Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

Children's Food Project

2010-2011 Report on Sampling

Foods intended for children aged 0 – 24 months

Canada

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Executive Summary

The main objectives of the 2010 – 2011 Children's Food Project (CFP) were to:

- assess the compliance status for pesticide residues in foods consumed by children aged 0 – 2 years;
- provide data to Health Canada that can be used for health risk assessment of foods consumed by children;
- gather preliminary pesticide data from a new scope of pesticide residues in foods commonly consumed by children aged 0 – 2 years.

In the 2010 – 2011 CFP, a total of 879 processed and manufactured food samples were purchased in the Ottawa – Gatineau area. Samples included a variety of biscuits, cereal-, dairy-, fruit- and vegetable based products targeted to and consumed by infants and toddlers aged 0 to 2 years. Sole source nutrition products (i.e., infant formula) were not sampled in the 2010 – 2011 CFP. Samples were analysed for pesticide residues and metals. A total of 2 570 analytical tests were performed, corresponding to over 300 000 results.

Of the 879 samples tested for pesticide residues, 661 (75%) contained no detected pesticide residues. The remaining 218 samples (25%) had detected levels of pesticide residues, with 91 (11%) containing two or more pesticide analytes. Of the 218 samples with detectable levels of pesticide residues, none exceeded established maximum residue limits (MRLs). The overall compliance rate of the 2010 – 2011 CFP was 100%.

There are very few maximum levels (i.e., tolerances or standards and MRLs) established for metals in food. Heavy metals that may pose the greatest inherent risk to human health at low levels include arsenic, cadmium, lead and mercury. Consistent with previous years' results, the highest arsenic levels were observed in rice-based products. The majority of the metal levels detected were within the range of typical background concentrations observed in similar foods.

Data obtained from studies like the Children's Food Project are instrumental in the assessment of the dietary exposure of Canadian children to pesticide residues and metals. The 2010 – 2011 Children's Food Project represents a typical overview of the nature of pesticide residues and metals in the Canadian food supply.

1 The Children's Food Project

1.1 Project purpose

As part of the 'Building Public Confidence in Pesticide Regulation and Improving Access to Pest Management Products' initiative the Canadian Food Inspection Agency (CFIA) received funding to undertake limited monitoring of pesticides in foods consumed by children. In January 2003, the CFIA initiated the 'Young Children's Food Chemical Residues Project' (later renamed the 'Children's Food Project') (CFP) to test children's foods for pesticide residues. The overall objective of the CFP is to ensure continued compliance of pesticide residues in children's foods, with specific aims to:

- gather data to determine the prevalence of pesticide residues in imported and domestically produced children's foods;
- identify foods that represent a potential health risk from illegal or inappropriate uses of pesticides; and
- determine compliance with pesticide and metal MRLs specified under the *Pest Control Products Act* (*PCPA*) and maximum levels for metals specified in the *Food and Drugs Regulations* (*FDR*).

1.2 Rationale

On an annual basis, the CFIA conducts a number of different monitoring and targeted surveys. For example, the National Chemical Residue Monitoring Program (NCRMP) targets federally-registered food commodities, such as foods of animal origin (meat, eggs, honey, and dairy products), maple products, processed products, and fresh fruits and vegetables. Alternatively, the CFP collects information on chemical residues in non-federally registered foods (manufactured and imported) frequently consumed by and targeted to children (e.g., fruit snacks, cereal-based products, fruit juices and beverages, etc.). These non-federally registered foods are also the focus of targeted surveys, deliverables of the Food and Consumer Safety Action Plan. However, targeted surveys conducted as part of the Food and Consumer Safety Action Plan do not focus on the level of pesticide residues in foods targeted to children as does the CFP. Together, the data from these programs help health authorities assess potential exposure to pesticide residues and metals in a number of foods consumed by Canadian children. The results from these on-going activities can be found at the following CFIA web address: http://www.inspection.gc.ca/english/fssa/microchem/resid/reside.shtml

1.3 Acts and Regulations Relating to Pesticide Residues and Metals

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).

Health Canada establishes Maximum Residue Limits (MRLs) for pesticide residues in food. The MRL is the maximum amount of residues that are expected to remain in or on food products when a pesticide is used according to label directions. In the absence of a MRL, pesticide residues must comply with the General MRL of 0.1 ppm as stated in section B.15.002(1) of the *Food and Drug Regulations*. The process for establishing a MRL is initiated through the publication of a Proposed Maximum Residue Limit (PMRL) on Health Canada's website. Established MRLs appear on Health Canada's List of MRLs Regulated under the PCPA. The CFIA recognizes the scientific validity of the safety evaluation carried out by Health Canada prior to publishing PMRLs and establishing MRLs. The results obtained in the CFP are compared to the applicable standards accordingly.

Maximum levels for chemical contaminants in foods may be expressed as either regulatory tolerances or standards. Regulatory tolerances are listed in the *Food and Drug* Regulations whereas standards can be viewed on Health Canada's website. A limited number of tolerances, standards and MRLs are established for metals in food. There are, at present, metal tolerances established in the *FDR* (Section B.15.001-TABLE I) for arsenic, lead and tin in specific commodities. It should be noted that the regulatory tolerances in Table 1 of Division 15 are under review by Health Canada. There are only two standards established for metals both of which are for mercury in different types of retail fish. There is one metal MRL established for copper.

Even in the absence of a specific MRL, tolerance or standard, all foods sold in Canada must comply with Section 4(1)(a) of the *Food and Drugs Act*, which states that no person shall sell an article of food that has in or on it any poisonous or harmful substance. If the level is found to be elevated, the potential risk to human health may be assessed by Health Canada in order to determine if risk management actions are required.

1.4 Limitations of CFP

The CFP is designed to be a case study. It is not designed to gather statistically valid information on the type and levels of chemical residues and metals in children's foods. This would require more samples and substantially increase project costs.

The sampled foods are chosen based on the market availability of manufactured foods frequently consumed by infants and toddlers and do not necessarily correspond to the relative importance of this type of food in their diets. No statistical methods are used to determine the types and numbers of samples selected. Other than sampling products targeted to infants, samples were picked at random. Very few duplicate products were tested.

2 2010-2011 Children's Food Project Design

2.1 Sample selection for 2010 – 2011

The CFP was designed to provide a snapshot of the levels of pesticide residues and metals found in foods commonly consumed by and targeted to children. The multitude of food available and targeted at children, as well as the different consumption patterns of children of different age groups, makes it impractical for the CFIA to test all of these on an annual basis. To overcome this challenge, different foods for different age groups are sampled each year.

In 2009 – 2010, foods for children aged 2 to 15 years were sampled. In 2010 - 2011, baby and toddler foods (0 – 24 months) were targeted. Foods collected for this age group have been previously targeted in 2002 – 2003 (0 to 18 months) and 2008 – 2009 (0 to 24 months). Please consult appendix A for a list and web links to previous Children's Food Project reports.

