

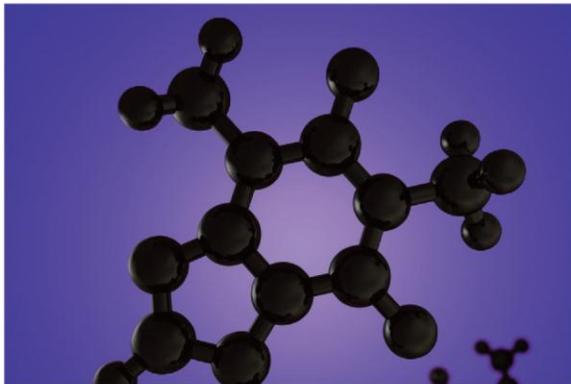


Food Safety Action Plan

REPORT

2010-2011 Targeted Surveys

Allergens



Gluten in Ground Spices

TS-CHEM-10/11

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Executive Summary

The Food Safety Action Plan (FSAP) aims to modernize and enhance Canada's food safety system. As part of the FSAP enhanced surveillance initiative, targeted surveys are used to evaluate various foods for specific hazards.

Ground spices are common in Canadian households. The range of spices in Canada has increased because of the introduction of a wide variety of multi-cultural foods to the population.

The main objective of the gluten in ground spices survey was:

- To obtain baseline information regarding the presence and levels of gluten in ground spices.
- To identify potential food safety concerns relating to gluten in ground spices.

A total of 268 ground spices, consisting of a single spice, were sampled and analyzed for the presence of gluten. The ground spices sampled are regulated under the Food and Drug Act and Regulations and are not permitted to contain any other ingredient. If a source of gluten is added, such as flour, this may pose a health risk to individuals with celiac disease or gluten sensitivity.

Of the 268 samples analyzed, 63 samples (24%) contained detectable levels of gluten ranging from 5 ppm to 20,000 ppm. The majority, 62, of these samples had a level of gluten that would not pose a risk to a sensitive individual. One sample of mace was determined to be in violation of the *Food and Drugs Act* and *Regulations* and was recalled.

1. Introduction

1.1. The Food Safety Action Plan

In 2007 the Canadian Government launched a five year initiative in response to a growing number of product recalls and concerns about food safety. This initiative, called the Food and Consumer Safety Action Plan (FSCAP), aims to modernize and strengthen the food safety regulatory system. The FSCAP initiative unites multiple partners in ensuring safe food for Canadians.

The CFIA's Food Safety Action Plan (FSAP) is one element of the Government's broader FSCAP initiative. The goal of FSAP is to identify risks in the food supply, limit the possibility that these risks occur, improve import and domestic food controls and identify food importers and manufacturers. FSAP also looks to verify that the food industry is actively applying preventative measures protect the safety of the Canadian food supply.

Within FSAP, there are twelve main areas of activity, one of which is risk mapping and baseline surveillance. The main objective of this area is to better identify, assess and prioritize potential food safety hazards through risk mapping, information gathering and testing foods from the Canadian marketplace. Targeted surveys are one tool that is used to test for the presence and level of a particular hazard in specific foods. Targeted surveys are largely directed towards the 70% of domestic and imported foods that are covered exclusively by the *Food and Drugs Act*, and are generally referred to as non-federally registered commodities.

1.2. Targeted Surveys

Targeted surveys are used to test various foods for specific hazards and are meant to complement the CFIA's regular programs and inspection activities. The surveys are designed to answer specific questions about hazards in food. Generally, they test for the occurrence and magnitude of defined hazards in targeted foods, often with the testing focusing on a specific segment of the population (i.e., consumers with an allergy or intolerance).

This targeted survey focused on determining if gluten is present in ground spices consisting of a single spice. Pre-packaged single ground spices are not permitted to contain other ingredients. Spices can be intentionally adulterated with flour, which contains gluten, to increase economic gain. They may also contain gluten through cross contamination, for example, if the spices are packaged using equipment that also packages product containing flour that has not been thoroughly cleaned. It is expected that single ground spices do not contain gluten, the unexpected presence of gluten may pose a health risk for sensitive individuals.

This survey aims to gather baseline information to determine if gluten is present in ground spices. The information gathered will assess the compliance of these products with Canadian regulations and will provide an indication if follow up with industry is required.

