



Canadian Food  
Inspection Agency

Agence canadienne  
d'inspection des aliments

# Parasites in Imported Fresh Green Onions - April 1, 2019 to March 31, 2020

## Food microbiology - Targeted surveys - Final report



## Summary

A targeted survey<sup>1</sup> analysed 197 samples of imported fresh green onions over a 1-year period from April 1, 2019 to March 31, 2020. All samples were tested for the presence of *Cyclospora cayetanensis* (*C. cayetanensis*), *Cryptosporidium* species (spp.), and *Toxoplasma gondii* (*T. gondii*).

All 197 (100%) samples tested were found to be satisfactory. *C. cayetanensis*, *Cryptosporidium* spp., and *T. gondii* were not found in any samples.

Overall, our survey results indicate that imported fresh green onions sold in Canada are generally safe for consumption. However, as with all foods, and especially with those that are consumed raw, good hygienic practices are recommended for producers, retailers, and consumers.

## Why was this survey conducted

The survey was conducted to provide enhanced oversight of the safety of imported fresh green onions sold at retail in Canada. While fresh green onions are popular among Canadians<sup>2</sup>, they have unfortunately been associated with foodborne illness outbreaks<sup>3,4</sup>.

Fresh produce, including green onions can be contaminated with parasites through contact with human and animal waste at any step in the food supply chain such as during production, harvest, post-harvest handling, packaging, distribution, and/or at retail. Unlike bacteria, parasites are unable to grow on foods, however they can remain viable for extended periods of time and may cause illness when ingested. Therefore the presence of parasites on fresh green onions is of concern as they are a commonly consumed by Canadians and are generally consumed raw.

## When was the survey conducted

The survey was conducted over a 1-year period from April 1, 2019 to March 31, 2020.

## Where were the samples collected from

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

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

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

## How many and what kind of samples were collected

A total of 197 imported fresh green onions were collected. Wherever possible, pre-packaged samples were collected. Samples were collected throughout the year, however a higher proportion was planned for the months of April to October to reflect the seasonality of foodborne parasitic infections in endemic countries<sup>4,5,6</sup>, imports into Canada, and reported cases of cyclosporiasis in Canada. A sample consisted of a single or multiple consumer sized packages of the same lot weighing at least 100g.

## What were the samples tested for

All 197 samples were tested for *C. cayentanensis*, *Cryptosporidium* spp., and *T. gondii*.

## What methods were used to test the samples

Samples were analyzed using methods that detect the presence of deoxyribonucleic acid (DNA) of *C. cayentanensis*, *Cryptosporidium* spp., and *T. gondii*.

## How were the samples assessed

There are currently no Canadian standards regarding the presence of parasites in fresh produce. As the analytical methods used in this survey can only determine the presence or absence of parasite DNA, they cannot discriminate between living (infectious) and dead (non-infectious) parasites. Therefore, the detection of parasite DNA was assessed (table 1) as “investigative” and required further consideration to determine appropriate follow-up actions.

**Table 1 - Assessment criteria**

Parasite	Satisfactory	Investigative
<i>C. cayetanensis</i>	Not detected	Detected
<i>Cryptosporidium</i> spp.	Not detected	Detected
<i>T. gondii</i>	Not detected	Detected

## What were the survey results

*C. cayetanensis*, *Cryptosporidium* spp., and *T. gondii* DNA were not found in any samples.

**Table 2 - Assessment results**

Parasite	Number of samples tested	Satisfactory (%)	Investigative (%)
<i>C. cayetanensis</i>	197	197	0
<i>Cryptosporidium</i> spp			0
<i>T. gondii</i>			0
<b>Total</b>	<b>197</b>	<b>197 (100)</b>	<b>0 (0)</b>

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

**Table 3 - Assessment results by production practice**

Production practice	Number of samples tested (%)	Satisfactory
Conventional	152 (77.2)	152
Organic	45 (22.8)	45
<b>Total</b>	<b>197</b>	<b>197</b>

**Table 4 - Assessment results by product origin**

Product origin	Number of samples tested (%)	Satisfactory
Mexico	159 (80.7)	159
United States	36 (18.3)	36
United States and Mexico	1 (0.5)	1
Spain	1 (0.5)	1
<b>Total</b>	<b>197 (100)</b>	<b>197</b>

## What do the survey results mean

Previous Canadian<sup>7,8</sup> and international<sup>9</sup> studies on the microbial safety of retail fresh green onions have shown similar<sup>8</sup> and higher<sup>7,9</sup> prevalence rates as compared those found in this study. Differing prevalence rates between studies may be attributable to differences in product type tested, methodology, study design, etc.

Overall, our survey results indicate that imported fresh green onions sold in Canada are generally safe for consumption. However, as with all foods, and especially with those that are consumed raw, good hygienic practices are recommended for producers, retailers and consumers.

## What is done with the survey results

All results are used to:

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

## Can I access the survey data

Yes. The data will be accessible on the [Open Government Portal](#).

## References

1. Canadian Food Inspection Agency, [Food chemistry and microbiology](#).
2. Public Health Agency of Canada, [Foodbook Report](#). 2015.
3. Hall, N. B., et al., [Cyclosporiasis Epidemiologically Linked to Consumption of Green Onions: Houston Metropolitan Area, August 2017](#). Journal of food protection. 2020. Jan 21:326-330.
4. FAO/WHO, [Multicriteria-Based Ranking for Risk Management of Food-Borne Parasites](#). Microbiological Risk Assessment Series (MRA) 23. 2014.
5. Kaminsky, R.G., et al., [Marked seasonality of Cyclospora cayetanensis infections: ten-year observation of hospital cases, Honduras](#). BMC Infectious Diseases. 2016. Feb 4;16:66.
6. Muchiri J.M., et al., [Seasonality of Cryptosporidium oocyst detection in surface waters of Meru, Kenya as determined by two isolation methods followed by PCR](#). Journal of Water and Health. 2009. Mar;7(1): p.67-75.
7. Canadian Food Inspection Agency, [2011-2013 Cyclospora cayetanensis and Cryptosporidium spp. in Fresh Produce](#). 2016.
8. Canadian Food Inspection Agency, [2013-2014 Cyclospora cayetanensis and Cryptosporidium spp. in Fresh Leafy Herbs and Green Onions](#). 2016.
9. Doaa El Said Said, [Detection of parasites in commonly consumed raw vegetables](#). Alexandria Journal of Medicine. 2012. 48:4, 345-352.