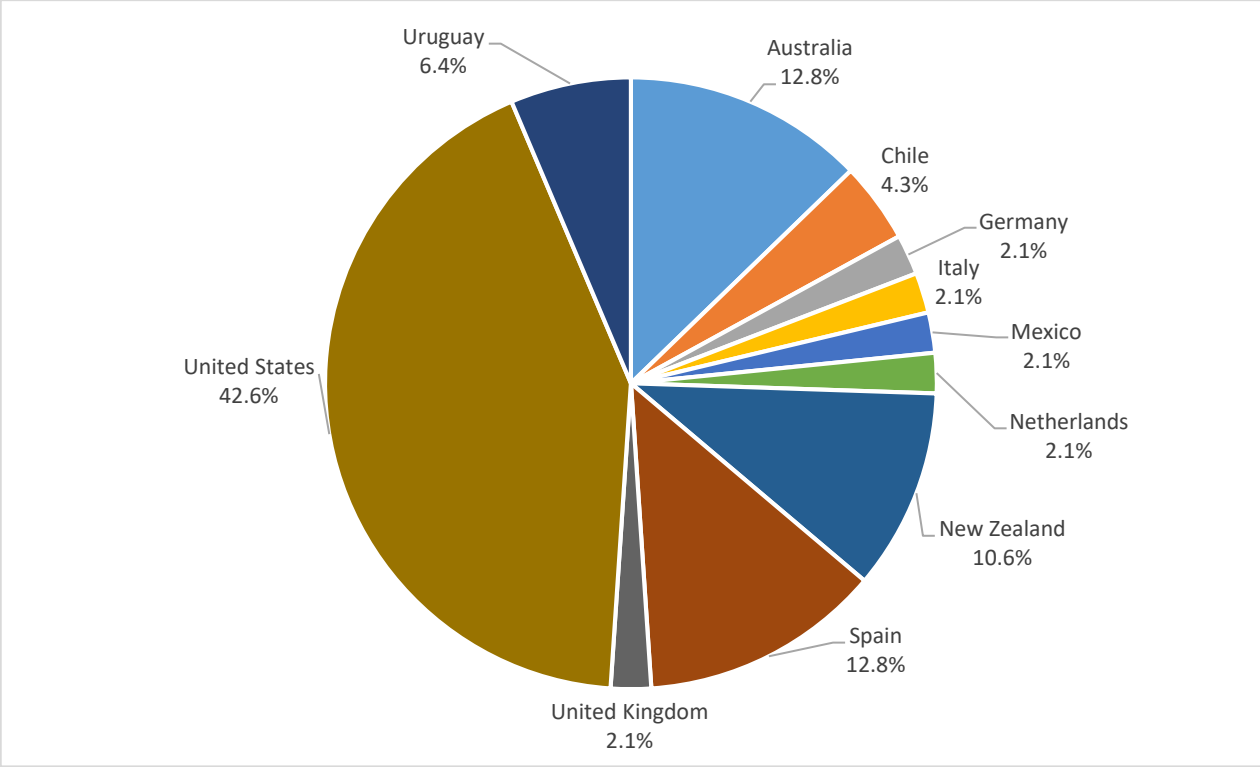

Figure 2. Percent Distribution of Imported Precursor Material and Raw Ground Beef/Veal Analyzed by Country of Origin (n=47).

iii) Raw Mechanically Separated Beef and Finely Textured Beef

Mechanically separated beef and finely textured beef are edible beef products obtained by mechanically separating most of the bone and cartilage from portions of beef from which the bone and cartilage have not been previously removed. Bovine Spongiform Encephalopathy (BSE), more commonly known as Mad Cow Disease, is a progressive, degenerative neurological disease. The BSE prion is able to infect humans, causing variant Creutzfeld-Jakob Disease (vCJD; FDA, 2012), through human consumption of contaminated meat products from BSE-infected cattle. Since BSE may be present in central nervous system (CNS) tissue of BSE-infected cattle, the spinal cord is removed from beef carcasses and portions of beef prior to their use as material for mechanical separation (CFIA, 2019). The CFIA tests domestic mechanically separated and finely textured beef products to verify the absence of CNS tissue. Although detection of CNS tissue in a meat product does not necessarily mean the BSE prion is present, detection of CNS tissue is a trigger for follow up actions to ensure that the establishment in question is producing this type of product in a manner that meets Canadian standards.

In 2019/20, 24 domestic mechanically separated beef and finely textured beef samples were tested under the NMMP for the presence of CNS tissue, one of which was unsatisfactory due to the presence of CNS tissue.

iv) Raw Pork and Wild Boar

Human infection by the parasitic roundworm *Trichinella spiralis* is traditionally associated with ingestion of infected raw and undercooked pork. Because of modern production methods of raising pigs in confinement and high quality feed, *T. spiralis* is rare in Canadian domestic swine populations. However, precautions must remain in effect due to the presence of *T. spiralis* in wildlife and the potential for its sporadic transfer to domestic herds. Government testing for *T. spiralis* in commercial pork and wild boar establishments also supports the Canadian pork industry's continued access to international markets.

Under the NMMP in 2019/20, market hogs, breeder hogs and wild boar were tested for *T. spiralis.* The analytical methodology for testing *T. spiralis* in pork allows for tissues from up to 100 animals to be pooled and submitted for analysis. A total of 319 samples, representing 29,027 individual animals, were tested under the NMMP in 2019/20. *T. spiralis* was not detected in any of these samples.

v) Meat Species Verification

Meat species verification is conducted on meat products to detect the presence of meat species not listed on the product label. In some cases, an operator may fraudulently substitute less expensive types of meat for some or all of the more expensive meat declared on the label. In other cases, the presence of other meat species may occur due to improper cleaning of equipment and contamination during processing, thus from a food safety perspective, species verification is performed to assess the effectiveness of sanitation procedures within the establishment.

The CFIA performs meat species verification on domestic and imported meat products. Products with label claims indicating they are composed of a single species or a combination of specific species are tested to verify these label claims. Selected products are those that have been ground to the point where it is impossible to determine through visual examination what species has been used. This includes raw ground meat products, RTE products and other products which have received heat treatment.

In 2019/20, 32 domestic meat products and 21 imported meat products, the majority originating from the United States (Figure 3), were tested to verify the meat species claimed. All samples were assessed as satisfactory.

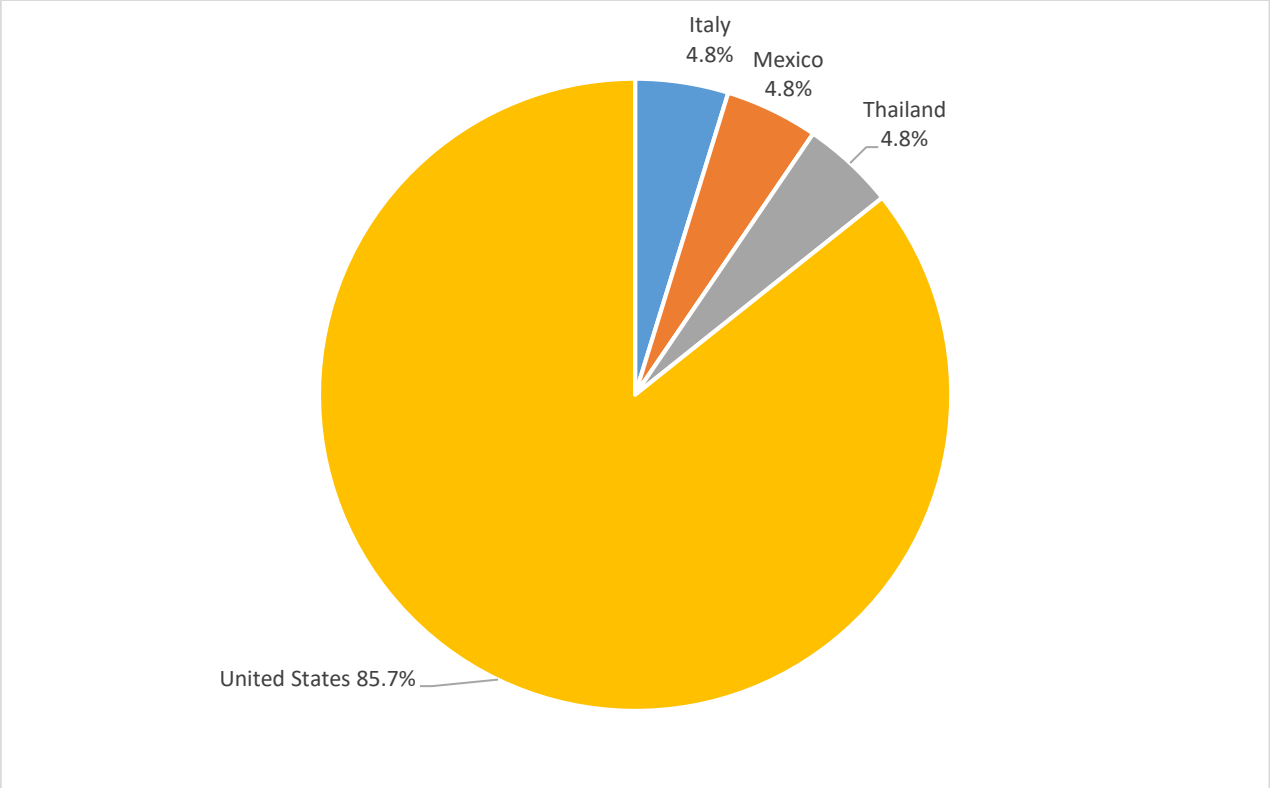

Figure 3. Percent Distribution of Imported Meat Products Analyzed by Country of Origin (n=21).

vi) Environmental Testing in Ready-To-Eat Meat Establishments

Environmental testing is also carried out at domestic federal licence holding establishments producing RTE meat products to verify the establishment's ability to control the presence of *Listeria* spp. within the processing environment. Surfaces within the RTE meat product establishments are swabbed during production, and the swabs are composited and tested for *Listeria* spp. If *Listeria* spp. are detected in an environmental sample, the sample is further tested to determine if *L. monocytogenes* is present.

In 2019/20, 987 environmental samples representing approximately 9870 food contact surfaces from 297 domestic federal licence holding establishments producing RTE meat products were tested for *Listeria* spp. and *L. monocytogenes* under the NMMP. Eight of the samples were assessed as unsatisfactory due the detection of *L. monocytogenes.* Fifteen of the samples were assessed as investigative due to the detection of other *Listeria* spp. The satisfactory rate was determined to be 97.7 %.

vii) % Satisfactory History

The historical % satisfactory rates of domestic and imported red meat and poultry products tested under the NMMP between April 1, 2016 and March 31, 2020 are summarized in Table 3. Consistently high % satisfactory rates were observed in most samples of RTE meat products, precursor materials and raw ground beef/veal, raw pork and wild boar, and in environmental samples.

Table 3: Historical Percent Satisfactory Rates of Red Meat and Poultry Product Samples

	2019/20	2018/19	2017/18	2016/17
RTE Meat Products	99.5 % (1150)	99.5 % (1128)	99.4 % (1105)	99.5 % (1106)
Precursor Materials and Raw Ground Beef/Veal	99.0 % (1363)	99.0 % (1426)	99.5 % (1410)	97.8 % (1424)
Raw Mechanically Separated and Finely Textured Beef	95.8 %[a] (24)	92.0 %[a] (25)	96.7 %[a] (30)	90.0 %[a] (30)
Raw Pork and Wild Boar	100 % (319)	100 % (328)	100 % (332)	100 % (327)
Meat Species Verification	100 %[a] (53)	100 %[a] (20)	100 %[a] (25)	95.5 %[a] (22)
Environmental Testing	97.7 % (987)	97.5 % (957)	95.0 % (957)	97.8 % (937)

[a] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

What Were The 2019/20 NMMP Results for Egg Products?

i) Egg Products

Egg products include all frozen, liquid, or dried egg products which are subjected to the process of pasteurization. In addition to *Salmonella* spp., which are associated with shell eggs, other microorganisms may be introduced during the production of egg products.

Under the NMMP in 2019/20, domestic and imported egg products were tested for ACC, coliforms, *L. monocytogenes* and *Salmonella* spp. A total of 285 domestic egg products were tested, of which 98.3 % were satisfactory (Table 4). One sample of liquid whole egg was assessed as unsatisfactory due to the presence of high ACC levels and four Category 2B salted yolk product samples were assessed as investigative due to the presence of low levels of *L. monocytogenes*. Additionally, seven imported egg products were tested, of which 100 % were satisfactory.