The samples in the CFP include both domestic and imported manufactured foods. The samples were packaged in a variety of packaging formats: glass and plastic bottles, cans, boxes, cartons and bags. Samples included products with both short and long shelf-lives (i.e., perishable, frozen). Samples were purchased from several national grocery chains, drugstores, and at smaller local markets in the Ottawa-Gatineau area. The number of samples purchased from each grocery store was related to the availability of products and/or brands and does not reflect the relative demographic composition of or the relative amounts of food consumed by Canadian children.

2.1.1 Sample breakdown for 2010 – 2011

A total of 879 samples were included in the 2010 – 2011 CFP. The products sampled were further subdivided into 14 different categories based on ingredient similarities between products. The larger categories include pureed fruits (26%), pureed vegetables (18%), meat combinations (18%), and cereals (12%). Table 1 provides a summary of the different categories used in the 2010 – 2011 CFP project.

Table 1 Breakdown of sampled products in the 2010 – 2011 CFP

Product Type	Count of Sample Number	Percent of Total
Biscuits	39	4%
Cereal	93	11%
Cereal bars	14	2%
Dairy (Other)	6	1%
Desserts	33	4%
Fruit & Vegetable Snacks	9	1%
Fruit or Vegetable Juice	34	4%
Meat Combinations	124	14%
Pasta & Vegetables	13	1%
Pureed Fruits	280	32%
Pureed Fruits & Cereals	11	1%
Pureed Vegetables	185	21%
Rice Snacks	15	2%
Yogurt	23	3%
Total	**879**	**100%**

2.2 Analysis

Analytical testing is performed using multi-residue methods (MRMs) and single-residue methods (SRMs). MRMs are capable of detecting large numbers of pesticide residues and metals and are generally more cost-efficient. SRMs are capable of detecting single residues or residues belonging to one chemical family. Samples in the CFP were analyzed by accredited third party laboratories. The CFIA has established requirements for the acceptance of analytical results from third party laboratories. These laboratories must have analytical methods that meet or surpass the equivalent CFIA method performance parameters.

2.2.1 Pesticide analysis

Pesticides and other agricultural chemicals are commonly used in large scale agricultural systems. These chemicals help to protect crops from damage by pests, increase yields and expand the geographical location in which crops can be grown. A consequence of using agricultural chemicals during food production is that foods can sometimes retain chemical residues which may be of concern to Canadian consumers.

Foods are tested for pesticide residues using a variety of analytical methods. The CFIA multi-residue and single residue reference methods listed in Table 2 were used in the analysis of the children food samples. The analytical scope is provided Appendix B, Tables B-1 to B-4. Please note that in the 2010-2011 CFP, benomyl (carbendazim), formetanate and thiabendazole were included in the analytes of the LC/ESI-MS-MS

MRM. Therefore these SRMs are no longer needed to quantitate the aforementioned analytes.

Table 2. List of CFIA multi-residue and single residue reference methods

Sample Type	CFIA Reference Method[1]	Method Detection Limit (MDL)
Processed fruit and vegetable based foods	'Determination of Pesticides in Infant Foods using Liquid Chromatography Electrospray Ionization Mass Spectrometry (LC/ESI-MS/MS)'	Ranged from 0.00014 ppm to 0.01 ppm
Processed products (meat-, cereal-, fruit- and vegetable-based)	'Determination of Pesticides in Honey, Fruit Juice and Wine (With Solid Phase Extraction Clean-Up and GC/MSD and HPLC Fluorescence Detection)'	Ranged from 0.001 ppm to 0.025 ppm
Dairy-based products	'The Determination of Organochlorine Pesticides and Polychlorinated Biphenyls PCB's in Dairy, Raw Milk, Egg and Egg Products by GC/ECD'	Ranged from 0.0003 ppm to 0.009 ppm
Dairy-based products	'Carbamates in Tissues'	0.005 ppm
Processed products (meat-, cereal-, fruit- and vegetable-based)	'Determination of Amitraz in Pears by GC/ECD'	0.009 ppm
Processed products (meat-, cereal-, fruit- and vegetable-based)	'Determination of 2-Imidazolidinethione in Fruits and Vegetables by GC/MSD'	0.01 ppm

[1] The contract laboratories are not required to use CFIA reference methods. The analytical method used must have third party accredited Standard Operating Procedures (SOPs) and meet the minimum limits of detection (LOD), limits of quantitation (LOQ) and reporting limits set out by the CFIA.

2.2.2 Metals analysis

Although many metals occur in food naturally, they may also be present in food as a result of the use of agricultural chemicals, environmental contamination or processing. While some metals are essential nutrients, exposure to others may be harmful to human health (i.e., arsenic, cadmium, mercury, lead). Some pesticides contain metals such as copper and aluminum, which may result in elevated levels of these metals in food crops. Arsenic has been used in the past as a component of pesticides but has been discontinued in many countries. Cadmium is a common contaminant of chemical fertilizers, and may accumulate in certain types of plants. Processed foods may contain elevated levels of certain metals that are approved as food additives (aluminum, titanium), in packaging materials (tin), or for fortification with essential minerals such as iron, selenium, chromium, and zinc. Food that has been processed using lead-containing equipment may have elevated levels of lead.

The multi-metal analytical method used in the CFP analyzes for 18 different metals including: aluminum, antimony, arsenic, beryllium, boron, cadmium, chromium, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, tin, titanium and zinc. For metals analyses performed at the contract laboratories, the CFIA does not specify a reference method, but only specifies that the method used must be third party accredited and meet minimum limits of detection.

3 Results

3.1 Pesticides

A total of 1874 tests for pesticide residues were carried out on 879 samples. Of these, 643 samples (75%) contained no detected pesticide residues. There were 218 samples (25%) with detected pesticide residues, none of which resulted in pesticide residue violations. The overall compliance rate is 100%. Figure 1 illustrates the distribution of samples.

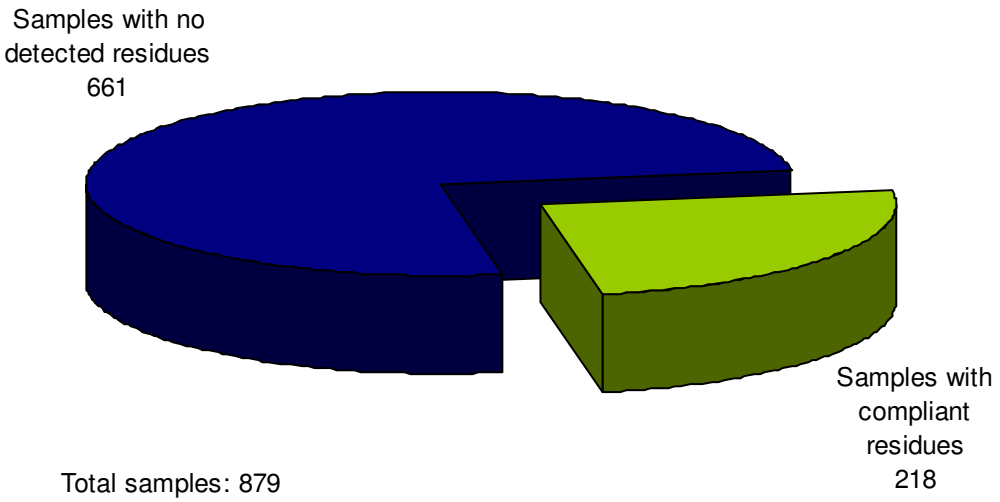

Figure 1. Distribution of sample pesticide residue results

The 2010-2011 CFP included samples from 11 countries including Canada. Of the 11 countries sampled, five had samples with detected pesticide residues. Few countries were sampled as infant and toddler foods available in Canada are generally manufactured by a small number of companies. The majority of the samples tested in the 2010-2011 CFP originated from Canada and the United States. In both cases approximately 25% of the samples had detectable pesticide residues, none of which exceeded established MRLs.

