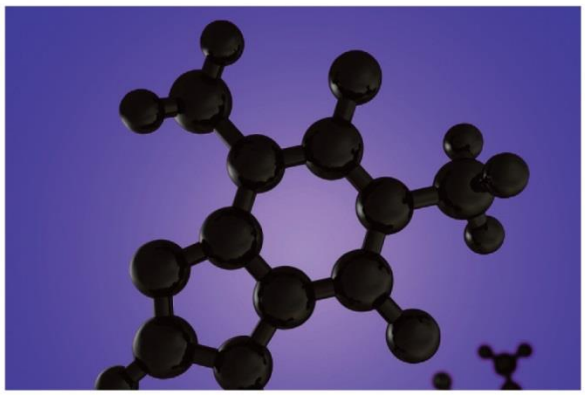
Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Food Safety Action Plan

REPORT

2012-2013 Targeted Surveys

Chemistry



Bisphenol A in Canned Foods

TS-CHEM-12/13

Canada

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Executive Summary

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

The main objectives of this targeted survey were:

- to provide baseline data on the presence and levels of bisphenol-A (BPA) in canned vegetables/legumes, fruits, juices/beverages, pastas, soups, coconut milk, and curry sauces/products available on the Canadian retail market; and
- to compare the prevalence and the levels of BPA found in this survey with other Canadian and US Food and Drug Administration data, where feasible.

Bisphenol A is a chemical used in the production of polycarbonate and epoxy resins. Food and beverage packaging, particularly metal cans, may be internally coated with epoxy resins to protect food from direct contact with metal. BPA can migrate from the epoxy coatings into food, particularly at elevated temperatures (e.g., in hot-filled or heat-processed canned foods). Elevated BPA concentrations have been associated with food products contained in syrups, sauces (i.e., tomato sauce), and brine.

Health Canada's Food Directorate has concluded in their most recent risk assessment of bisphenol A that the current dietary exposure to BPA through food packaging uses is not expected to pose a health risk to the general population, including newborns and infants. This conclusion has been re-affirmed by other international food regulatory agencies, including those of Canada's major trading partners. As a result, the use of BPA in food packaging materials has not been prohibited in Canada. Health Canada has recommended that the general principle of ALARA (as low as reasonably achievable) be applied to continue efforts on limiting BPA exposure from food packaging applications, specifically from pre-packaged infant formula products as a sole source food consumed by infants and newborns.

A total of 576 samples of canned products were collected and analyzed in the 2012-2013 BPA targeted survey as these products are likely to have epoxy coatings. Samples included 217 pastas/soups, 144 vegetables/legumes, 73 fruit products, 72 juices/beverages, 46 coconut milks, and 24 curry products. BPA was not detected in 74.8% of the survey samples, but was detected in all product categories sampled in this survey. In the 145 positive samples, the observed BPA levels ranged from 0.0052 parts-per-million (ppm) (found in a canned pasta sample) to 0.381 ppm (detected in a coconut milk sample).

The current FSAP survey, the previous FSAP surveys and the CFIA's National Chemical Residue Monitoring Program had comparable detection rates for BPA. The overall results of the

current targeted survey were comparable to those in Health Canada and US Food and Drug Administration publications for similar products.

No Canadian regulations or maximum levels (tolerances or standards) have been established for BPA in food, therefore compliance to a numerical standard could not be assessed. Health Canada's Bureau of Chemical Safety determined that none of the samples analyzed for BPA in this survey posed a concern to human health and therefore no follow-up actions were needed.

1 Introduction

1.1 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 Canada's safety system for food, health, and consumer products. The FCSAP initiative unites multiple government partners in ensuring safe food for Canadians.

The Canadian Food Inspection Agency's (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 preventive measures, and that there is a rapid response when/if these measures fail.

Within FSAP, there are 12 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 of foods from the Canadian marketplace. Targeted surveys are one tool used to test for the presence and level of a particular hazard in specific foods.

Within the current regulatory framework, some commodities (such as meat products) traded internationally and interprovincially are regulated by specific Acts. These are referred to as federally registered commodities. Under the current regulatory framework, the non-federally registered commodities encompass 70% of domestic and imported foods that are regulated solely under the *Food and Drugs Act* and the *Food and Drug Regulations*. Targeted surveys are primarily directed towards non-federally registered commodities.