Table 4: Assessment of Domestic and Imported Processed Egg Products Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
ACC	238	237	n/a	1	99.6
Coliforms	238	238	n/a	0	100
L. monocytogenes	285	281	4	0	98.6
Salmonella spp.	284	284	n/a	0	100
Total Domestic Samples	285	280	4	1	98.3
Imported					
ACC	7	7	n/a	0	100[b]
Coliforms	7	7	n/a	0	100[b]
L. monocytogenes	7	7	0	0	100[b]
Salmonella spp.	7	7	n/a	0	100[b]
Total Imported Samples	7	7	0	0	100[b]
Total Samples	**292**	**287**	**4**	**1**	**98.3**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

ii) Environmental Testing in Domestic Shell Egg Grading Stations and Egg Product Processing Establishments

Environmental testing of surfaces and wash water is carried out at domestic federal licence holding establishment for shell egg grading stations and egg product processing to verify the operator systems' ability to control contaminants within the processing environment.

At shell egg grading stations in Canada, eggs are washed, checked for cracks, weighed, sorted and packaged. Within these domestic shell egg grading stations, surfaces from both graded and ungraded product areas within the establishments were swabbed under the NMMP in 2019/20, and the swabs from each area were composited and tested for *Salmonella* spp. A total 466 tests for *Salmonella* spp. were performed on 233 composited environmental samples (food contact and non-food contact surfaces) (Table 5), representing approximately 2330 surfaces within the shell egg grading establishments. Samples were assessed as 99.6 % satisfactory.

Processed egg products are produced at egg product processing establishments in Canada. In domestic egg product processing establishments, surface swabs are taken on food contact surfaces and non-food

contact surfaces along the manufacturing line, both prior to production and during production. Samples taken prior to production were tested for *Salmonella* spp., while samples taken during production were tested for *Salmonella* spp. and *L. monocytogenes*. If *Listeria* spp. were detected, the sample was further tested to determine if *L. monocytogenes* is present. Under the NMMP in 2019/20, 50 environmental samples, each representing approximately 500 surfaces from both raw and finished product areas within the processing establishments, were subjected to 50 tests for *Listeria* spp. and 100 tests for *Salmonella* spp. (Table 5). The overall satisfactory rate was 98 %. One sample was assessed as investigative due to the presence of *Listeria* species other than *L. monocytogenes*.

Within both domestic shell egg grading stations and domestic egg product processing establishments, wash water environmental samples are also collected and tested for ACC. Although high levels of ACC in wash water are not a health concern, their presence may indicate inadequate practices at the establishment to ensure that the microbial quality of the wash water is controlled. Under the NMMP in 2019/20, 213 environmental wash water samples were tested, and 15 of these samples were found to contain high levels of ACC for a 93.0 % satisfactory rate (Table 5).

In total, in 2019/20, 496 environmental samples were tested with an overall satisfactory rate of 96.6 %.

Table 5: Assessment of Environmental Samples from Domestic Shell Egg Grading Stations and Egg Product Processing Establishments Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Shell Egg Grading Station Environmental Swabs					
Salmonella spp.	466	465	n/a	1	99.8
Total Egg Grading Station Samples	233	232	n/a	1	99.6
Egg Processing Establishment Environmental Swabs					
L. monocytogenes	50	49	1	0	98
Salmonella spp.	100	100	n/a	0	100
Total Egg Processing Samples	50	49	1	0	98
Wash Water Environmental Samples					
ACC	213	198	n/a	15	93.0
Total ACC Samples	213	198	n/a	15	93.0
Total Environmental Samples	**496**	**479**	**1**	**16**	**96.6**

[a] n/a = not applicable. The investigative assessment does not apply.

iii) % Satisfactory History

The historical % satisfactory rates of domestic and imported egg products and environmental samples tested under the NMMP between April 1, 2016 and March 31, 2020 are summarized in Table 6. % satisfactory levels for both product and environmental samples were consistent over the years. % satisfactory levels of samples of egg products were higher than those of environmental samples.

Table 6: Historical Percent Satisfactory Rates of Egg Product Samples

	2019/20	2018/19	2017/18	2016/17
Egg Products	98.3 % (292)	100 % (334)	99.7 % (335)	99.4 % (339)
Environmental Testing	96.6 % (496)	96.4 % (580)	95.0 % (646)	95.7 % (631)

What Were The 2019/20 NMMP Results for Dairy Products?

i) Fluid Milk Products

Fluid milk products were targeted for testing in 2019/20. Imported fluid milk represents only about 1 % of what is consumed by Canadians (Catford *et al*, 2014); therefore only domestic fluid milk products were tested under the NMMP.

Under the NMMP in 2019/20, flavoured fluid milk products at domestic dairy producers were tested for generic *E. coli*, *L. monocytogenes* and ACC. A total of 89 domestic flavoured fluid milk products were tested. One sample was unsatisfactory due to high levels of ACC (Table 7).

Table 7: Assessment of Domestic Fluid Milk Products Sampled by CFIA Inspectors under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Generic *E.coli*	89	89	n/a	0	100
L. monocytogenes	89	89	n/a	0	100
ACC[b]	11	10	n/a	1	90.9[c]
Total Samples	**89**	**88**	**n/a**	**1**	**98.9**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Only for flavored milk products.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

ii) Cheese Products

Cheese is a manufactured product for which microbial contamination may be introduced during handling and fermentation. A broad range of types of cheeses made from various milk sources, of various moisture contents and using various manufacturing techniques are tested. Because the microbial contaminants in cheese products made from pasteurized milk and those made from raw milk may differ, the sampling results for these two categories of cheese products will be presented separately.

Under the NMMP in 2019/20, domestic and imported cheeses were sampled and tested for generic *E. coli*, *Salmonella* spp., *L. monocytogenes,* and *S. aureus*. In addition, *E. coli* O157:H7 testing was performed on cheeses claimed to be made from raw milk, and phosphatase testing was performed, when deemed appropriate, to verify claims of pasteurization.

A total of 358 domestic pasteurized milk cheeses were tested and determined to be 99.4 % satisfactory (Table 8). One Category 1 cheese sample, shredded mozzarella, was assessed as unsatisfactory due to the presence of *L. monocytogenes.* Another cheese sample, a cheddar cheese, was assessed as unsatisfactory due to high levels of *S. aureus*. In addition, 182 samples of imported pasteurized milk cheeses were tested and found to be 93.4 % satisfactory (Table 8). The largest proportion of these samples was from France, Greece and Italy but numerous other countries were also represented (Figure 4). Of these imported cheeses, six cheese samples (four from Italy, one from Greece and one from Egypt) were unsatisfactory due to detection of high levels of generic *E. coli*. These cheeses included hard ripened cheese, mozzarella, goat milk cheese, and burrata cheese. Three Category 1 cheese samples (a gouda from Poland and a mozzarella and a blue cheese from Italy) were unsatisfactory due to the detection of *L. monocytogenes*. One Category 2B sample, a whey cheese sample from Greece, was assessed as investigative due to the presence of low levels of *L. monocytogenes.* An additional two imported cheese samples, a goat milk cheese from Greece and a burrata from Italy, were assessed unsatisfactory due to high levels of *S. aureus.*

Table 8: Assessment of Domestic and Imported Pasteurized Milk Cheeses Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
Generic *E. coli*	358	358	n/a	0	100
Salmonella spp.	358	358	n/a	0	100
L. monocytogenes	358	357	0	1	99.7
S. aureus	356	355	n/a	1	99.7

Phosphatase	0	0	n/a	0	n/a
Total Domestic Samples	358	356	0	2	99.4
Imported					
Generic *E. coli*	181	175	n/a	6	96.7
Salmonella spp.	179	179	n/a	0	100
L. monocytogenes	181	177	1	3	97.8
S. aureus	179	177	n/a	2	98.9
Phosphatase	1	1	n/a	0	100[b]
Total Imported Samples	182	170	1	11	93.4
Total Samples	**539**	**525**	**1**	**13**	**97.4**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to the limited number of samples analyzed, the % satisfactory rate should be interpreted with caution.

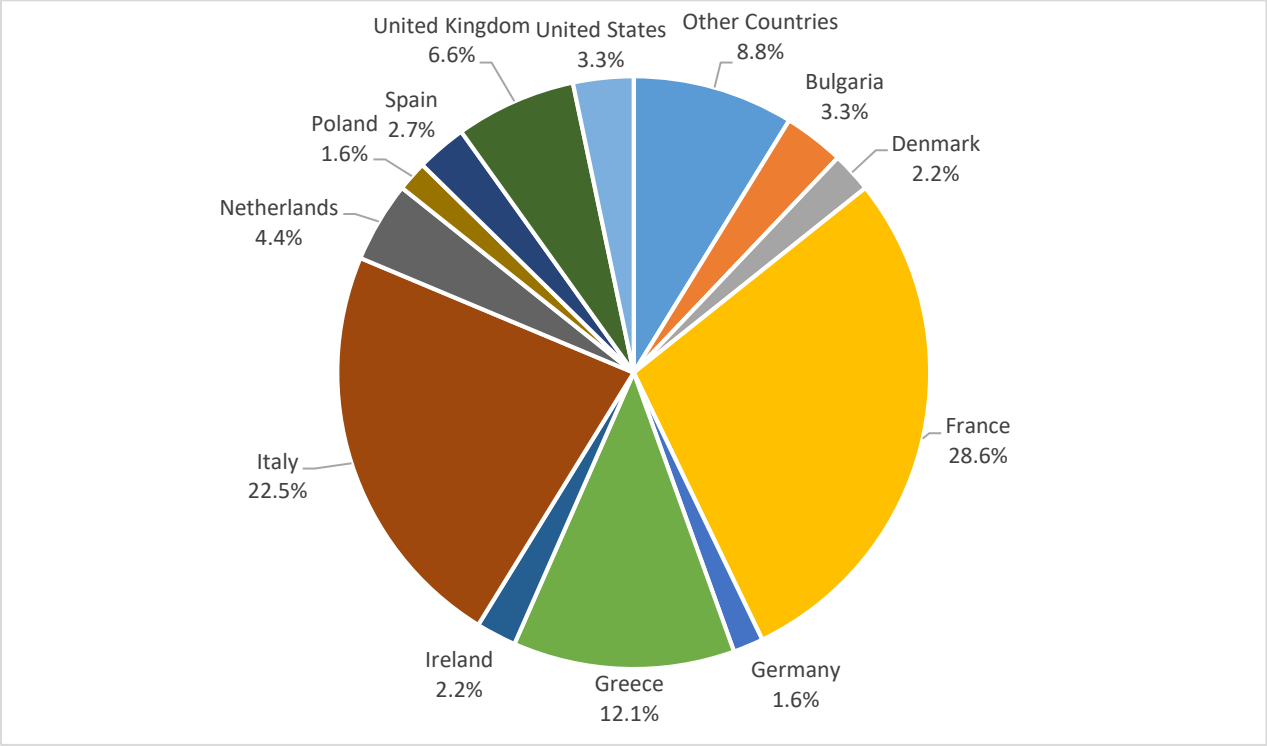

Figure 4. Percent Distribution of Imported Pasteurized Milk Cheeses Analyzed by Country of Origin (n=182).

Under the NMMP in 2019/20, 42 domestic cheeses made with raw milk were tested and were determined to be 97.6 % satisfactory (Table 9). One firm cheese sample was assessed as unsatisfactory due to the presence of generic *E. coli*. In addition, 65 imported raw milk cheese samples were tested and were determined to be 95.4 % satisfactory. The largest proportion of the imported raw milk cheeses

sampled was from France, Italy and Switzerland however cheeses from numerous other countries were also tested (Figure 5). One camembert cheese sample from France was assessed as unsatisfactory due to high levels of generic *E. coli*. Two Category 1 cheese samples from France, a brie and an inedible rind cheese, were assessed unsatisfactory due to detection of *L. monocytogenes*.