Table 3. Percent of detectable pesticide residues by country of origin

Country of Origin	Number of Samples	Number of Positive Samples	% Positive Samples	Product Types (containing detectable pesticide residues)
Belgium	1	0	0.00%	
Canada	498	132	26.51%	Biscuits, cereal, cereal bars, desserts, fruit or vegetable juice, meat combinations, pureed fruits, pureed fruits and cereals, pureed vegetables, rice snacks
Switzerland	31	3	9.68%	Cereal, cereal bars, rice snacks
China	9	0	0.00%	
France	1	0	0.00%	
United Kingdom	2	0	0.00%	
Italy	3	0	0.00%	
Poland	16	1	6.25%	Cereal
United States	313	80	25.56%	Biscuits, cereal, cereal bars, desserts, fruit and vegetable snacks, fruit or vegetable juice, meat combinations, pasta and vegetables, pureed fruits, pureed fruits and cereals, pureed vegetables, rice snacks
Unknown	5	2	40.00%	Cereal, cereal bars, rice snacks

The nature of detected pesticide residues observed in the different product types is presented in Figure 2. Twelve of the fourteen product types sampled contained detectable pesticide residues. Dairy (other) and yogurt were the only product types where no pesticide residues were detected. It is important to note that while pureed fruits and cereals, cereal bars, fruit or vegetable juice and desserts had positive rates in excess of 50%, there were less than 30 samples in total for each of these product types. The results from those product types for which there are a very small number of total samples should be interpreted cautiously.

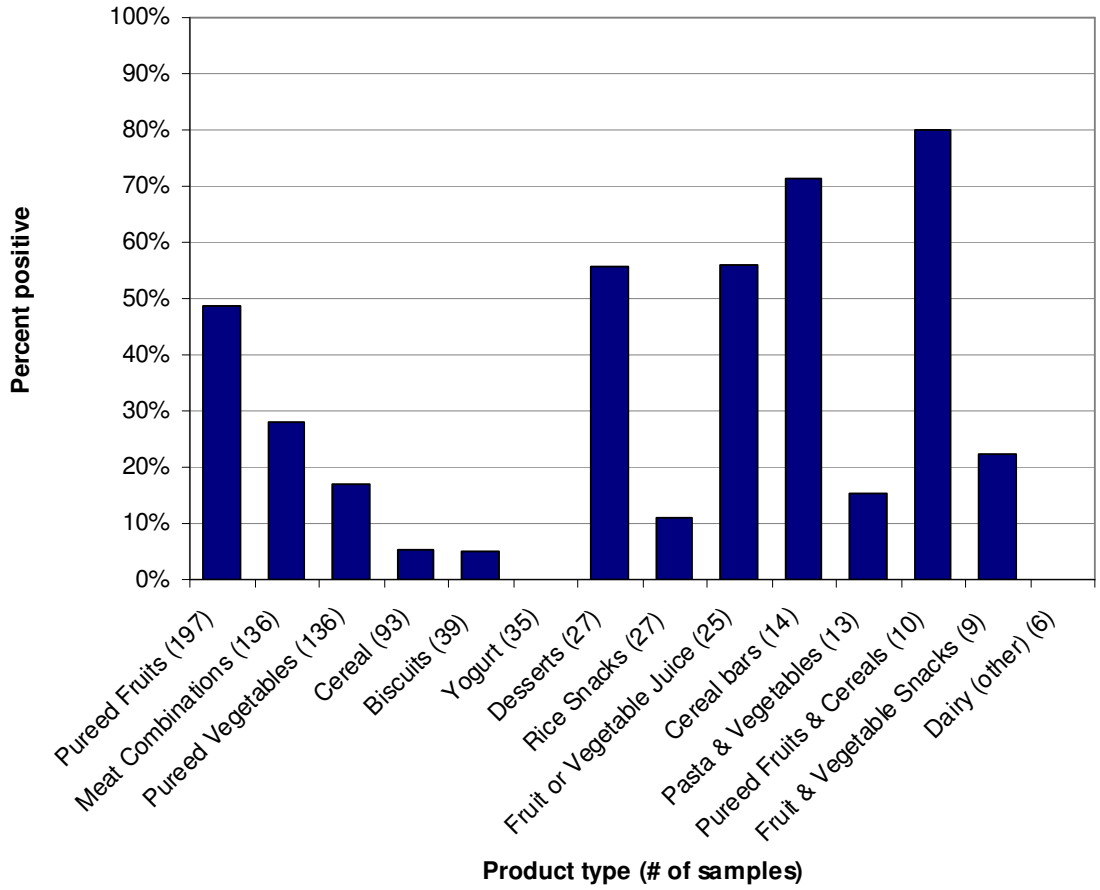

Figure 2. Percentage of samples with detected pesticide residues by product type

The prevalence of pesticide residues was examined in the CFP samples as well. Pesticide residue prevalence was calculated as the number of times a residue was detected as a percentage of the total number of samples tested for that residue. In total there were 45 different pesticide residues detected. Figure 3 below illustrates the ten most prevalent pesticide residues detected in the 2010-2011 CFP.

Captan was the most prevalent pesticide detected (9.92%). It is a fungicide used to control a wide variety of fungal diseases on small fruits, berries and vegetables. Many of the samples that contained detectable levels of captan were fruit-based, which reflects the high rate of usage in small fruit production. Diphenylamine is registered for use for the post-harvest treatment of apple and pear. It was detected at a level of 8.55% on many apple or pear-based samples. Chlorpropham was detected in 6.26% of samples tested, the majority of which were vegetable-based containing potatoes. This is attributed to the high

use of chlorpropham in potatoes as a sprout inhibitor. Ethylene thiourea (4.86%), a common metabolite to several fungicides, and thiabendazole (3.95%) are used on a wide variety of fruits and vegetables.

