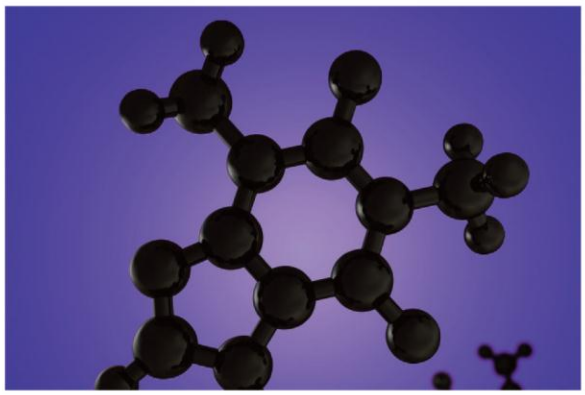
Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Food Safety Action Plan

REPORT

2010-2011 Targeted Surveys

Allergens



Milk and Egg Proteins in Beer

TS-CHEM-10/11

Canada

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.

The main objective of this survey was:

- To obtain baseline information regarding the presence and levels of milk and egg in beer.
- To identify potential food safety concerns relating to the presence of milk and egg in beer.

The production of alcoholic beverages may include the use of fining agents. Milk and egg may be used as fining agents in some alcoholic beverages, like wine, to improve the clarity, as well as, to enhance the palatability of alcoholic beverages prior to filtration and bottling. It should be noted that the use of milk- and egg-based fining agents in standardized beer is not permitted as per the *Food and Drugs Regulations* B.02.130.

A total of 196 samples of beer were analysed for milk (casein and beta-lactoglobulin) and egg. The samples consisted of different beer styles including, but not limited to, pale lagers, pilsners, dark lagers, porters, and stouts. One sample analysed had very low detectable levels of the milk protein (beta-lactoglobulin). The remaining samples had no measurable levels of milk or egg protein.

Standardized beer is exempted from labelling the ingredients used to make the beverage. As such, any allergens are also exempted from declaration on the beer labels under the *Food and Drugs Act and Regulations (FDAR)* B01.008 (2).

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 (FCSAP), aims to modernize and strengthen the food safety regulatory system. The FCSAP 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 FCSAP 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.

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 compliment 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 the potential presence of two undeclared allergens, milk and egg proteins in beer available at retail. The information gathered will provide baseline information on the potential levels of allergenic proteins of milk and egg in beer available at retail.

1.3 Acts and Regulations

The *Food and Drug Act* (F&DA) 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 & Regulations* (FDAR).

The Canadian Food Inspection Agency and the provincial liquor boards work together to ensure that alcoholic beverages, including beer, conform to Canadian compositional safety standards under the *Food and Drugs Act* (for alcohol content, toxins, etc.) before being approved for sale in Canada. In addition, both domestic and imported alcoholic beverages must comply with labelling, net quantity and standardized container size requirements under the Consumer Packaging and Labelling Act.[i]

Beer products whose components respect the standards of composition for beer in the *Food and Drug Regulations* (B02.130) are considered "standardized". Standardized beers are not required to carry an ingredient list (B01.008 (2)). Standardized beer is made from barley and or wheat, and is therefore not suitable for individuals with celiac disease to consume. Unstandardized beer can contain other allergens or sulphites depending on the individual product. [ii] Some standardized beers voluntarily provide a list of ingredients. If a list of ingredients is voluntarily provided it must be complete and accurate with respect to any food allergens, gluten sources or added sulphites that are present in the beer.

As previously advised by Health Canada, a food allergic consumer should always seek out products with a list of ingredients. This is also applicable to beer products. Health Canada also advises that food allergic consumers continue to contact the product manufacturer directly to determine the ingredients present within an unlabelled beer product. [iii]

2 Allergens Survey

2.1 Rationale

The presence of an undeclared allergen or gluten source in a food is not a concern for the majority of Canadians. However, undeclared allergens may represent a serious or life threatening health risk for allergic or sensitive individuals. As well, undeclared gluten may contribute to 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 undeclared milk and egg protein in beer. The information gathered will

provide an indication of potential food safety concerns relating to undeclared allergens in beer.

2.2 Hazard: Milk and Egg Protein Residues

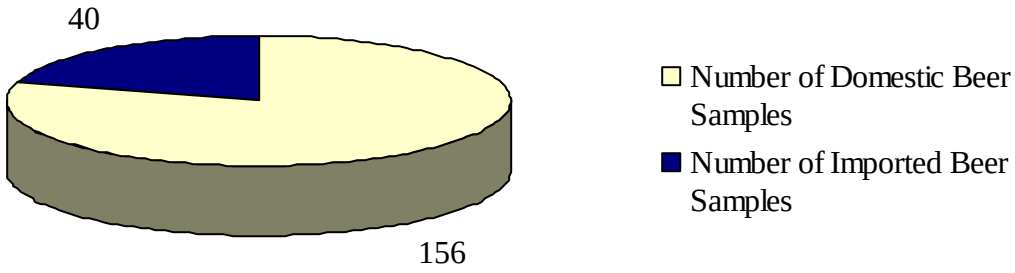
Current estimates indicate that food allergies affect as many as 6% of young children and 3% to 4% of adults in westernised countries[iv] and approximately 7% of Canadians self-report at least one food allergy.[v] Currently in Canada a specific list of food allergens have been identified by Health Canada as being responsible for causing the majority of severe allergic reactions, and are sometimes referred to as the priority allergens.[vi] The priority allergens in Canada are as follows: milk, eggs, peanut, sesame seeds, tree nuts, soy, wheat, seafood and mustard. Sulphites at levels of 10 ppm or higher have been recognized as having the potential to produce serious symptoms similar to an allergen in sensitive individuals and have been added to the Enhanced Allergen Labelling Regulations. There is no cure for a food allergy, and the most important strategy for a person with a food allergy, or a person choosing food for an individual with a food allergy, is avoidance of the allergen or allergens that can trigger an adverse reaction. Allergens and gluten sources should be appropriately labelled to ensure consumers have complete, accurate information when choosing food products.