1.2 Targeted Surveys

Targeted surveys are pilot surveys used to gather information regarding the potential occurrence of contaminants (hazards) in defined food commodities. The surveys are designed to answer specific questions. Therefore, unlike monitoring activities, testing for a particular hazard is targeted to commodity types and/or geographical areas.

Due to the vast number of hazard/food commodity combinations, it is not possible, nor should it be necessary, to use targeted surveys to identify and quantify all hazards in foods. To identify food-hazard combinations of greatest potential health risk, the CFIA uses a combination of scientific literature, media reports, and/or a risk-based model developed by the Food Safety

Science Committee (FSSC), a group of federal, provincial and territorial subject matter experts in the area of food safety.

Bisphenol A (BPA) has garnered attention in recent years because of potential human health concerns, widespread human exposure, and limited dietary exposure information[i,ii,iii]. The purpose of this targeted survey was to add to existing baseline data on the levels of BPA in canned foods available at the Canadian retail level.

1.3 Acts and Regulations

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 Drug Regulations*.

Health Canada establishes the health-based maximum levels for chemical residues and contaminants in food sold in Canada. Certain maximum levels for chemical contaminants in food appear in the Canadian *Food and Drug Regulations*, where they are referred to as tolerances. Tolerances are established as a risk management tool, and generally only for foods that significantly contribute to the total dietary exposure of the food contaminant in question. There are also a number of maximum levels that do not appear in the regulations and are referred to as standards. However, all foods sold in Canada must comply with the provisions in Section 4(1)(a) of the *Food and Drug Act*, which prohibits the sale of a food that contains a poisonous or harmful substance.

Currently, no maximum level, tolerance, or standard has been established by Health Canada for BPA in food and therefore, compliance with Canadian regulations or standards was not evaluated in this survey.

Health Canada's Food Directorate has concluded that the current dietary exposure to BPA through food packaging uses is not expected to pose a health risk to the general population, including newborns and infants. However, Health Canada[iv,v] has recommended that the general principle of ALARA (as low as reasonably achievable) be applied to continue efforts on limiting BPA exposure from food packaging applications, specifically from pre-packaged infant formula products as a sole source food consumed by infants and newborns. Similarly, the US FDA[vi], and other international food safety authorities such as Food Standards Australia and New Zealand[vii] have supported initiatives to reduce BPA exposure from food packaging applications, including development of alternative materials. In addition, the European Union has introduced a specific migration limit for BPA into food from packaging (0.6 mg BPA per kg food)[viii].

In the absence of tolerances or standards, elevated levels of BPA in specific foods may be assessed by Health Canada on a case-by-case basis using the most current scientific data

available. If Health Canada's Bureau of Chemical Safety identifies a potential safety concern, the CFIA can conduct follow-up actions. Follow-up actions are initiated in a manner that reflects the magnitude of the health concern. Actions may include further analysis, notification of the producer or importer, follow-up inspections, additional directed sampling, and recall of products.

2 Survey Details

2.1 Bisphenol A (BPA)

Bisphenol A (BPA) is an industrial chemical used in the production of polycarbonate plastics and epoxy-phenolic resins[ix,x]. It does not occur naturally in the environment. BPA is permitted for use in food contact materials in many countries, including Canada[xi]. However, Health Canada has banned the importation, sale, and advertising of polycarbonate baby bottles containing BPA[xii], and many countries have since followed suit[xiii,xiv,xv,xvi]. Food and beverage packaging, particularly metal cans, may be coated on the inside of the container with epoxy resins to prevent corrosion and protect food from direct contact with metal. BPA can migrate from the epoxy coating into food, especially at elevated temperatures (for example, in hot-filled or heat-processed canned foods)[xvii].

There is some uncertainty about BPA-related effects at low dose levels and some contrasting opinions remain as to whether BPA poses a health concern[xviii]. Some studies have shown that BPA is an estrogenic chemical, can act as an endocrine disruptor, and may have other negative health effects[xix,xx,xxi,xxii,xxiii]. However, various food regulatory agencies, including those in Canada, the US, Australia/New Zealand and the European Union, while recognizing the uncertainty, have indicated that current dietary exposure to BPA for the general population is not expected to represent a health concern. Given the concerns of consumers, and the continued efforts to limit BPA exposure from food packaging applications for newborns and infants, alternative BPA-free can coatings have been developed by the can coating industry and are becoming available on the retail food market. Health Canada's Food Directorate continues to place a high priority on the timely evaluation of pre-market submissions for BPA-free can coatings[xxiv], and some companies are now voluntarily phasing out use of BPA in their food packaging[xxv].