Table 9: Assessment of Domestic and Imported Raw Milk Cheeses Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
Generic *E. coli*	42	41	n/a	1	97.6[b]
E. coli O157:H7	39	39	n/a	0	100[b]
Salmonella spp.	42	42	n/a	0	100[b]
L. monocytogenes[b]	42	42	0	0	100[b]
S. aureus	42	42	n/a	0	100[b]
Total Domestic Samples	42	41	n/a	1	97.6[b]
Imported					
Generic *E. coli*	65	64	n/a	1	98.5
E. coli O157:H7	64	64	n/a	0	100
Salmonella spp.	65	65	n/a	0	100
L. monocytogenes[b]	65	63	0	2	96.9
S. aureus	65	65	n/a	0	100
Total Imported Samples	65	62	0	3	95.4
Total Samples	**107**	**103**	**0**	**4**	**96.3**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

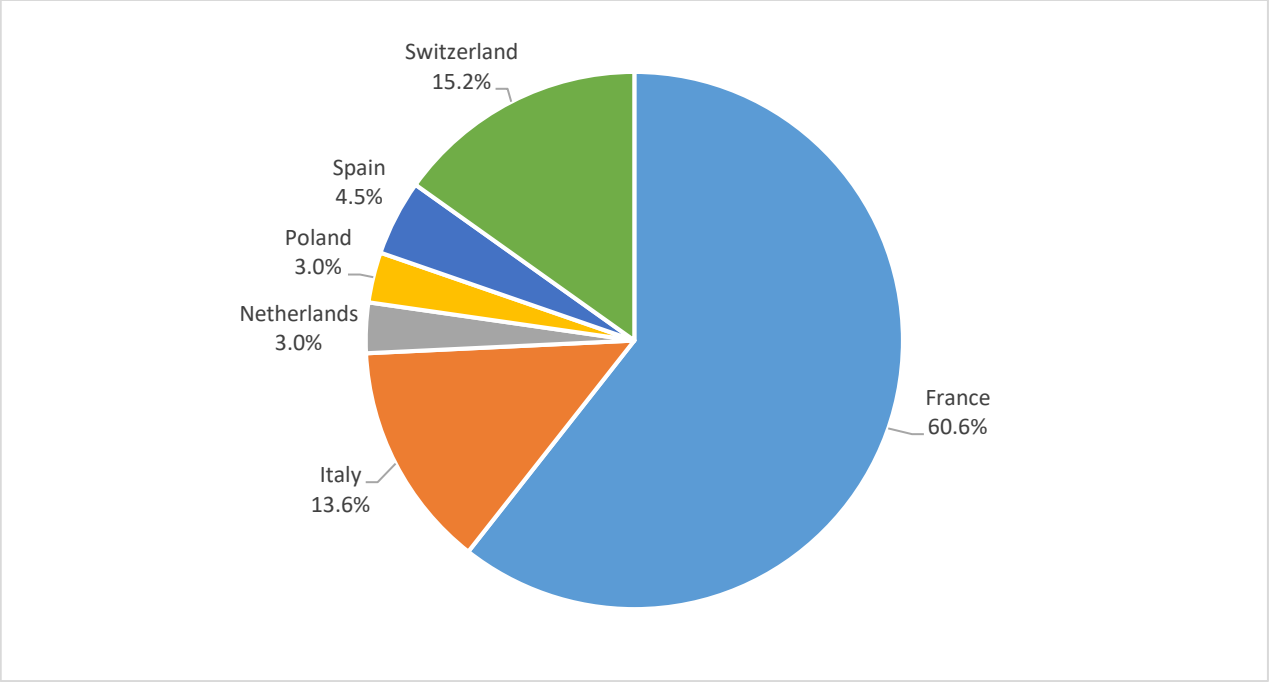

Figure 1. Percent Distribution of Imported Raw Milk Cheeses Analyzed by Country of Origin (n=65).

iii) Environmental Testing in Cheese Manufacturing Establishments

Environmental testing is carried out at domestic federal licence holding establishments producing cheese to verify the operator systems' ability to control the presence of *Listeria* spp. within the processing environment. Under the NMMP in 2019/20, surfaces within these establishments were swabbed and the swabs from each area were composited and tested for *Listeria* spp. If *Listeria* spp. were detected in an environmental sample, the sample was further tested to determine if *L. monocytogenes* is present.

A total of 125 environmental samples, representing approximately 1,250 food contact surfaces from 97 domestic federal licence holding establishments producing cheese products were tested for *Listeria* spp. The samples were 99.2 % satisfactory. One environmental sample was found to be investigative due to the presence of *Listeria* species other than *L. monocytogenes.*

iv) % Satisfactory History

The historical % satisfactory rates of domestic and imported dairy products tested under the NMMP between April 1, 2016 and March 31, 2020 are shown in Table 10. Satisfactory levels were consistent for all products over the years, with those for raw milk cheeses being lower than those for cheeses made with pasteurized milk.

Table 9: Historical Percent Satisfactory Rates of Dairy Product Samples

	2019/20	2018/19	2017/18	2016/17
Fluid Milk[a]	98.9 % (89)	100 % (88)	100 % (91)	100 % (96)
Pasteurized Milk Cheese	97.4 % (539)	98.9 % (532)	98.7 % (519)	98.7 % (457)
Raw Milk Cheese	96.3 % (107)	96.7 % (122)	96.6 % (119)	96.0 % (149)
Environmental Testing	99.2 % (125)	98.5 % (131)	100 % (128)	99.2 % (122)

[a] Prior to 2019/20, both flavoured and unflavoured fluid milk products were tested.

What Were The 2019/20 NMMP/FSO Results for Fresh and Ready-To-Eat Fresh-Cut Fruits and Vegetables?

i) Fresh Fruits and Ready-to-Eat Fresh-Cut Fruits

Whole fresh fruits may be contaminated with pathogens. Ready-to-eat fresh-cut fruits may also be exposed to environmental contaminants during processing. Both whole fresh and RTE fresh-cut fruits are often consumed without further processing that might kill or remove pathogens thus, if pathogens are present, they are a food safety concern. Because the microbial contaminants in whole fresh and RTE fresh-cut fruits may differ, the sampling results for these two categories of products will be presented separately.

A variety of domestic and imported whole fresh fruits were targeted for sampling at both federal licence holding establishments and at retail under the NMMP and FSO programs in 2019/20 (Figure 6). Some of these whole fresh fruit samples were tested for the bacteria generic *E. coli*, *E. coli* O157:H7 and *Salmonella* spp. Whole cantaloupe samples could not be tested for generic *E. coli* due to difficulty extracting this particular microorganism from its netted rind. Imported berries were tested for the parasite *Cyclospora*.

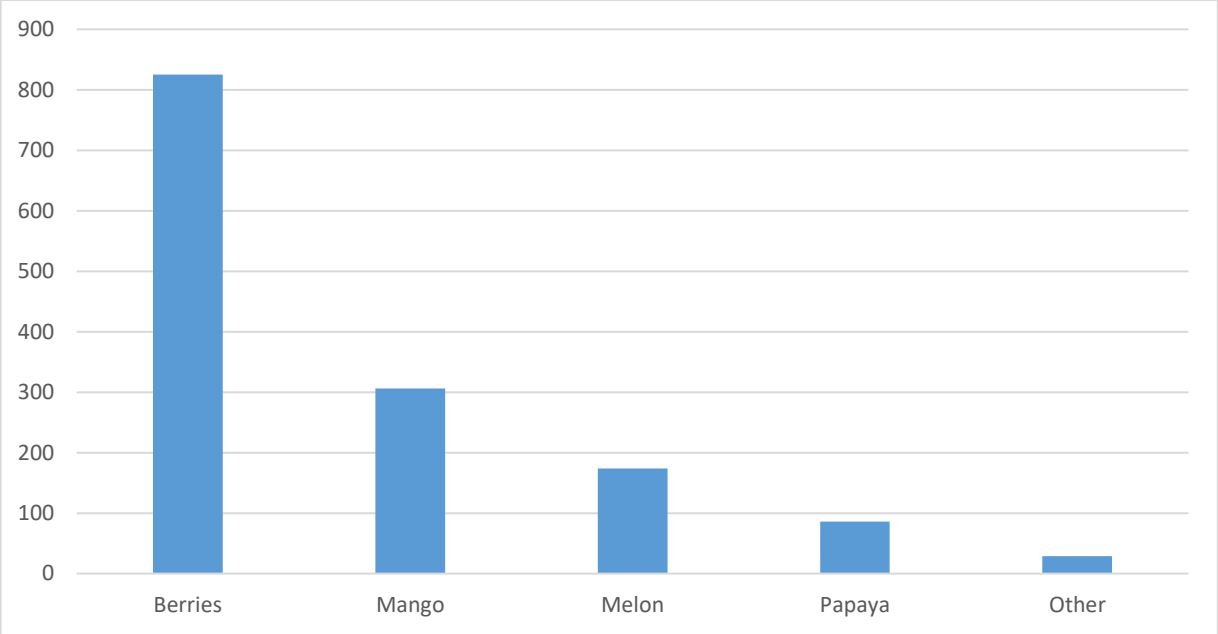

Figure 2. Number and Types of Whole Fresh Fruits and Ready-To-Eat Fresh-Cut Fruits Sampled Under the NMMP and FSO Programs.

Table 11 summarizes test results of whole fresh fruit samples collected by CFIA inspectors under the NMMP and FSO programs. A total of 27 domestic whole fresh fruit samples and 158 imported whole fresh fruit samples were tested for bacteria. Both domestic and imported whole fresh fruit samples were 100 % satisfactory. An additional 33 samples of fresh berries were tested for *Cyclospora* and were 100 % satisfactory.

Table 11: Assessment of Domestic and Imported Whole Fresh Fruit Sampled by CFIA Inspectors Under the NMMP and FSO Programs

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory[a]	% Satisfactory
Domestic					
Generic *E. coli*	21	21	n/a[a]	0	100[b]
E. coli O157:H7	27	27	n/a	0	100[b]
Salmonella spp.	27	27	n/a	0	100[b]
Total Domestic Samples	27	27	n/a	0	100[b]
Imported					
Generic *E. coli*	64	64	n/a	0	100
E. coli O157:H7	158	158	n/a	0	100

Salmonella spp.	158	158	n/a	0	100
Cyclospora spp.	33	33	0	n/a[c]	100[b]
Total Imported Samples	191	191	0	0	100
Total Samples	**218**	**218**	**0**	**0**	**100**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

Table 12 summarizes test results of whole fresh fruit samples collected at retail. A total of 121 domestic whole fresh fruit samples and 245 imported whole fresh fruit samples were tested for bacteria. All samples were assessed as satisfactory.

Table 12: Assessment of Domestic and Imported Whole Fresh Fruit Sampled at Retail Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative	# Unsatisfactory	% Satisfactory
Domestic					
Generic *E. coli*	119	119	0	0	100
E. coli O157:H7	121	121	n/a[a]	0	100
Salmonella spp.	121	121	n/a[a]	0	100
Total Domestic Samples	121	121	0	0	100
Imported					
Generic *E. coli*	64	64	0	0	100
E. coli O157:H7	245	245	n/a[a]	0	100
Salmonella spp.	245	245	n/a[a]	0	100
Total Imported Samples	245	245	0	0	100
Total Samples	**366**	**366**	**0**	**0**	**100**

[a] n/a = not applicable. The investigative assessment does not apply.

A variety of domestic RTE fresh-cut fruits were also targeted for sampling under the NMMP and FSO programs in 2019/20 (Figure 6). All RTE fresh-cut fruits were tested for generic *E. coli*, *E. coli* O157:H7, *L. monocytogenes* and *Salmonella* spp., except for whole cantaloupe which could not be tested for generic *E. coli* due to difficulty extracting this particular microorganism from its netted rind.

Table 13 summarizes test results of RTE fresh-cut fruit samples collected by CFIA inspectors under the NMMP and FSO programs. A total of three domestic and two imported RTE fresh-cut fruit samples were tested for bacteria. Since RTE fresh-cut fruit is minimally processed, the country in which fruit used in an RTE fresh-cut fruit product is grown determines whether the product is considered domestic

or imported. All RTE fresh-cut fruit samples collected by CFIA inspectors under the NMMP and FSO were assessed as satisfactory. The majority of the 438 imported whole fresh fruit and RTE fresh-cut fruit samples collected under the NMMP and FSO programs in 2019/20 were from Mexico and the United States (Figure 7). The overall satisfactory rate was 100 %.