1.3. Acts and Regulations

The *Food and Drug Act* (FDA) is the legal authority that governs the sale of food in Canada. The *Canadian Food Inspection Agency Act* stipulates that the CFIA is responsible for enforcing restrictions on the production, sale, composition and content of foods and food products as outlined in the *Food and Drugs Act* and the *Food and Drugs Regulations* (FDA and FDR).

Spices sold as a pre-packaged single ground spice are not permitted to contain other ingredients as per Division 7 of the FDR. If a spice contains gluten it may pose a health risk to sensitive individuals and also be contrary to Subsection 5(1) of the FDA. These products may therefore be subject to regulatory measures taken by the CFIA.

2. Allergens Survey

2.1. Rationale

Single ground spices are not expected to contain any other ingredients, the presence of gluten may represent poor manufacturing practices or commercial dilution of the spice. The presence of gluten in a single ground spice is not a health concern for the majority of Canadians, however, consumption of gluten may contribute to immediate and chronic health issues for those individuals with celiac disease or gluten sensitivity.

The main objective of this survey is to obtain baseline information regarding the presence and levels of gluten in pre-packaged single ground spices. The information gathered will provide an indication of potential food safety concerns relating to the presence of gluten in ground spices.

2.2. Hazard: Gluten

Celiac disease is a digestive disease, in which the consumption of gluten (a protein in wheat, rye and barley) leads to damage of the small intestine which in turn results in the inability to absorb nutrients from food consumed.^{1, 2} Symptoms of celiac disease can vary and may include anaemia, diarrhoea, weight loss, fatigue, irritability, cramps and bloating.³ Gluten sensitivity is the term used for individuals who react to gluten in their diet but do not have celiac disease.³ Symptoms of gluten sensitivity may include abdominal pain, headaches and fatigue.³ Celiac disease affects approximately 1% of the population and impacts all age groups.^{4, 5, 6}

Individuals with celiac disease and gluten sensitivity should avoid all foods containing gluten including wheat, barley, rye and their cross-bred hybrids (e.g., triticale).^{2,4} There is no cure for celiac disease or gluten sensitivity, and the most important strategy for a person with celiac disease or gluten sensitivity, or a person choosing food for an individual with celiac disease or gluten sensitivity, is avoidance of gluten.

2.3. Sample Distribution

This survey targeted a variety of ground spices including: allspice, anise, black pepper, cardamom, cayenne, cinnamon, clove, coriander, cumin, fenugreek, ginger, mace, marjoram, mustard, nutmeg, oregano, paprika, sage, thyme, turmeric and white pepper. Mixed and whole spices were not a part of this survey. Samples were collected based on availability in 2010 from major retail stores as well as smaller and ethnic retailers. No specific brands were targeted. A total of 268 samples were collected. The distribution of samples by type is listed in Table 1. The mace samples included 2 that were taken from the same lot; these samples are considered one sample to avoid the result being counted twice in the analysis.

Table 1. Sample Distribution by Type and Imported or Domestic*

Sample Type	Domestic	Imported	Grand Total
Allspice	2	10	12
Anise	-	3	3
Black pepper	-	15	15
Cardamom	1	12	13
Cayenne	-	15	15
Cinnamon	5	9	14
Clove	1	21	22
Coriander	4	3	7
Cumin	-	15	15
Fenugreek	-	10	10
Ginger	-	15	15
Mace	-	12	12
Marjoram	2	12	14
Mustard	3	7	10
Nutmeg	-	15	15
Oregano	-	3	3
Paprika	3	12	15
Sage	-	15	15
Thyme	-	15	15
Turmeric	-	15	15
White pepper	2	12	14
Grand Total	23	245	268

* Domestic products may be processed (ex. ground) and/or packaged in Canada from imported ingredients

2.4. Limitations

A total of 268 samples of ground spices were collected and analysed in 2010-2011. Samples were all purchased in various retail chains across Canada. Between 3 and 22 samples of each spice were collected, this is a small number of samples size for each spice represented in this survey. The data collected from this survey is meant to provide a snapshot of the targeted commodity and has the potential to highlight problem areas that warrant further investigation.

2.5. Methodology

Samples were analyzed by an accredited third party laboratory. Third party laboratories are accredited to ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories (or its replacement by the Standards Council of Canada (SCC)).

The samples were tested for the presence of gluten proteins using Ridascreen Gliadin, this method has a reporting limit of 5 parts per million (ppm) soluble protein.