2.2 Rationale

In a recent health risk assessment, Health Canada concluded that current dietary exposure to BPA through food packaging is not expected to pose a health risk to the general population, including newborns and infants[v.] Health Canada also acknowledged uncertainty regarding the interpretation of rodent studies demonstrating a heightened sensitivity to BPA during stages of neural and behavioural development[5]. Current opinions vary about BPA-related effects at low dose levels and the potential health effects associated with exposure to BPA[xviii].

Three CFIA FSAP targeted surveys[xxvi,xxvii,xxviii], the CFIA National Chemical Residue Monitoring Program (NCRMP)[xxix], as well as a Health Canada survey[xxx], have generated baseline data on levels of BPA in various foods. These surveys indicated that BPA is present at very low levels in some infant foods, ready-to-serve and concentrate infant formulas, tuna, pasta, soup, juices, and vegetables, particularly those in metal cans or glass jars with metal lids. Additionally, data published by Canada's major trading partners showed low levels of BPA in some canned fruits, canned vegetables, canned pastas, and canned soups[xxxi] and have been associated with products contained in syrups, sauces (i.e. tomato sauce), and salted water[xxxii].

The purpose of this targeted survey was to generate additional baseline data on the levels of BPA in canned foods for which Canadian data is not available or available in limited quantity, in particular those packed in sauces, syrups, and salted water.

2.3 Sample Distribution

The 2012-2013 survey targeted domestic and imported canned products as these products are likely to have epoxy coatings in contact with the food product which may leach BPA. A total of 576 samples were collected from grocery and specialty stores in 11 Canadian cities between April 2012 and March 2013 by samplers under contract with the Government of Canada. The samples collected included 217 pastas/soups, 144 vegetables/legumes, 73 fruit products, 72 juices/beverages, 46 coconut milks, and 24 curry products.

The 576 survey samples included 23 domestic products, 405 imported products, and 148 products of unspecified origin. In general, an unspecified country of origin refers to those samples for which the origin could not be determined from the product label or sample information. It is important to note that the products sampled often contained the statement "imported for Company A in Country Y" or "manufactured for Company B in Country Z", and though the labelling meets the intent of the regulatory standard, it does not specify the true origin of the product ingredients. Only those products labelled with a clear statement of "Product of", "Prepared in", "Made in", "Processed in", and "Manufactured by" were considered as being from a specific country of origin. The samples originated in at least 32 countries, including Canada. The distribution of samples collected in this survey with respect to the country of origin (as recorded on the sampling documentation or indicated on the product label) is presented in Table 1.

Table 1: Distribution of samples by category type and origin

Category	Number of Samples of Domestic Origin	Number of Imported Samples	Number of Samples of Unspecified*	Total Number of Samples

			Origin	
Canned Pasta/Soup	16	67	134	**217**
Coconut Milk	-	46	-	**46**
Curry Sauces/Products	-	21	3	**24**
Fruit Products	-	73	-	**73**
Juices/Beverages	-	67	5	**72**
Vegetable Products	7	131	6	**144**
Total	**23**	**405**	**148**	**576**

*Unspecified refers to those samples for which the country of origin could not be assigned from the product label or available sample information

2.4 Analytical Methods

Samples in the BPA targeted survey were analyzed by ISO 17025 accredited laboratories under contract with the Government of Canada. Samples were tested as sold, meaning that the product was not prepared as per the package instructions (if applicable).

The analytical method used by the testing laboratory was based on a liquid chromatography-tandem mass spectrometry method previously developed by Health Canada. The method has a limit of detection (LOD) of 0.005 parts per million (ppm) and a limit of quantitation (LOQ) of 0.01 ppm.

2.5 Limitations

The current targeted survey was designed to provide a snapshot of the levels of BPA in selected canned foods available to Canadian consumers, and had the potential to highlight commodities that warrant further investigation.

Few inferences or conclusions were made regarding the data with respect to country of origin. Regional differences, impact of product shelf-life, packaging and storage conditions, or cost of the commodity on the open market were also not examined in this survey.

The limited numbers of sample analyzed represent a small fraction of the products available to Canadian consumers. Therefore, care must be taken when interpreting and extrapolating these results.