Table 13: Assessment of Domestic and Imported Ready-To-Eat Fresh-Cut Fruit Sampled by CFIA Inspectors Under the NMMP and FSO Programs

Analysis	# Tests	# Satisfactory	# Investigative	# Unsatisfactory	% Satisfactory
Domestic/Domestically Processed					
Generic *E. coli*	2	2	n/a[a]	0	100[b]
E. coli O157:H7	3	3	n/a[a]	0	100[b]
L. monocytogenes	2	2	0	0	100[b]
Salmonella spp.	2	2	n/a[a]	0	100[b]
Total Domestic Samples	3	3	0	0	100[b]
Imported					
Generic *E. coli*	2	2	n/a[a]	0	100[b]
E. coli O157:H7	2	2	n/a[a]	0	100[b]
L. monocytogenes	2	2	0	0	100[b]
Salmonella spp.	2	2	n/a[a]	0	100[b]
Total Imported Samples	2	2	0	0	100[b]
Total Samples	**5**	**5**	**0**	**0**	**100[b]**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

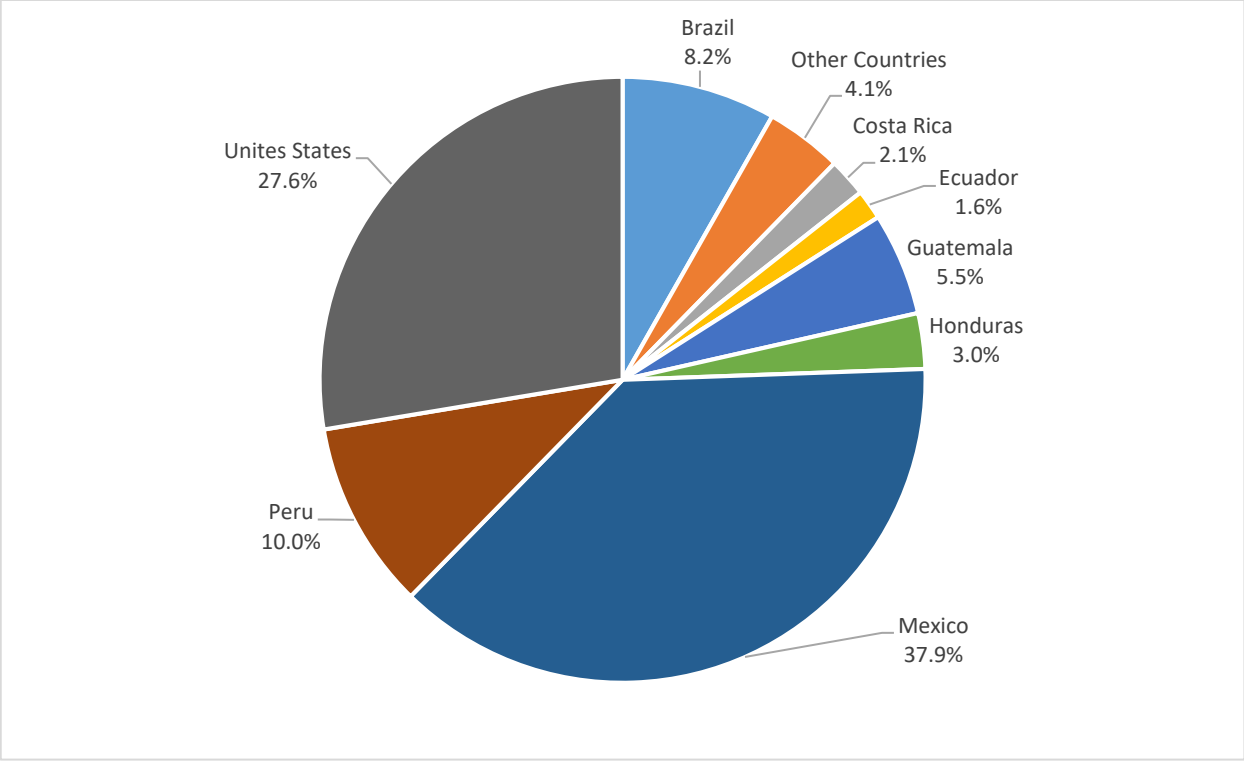

Figure 3. Percent Distribution of Imported Fresh Fruit and Ready-To-Eat Fresh-Cut Fruit Samples Analyzed by Country of Origin (n=438).

ii) Fresh Vegetables and Ready-to-Eat Fresh-Cut Vegetables

Fresh vegetables may be contaminated with pathogenic microorganisms. Ready-to-eat fresh-cut vegetables may also be exposed to environmental contaminants during processing. These products are often consumed without further processing that might kill or remove pathogens thus, if pathogens are present, they are a food safety concern. Because the microbial contaminants in fresh and RTE fresh-cut vegetables may differ, the sampling results for these two categories of products will be presented separately.

A variety of domestic and imported whole fresh vegetables were targeted for sampling under the NMMP and FSO programs in 2019/20 (Figure 8). Some of these whole fresh vegetable samples were tested for the bacteria generic *E. coli*, *E. coli* O157:H7, and *Salmonella* spp. Other whole fresh vegetable samples were tested for the bacteria generic *E. coli*. The remaining whole fresh vegetable samples, which consisted of domestic leafy greens and imported fresh herbs, were tested for the viruses Norovirus Genotypes I and II, and Hepatitis A virus, and the parasites *Giardia*, *Cyclospora*, *Cryptosporidium* and *Toxoplasma*.

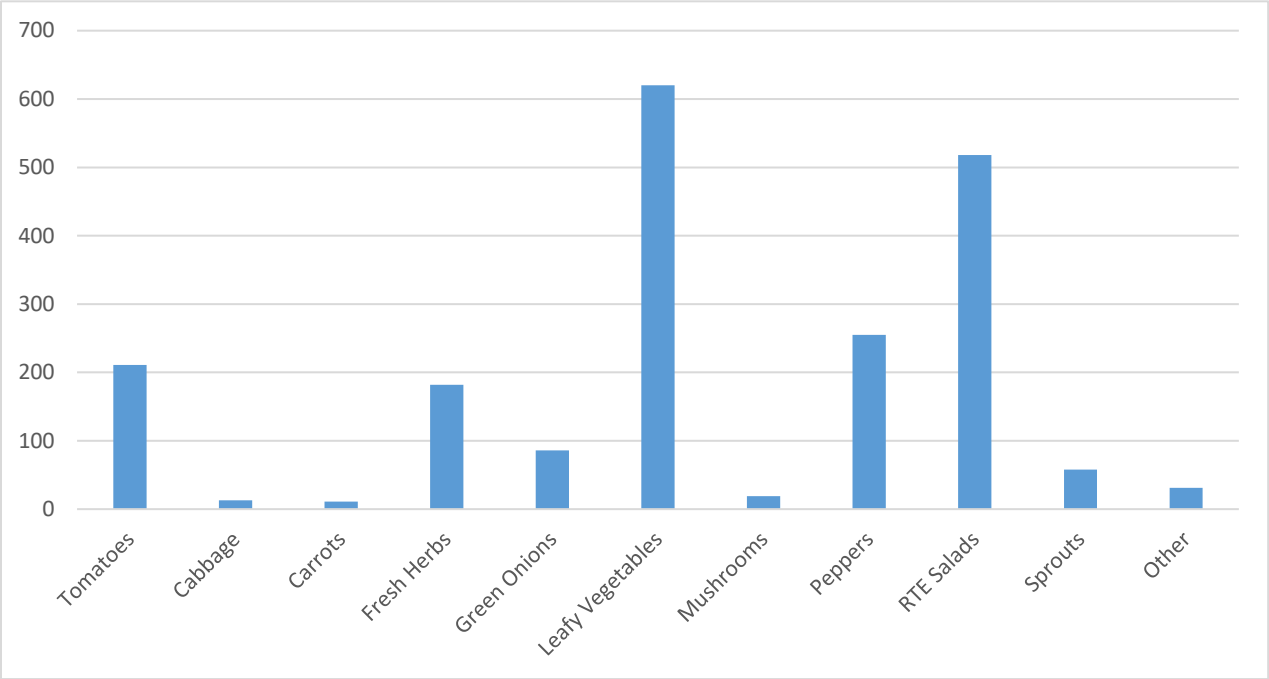

Figure 4. Number and Types of Fresh Whole Vegetables and Ready-To-Eat Fresh-Cut Vegetables Sampled Under the NMMP and FSO Programs.

Table 14 summarizes test results of whole fresh vegetable samples collected by CFIA inspectors under the NMMP and FSO programs. A total of 271 domestic whole fresh vegetable samples and 320 imported whole fresh vegetable samples were tested for bacteria. The domestic whole fresh vegetable samples were 100 % satisfactory, and the imported whole fresh vegetable samples were 99.4 % satisfactory. One imported thyme sample from Guyana was determined to be unsatisfactory due to the presence of both *Salmonella* spp. as well as high levels of generic *E. coli*.

Table 14: Assessment of Domestic and Imported Whole Fresh Vegetables Sampled by CFIA Inspectors Under the NMMP and FSO Programs

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
Generic *E. coli*	213	213	n/a	0	100
E. coli O157:H7	271	271	n/a	0	100
Salmonella spp.	271	271	n/a	0	100
Total Domestic Samples	271	271	n/a	0	100
Imported					

Generic *E. coli*	320	319	n/a	1	99.7
E. coli O157:H7	319	319	n/a	0	100
Salmonella spp.	320	319	n/a	1	99.7
Total Imported Samples	320	318	n/a	1	99.4
Total Samples	**591**	**590**	**n/a**	**1**	**99.8**

[a] n/a = not applicable. The investigative assessment does not apply.

Table 15 summarizes test results of all whole fresh vegetable samples collected at retail. A total of 135 domestic whole fresh vegetable samples and 246 imported whole fresh vegetable samples were tested for bacteria. In addition, 137 domestic and 142 imported leafy greens and fresh herb samples were tested for viruses. Lastly, 394 imported leafy greens and salads were tested for parasites. The domestic whole fresh vegetable samples were 100 % satisfactory. One imported prepackaged salad sample was assessed as investigative due to the detection of *Cyclospora* genetic material.

Table 15: Assessment of Domestic and Imported Whole Fresh Vegetables Sampled at Retail Under the FSO Program

Product Type	Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory[b]	% Satisfactory
Domestic						
Whole Fresh Vegetables	Generic *E. coli*	135	135	n/a	0	100
	E. coli O157:H7	135	135	n/a	0	100
	Salmonella spp.	135	135	n/a	0	100
Leafy Greens and Fresh Herbs	Hepatitis A	137	137	0	n/a	100
	Norovirus Genotype I	137	137	0	n/a	100
	Norovirus Genotype II	137	137	0	n/a	100
Total Domestic Samples		272	272	0	0	100
Imported						
Whole Fresh Vegetables	Generic *E. coli*	246	246	n/a	0	100
	E. coli O157:H7	246	246	n/a	0	100
	Salmonella spp.	246	246	n/a	0	100
	Hepatitis A	142	142	0	n/a	100

Leafy Greens and Fresh Herbs	Norovirus Genotype I	142	142	0	n/a	100
	Norovirus Genotype II	142	142	0	n/a	100
Leafy Greens and Salads	*Cryptosporidium*	394	394	0	n/a	100
	Giardia	258	258	0	n/a	100
	Toxoplasma	393	393	0	n/a	100
	Cyclospora	394	393	1	n/a	99.8
Total Imported Samples		782	781	1	0	99.9
Total Samples		**1054**	**1053**	**1**	**0**	**99.9**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] n/a = not applicable. The unsatisfactory assessment does not apply.

A variety of RTE fresh-cut vegetables were also sampled under the NMMP and FSO programs in 2019/20 (Figure 8). Ready-to-eat fresh-cut vegetables were tested for generic *E. coli, E. coli* O157:H7, *L. monocytogenes*, and *Salmonella* spp.

Tables 16 summarize test results of RTE fresh-cut vegetable samples collected at by CFIA inspectors under the NMMP and FSO programs. A total of 34 domestic and 52 imported RTE fresh-cut vegetable samples were tested for bacteria. Since RTE fresh-cut vegetables are minimally processed, the country in which a vegetable used in an RTE fresh-cut vegetable product is grown determines whether the product is considered domestic or imported. The overall satisfactory rate for domestic/domestically processed products was determined to be 97.1 %. Of the samples collected at Canadian establishments, one domestic sample of shredded cabbage was assessed as unsatisfactory due to the detection of high levels of generic *E. coli*. The imported samples had a satisfactory rate of 100 %.

The 1,399 imported fresh vegetables and RTE fresh-cut vegetable samples tested in 2019/20 had an overall satisfactory rate of 99.6 %. The majority of these originated from the United States and Mexico (Figure 9).

Table 16: Assessment of Domestic and Imported Ready-To-Eat Fresh-Cut Vegetables Sampled by CFIA Inspectors Under the NMMP and FSO Programs

Product Type / Pathogen	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic/Domestically Processed					
Generic *E. coli*	34	33	n/a	1	97.1[b]
E. coli O157:H7	33	33	n/a	0	100[b]
L. monocytogenes	32	32	0	0	100[b]

Salmonella spp.	34	34	n/a	0	100[b]
Total Domestic/ Domestically Processed Samples	34	33	0	1	97.1[b]
Imported					
Generic *E. coli*	52	52	n/a	0	100
E. coli O157:H7	52	52	n/a	0	100
L. monocytogenes	41	41	0	0	100[b]
Salmonella spp.	52	52	n/a	0	100
Total Imported Samples	52	52	0	0	100
Total Samples	**86**	**85**	**0**	**1**	**98.8**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

Table 17 summarizes test results for the domestic and imported RTE fresh-cut vegetable samples sampled at retail. A total of 29 domestic and 245 imported RTE fresh-cut vegetable samples were tested for bacteria. The domestic samples were 100 % satisfactory. One Category 1 sample, a kale mixed salad imported from the United States, was assessed as unsatisfactory due to the presence of *L. monocytogenes*. Additionally, one coleslaw sample was assessed as unsatisfactory due to the presence of *Salmonella* spp. The overall satisfactory rate for the imported samples was determined to be 99.2 %.