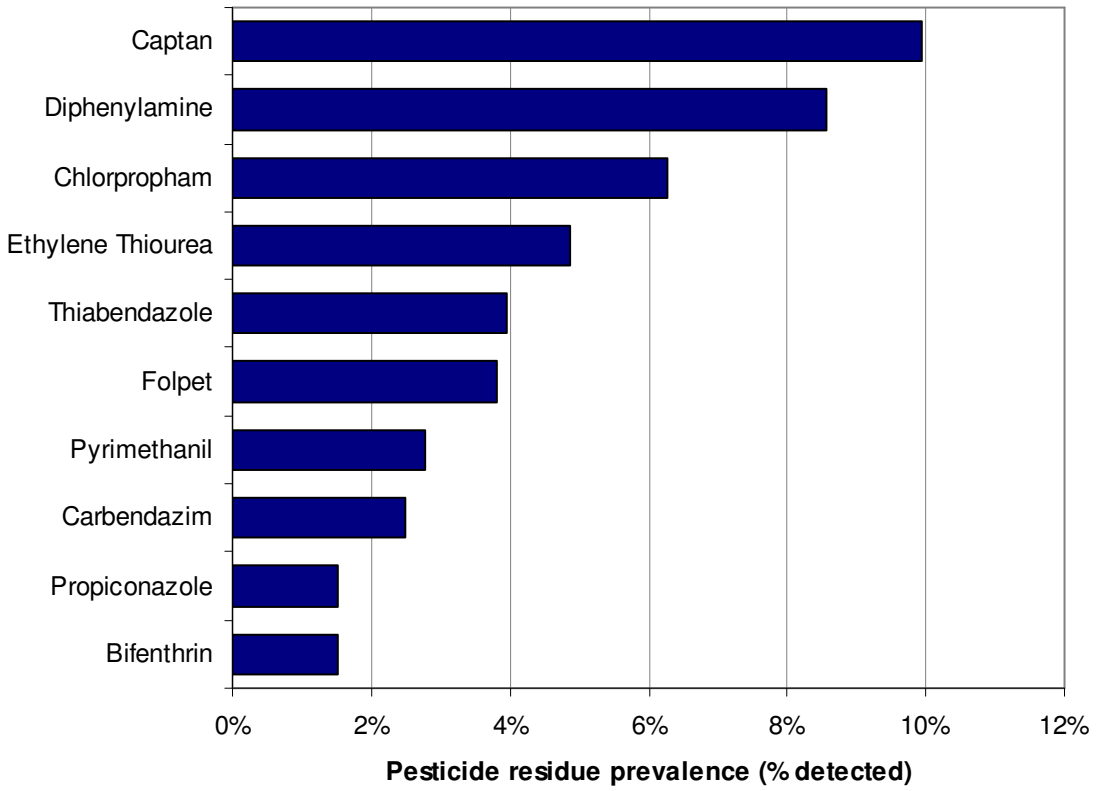

Figure 3. Pesticide residue prevalence

Figure 4 below illustrates the distribution of CFP samples containing no detected residues (ND), one or multiple pesticide residues (2 – 7). Approximately 75% of all samples tested contained no detected pesticide residues. Of the 218 samples with detected pesticide residues, 127 samples (14%) had one pesticide residue, 47 samples (5%) had two pesticide residues and 44 samples (6%) had three to seven residues per sample. There were two samples with seven detected residues each, both were domestic pureed peaches.

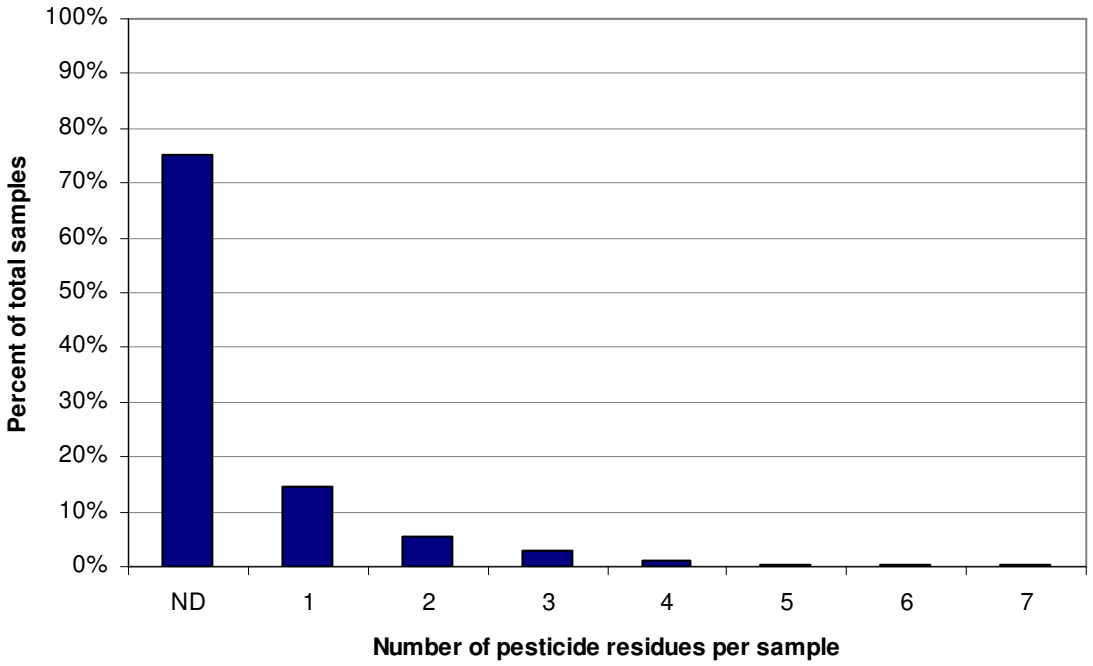

Figure 4. Pesticide residue frequency in CFP 2010-2011 samples

3.1.1 Comparison of results with 2008 – 2009 CFP results

The food products sampled in the 2010 – 2011 CFP were similar to those sampled in the 2008 – 2009 CFP as the targeted age groups were identical for both project years. Table 5 summarizes the main project parameters for both sampling years.

Table 5 Summary of the 2008-2009 and 2010-2011 CFP

2008-2009	CFP sampling year	2010-2011
382	Number samples	879
166	Number domestic samples	498
216	Number import samples	381
20	Number product types	14
0 – 2 years	Age group targeted	0 – 2 years
99.7%	Overall compliance rate	**100%**
23%	% Positive samples	25%
26	Number pesticide residues detected	45
1	Number of violations	0

Both years the overall compliance rate was very high, at 100% for 2010-2011 and 99.7% for 2008-2009. The percentage of samples containing detectable pesticide residues was similar in both years 25% (2010-2011) and 23% (2008-2009). The slight increase in 2010-2011 may be due to the increase in analytical scope. In 2008-2009, the LC/ESI-MS-MS pesticide MRM method was only used on a small number of samples, whereas in 2010-2011 this method was used on all samples. This method increases the analytical scope of the 2010-2011 CFP by approximately 100 analytes for each sample. Captan, diphenylamine and chlorpropham were some of the most prevalent pesticide residues in 2010-2011 as well as in 2008-2009.