3. Results and Discussion

3.1. General Results

A total of 268 ground spices were analysed for the presence of gluten. The distribution of positive samples can be found in Table 2, with further details in Appendix I. Of the 268 samples analysed, 63 had detectable levels of gluten (24%). Of the 23 domestic samples analyzed 5 (22%) had detectable levels of gluten and 58 (24%) of the 245 imported samples had detectable levels of gluten.

Gluten is not permitted in single pre-packaged ground spices. It is therefore expected that single ground spices do not contain gluten; the unexpected presence of gluten may pose a health risk for sensitive individuals. A number of factors are considered when determining if a food poses a health risk. The amount of the hazard, in this case gluten, that a person would ingest during a typical meal is a primary consideration. For single ground spices a serving size is relatively small at approximately 0.5 g.⁷

It was determined, in consultation with Health Canada, that 62 (97%) of the spices with detectable levels of gluten did not pose a risk to sensitive individuals. One sample of mace was determined to be in violation of the FDA and FDR. This product was recalled.

Table 2: Distribution of Samples Contaminated with Gluten

Sample Type	Number of positive samples	Domestic	Imported
Allspice	0	0	0
Anise	2	0	2
Black pepper	1	0	1
Cardamom	2	0	2
Cayenne	1	0	1
Cinnamon	0	0	0
Clove	6	1	5
Coriander	7	4	3
Cumin	8	0	8
Fenugreek	6	0	6
Ginger	2	0	2
Mace	3	0	3
Marjoram	1	0	1
Mustard	1	0	1
Nutmeg	0	0	0
Oregano	1	0	1
Paprika	0	0	0
Sage	10	0	10
Thyme	11	0	11
Tumeric	0	0	0
White pepper	1	0	1
Grand Total	63	5	58

4. Conclusion

Of the 268 samples analyzed for gluten, 63 contained levels above 5 ppm. The majority, 62, of the results were determined to pose no risk to sensitive individuals. One sample of mace was determined to be in violation of the FDA and FDR. This product was recalled. The compliance rate for this survey was >99%.

This survey was limited in the number of samples tested, however, it met the objective of gathering baseline information on the occurrence of non-permitted gluten in spices. The survey provides evidence that low levels of gluten may be found in ground spices. It is not permitted to add gluten sources to a pre-packaged single ground spice. It is the responsibility of the manufacturer or imported to ensure that GMPs are in place to avoid the cross contamination of ground spices with gluten.

Appendix I
Sample Type and Amount of Gluten Detected

Sample Type	Domestic/Imported	Gluten (ppm)
Anise	Import	9.3
Anise	Import	15
Black pepper	Import	9.1
Cardamom	Import	5.7
Cardamom	Import	11
Cayenne	Import	10
Clove	Import	10
Clove	Domestic	14
Clove	Import	24
Clove	Import	57
Clove	Import	73
Clove	Import	590
Coriander	Domestic	7.8
Coriander	Import	11
Coriander	Import	14
Coriander	Domestic	33
Coriander	Import	38
Coriander	Domestic	150
Coriander	Domestic	260
Cumin	Import	18
Cumin	Import	31
Cumin	Import	31
Cumin	Import	32
Cumin	Import	33
Cumin	Import	37
Cumin	Import	38
Cumin	Import	49
Fenugreek	Import	8.6
Fenugreek	Import	13
Fenugreek	Import	14
Fenugreek	Import	18
Fenugreek	Import	20
Fenugreek	Import	39
Ginger	Import	5
Ginger	Import	11
Mace	Import	8.3
Mace	Import	83
Mace	Import	3000-20000
Marjoram	Import	6.7
Mustard	Import	5.2
Oregano	Import	5.7
Sage	Import	5.3
Sage	Import	5.4
Sage	Import	5.4
Sage	Import	6.6
Sage	Import	6.7
Sage	Import	8.1

Sample Type	Domestic/Imported	Gluten (ppm)
Sage	Import	14
Sage	Import	17
Sage	Import	21
Thyme	Import	5.3
Thyme	Import	5.6
Thyme	Import	10
Thyme	Import	10
Thyme	Import	12
Thyme	Import	14
Thyme	Import	19
Thyme	Import	20
Thyme	Import	21
Thyme	Import	24
Thyme	Import	26
White pepper	Import	32

5. References

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- ⁷ Food and Drug Regulations, Schedule M. Reference amounts. [online] (2012) Accessed January 20, 2012. http://laws-lois.justice.gc.ca/eng/regulations/C.R.C.,_c._870/page-368.html#h-371