Table 17: Assessment of Domestic and Imported Ready-To-Eat Fresh-Cut Vegetables Sampled at Retail Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
Generic *E. coli*	29	29	0	0	100[b]
E. coli O157:H7	29	29	n/a	0	100[b]
L. monocytogenes	28	28	0	0	100[b]
Salmonella spp.	29	29	n/a	0	100[b]
Total Domestic Samples	29	29	0	0	100[b]
Imported					
Generic *E. coli*	245	245	0	0	100
E. coli O157:H7	245	245	n/a	0	100
L. monocytogenes	245	244	0	1	99.6

Salmonella spp.	245	244	n/a	1	99.6
Total Imported Samples	245	243	0	2	99.2
Total Samples	**274**	**272**	**0**	**2**	**99.3**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

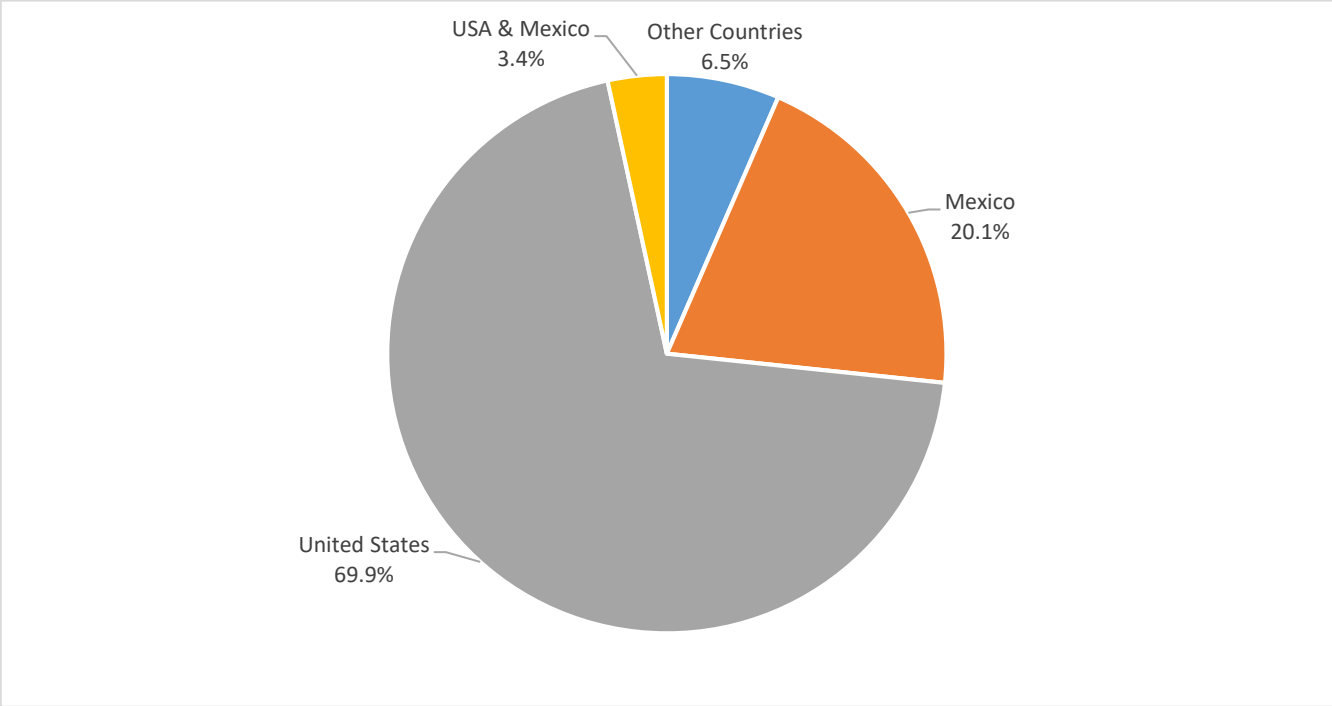

Figure 5. Percent Distribution of Imported Fresh Vegetable and Ready-To-Eat Fresh-Cut Vegetable Samples Analyzed by Country of Origin (n=1399).

iii) Environmental Testing in Domestic Fresh-cut Fruit and Vegetable Manufacturing Establishments

Environmental testing is carried out at domestic federal licence holding establishments producing RTE fresh-cut fruit and vegetables to verify the operator systems' ability to control the presence of *Listeria* spp. within the processing environment. Under the FSO Program in 2019/20, surfaces within these establishments were swabbed and the swabs from each area were composited and tested for *Listeria* spp. If *Listeria* spp. were detected in an environmental sample, the sample was further tested to determine which *Listeria* species were present.

A total of 11 environmental samples, representing approximately 110 food contact surfaces from 11 domestic federal licence holding establishments producing fresh-cut fruit and vegetable products were tested for *Listeria* spp. One environmental swab was found to be unsatisfactory due to the presence of *Listeria monocytogenes.*

iv) % Satisfactory History

The historical % satisfactory rates of domestic and imported fresh fruit and vegetables and RTE fresh-cut fruit and vegetables tested under the NMMP and FSO programs between April 1, 2016 and March 31, 2020 is shown in Table 18. Satisfactory levels of samples of these products were consistent over the years.

Table 18: Historical Percent Satisfactory Rates of Fresh Fruit and Vegetable Samples

	2019/20	2018/19	2017/18	2016/17
Fresh Fruit	100 % (584)	100 % (623)	100 % (599)	99.9 % (889)
Fresh-Cut Fruit	100 % (5)[a]	100 % (10)[a]	100 % (10)[a]	100 % (17)[a]
Fresh Vegetables	99.9 % (1,645)	99.7 % (1,700)	99.8 % (1,680)	99.8 % (1,665)
Fresh-Cut Vegetables	99.2 % (360)	98.7 % (378)	99.0 % (393)	99.1 % (321)
Environmental Testing	90.9 % (11)	100 % (11)	100 % (25)	97.1 % (34)

[a] Due to small sample/test number, the significance of the % satisfactory level should be interpreted with caution.

What Were The 2019/20 NMMP/FSO Results for Processed Fruit and Vegetable Products?

i) Frozen Fruits

Frozen fruits may be contaminated with pathogens. These products are often consumed without further processing that might kill or remove pathogens thus, if pathogens are present, they would present a food safety concern. A variety of domestic and imported frozen fruits were targeted for sampling under the NMMP and FSO programs in 2019/20. Some of these frozen fruit samples were tested for the bacteria *L. monocytogenes* and *Salmonella* spp. (frozen berries only). Other frozen fruit samples (berries only) were tested for the viruses Hepatitis A, Norovirus Genotype I and Norovirus Genotype II.

Table 19 summarizes test results of frozen fruit samples collected at collected at by CFIA inspectors under the NMMP and FSO programs. A total of 15 domestic frozen fruit samples and 24 imported frozen fruit samples were tested for bacteria. All samples were assessed as satisfactory.

Table 19: Assessment of Domestic and Imported Frozen Fruit Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
L. monocytogenes	15	15	0	0	100[b]
Salmonella spp.	14	14	n/a	0	100[b]
Total Domestic Samples	15	15	n/a	0	100[b]
Imported					
L. monocytogenes	24	24	0	0	100[b]
Salmonella spp.	13	13	n/a	0	100[b]
Total Imported Samples	24	24	0	0	100[b]
Total Samples	**39**	**39**	**0**	**0**	**100[b]**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

Table 20 summarizes test results of frozen fruit samples collected at retail. A total of 64 domestic frozen fruit samples, 534 imported frozen fruit samples, and 3 frozen fruit samples of unknown origin were tested for viruses. These products of unknown origin are products where the country of origin of the frozen berries was not listed on the packaging, e.g. only the importer was listed. The domestic and unknown country of origin samples were 100 % satisfactory. One sample of imported frozen raspberries from Serbia was assessed as investigative due to detection of Norovirus Genotype II viral genetic material. Another frozen raspberry sample from Chile was assessed investigative due to detection of Norovirus Genotype I viral genetic material. The 558 imported frozen fruit samples tested in 2019/20 originated mainly from Chile, Mexico, Peru Serbia and the United States (Figure 10).

Table 20: Assessment of Domestic and Imported Frozen Fruit (Berries) Sampled at Retail Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative	# Unsatisfactory[a]	% Satisfactory
Domestic					
Hepatitis A	64	64	0	n/a	100
Norovirus Genotype I	64	64	0	n/a	100
Norovirus Genotype II	64	64	0	n/a	100
Total Domestic Samples	64	64	0	n/a	100
Imported					
Hepatitis A	534	534	0	n/a	100
Norovirus Genotype I	533	532	1	n/a	99,8
Norovirus Genotype II	533	532	1	n/a	99,8
Total Imported Samples	534	532	2	n/a	99.6
Unknown Country of Origin					
Hepatitis A	3	3	0	n/a	100[b]
Norovirus Genotype I	3	3	0	n/a	100[b]
Norovirus Genotype II	3	3	0	n/a	100[b]
Total Unknown Samples	3	3	0	n/a	100[b]
Total Samples	**601**	**599**	**2**	**n/a**	**99.7**

[a] n/a = not applicable. The unsatisfactory assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

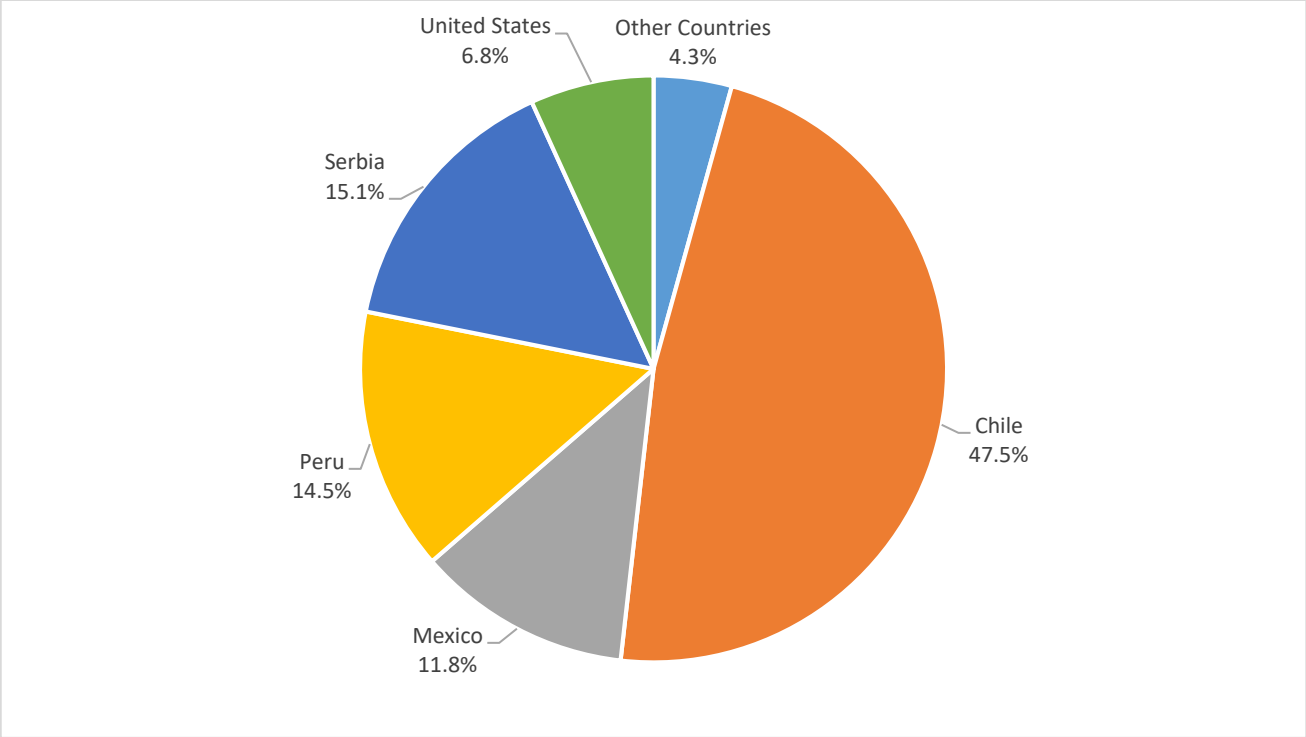

Figure 10. Percent Distribution of Imported Frozen Fruit Analyzed by Country of Origin (n=558).

ii) Frozen Vegetables

Frozen vegetables may be contaminated with pathogens. Typically, frozen vegetables are heated or cooked prior to serving. Many frozen vegetables are clearly labelled with cooking instructions that, if followed, will kill any pathogens that may be present but some types of frozen vegetables are not clearly labelled with cooking instructions, for example, frozen spinach. Frozen vegetables that are not clearly labelled with cooking instructions are not always subjected to cooking prior to consumption and thus may be considered RTE. For this reason, products that were not clearly labelled with cooking instructions were tested for *L. monocytogenes* to confirm that these products are produced under good manufacturing conditions.