3 Results and Discussion

3.1 Overview of BPA Survey Results

The 2012-2013 BPA targeted survey consisted of testing 576 canned food samples obtained at the Canadian retail level. The samples included 145 juices/beverages and fruit products, 144 canned vegetables/legumes, and 287 mixed products (217 canned pastas/soups, 46 coconut milk, and 24 curry products). BPA was not detected in 74.8% of the survey samples. BPA was detected in three samples of canned juice/beverages and fruit products, 30 samples of canned vegetables and legumes, and 112 samples of canned mixed products, with levels ranging from 0.0052 ppm to 0.381 ppm.

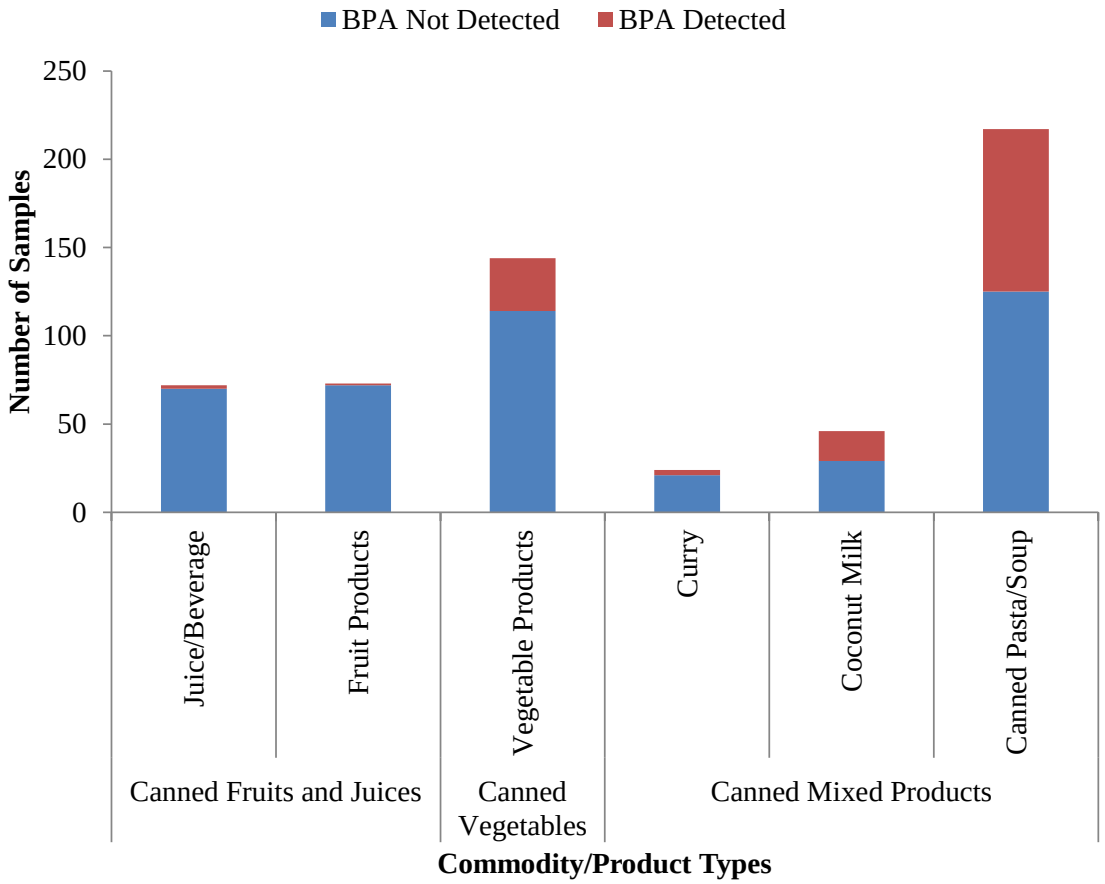
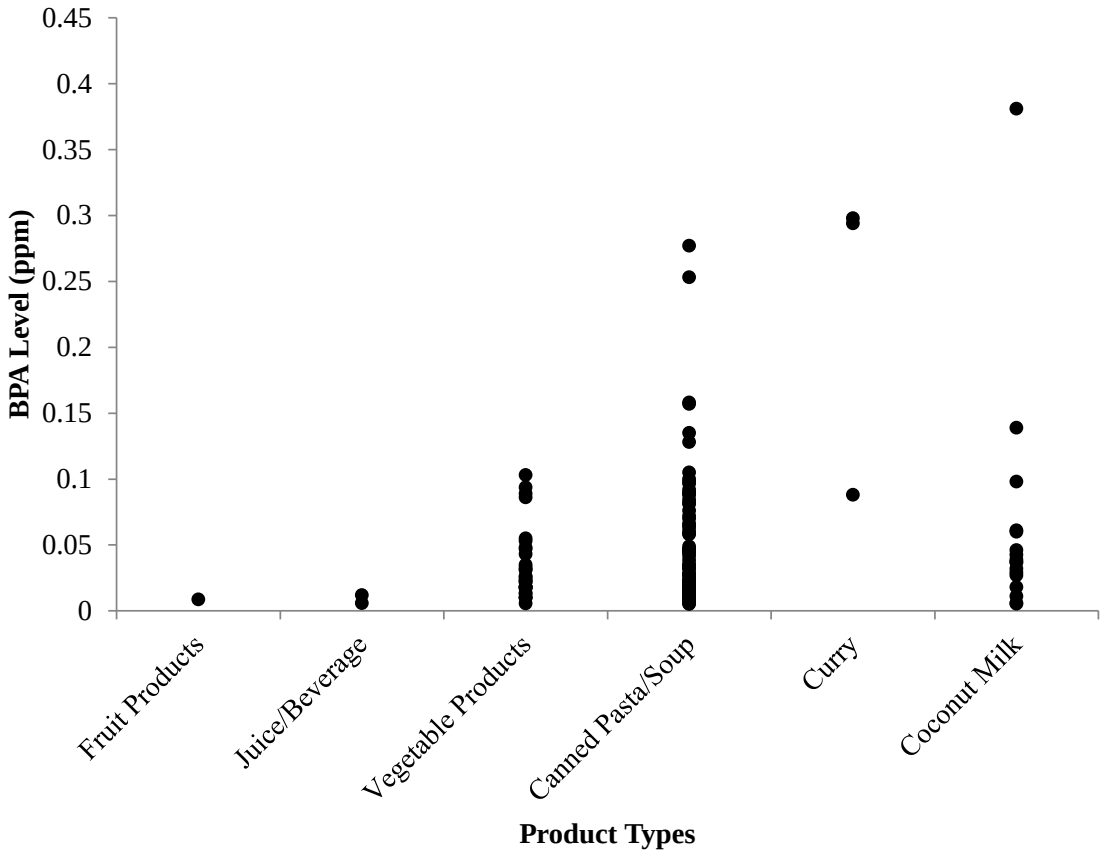