3.2 Metals

Appendix C contains a detailed summary of the levels of metals observed in the product types sampled for the 2010 – 2011 CFP. All samples had detected levels of metals. As mentioned in section 2.2, metals are anticipated in most food products. The results presented in Appendix C are a measure of total metal concentration present in food and does not distinguish between organic and inorganic forms, or ionic species. The CFIA continues to develop and validate methods to enable quantitation of metal species to complement the current approach.

The following discussion focuses on copper due to its use as fungicide in agriculture and the four detected metals that pose the greatest inherent risk to human health (arsenic, cadmium, mercury and lead). These inherently toxic metals are historically not present in food at elevated levels.

Copper

Copper and copper compounds are used as natural fungicides. An MRL of 50 ppm is specified under the PCPA for fruit and vegetable products. No results of concern were identified in the 2010 – 2011 study. Figure 5 illustrates the levels of copper detected in the 14 product types. The majority of samples contained some level of copper. Average levels ranged from 0.093 ppm in yogurt to 2.513 ppm in cereal.

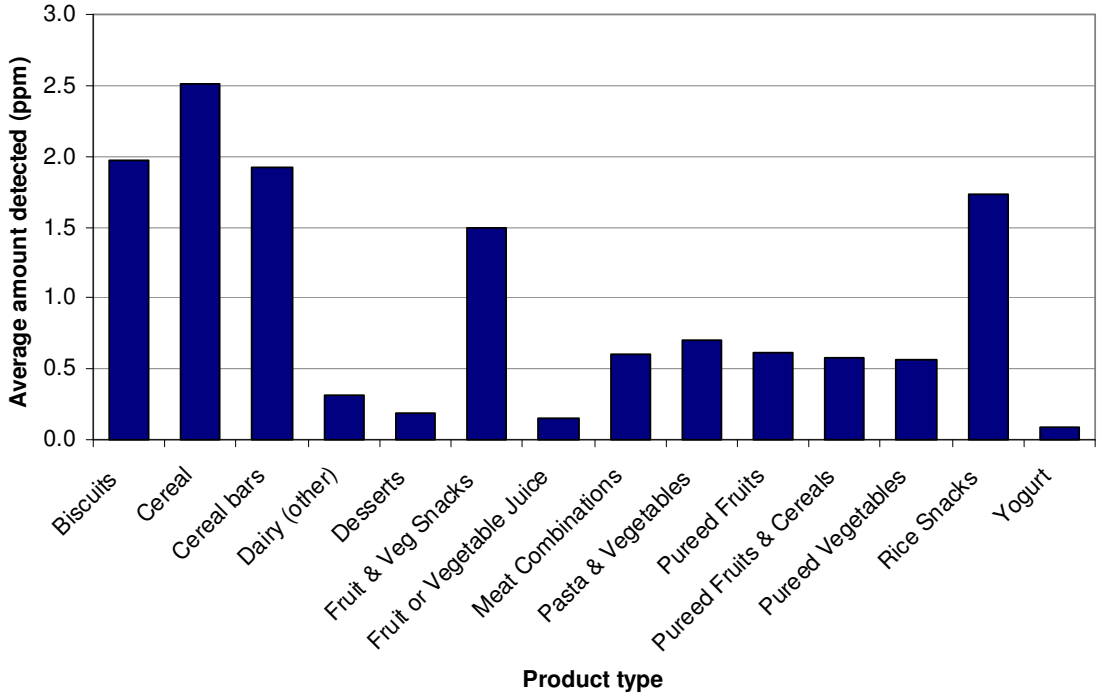

Figure 5. Average level of copper detected by product type

Arsenic

Arsenic can be found at low levels in foods such as fish and seafood, cereals, apples and pears.[4] There is an established arsenic tolerance in fruit juice, fruit nectar, beverages when ready-to-serve and water in sealed containers other than spring or mineral water specified in Table I of *Division 15* of the *FDR*. Health Canada has informed industry and the CFIA that the current limits listed in the *FDR* are outdated and under review.[1] In addition, there is an established arsenic tolerance that exists for food colours (*Division 6* of the *FDR*). There are no Canadian standards or tolerances established for any of the other foods tested. It should be noted that the results discussed below are reported as total arsenic only. The arsenic tolerances were not exceeded in any of the fruit juice, nectar products and those products containing food colouring. Figure 6 illustrates the average level of arsenic detected in the 14 product types. The average levels of arsenic ranged from 0.004 ppm in dairy (other) to 0.086 ppm in rice snacks.

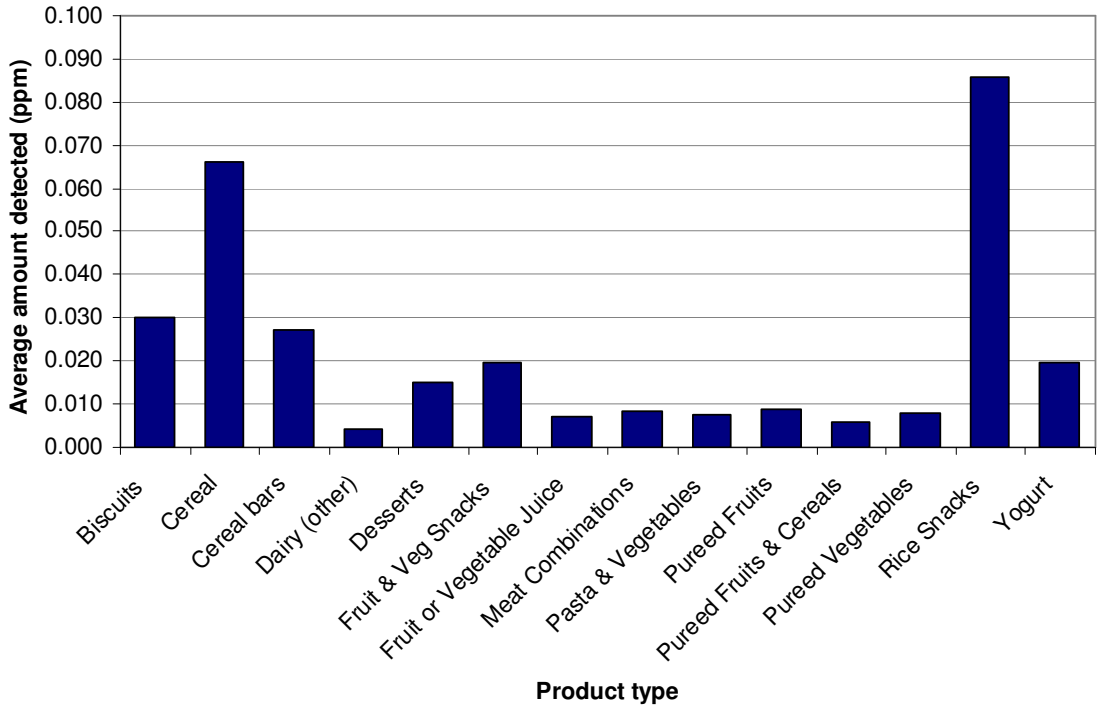

Figure 6. Average level of arsenic detected by product type

Cadmium

There are no Canadian tolerances or standards established for cadmium levels in food. Cadmium can be present in water and soils. Soil may become contaminated with cadmium by the use of phosphate fertilizers or sewage sludge. Food grown in cadmium-contaminated soils is the primary source of cadmium exposure in the general population.[2] Figure 7 illustrates the average level of cadmium detected in the 14 product types. Grain-based products had the highest levels of cadmium detected. The levels of cadmium ranged from not detected in desserts, pureed fruits and cereals and yogurt to an average of 0.023 ppm in rice snacks.