Table 21 summarizes test results of frozen vegetables without cooking instructions collected under the NMMP in 2019/20. In total, 3 domestic frozen vegetable sample without cooking instructions and 11 imported frozen vegetable samples without cooking instructions, originating from a variety of countries (Figure 11), were tested. All were assessed as satisfactory.

Table 21: Assessment of Domestic and Imported Frozen Vegetables Without Cooking Instructions Sampled by CFIA Inspectors Under the NMMP

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
L. monocytogenes	3	3	0	0	100[b]
Total Domestic Samples	3	3	n/a	0	100[b]
Imported					
L. monocytogenes[b]	11	11	0	0	100[b]
Total Imported Samples	11	11	n/a	0	100[b]
Total Samples	**14**	**14**	**0**	**0**	**100[b]**

[a] n/a = not applicable. The investigative assessment does not apply.
[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

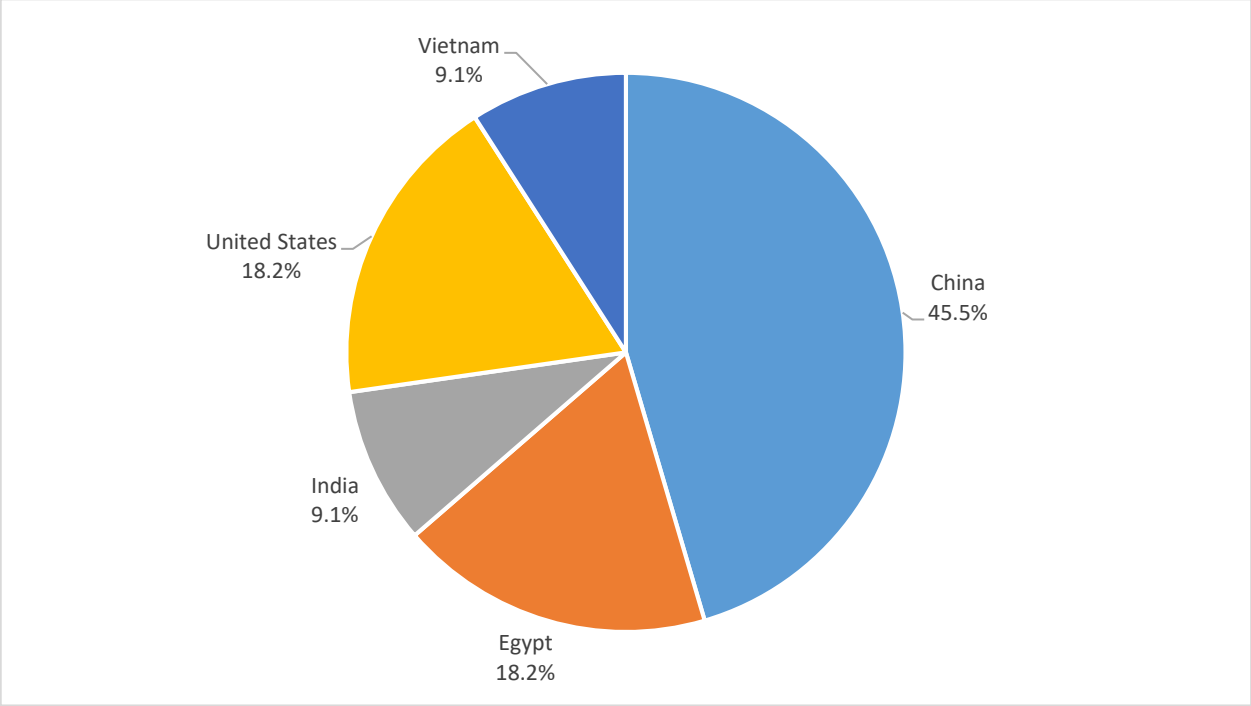

Figure 11. Percent Distribution of Imported Frozen Vegetables Without Cooking Instructions Analyzed by Country of Origin (n=11)

iii) % Satisfactory History

The historical satisfactory rates of domestic and imported processed fruit and vegetables tested under the NMMP and FSO programs between April 1, 2016 and March 31, 2020 is shown in Table 22. Satisfactory levels of samples of these products were consistent over the years.

Table 22: Historical Percent Satisfactory Rates of Processed Fruit and Vegetable Product Samples

	2019/20	2018/19	2017/18	2016/17
Frozen Fruit	99.7 % (640)	99.8 % (608)	99.7 % (606)	99.0 % (312)
Frozen Vegetables	100 % (14)	95.1 % (61)	92.3 % (65)	89.1 % (55)

[a] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

What Were The 2019/20 FSO Results for Manufactured Foods?

i) Tahini

Tahini may be contaminated with pathogenic microorganisms. Tahini is often incorporated into foods, such as hummus, which are not subsequently heated to reduce microbial growth and which would possess sufficient water activity to permit growth of *Salmonella* spp. if improperly stored (i.e., temperature abuse). These products are often consumed without further processing that might kill or remove pathogens thus, if pathogens are present, they are a food safety concern. Tahini products were targeted for sampling at retail under the FSO Program. Tahini samples were tested for the bacteria *Salmonella* spp.

Table 23 summarizes test results for imported tahini samples collected at retail under the FSO 2019/20. The 90 imported tahini samples originated mainly from Israel, Lebanon and the Unites States (Figure 12). These samples had a satisfactory rate of 100 %.

Table 23: Assessment of Imported Tahini Sampled at Retail Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Salmonella spp.	90	90	n/a	0	100
Total Samples	**90**	**90**	**n/a**	**0**	**100**

[a] n/a = not applicable. The investigative assessment does not apply.

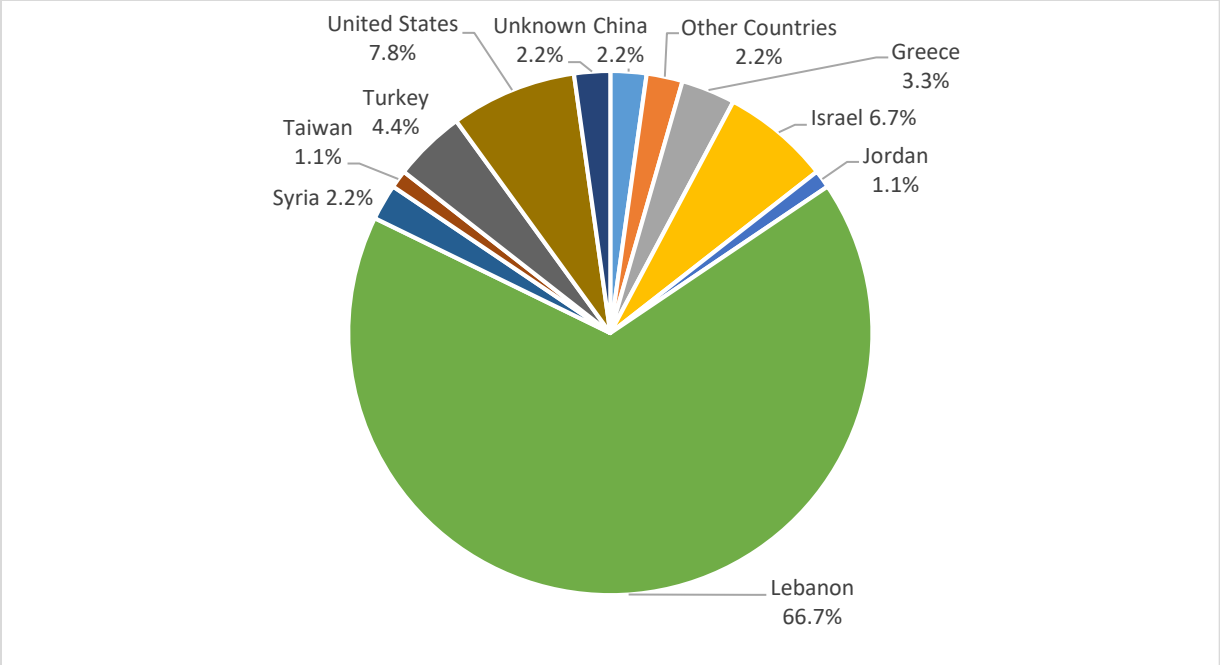

Figure 12. Percent Distribution of Imported Tahini Analyzed by Country of Origin (n=90).

ii) Powdered Infant Formula

Powdered infant may be contaminated with pathogenic microorganisms. Powdered infant formula is commonly consumed by newborns and infants in Canada. Unfortunately, the consumption of reconstituted powdered infant formula has been associated with recalls and outbreaks of foodborne illnesses in Canada and worldwide, with the main pathogens of concern being *Cronobacter* species (spp.) and *Salmonella* spp. While very rare, infections with these pathogens in babies can be fatal. Contamination can occur at any point in the food production chain and have been previously traced back during food safety investigations to the production facility and equipment used to prepare the infant formula. Powdered infant formula products were targeted for sampling at retail under the FSO Program. Powdered infant formula samples were tested for the Enterobacteriaceae and *Cronobacter* spp.

Table 24 summarizes test results for powdered infant formula samples collected at retail under the FSO program in 2019/20. In total, 148 samples were tested for both Enterobacteriaceae and *Cronobacter* spp. The samples originated mainly from Ireland and the United States (Figure 13). The satisfactory rate was 98.7 %. One sample of powdered infant formula was assessed as unsatisfactory due to detection of *Cronobacter* spp., and another sample was assessed as investigative due to detection of Enterobacteriaceae. Both samples were imported from the United States.

Table 24: Assessment of Domestic and Imported Powdered Infant Formula Sampled at Retail Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Domestic					
Enterobacteriaceae	0	0	0	n/a	n/a
Cronobacter spp.	0	0	n/a	0	n/a
Total Domestic Samples	0	0	0	0	n/a
Imported					
Enterobacteriaceae	128	127	1	n/a	99.2
Cronobacter spp.	128	127	n/a	1	99.2
Total Imported Samples	128	126	1	1	98.4
Unknown Country of Origin					
Enterobacteriaceae	20	20	0	n/a	100[b]
Cronobacter spp.	20	20	n/a	0	100[b]
Total Unknown Samples	20	20	0	0	100[b]
Total Samples	**148**	**146**	**1**	**1**	**98.6**

[a] n/a = not applicable. The investigative assessment does not apply.

[b] Due to small sample/test number, the significance of the % satisfactory rate should be interpreted with caution.