Figure 1: Distribution of samples by product type

From Figure 1, canned pastas and soups had the highest positive detection rate for BPA (42%), whereas fruit products had the lowest rate, with only one sample out of 76 testing positive for BPA. The maximum level of BPA (0.381 ppm) was observed in a can of coconut milk, and the minimum level of BPA (0.0052 ppm) was found in a can of pasta (see Figure 2 below). It should be noted that the average BPA results discussed below were calculated using only those samples for which BPA was detected (i.e., average of the positive results only). Juices/beverages have the

lowest overall average level of BPA detected at 0.009 ppm, whereas curry products had the highest average level of BPA detected at 0.2267 ppm.



*Only the levels above the limit of detection are depicted in the graph.

Figure 2: Comparison of the levels of BPA detected by product type (arranged by increasing maximum level of BPA detected)

There are no Canadian regulations or maximum levels (tolerances or standards) for BPA in foods sold in Canada, so compliance to a numerical standard could not be assessed. Health Canada's Bureau of Chemical Safety determined that none of the samples analysed for BPA in this survey posed a concern to human health and therefore no follow-up actions were needed.

3.2 *BPA Results by Product Type*

Results by product type are presented in the following sections. Some comparisons will be made to available data in the scientific literature, where feasible.

3.2.1 Canned Juices/Beverages and Fruit Products

Seventy-two canned juice/beverage samples were analyzed in this survey. Seventy-three canned fruit products were analyzed in this survey, including canned peach, mango, jackfruit, pineapple, apricot, orange, lychee, pear, grapefruit, strawberry, papaya, longan, nipa/Attap palm, and mixed fruit cocktails/medleys/salads.