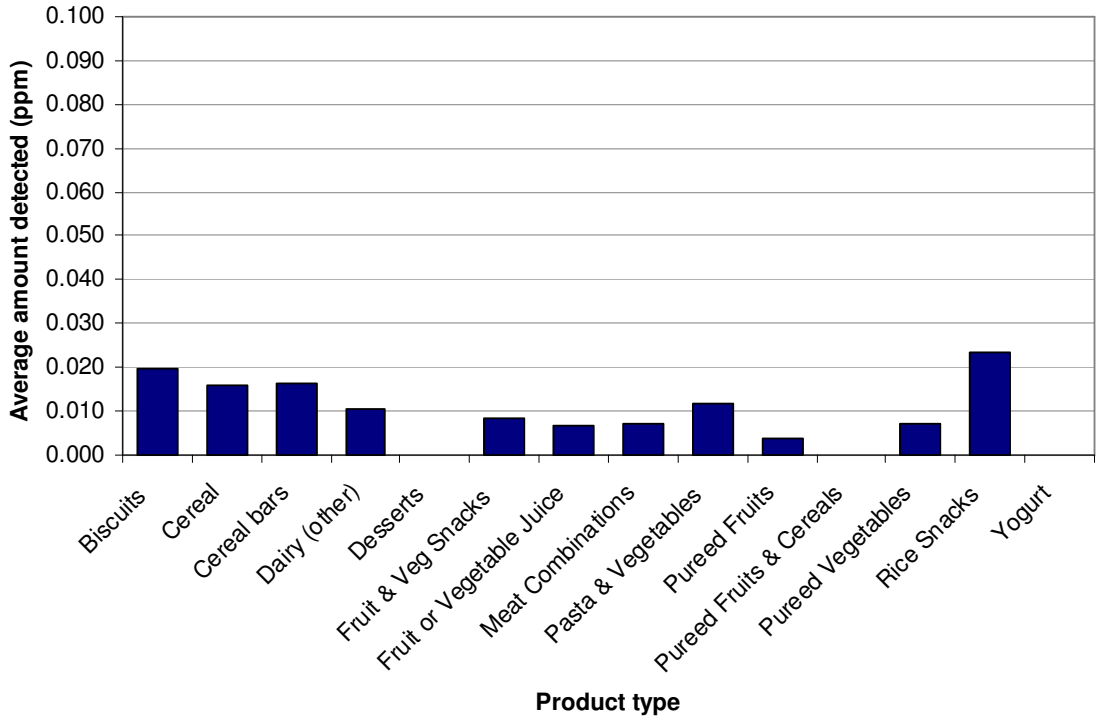

Figure 7. Average level of cadmium detected by product type

Lead

Lead exposure may occur from a number of environmental and food sources. There are several tolerances for lead in food that are specified in *Division 15* of the *FDR*. Included are tolerances for lead in tomato paste, tomato sauce, fruit juice, fruit nectar, beverages when ready-to-serve and water in sealed containers other than spring or mineral water. The lead tolerances were not exceeded in any of the tomato paste, tomato sauce, fruit juice, fruit nectar, beverages (ready-to-serve) and water in sealed container products. As part of Health Canada's risk management strategies for lead, the lead tolerances in Table 1 of Division 15 are being updated.[3] Figure 8 illustrates the average level (0.003 ppm – 0.013 ppm) of lead detected in the 14 product types.

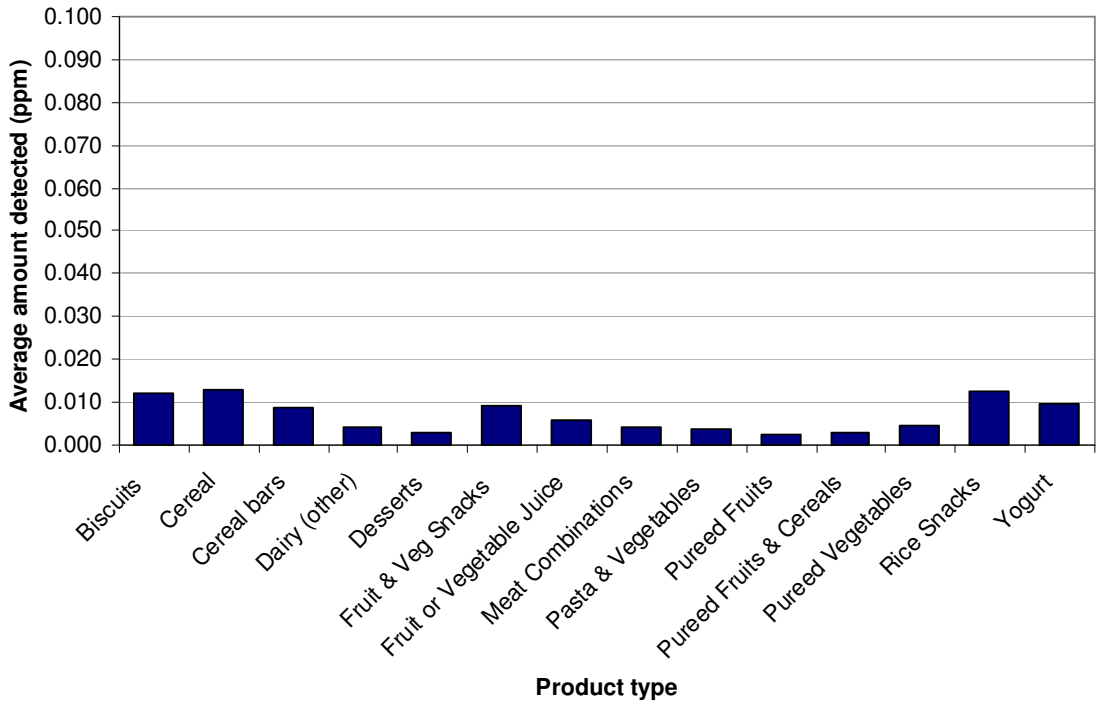

Figure 8. Average level of lead detected by product type

Mercury

Health Canada has established a maximum level of 1 ppm total mercury in the edible portion of escolar, orange roughy, marlin, fresh and frozen tuna, shark, and swordfish. The maximum level of mercury permitted in all other types of retail fish is 0.5 ppm. There were no fish-based infant and toddler foods included in the survey and there are no other mercury standards established for any other type of food tested in this survey. Mercury was detected in a total of 11 samples consisting of cereal bars, dairy (other), desserts, meat combinations, pureed fruits, pureed vegetables and rice snacks. Average levels of mercury in these samples ranged from 0.002 ppm to 0.004 ppm mercury (Figure 9).