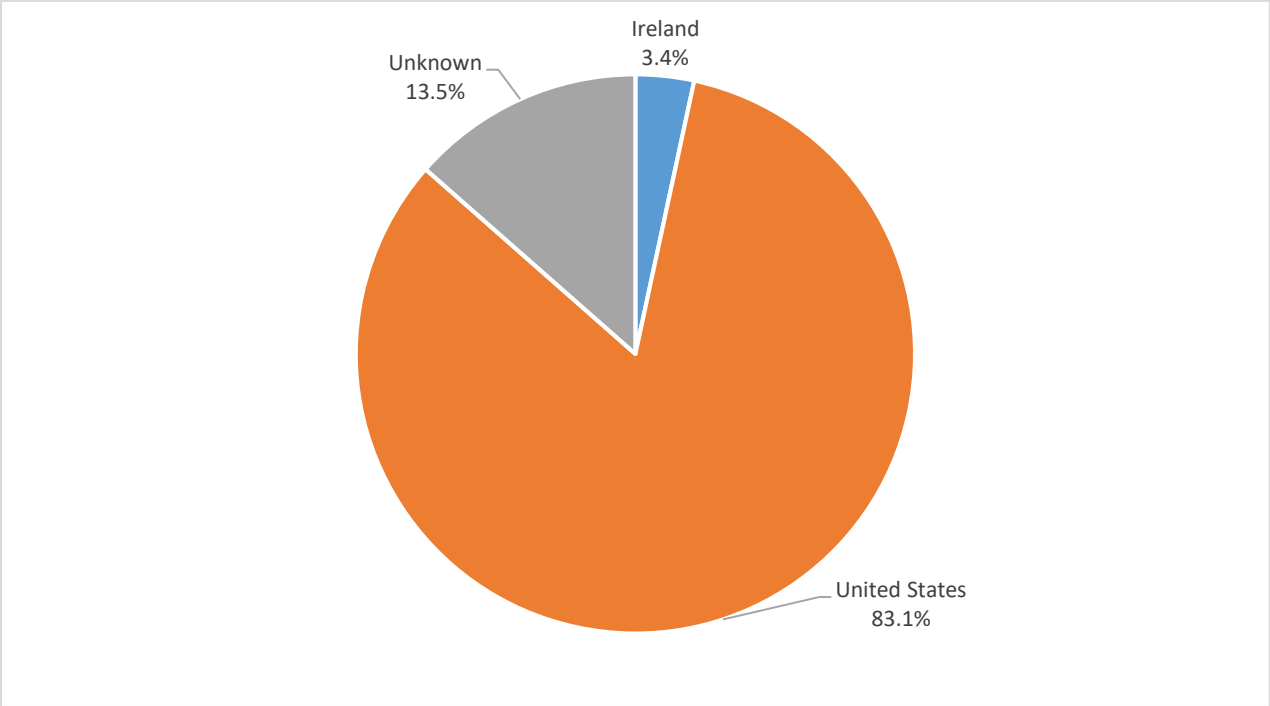

Figure 13. Percent Distribution of Imported Powdered Infant Formula Analyzed by Country of Origin (n=148).

iii) % Satisfactory History

The historical % satisfactory rates of domestic and imported manufactured products tested under the NMMP between April 1, 2018 and March 31, 2020 are summarized in Table 25.

Table 25: Historical Percent Satisfactory Rates of Manufactured Food Product Samples

	2019/20	**2018/19**
Tahini	100 % (90)	100 % (95)
Powdered Infant Formula	98.6 % (148)	100 % (149)

What Were The 2019/20 FSO Results for Fish and Seafood Products?

i) Fish and Seafood Products

Raw fish and seafood may be contaminated with pathogenic microorganisms. Ready-to-eat fish and seafood may become exposed to environmental contaminants during processing. These products are often consumed without further processing that might kill or remove pathogens, thus if pathogens are present, they are a food safety concern. Raw molluscan shellfish and RTE fish products were targeted for sampling by CFIA inspectors at federal licence holding establishments and at retail under the FSO Program. The raw bivalve molluscan shellfish were tested for the bacteria *Vibrio parahaemolyticus,* and the RTE fish products were tested for other bacteria: generic *E. coli, L. monocytogenes, Salmonella* spp. and *S. aureus*.

Table 26 summarizes test results for domestic raw molluscan shellfish samples collected by CFIA inspectors under the FSO in 2019/20. In total, 81 domestic raw molluscan shellfish samples were tested for *V. parahaemolyticus*. The satisfactory rate was 87.7 %, with ten samples being assessed as unsatisfactory due to the presence of high levels of *V. parahaemolyticus*.

Table 26: Assessment of Domestic Raw Molluscan Shellfish Sampled by CFIA Inspectors Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Vibrio parahaemolyticus	81	71	n/a	10	87.7
Total Samples	**81**	**71**	**n/a**	**10**	**87.7**

[a] n/a = not applicable. The investigative assessment does not apply.

Table 27 summarizes test results for imported RTE fish products collected at retail under the FSO in 2019/20. In total, 76 RTE fish samples, the majority originating from the United States (Figure 14), were tested for generic *E. coli, L. monocytogenes, Salmonella* spp. and *S. aureus* and were determined to be 98.7 % satisfactory. One sample of anchovy fillets was assessed as investigative due to detection of high levels of *S. aureus.*

Table 27: Assessment of Imported Ready-to-Eat Fish Products Sampled at Retail Under the FSO Program

Analysis	# Tests	# Satisfactory	# Investigative[a]	# Unsatisfactory	% Satisfactory
Generic *E. coli*	76	76	0	0	100
L. monocytogenes	76	76	0	0	100

Salmonella spp.	75	75	n/a	0	100
S. aureus	76	75	1	0	98.7
Total Samples	**76**	**75**	**1**	**0**	**98.7**

[a] n/a = not applicable. The investigative assessment does not apply.

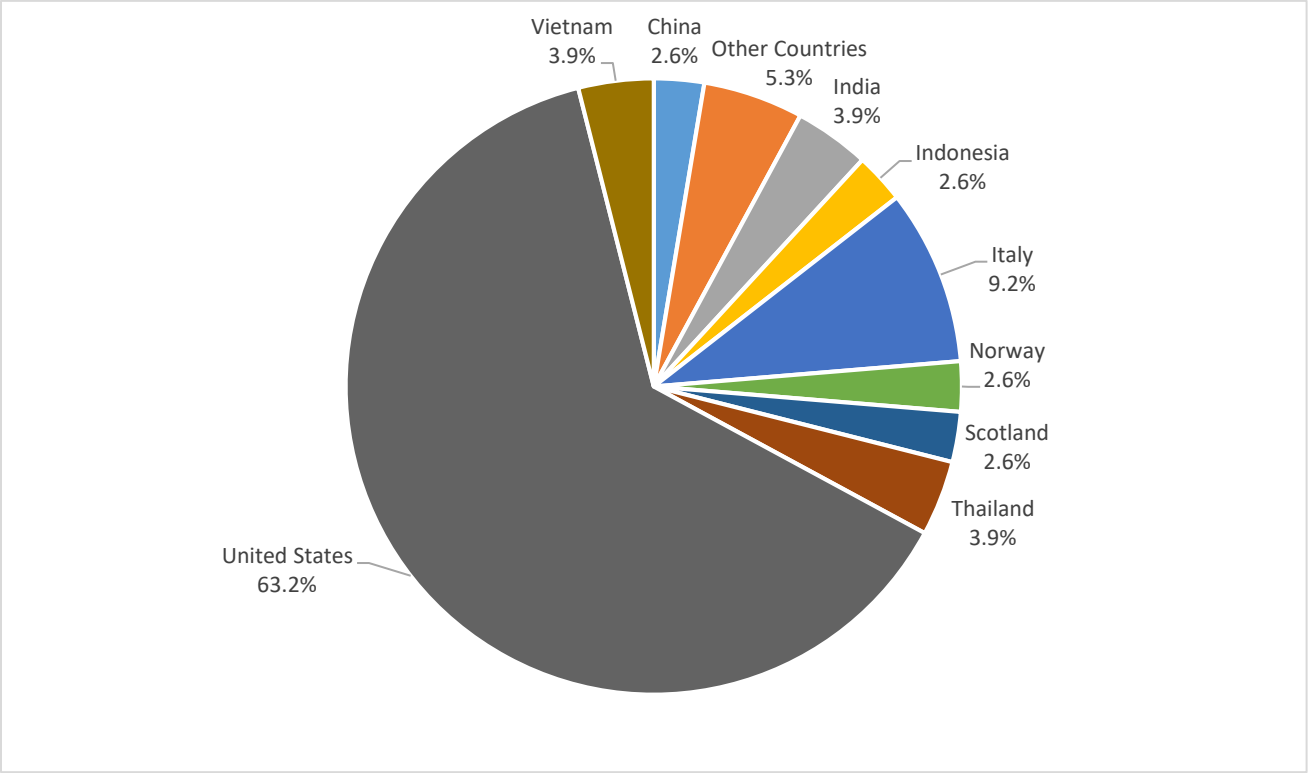

Figure 14. Percent Distribution of Imported Ready-to-Eat Fish Products Analyzed by Country of Origin (n=76).

ii) Environmental Testing in Ready-To-Eat Fish Product Establishments

Environmental testing is carried out at domestic federal licence holding establishments producing RTE fish products to verify the operator systems' ability to control the presence of *Listeria* spp. within the processing environment. Under the FSO Program in 2019/20, surfaces within these establishments were swabbed and the swabs from each area were composited and tested for *Listeria* spp. If *Listeria* spp. was detected in an environmental sample, the sample was further tested to determine which *Listeria* species were present.

A total of 41 environmental samples, representing approximately 410 food contact surfaces from 41 domestic federal licence holding establishments producing ready-to-eat fish products were tested for

Listeria spp. The overall satisfactory rate was 97.6 %. One sample was assessed as assessed as unsatisfactory due to the presence of *L. monocytogenes*.

iii) % Satisfactory History

The historical % satisfactory rates of domestic and imported fish and seafood products tested under the FSO program between April 1, 2016 and March 31, 2020 and shown in Table 28. Satisfactory rates of samples of these products were consistent over the years.

Table 28: Historical Percent Satisfactory Rates of Fish and Seafood Product Samples

	2019/20	2018/19	2017/18	2016/17
Raw Molluscan Shellfish	87.7 % (81)	86.5 % (74)	92.2 % (77)	100 % (49)[a]
Ready-to-Eat Fish	98.7 % (76)	100 % (75)	100 % (78)	100 % (70)
Environmental Testing	97.6 % (41)[a]	100 % (11)[a]	100 % (14)[a]	100 % (11)[a]

[a] Due to small sample/test number, the significance of the % satisfactory value should be interpreted with caution.

What Do The NMMP/FSO Results Mean?

In the 2019/20 fiscal year, 11,234 tests were performed on 4,843 domestic and imported food products collected from under the NMMP. Specifically, 8,268 tests were performed on 3,837 domestic products and 2,966 tests were performed on 1,006 imported products to verify compliance with food safety standards. Results indicated that domestic products were 99.2 % satisfactory whereas imported products were 99.0 % satisfactory. Overall, a 99.1 % satisfactory rate was observed for combined domestic and imported products. In addition, there were 1941 tests performed on 1,608 environmental samples, which were assessed as 97.4 % satisfactory.

In 2019/20 fiscal year, 8,399 tests were performed on 2,736 domestic, imported, and unknown origin food products collected under the FSO Program. Specifically, 1,644 tests were performed on 589 domestic products; 6,706 tests were performed on 2,124 imported products; and 49 tests were performed on 23 food products of unknown origin. Results indicated that domestic products were 98.5 % satisfactory, imported products were 99.6 % satisfactory, and food products of unknown origin were 100 % satisfactory. Overall, a 99.1 % satisfactory rate was observed for domestic, imported, and unknown origin products. In addition, there were 52 tests performed on 52 environmental samples under the FSO program, which were assessed as 94.2 % satisfactory.

A total of 38 product samples and 26 environmental samples were assessed as unsatisfactory in 2019/20 under the NMMP and FSO programs. Of the 38 unsatisfactory food product samples, 25 were assessed

as unsatisfactory due to the presence of one or more pathogens, 12 were assessed as unsatisfactory due to the presence of high levels of indicator organisms and one product sample was assessed as unsatisfactory due to the presence of CNS tissue. Of the 26 unsatisfactory environmental samples, 11 were assessed as unsatisfactory due to the presence of one or more pathogens, while the remaining 15 were assessed as unsatisfactory due to the presence of high levels of indicator organisms. The presence of a pathogen in a food sample represents a direct food hazard. The presence of a pathogen in an environmental sample indicates that pathogens are present in the production environment and that the food product is at a higher risk of being contaminated. The presence of high levels of indicator organisms does not always imply the existence of a food-related health hazard but can expose unsanitary practices and conditions under which pathogenic microorganism could contaminate food products.

A total of 27 product samples and 17 environmental samples were assessed as investigative in 2019/20 under the NMMP and FSO programs. Of these investigative product samples, 12 were assessed as investigative due to the presence of pathogens detected at low levels (<100 CFU/g) or genetic material from pathogens, i.e. viruses or parasites. Fifteen product samples were assessed as investigative due to the presence of indicator organisms. Seventeen environmental samples were assessed as investigative due to the presence of indicator organisms, i.e. *Listeria* species other than *L. monocytogenes*.

These results indicate that Canada maintains a very high overall level of quality and safety, for both domestic and imported food products and for the environments under which domestic products were produced. In addition, the levels of satisfactory products being observed in the 2019/20 fiscal year were relatively consistent with previous years, indicating that this high level of quality and safety is being maintained over time.

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Appendix I: Assessment Criteria for NMMP/FSO Samples Collected by CFIA Inspectors

Assessment criteria (n, c, m and M) are used to assess test results to determine if a sample is satisfactory, unsatisfactory or investigative. For all sample plans, "n" represents the number of sample units (i.e., subsamples) from a single lot of product to be analyzed. Collectively, these samples units represent one sample. "c" represents the maximum allowable number of unacceptable sample units in a 2-class plan (i.e, only two possible results) or marginally acceptable sample units in a 3-class plan. "m" represents a microbiological limit which, in a 2-class plan, separates sample units of acceptable from unacceptable quality or, in a 3-class plan, "m" separates sample units of acceptable quality from those of marginally acceptable quality. "M" represents a microbiological limit which, in a 3-class plan, separates sample units of marginally acceptable quality from those of unacceptable quality.