As shown in Table 2, one sample of canned fruit products (tropical fruit medley (0.0086 ppm)), and two samples of canned juice/beverages (guava nectar (0.0059 ppm) and coconut juice (0.012 ppm)) contained detectable levels of BPA. Given that only one canned fruit product contained a detectable level of BPA, it was not possible to explore the relationship between BPA levels and the use of syrup, juice or water as a packing media.

Table 2: Overview of the Results of the Canned Juices/Beverages and Fruit Products sampled (arranged in increasing order of maximum level of BPA detected)

Commodity	Total Number of Samples	Number of Positively Detected Samples (Percentage)	Minimum Level of BPA Detected (ppm)	Maximum Level of BPA Detected (ppm)	Average* Level of BPA Detected (ppm)
Fruit Products	73	1 (1)	ND	0.0086	-
Juices/Beverages	72	2 (3)	0.0059	0.012	0.009

*Average is calculated using only the results of the samples testing positive for BPA.
ND = Not detected

Table 3 provides a comparison of the current FSAP survey to Canadian and American data on BPA levels in similar products. The low positive rate of detection of BPA in canned juice/beverages and canned fruit products is consistent with the previous FSAP survey results, and the 2011-2012 National Chemical Residue Monitoring Program (NCRMP) data. The US FDA and Health Canada studies had similar LODs, but had higher positive detection rates. The levels of BPA in canned fruits and juices/beverages from this targeted survey (0.0059-0.012 ppm) were similar to BPA levels in canned fruits and juices/beverages from the US FDA total diet study (0.0027-0.019 ppm), but higher than BPA levels of canned fruits and juices/beverages from the Health Canada total diet study (0.00036-0.00324 ppm).

Table 3: Comparison of the BPA levels in canned fruits and juices/beverages in the 2012-2013 Targeted Survey to the results in the scientific literature

Survey (Year)	Total Number of	Number of Positively	Minimum Level of BPA	Maximum Level of BPA	Average* Level of BPA

	Samples	Detected Samples (Percentage)	Detected (ppm)	Detected (ppm)	Detected (ppm)
FSAP (2012-2013)	145	3 (2)	0.0059	0.012	0.009
FSAP (2011-2012)[xxviii]	151	0 (0)	ND	ND	-
FSAP (2010-2011)[xxvii]	107	0 (0)	ND	ND	-
NCRMP (2011-2012)[xxix]	9	1 (11)	ND	0.0025	-
US FDA (2011)[31]	14	8 (57)	0.0027	0.019	0.008
Health Canada (2008)[xxxiii]	4	2 (50)	0.00036	0.00324	0.002

*Average is calculated using only the results of the samples testing positive for BPA.
ND = Not detected
Note: The US FDA and Health Canada surveys included canned fruit products.

3.2.2 Canned Vegetables

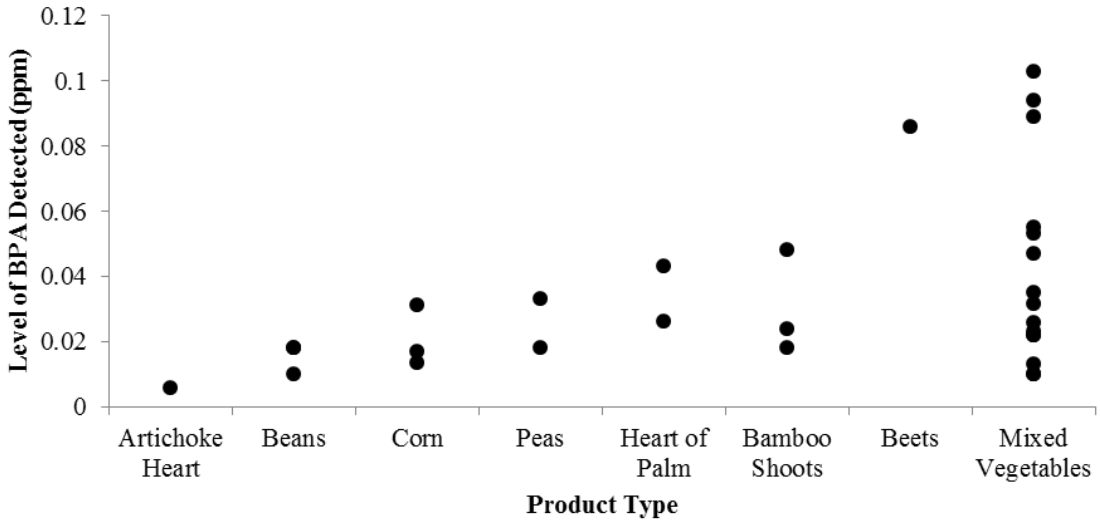
One hundred and forty-four canned vegetable/legume samples were analyzed in this survey, including peas, heart of palm, tomatoes, artichoke hearts, mushrooms, hot peppers, bamboo shoots, beans, corn, cabbage, cucumber, beet, okra, callaloo, tomatillo, asparagus, mixed vegetables and water chestnuts.