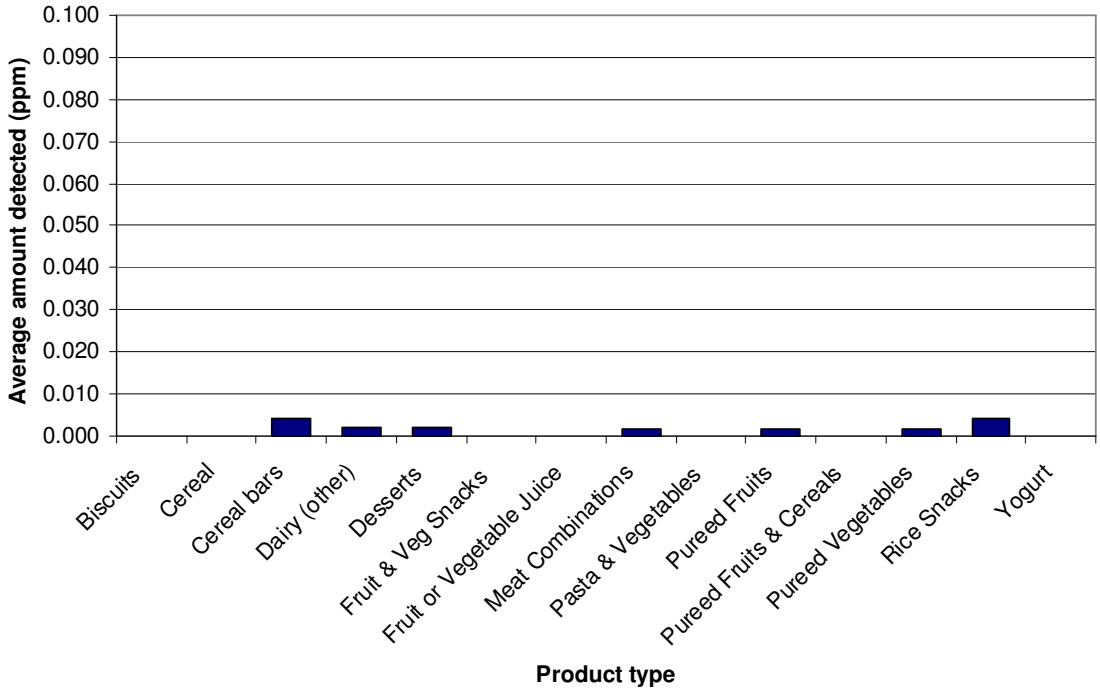

Figure 9. Average level of mercury detected by product type

4 Discussion

In the 2010 – 2011 CFP, over 2 500 tests for pesticide residues and metals were performed on domestically and imported foods consumed by and targeted to children aged 0 to 2 years. The results observed were consistent with those seen in previous years with an overall compliance rate of 100%. Similar results were observed for domestic and imported products, and there was no clear relationship between compliance rate and country of origin. The compliance rate is similar to the compliance rates of previous CFPs and also to those determined for the much larger number and scope of samples tested under the NCRMP.

Pesticides and other agricultural chemicals are commonly used in conventional agricultural systems. These are an important tool in food production because pests such as insects, bacteria, fungi, and other organisms can have devastating effects on the quantity and quality of the food. In total there were 879 samples tested for pesticide residues. The compliance rate in these samples was 100%. The samples tested in the 2010 – 2011 CFP originated from 11 countries including Canada. The samples from five of the countries contained detectable pesticide residues with the majority of them originating from Canada and the United States. In both cases, approximately 25% of the total sample number contained detectable residues. There are a wide variety of infant and toddler foods available to Canadian consumers, however many of these foods are made by a limited number of manufacturers in North America.

Although none of the samples contained pesticide residue violations, approximately 25% (218 samples) contained detectable pesticide residues. The dairy (other) and yogurt samples were the only product types that did not contain any detectable levels of pesticide residues. There was a total of 45 different pesticide residues detected with the most prevalent residue being captan at 9.92% followed by diphenylamine at 8.55%. Captan and diphenylamine are fungicides often used in small fruit production. Of the product types that had detectable residues of these pesticides, the majority were fruit based product types. Chlorpropham was detected in 6.26% of samples; this is attributed to the high prevalence of chlorpropham in potatoes. This herbicide is used to inhibit potato sprouting and was detected in a large proportion of vegetable-based products containing potatoes.

It is not uncommon to find products that contain more than one detectable pesticide residue. Approximately 75% of all samples tested contained no detectable pesticide residues, 14% contained one residue and 11% had two or more residues. Many of the samples that contained two or more pesticide residues per sample were fruit based (i.e., apple, strawberry, and peach). These fruit types were the same types of fresh fruit

sampled under the NCRMP that had a higher likelihood of containing one or more detected pesticide residue.

All samples were analysed for 18 different metals. There were also no violations of the specific metals tolerances or MRLs. The levels of metals observed are comparable to CFP and NCRMP results seen in the past.

Arsenic was detected in approximately 45% of samples with average values ranging from 0.004 ppm in dairy (other) to 0.086 ppm in rice snacks. The maximum level of 0.335 ppm was observed in an organic rice snack – whole grain brown rice product. A study conducted by the European Food Safety Authority (EFSA) in 2009 identified fish and seafood and cereal products as having the highest levels of total arsenic.[4] Arsenic levels detected in the CFP were all within the ranges observed in the EFSA study. The ranges observed in the EFSA study were between 0.0024 ppm in juices, soft drinks and bottled water and 9.2088 ppm in miscellaneous/special dietary products (i.e., spices, salt, additives, food colours, algae as food and food supplements which can be derived from algae). In the 2010 – 2011 CFP, the highest levels of arsenic (> 0.200 ppm) were detected in rice products. The arsenic levels in these samples and in all food samples tested in the 2010 – 2011 CFP were within the typical range of background concentrations observed in similar types of foods.

The presence of cadmium in foods is not unexpected. Cadmium was detected in 44% of samples. Average levels of cadmium ranged from not detected to 0.023 ppm. Higher levels of cadmium were observed in grain-based products. From 2003 to 2007 the European Commission (EC) assessed the presence of cadmium in foodstuffs.[5] It found that the highest levels of cadmium were observed in seaweed, fish and seafood, chocolate, and foods for special dietary uses. However, food groups that contributed to the major part of the dietary cadmium exposure, primarily because of the high consumption, were cereals and cereal products, vegetables, nuts and pulses, starchy roots or potatoes, and meat and meat products.[5] The cadmium levels observed in the 2010 – 2011 CFP were consistent with typical levels found in similar types of foods.