Commodity	Analyte	n	c	m	M	Satisfactory	Investigative[a]	Unsatisfactory[b]
Red Meat & Poultry Products and Environmental								
Category 1 RTE Meat Products	*L. monocytogenes*	5	0	0	-	Not Detected	n/a	Detected
Category 2A/2B RTE Meat Products	*L. monocytogenes*	5	0	100	-	Not Detected	≤m/g in all sub sample units tested	>m/g in any sub sample unit tested
RTE Meat Products	*Salmonella* spp.	5	0	0	-	Not Detected	n/a	Detected
RTE Dry & Semi-dry Fermented Meat Products	*E. coli* O157:H7	5	0	0	-	Not Detected	n/a	Detected
Raw Ground Beef/Veal	generic *E. coli*	5	0	10^2	-	≤10^2/g	>10^2/g	n/a
Raw Ground Beef/Veal	*E. coli* O157:H7	5	0	0	-	Not Detected	n/a	Detected
Beef/Veal Trims	generic *E. coli*	60	0	10^2	-	≤10^2/g	>10^2/g	n/a
Beef/Veal Trims	*E. coli* O157:H7	60	0	0	-	Not Detected	n/a	Detected

Commodity	Analyte	n	c	m	M	Satisfactory	Investigative[a]	Unsatisfactory[b]
Mechanically Separated & Finely Textured Beef	CNS	3	n/a			Not Detected	n/a	Detected
Pork Carcasses	*Trichinella spiralis*	100	n/a			Not Detected	n/a	Detected
Raw Meat & RTE Meat Products	Species Verification	1	n/a			Detected as declared or not detected and not declared	n/a	Not detected but declared or detected but not declared
Environmental - RTE Meat Establishments	*Listeria* spp.	10	n/a			Not Detected	*Listeria* spp. other than *L. monocytogenes* detected	*L. monocytogenes* detected
Processed Egg Products and Environmental								
Processed Egg	ACC	5	0	5×10^4	-	≤m/g	n/a	>m/g in one or more sample units
Processed Egg	Coliforms	5	0	10	-	≤m/g	n/a	>m/g in one or more sample units
Processed & Cooked Egg Products	*Salmonella* spp.	10	0	0	-	Not Detected	n/a	Detected
Category 1 RTE Processed Egg Products	*L. monocytogenes*	5	0	0	-	Not Detected	n/a	Detected
Category 2A/2B RTE Processed Egg Products	*L. monocytogenes*	5	0	100	-	Not Detected	≤m/g in all sub sample units tested	>m/g in any sub sample unit tested
Egg Wash Water - Basket Washer	ACC	1	n/d[c]	n/d	10^5	≤10^5/mL	n/a	>10^5 /mL
Egg Wash Water - Recirculating Washer	ACC	3	n/d	n/d	10^5	≤10^5/mL	n/a	>10^5/mL

Commodity	Analyte	n	c	m	M	Satisfactory	Investigative[a]	Unsatisfactory[b]
Environmental - Shell Egg Grading Station (FCS, NFCS)	*Salmonella* spp.	5	0	0	-	Not Detected	n/a	Detected
Environmental - Processed Egg (FCS, NFCS)	*Listeria* spp.	5	0	0	-	Not Detected	*Listeria* spp. other than *L. monocytogenes* detected	*L. monocytogenes* detected
Environmental - Processed Egg (FCS, NFCS)	*Salmonella* spp.	5	0	0	-	Not Detected	n/a	Detected
Dairy Products and Environmental								
Flavoured Fluid Milk Products	generic *E. coli*	5	0	0	-	Not Detected	n/a	Detected
Category 1 RTE Flavoured Fluid Milk Products	*L. monocytogenes*	5	0	0	-	Not Detected	n/a	Detected
Flavoured Fluid Milk Products	ACC	5	2	5×10^4	10^6	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded
Cheese (pasteurized milk)	generic *E. coli*	5	2	10^2	2×10^3	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded
Cheese (raw milk)	generic *E. coli*	5	2	5×10^2	2×10^3	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded
Cheese (raw milk)	*E. coli* O157:H7	5	0	0	-	Not Detected	n/a	Detected
Cheese (pasteurized and raw milk)	*Salmonella* spp.	5	0	0	-	Not Detected	n/a	Detected

Commodity	Analyte	n	c	m	M	Satisfactory	Investigative[a]	Unsatisfactory[b]
Category 1 RTE Cheese Products (pasteurized and raw milk)	*L. monocytogenes*	5	0	0	-	Not Detected	n/a	Detected
Category 2A/2B RTE Cheese Products (pasteurized and raw milk)	*L. monocytogenes*	5	0	100	-	Not Detected	≤m/g in all sub sample units tested	>m/g in any sub sample unit tested
Cheese (pasteurized milk)	*S. aureus*	5	2	10^2	10^4	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded
Cheese (raw milk)	*S. aureus*	5	2	10^3	10^4	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded
Cheese (pasteurized milk)	Phosphatase	3	2	5ug	10ug	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if C is exceeded
Environmental - Cheese (FCS) & Dairy (FCS, NFCS) Processors	*Listeria* spp.	10	0	0	-	Not Detected	*Listeria* spp. other than *L. monocytogenes* detected	*L. monocytogenes* detected
Fresh Fruits & Vegetables and Environmental								
Fresh and RTE Fresh-Cut Fruits & Vegetables	generic *E. coli*	5	2	10^2	10^3	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded
Fresh and RTE Fresh-Cut Fruits & Vegetables	*E. coli* O157:H7	5	0	0	-	Not Detected	n/a	Detected
Sprouted Seeds and Beans	generic *E. coli*	5	2	10^2	10^3	≤m/g or if c is not exceeded	n/a	>M/g in one or more sample units or if c is exceeded

Commodity	Analyte	n	c	m	M	Satisfactory	Investigative[a]	Unsatisfactory[b]
Sprouted Seeds and Beans	*E. coli* O157:H7	5	0	0	-	Not Detected	n/a	Detected
Fresh and RTE Fresh-Cut Fruits & Vegetables	*Salmonella* spp.	5	0	0	-	Not Detected	n/a	Detected
Category 1 RTE Fresh-Cut Fruit & Vegetable Products	*L. monocytogenes*	5	0	0	-	Not Detected	n/a	Detected
Category 2A/2B RTE Fresh-Cut Fruit & Vegetable Products	*L. monocytogenes*	5	0	100	-	Not Detected	≤m/g in all sub sample units tested	>m/g in any sub sample unit tested
Blackberries and Raspberries	*Cyclospora*	5	0	0	-	Not Detected	Detected	n/a
Environmental - Fresh Produce Producers (FCS)	*Listeria* spp.	10	0	0	-	Not Detected	*Listeria* spp. other than *L. mono*	*L. monocytogenes* detected
Environmental Samples of Food Contact Surface (FCS) for Domestic Fresh-Cut facilities	*Listeria* spp.	-	n/a			Not Detected	*Listeria* spp. other than *L. mono*	*L. monocytogenes* detected
Environmental Samples of Food Contact Surface (FCS) for Domestic Fresh-Cut facilities	*Salmonella* spp.	-	n/a			Not Detected	n/a	Detected
Processed Products								
Frozen Vegetables without cooking instructions (Category 2A/2B)	*L. monocytogenes*	5	0	100	-	Not Detected	≤m/g in all sub sample units tested	>m/g in any sub sample unit tested

Commodity	Analyte	n	c	m	M	Satisfactory	Investigative[a]	Unsatisfactory[b]
Frozen Berries	*Salmonella* spp.	5	0	0	-	Not Detected	n/a	Detected
Frozen Fruit & (Category 2A/2B)	*L. monocytogenes*	5	0	100	-	Not Detected	≤m/g in all sub sample units tested	>m/g in any sub sample unit tested
Fish								
Raw molluscan shellfish	*Vibrio parahaemolyticus*	5	0	10^2	n/a	≤m	n/a	>m in any sample unit
Environmental Samples of Food Contact Surface (FCS) for Domestic RTE Fish Facilities	*Listeria* spp.	-	n/a			Not Detected	*Listeria* spp. other than *L. mono*	*L. monocytogenes* detected

[a] n/a = not applicable. The investigative assessment does not apply.

[b] n/a = not applicable. The unsatisfactory assessment does not apply.

[c] n/d = not determined.

Appendix II: Assessment Criteria for FSO Samples Collected at Retail

As for products collected by CFIA inspectors (Annex I), samples collected at retail are assessed using assessment criteria to determine if a sample was satisfactory, unsatisfactory or investigative. For these samples, it was not possible to representatively sample multiple units from the same lot due to limited product availability so a single sample unit was collected. Because of differences in sample collection, retail samples were not assessed using the same n, c, m and M parameters used to assess samples collected by CFIA inspectors. Retail samples were assessed using alternative criteria. These alternative criteria were not intended to determine a level of risk. Instead, they allowed the laboratory to be able to assess each result on an individual basis and informed risk management decisions by CFIA's Policy and Programs Branch and/or Operations Branch.

Commodity	Analyte	n	Satisfactory	Investigative[a]	Unsatisfactory[b]
Fresh Fruits & Vegetables and Environmental					
Fresh and RTE Fresh-Cut Fruits & Vegetables	generic *E. coli*	1	≤ 10^2 cfu/g or MPN/g	10^2 – 10^3 cfu/g or MPN/g	≥ 10^3 cfu/g or MPN/g
Fresh and RTE Fresh-Cut Fruits & Vegetables	*E. coli* O157:H7/NM	1	Not Detected	n/a	Detected
Fresh and RTE Fresh-Cut Fruits & Vegetables	*Salmonella* spp.	1	Not Detected	n/a	Detected
Category 1 RTE Fresh-Cut Fruit & Vegetable Products	*L. monocytogenes*	1	Not Detected	n/a	Detected
Category 2A/2B RTE Fresh-Cut Fruit & Vegetable Products	*L. monocytogenes*	1	Not Detected	≤ 10^2 m/g in all sub sample units tested	>m/g in any sub sample unit tested
Leafy Greens	*Giardia*	1	Not Detected	Detected	n/a
Leafy Greens	*Toxoplasma*	1	Not Detected	Detected	n/a

Commodity	Analyte	n	Satisfactory	Investigative[a]	Unsatisfactory[b]
Leafy Greens	*Cyclospora*	1	Not Detected	Detected	n/a
Leafy Greens	*Cryptosporidium*	1	Not Detected	Detected	n/a
Leafy Greens and Herbs	Hepatitis A	1	Not Detected	Detected	n/a
Leafy Greens and Herbs	Norovirus Genotype I	1	Not Detected	Detected	n/a
Leafy Greens and Herbs	Norovirus Genotype II	1	Not Detected	Detected	n/a
Processed Products					
Fresh/Frozen Berries	Hepatitis A	1	Not Detected	Detected	n/a
Fresh/Frozen Berries	Norovirus Genotype I	1	Not Detected	Detected	n/a
Fresh/Frozen Berries	Norovirus Genotype II	1	Not Detected	Detected	n/a
Fish					
RTE Fish	generic *E. coli*	1	≤ 4 cfu/g or MPN/g	4 – 40 cfu/g or MPN/g	≥ 40 cfu/g or MPN/g
RTE Fish	*S. aureus*	1	≤ 10^3 cfu/g or MPN/g	10^3 – 10^4 cfu/g or MPN/g	≥ 10^4 cfu/g or MPN/g
RTE Fish	*Salmonella* spp.	1	Not Detected	n/a	Detected
Category 1 RTE Fish	*L. monocytogenes*	1	Not Detected	n/a	Detected
Category 2A/2B RTE Fish	*L. monocytogenes*	1	Not Detected	≤ 10^2 m/g in all sub sample units tested	>m/g in any sub sample unit tested
Manufactured Food Products					
Tahini	*Salmonella* spp.	1	Not Detected	n/a	Detected

Commodity	Analyte	n	Satisfactory	Investigative[a]	Unsatisfactory[b]
Powdered Infant Formula	*Enterobacteriaceae*	1	Not Detected	Detected	n/a
Powdered Infant Formula	*Cronobacter* spp.	1	Not Detected	n/a	Detected

[a] n/a = not applicable. The investigative assessment does not apply.

[b] n/a = not applicable. unsatisfactory assessment does not apply.