As shown in Table 4, BPA was detected in 15 samples of mixed vegetables, three samples each of beans, bamboo shoots, and corn, two samples each of heart of palm and peas, and one sample each of artichoke hearts and beets. Figure 3 shows the detectable levels of BPA per type of vegetable product. Artichoke hearts and mixed vegetables had the lowest and highest BPA levels, respectively.

Table 4: Overview of the results of the canned vegetable products sampled as presented by product type (arranged in increasing order of average level of BPA detected)

Vegetable Product	Total Number of Samples	Number of Positively Detected Samples (Percentage)	Minimum Level of BPA Detected (ppm)	Maximum Level of BPA Detected (ppm)	Average** Level of BPA Detected (ppm)
Hot Pepper	8	0 (0)	ND	ND	-
Mushroom	7	0 (0)	ND	ND	-
Tomato	5	0 (0)	ND	ND	-
Artichoke Heart	7	1 (14)	ND	0.00554	-
Other Vegetables*	10	1 (10)	ND	0.086	-
Bean	9	3 (33)	0.0101	0.018	0.015
Corn	26	3 (12)	0.0134	0.031	0.020
Pea	3	2 (67)	0.018	0.033	0.026
Bamboo Shoot	10	3 (30)	0.018	0.048	0.030
Heart of Palm	5	2 (40)	0.026	0.043	0.035
Mixed Vegetable	51	15 (30)	0.010	0.103	0.040

*Other Vegetables include cabbage, cucumber, beet, okra, callaloo, tomatillo, asparagus, and water chestnut.
**Average is calculated using only the results of the samples testing positive for BPA.
ND = Not detected



*Only the levels above the limit of detection are depicted in the graph.

Figure 3: Levels of BPA detected in the canned vegetables sampled during the 2012-2013 Targeted Survey.

Table 5 provides a comparison of the current FSAP survey to Canadian and U.S. data on BPA levels in similar products. The observed maximum and average levels of BPA detected in canned vegetables analyzed for this survey fall within the levels found in US FDA[xxxi], by Health Canada[xxxiii], and the NCRMP surveillance data[xxix].

Table 5: Comparison of the BPA levels in the canned vegetable products in the 2012-2013 Targeted Survey to the scientific literature results

Survey (Year)	Total Number of Samples	Number of Positively Detected Samples (Percentage)	Minimum Level of BPA Detected (ppm)	Maximum Level of BPA Detected (ppm)	Average* Level of BPA Detected (ppm)
FSAP (2012-2013)	144	30 (21)	0.00554	0.103	0.034
FSAP (2011-2012)[xxviii]	151	5 (3)	0.018	0.307	0.121
NCRMP (2011-2012)[xxix]	13	4 (31)	0.0079	0.112	0.046
US FDA (2011)[xxxi]	25	23 (92)	0.0026	0.5	0.095
Health Canada (2010)[xxxiii]	13	13 (100)	0.0043	0.092	0.020

*Average is calculated using only the results of the samples testing positive for BPA.

3.2.3 Canned Mixed Products

Two hundred and seventeen canned pasta/soup samples, 46 samples of coconut milk, and 24 curry sauces/products (e.g. green or red curry pastes and Thai curry soups) were analyzed in this survey. Fifty-three pasta samples (0.0052-0.157 ppm), 39 soup samples (0.0057-0.277 ppm), 17

coconut milk samples (0.0054-0.381ppm), and three curry-based samples (0.088-0.298 ppm) contained detectable levels of BPA – see Table 6.

Table 6: Overview of the Results of the Canned Mixed Product sampled as presented by product type (arranged in increasing order of average level of BPA detected)

Commodity	Total Number of Samples	Number of Positively Detected Samples (Percentage)	Minimum Level of BPA Detected (ppm)	Maximum Level of BPA Detected (ppm)	Average* Level of BPA Detected (ppm)
Canned Pasta/Soup	217	92 (42)	0.0052	0.277	0.045
Coconut Milk	46	17 (37)	0.0054	0.381	0.063
Curry Products	24	3 (12)	0.088	0.298	0.227

*Average is calculated using only the results of the samples testing positive for BPA.

