



Canadian Food
Inspection Agency

Agence canadienne
d'inspection des aliments

Undeclared Allergens and Gluten in Halloween-Themed Candies and Chocolate Products – April 1, 2018 to March 31, 2019

Food allergen - Targeted surveys



Summary

Targeted surveys provide information on potential food hazards and enhance the Canadian Food Inspection Agency's (CFIA's) routine monitoring programs. These surveys provide evidence regarding the safety of the food supply, identify potential emerging hazards, and contribute new information and data to food categories where it may be limited or non-existent. We use them to focus surveillance on potential areas of higher risk. Surveys can also help identify trends and provide information about how industry complies with Canadian regulations.

Food allergies can affect people of all ages but are particularly common in children. Food allergens can represent a serious or life threatening health risk for allergic individuals. Additionally, although it is not considered an allergen, undeclared gluten may contribute to chronic health issues for those individuals with celiac disease or gluten sensitivity. Allergens and gluten can be found in food due to their presence in the raw ingredients or they can be accidentally introduced along the food production chain due to cross contamination. Regardless of the source of the allergens, industry must ensure that the food produced is safe for human consumption, either by complying with specific Canadian regulations where applicable or by keeping the levels as low as reasonably possible.

The main objective of this survey was to obtain baseline information regarding the presence and levels of undeclared allergens and gluten in Halloween-themed candies and chocolate products. Of the 356 samples tested, 10 were found to contain undeclared allergens, specifically beta-lactoglobulin (BLG) and casein.

All positive results obtained during the course of these surveys were forwarded to the CFIA's Office of Food Safety and Recall (OFSR) to determine if the levels found would pose a health concern to allergic individuals. The extent of the follow-up actions taken by the Agency is based on the level of the contamination and the resulting health concern as determined by a health risk assessment. 4 Halloween-themed candies containing both BLG and casein were deemed to represent a health risk and were recalled.

What are targeted surveys

Targeted surveys are used by the CFIA to focus its surveillance activities on areas of higher health risk. The information gained from these surveys provides support for the allocation and prioritization of the Agency's activities to areas of greater concern. Targeted surveys are a valuable tool for generating information on certain hazards in foods, identifying and characterizing new and emerging hazards, informing trend analysis, prompting and refining health risk assessments, highlighting potential contamination issues, as well as assessing and promoting compliance with Canadian regulations.

Food safety is a shared responsibility. The Agency works with federal, provincial, territorial and municipal governments and provides regulatory oversight of the food industry to promote safe handling of foods throughout the food production chain. The food industry and retail sectors in Canada are responsible for the food they produce and sell, while individual consumers are responsible for the safe handling of the food they have in their possession.

Why did we conduct this survey

Approximately 7% of Canadians have self-reported as having at least 1 food allergy, but the actual number of medically confirmed food allergies is expected to be slightly lower¹. It is believed that the rate of food allergies is increasing, particularly among children. Food allergies are estimated to affect up to 5% of adults and up to 8% of children in developed countries². Food allergens are food proteins that can cause a reaction of the body's immune system, and can represent a serious or life threatening health risk for allergic individuals, or contribute to chronic health issues for those with pre-existing health conditions like celiac disease. Celiac disease is a chronic reaction where the body reacts to a component of gluten which can damage or destroy certain intestinal cells. Approximately 1% of the total population are affected with celiac disease³.

The priority food allergens are the 10 most common food allergens that are associated with severe allergic or allergy-like reactions in Canada. These allergens consist of peanuts, tree nuts, sesame, seafood (fish, shellfish and crustaceans), eggs, milk, soy, mustard, sulphites, and wheat⁴. Gluten, while not a true allergen, is a family of proteins found in certain grains like wheat, rye, barley, kamut, and spelt and is included in this list⁵. Gluten can cause digestive problems and other issues for people with certain health conditions such as celiac disease and gluten sensitivity. This makes proper identification and labeling of allergens in food by the manufacturer essential.

Undeclared allergens can be found in foods due to their presence in the raw ingredients, or can be accidentally introduced along the food production chain through cross contamination. Regardless of the source of the allergens, industry must ensure that the food they produce is safe for human consumption. This can be achieved by complying with specific Canadian regulations where applicable, or by keeping the levels as low as reasonably possible.

This was the first survey conducted by the Agency for undeclared allergens and gluten in Halloween-themed candies and chocolate products. The main objective of this survey was to obtain baseline information regarding the presence and levels of undeclared allergens including egg, mustard, sesame, soy, peanut, almond, hazelnut, gluten, and the milk proteins casein and BLG in Halloween-themed candies and chocolate products.

All products were tested “as sold,” meaning that they were not prepared as per the manufacturer’s instructions or as they would typically be consumed.

What did we sample

All products were sampled between April 2018 and March 2019. Samples were collected from local and regional grocery stores located in 6 major cities across Canada. These cities encompassed 4 geographical areas: Atlantic (Halifax), Quebec (Montreal), Ontario (Toronto, Ottawa) and the West (Vancouver, Calgary). The number of samples collected from these cities was in proportion to the relative population of the respective areas.

The following products were not included in the survey:

- products with **all** of the following allergens in the list of ingredients – almond, hazelnut, peanut, mustard, sesame, soy/soybean, egg, milk, and wheat, barley, oats, rye, triticale, or gluten
- products with a precautionary statement for all priority allergens
- non pre-packaged products
- products with multi-flavours
- products with no list of ingredients
- products past the best before date

Table 1: Distribution of product samples based on product type and origin

Sample type	Domestic	Imported	Unspecified ^a origin	Total
Candies	87	99	0	186
Chocolate products	48	121	1	170
Total	135	220	1	356

^a unspecified refers to those samples for which a country of origin could not be determined from the product label or available sample information.