As indicated above, 3 to 4% of adults in westernized countries may suffer from food allergies. Therefore, the potential presence of allergens such as milk and egg in alcoholic beverages may pose a health concern to this sensitive population. Milk and egg products are frequently used in the manufacturing process of alcoholic beverages to clarify and increase the palatability of the final product. These allergens may be introduced into beer by cross contamination during the manufacturing of multiple types of alcoholic beverages in the same plant. As well, milk and egg proteins may be components of the ingredients used in the production of beer. The information gathered will be an indicator of potential food safety concerns relating to undeclared milk and egg allergens in the beer tested.

2.3 Sample Distribution

This survey targeted standardized and non-standardized beer including, but not limited to: pale lagers, pilsners, dark lagers, porters, and stouts. Samples were collected based on availability in 2010 from major retail stores as well as smaller ethnic retailers. No specific brands were targeted. A total of 200 beer samples were collected. The distribution of domestic versus imported samples is listed in Table.1.

Sample Distribution of Imported vs Domestic Beer



2.4 Limitations

In 2007 the Canadian brewing industry produced $4.4 billion, of this $4.1 billion was consumed by Canadians, the remainder being exported. Canada also imported $548 million worth of product.[vii] Samples were all purchased in various retail chains in Ottawa, ON and the immediate surrounding areas. This represents a small sample size in comparison to what is available to Canadian consumers throughout the country. As well, the samples collected in this survey do not represent national products available.

In this survey there was no differentiation made between standardized and non standardized beer and it was not known if the manufacturer used any fining agents in the production of their beer, nor is it known if other alcoholic beverages were produced in the same plant.

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 beta-lactoglobulin (BLG - milk protein), casein (milk protein) and egg protein. Food allergen proteins were detected and measured using ELISA-based accredited methodology. There was no knowledge of the type of allergens used, if used, during the production of the beer tested.

Table 2 Methods of Analysis			
Method	**Analyte**	**Reporting Limit (ppm)**	
		Analyte Level*	**Soluble protein****
Veratox Quantitative Egg Allergen Test	Egg	2.5	1.25
ELISA Systems Beta-Lactoglobulin	Beta-Lactoglobulin	0.1	-
ELISA Systems Casein Residue	Casein	1	0.26

* as defined by manufacturer ELISA kit

**as defined by Allergens Method Committee (a joint Health Canada/CFIA committee focussed on the advancement of allergen based testing capability and knowledge of allergenicity of food)

3 Results and Discussion

3.1 General Results

A total of 196 samples of beer were analyzed for presence of egg and milk (casein and beta-lactoglobulin separately) protein. A total of 588 individual allergen tests were completed on these 196 samples. Of the 588 analyses 587 results were non-detectable levels of allergenic proteins. One sample, a domestic dark beer, was positive for beta-lactoglobulin (0.19 ppm).

Table 3 Positive Results of Milk and Egg Protein Analysis		
Analyte	No. samples tested	No. of positive samples
Egg	196	0
Milk:		
casein	196	0
beta-lactoglobulin	196	1
Total No. of tests run on 196 samples	**588**	**1**

3.2 Milk

The prevalence of milk allergy in the Canadian population has been estimated to be 2.09%.[viii]

There are two major allergen proteins in cow's milk: casein and beta-lactoglobulin.[ix] Cow's milk contains approximately 30-35 g of protein per litre[x], of which casein and whey account for 80% and 20%, respectively.[xi] Betalactoglobulin makes up approximately 50% of the protein found in whey, or approximately 10% of the protein found in cow's milk.

A total of 196 samples were tested for the presence of undeclared milk. Only one sample tested positive for beta-lactoglobulin (0.19 ppm).

3.3 Egg

Egg allergies are considered one of the most common allergies in the population, with between 1.6% and 3.2% of the population estimated as being affected. Both egg whites and egg yolk contain allergenic proteins, with a much higher concentration found in egg whites. [xii]

Egg whites are also used in the fining process of alcoholic beverages. All of the 196 samples tested showed no detectable levels of egg protein.

4 Conclusion

Of the 196 samples of beer that were analysed for undeclared allergens (milk and egg), 195 had no detectable level of milk or egg protein. One sample had very low levels of beta-lactoglobulin. This survey, even with limited product types in comparison to the Canadian beer market, met the objective of gathering baseline information on the occurrence of the undeclared priority allergens milk and egg in a variety of beer. In this survey, no food safety concerns were identified for milk and egg allergic consumers.

5 References

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