The observed average levels of BPA detected in pasta/soup samples from the current survey are comparable to the levels found in surveys conducted by the US FDA[xxxi] and by Health Canada[xxxiii] – see Table 7. Additionally, it appeared that the levels of BPA found in canned soups or canned pastas were similar, regardless of the commodity type sampled.

Table 7: Comparison of the BPA levels in canned soups and pastas in the 2012-2013 Targeted Survey to the scientific literature results

Survey (Year)	Commodities Examined in the Survey	Total Number of Samples	Number of Positively Detected Samples (Percentage)	Minimum Level of BPA Detected (ppm)	Maximum Level of BPA Detected (ppm)	Average* Level of BPA Detected (ppm)
FSAP (2012-2013)	Pastas and Soups	217	92 (42)	0.0052	0.277	0.045
FSAP (2011-2012)[xxviii]	Pastas	101	1 (1)	ND	0.073	-
US FDA (2011)[xxxi]	Pastas and Soups	12	12 (100)	0.012	0.074	0.038
Health Canada (2010)[xxxiii]	Pasta and Soups	42	42 (100)	0.00205	0.0945	0.041

*Average is calculated using only the results of the samples testing positive for BPA.
ND = Not detected

Coconut milk was not analysed in the NCRMP, Health Canada or the US FDA studies. The coconut milks sampled in this survey were compared to data reported in the primary literature from New Zealand and Japan[xxxiv,xxxv] (see Table 8). Unfortunately, due to the limited sample

size of both of these surveys, the positive detection rates cannot be compared. One sample of coconut milk in the 2012-2013 FSAP survey had a BPA level (0.381 ppm) which was almost three times higher than the other samples. With the exception of this one sample, the average and maximum BPA values in the current survey are within the range of the other two studies. The New Zealand study[xxxiv] found a higher overall average level of BPA in canned coconut milk samples than the current FSAP survey, although this finding may be influenced by the low sample size (n=3) of the study.

Table 8: Comparison of the BPA levels in coconut milk sampled in the 2012-2013 FSAP Targeted Survey to the scientific literature results

Survey (Year)	Total Number of Samples	Number of Positively Detected Samples (Percentage)	Minimum Level of BPA Detected (ppm)	Maximum Level of BPA Detected (ppm)	Average* Level of BPA Detected (ppm)
FSAP (2012-2013)	48	17 (35)	0.0054	0.381	0.063
Thomson (2005)[xxxiv]	3	2 (67)	0.029	0.192	0.111
Kawamura (2013)[xxxv]	1	1 (100)	-	0.2	-

*Average is calculated using only the results of the samples testing positive for BPA.

No scientific literature was available for BPA levels in curry-based sauces and/or products, so no comparison could be made.

4 Conclusions

The present survey generated additional baseline surveillance data on the levels of bisphenol A (BPA) in domestic and imported canned products available on the Canadian retail market.

A total of 576 products were sampled, which included 217 pastas/soups, 144 vegetables/legumes, 73 fruit products, 72 juices/beverages, 46 coconut milks, and 24 curry products. Only canned products were sampled, as these products are likely to have epoxy coatings. BPA can migrate from the epoxy coatings into food, particularly at elevated temperatures.

Bisphenol A was not detected in 74.8% of the survey samples. BPA was detected in 145 samples in this survey (92 in pastas/soups, 30 in vegetables/legumes, 17 in coconut milks, three in curry products, two in juices/beverages, and one in fruit products), ranging from 0.0052 ppm to 0.381 ppm.

In comparing the positive detection rates for BPA, the previous NCRMP and FSAP survey results are similar to the current FSAP survey's findings. The current targeted survey also found comparable levels of BPA relative to data reported by Health Canada and the U.S. FDA.

No regulatory tolerances or standards/maximum levels have been established by Health Canada for BPA in food, therefore compliance could not be assessed to a numerical standard. The results of the current survey of BPA in selected foods were evaluated and Health Canada's Bureau of Chemical Safety was consulted on the observed BPA levels. Health Canada determined that none of the samples analysed for BPA in this survey posed a concern to human health, therefore, no follow-up actions were needed.

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