How were samples analyzed and assessed

Samples were analyzed by an ISO/IEC 17025 accredited food testing laboratory under contract with the Government of Canada. The samples were tested as sold, meaning that the product was tested as-is and not as prepared according to package instructions.

In Canada, food allergens and gluten must be declared in the list of ingredient if they are present in the prepackaged product in order to comply with the requirements of the *Food and Drug Regulations* Section [B.01.010.1](#). A prepackaged product will be deemed non-compliant if any level of undeclared allergens and gluten is detected.

Health Canada considers that gluten-free foods, prepared under good manufacturing practices, which contain levels of gluten not exceeding 20 parts per million (ppm) (due to cross contamination) meet the intent of the *Food and Drug Regulations* [Section B.24.018](#) for a gluten-free claim.

What were the survey results

Over 97% of all Halloween-themed candy and chocolate products sampled in this survey did not contain any detectable levels of allergens. 10 samples were positive for BLG and/or casein.

Table 2: Levels of undeclared allergens and gluten in Halloween-themed candies and chocolate products in ppm

Sample	BLG (ppm)	Casein (ppm)
Candies		
Autumn mix candy	0.6	0
Marshmallows with a chocolaty coating-1	14	330
Marshmallows with a chocolaty coating-2	22	340
Marshmallows with a chocolaty coating-3	0.8	350
Kids mix 20 flavours kids love 25 fun packs -1	1	0
Kids mix 20 flavours kids love 25 fun packs -2	0.2	0
Kids mix 20 flavours kids love 25 fun packs -3	1.3	0
Marshmallow candy	16	110
Molasses kisses	0	1.3
Candy corn	0.2	0

What do the survey results mean

Of the 356 samples tested in this survey, over 97% did not contain any detectable levels of allergens and gluten, while only 10 samples were found to contain varying levels of BLG and/or casein.

Of the 10 samples with positive results, 4 samples contained both undeclared BLG and casein, 5 samples contained undeclared BLG alone and 1 sample contained undeclared casein alone. Both BLG (one of the whey proteins) and casein are major milk proteins. Casein derivatives such as sodium caseinate have favorable emulsification and stabilization functions as well as viscosity increasing, adhesive, foaming and foam stabilizing functions, so they are used as emulsifier and thickening agent in processed food including candies and chocolate products⁶. Whey protein is also used as emulsifier in confectionary production as it have a good emulsifying property as well^{7,8}. Low levels of BLG and casein found in this survey could be introduced into the product due to cross contamination in an ingredient or the final product.

The extent of the follow-up actions taken by the CFIA is based on the level of contamination and the resulting health concern as determined by a health risk assessment. Appropriate follow-up actions include additional sample testing, facility inspection and product recall. The health risk assessment is based on exposure to the allergens and gluten through consumption. The exposure is calculated by using the typical serving sizes for each food. Assessment based on serving size means not all detectable levels of undeclared allergens and gluten in food will cause a reaction in an allergic individual.

All positive results were forwarded to the OFSR for follow-up and 4 products containing both undeclared BLG and casein were deemed to represent a health risk and were recalled^{9,10}. No published literature could be found on the similar topic for results comparison.

This survey generated new information on the background level of undeclared allergens and gluten in Halloween-themed candies and chocolate products collected from 6 cities across Canada. Information gathered in this survey, in conjunction with other data including the Canadian Total Diet Study and Statistics Canada's Canadian Health Measures Survey food consumption data, are critical in assessing the health risk that our food supply poses to Canadian consumers. The results of the CFIA's surveillance activities are also used to inform the Canadian public and stakeholders by raising consumer awareness and help build public confidence in their food supply by removing non-compliant products.

References

1. Soller, L., Ben-Shoshan, M., Harrington, D. W., Fragapane, J., Joseph, L., Pierre, Y. S., Clarke, A. E. (2012). Overall prevalence of self-reported food allergy in Canada. *Journal of Allergy and Clinical Immunology*, 130(4), 986-988.
2. Sicherer, S. H., & Sampson, H. A. (2014). Food allergy: Epidemiology, pathogenesis, diagnosis, and treatment. *Journal of Allergy and Clinical Immunology*, 133(2), 291-307.e5.
3. [Celiac disease foundation](#); (2018). United States. Celiac Disease Foundation.
4. [Common food allergens](#); (2018, May 14). Canada. Health Canada
5. [Codex Alimentarius Standard for Foods for Special Dietary Use for Persons Intolerant to Gluten - Codex Stan 118-1979](#). (2008) United States. Food and Agriculture Organization of United Nations & World Health Organization.
6. [Applications and uses of sodium caseinate](#); (2015, July 3rd). China. Newseed Chemical Co., Limited.
7. [U.S. Whey Products and Lactose in Confectionery Applications](#); (1999, January). United States. U.S. Dairy Export Council.
8. G. Masson, R. Jost. (1986). A study of oil-in-water emulsions stabilized by whey proteins. *Journal of Colloid and Polymer Science*, Volume 264, Issue 7, pp 631–638
9. [Food Recall Warning \(Allergen\) \(Reference #12593\)](#); (2018, October 22). Canada. Canadian Food Inspection Agency.
10. [Food Recall Warning \(Allergen\) \(Reference #12597\)](#); (2018, October 24). Canada. Canadian Food Inspection Agency.