Lead occurs naturally in the environment and has many industrial uses, such as in mining, smelting and battery manufacturing. After the implementation of measures to reduce exposures to lead through the inhalation route (e.g., use of unleaded gasoline), oral exposure from food and water along with ingestion of house dust and soil contaminated with lead are the greatest sources of a child's environmental exposure to lead.[6] An EFSA scientific opinion on lead in food reported that the highest contributors to lead in the diet were cereals and cereal products, vegetables, nuts and pulses, meat and meat products and foods for special uses (e.g., herbs and spices).[7] Lead was detected in approximately

71% of the samples tested for the 2010 – 2011 CFP. Average levels ranged from 0.003 ppm to 0.013 ppm. The levels of lead observed in the 2010 – 2011 CFP are comparable to amounts observed in similar product types.

Although mercury is released naturally from rocks, soils and volcanoes, industrial activities have increased the amount of mercury in the environment. Mercury was detected in less than 2% of samples. Levels ranged from 0.002 ppm to 0.004 ppm mercury. The levels observed in the 2010 – 2011 CFP are comparable to those observed in previous CFP and NCRMP reports.

5 Conclusion

The results of the 2010 – 2011 Children's Food Project indicate that the majority of samples analyzed for pesticide residues (75% of 879 samples) contained no detected pesticide residues. There were 218 (25%) samples with detected pesticide residues and none violated Canadian pesticide regulations. The overall sample compliance rate for pesticide residues was 100%. This sample compliance rate is similar to the compliance rates of previous CFPs and also to those determined for the much larger number and scope of samples tested under the NCRMP.

There were no violations of the established metal maximum levels or MRLs. Consistent with previous years' results, higher levels of arsenic were found in some rice-based products. The levels of metals detected in samples from the 2010 – 2011 CFP were comparable to typical concentrations of metals observed in similar foods.

Due to the limited scope and number of samples collected in the project, no clear relationships can be made between product type or country of origin. The data obtained from studies like the Children's Food Project are, however, instrumental in the assessment of the dietary exposure to pesticide residues and metals in foods consumed by Canadian children.

6 References

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7 Appendix A

Table A.1. Summary of pesticide results obtained in previous Children's Food Projects

Age Group Targeted	Remarks and pesticide residue results	Sampling Year	Sample Size
0 – 18 months	• Overall compliance rate of 99.76%	*2002 - 2003*	412
2 – 10 years	• Scope expansion to include some veterinary drug residues and metals • Overall compliance rate of 100%	*2003 - 2004*	594
0.5 – 15 years	• Overall compliance rate of 98.8%	*2004 - 2006*	1523
0.5 – 15 years	• Overall compliance rate of 100%	*2006 - 2007*	350
3 – 15 years	• Overall compliance rate of 98.6%	*2007 - 2008*	836
0 – 24 months	• Pesticide residue scope expansion from 300 to 400 residues • Overall compliance rate of 99.7%	*2008 – 2009*	382
2 – 15 years	• Overall compliance rate of 98.6%	*2009 – 2010*	821

8 Appendix B

Table B-1 List of analytes (142) included in CFIA LC/ESI-MS-MS pesticide method (PMR-006-V1.0)

3-Hydroxycarbofuran	Diniconazole	Isocarbamide	Pyrifenox
Acetochlor	Dioxacarb	Isoprocarb	Pyrimethanil
Aclonifen	Dipropetryn	Isoxathion	Pyriproxyfen
Aldicarb	Diuron	Mepanipyrim	Quinoxyfen
Aldicarb sulfone	Dodemorph	Mephosfolan	Quizalofop
Aldicarb sulfoxide	Emamectin	Methabenzthiazuron	Quizalofop-ethyl
Azaconazole	Epoxiconazole	Methiocarb	Schradan
Benomyl	Ethiofencarb	Methiocarb sulfone	Spinosad
Benoxacor	Ethiofencarb sulfone	Methiocarb sulfoxyde	Spirodiclofen
Bitertanol	Ethiofencarb sulfoxyde	Methomyl	Spiromesifen
Bromuconazole	Ethirimol	Methoxyfenozide	Spiroxamine
Butafenacil	Ethoprop	Metolcarb	Sulfentrazone
Butocarboxim sulfoxide	Etofenprox	Metoxuron	Tebufenozide
Cadusafos	Etoxazole	Molinate	Tebufenpyrad
Carbaryl	Fenamidone	Napropamide	Tebupirimfos
Carbendazim	Fenazaquin	Naptalam	Tepraloxydim
Carbofuran	Fenhexamid	Neburon	Tetraconazole
Carbosulfan	Fenoxanil	Ofurace	Thiabendazole
Carfentrazone-ethyl	Fenpropidine	Oxamyl	Thiacloprid
Chlorimuron-ethyl	Fenpropimorph	Oxamyl oxime	Thiamethoxam
Chloroxuron	Fenpyroximate	Paclobutrazol	Thiazopyr
Chlortoluron	Fentrazamide	Pencycuron	Thiodicarb
Clodinafop-propargyl	Fluazifop-butyl	Penoxsulam	Thiofanox
Cloquintocet-mexyl	Flucarbazone-sodium	Picolinafen	Thiofanox sulfone
Clothianidin	Flutolanil	Picoxystrobin	Thiofanox sulfoxyde
Cyanofenphos	Flutriafol	Piperophos	Thiophanate methyl
Cycloxydim	Forchlorfenuron	Pretilachlor	Tralkoxydim
Cycluron	Formetanate	Primisulfuron-methyl	Trichlorfon
Demeton-s-methyl sulfone	Fosthiazate	Prodiamine	Trietazine
Demeton-s-methyl sulfoxyde	Fuberidazole	Propoxur	Trifloxysulfuron
Desmedipham	Furathiocarb	Pymetrozine	Triforine
Diclocymet	Haloxyfop	Pyraclostrobin	Trimethacarb
Diethofencarb	Imazamethabenz-methyl	Pyraflufen-ethyl	Zinophos
Difenoconazole	Imidacloprid	Pyridalyl	Zoxamide
Dimethametryn	Indoxacarb	Pyridaphenthion	
Dimethomorph	Iprovalicarb	Pyridate	

Table B-2 List of analytes (299) included in third party lab method for pesticide analysis in processed products

2-phenylphenol	Cyfluthrin	Flucythrinate	Parathion-methyl
3-hydroxyCarbofuran	Lambda-cyfluthrin	Fludioxinil	Pebulate
Acephate	Cypermethrin	Flumetralin	Penconazole
Acibenzolar-s-methyl	Cyprazine	Fluorochloridone	Pendimethalin
Alachlor	Cyproconazole	Fluorodifen	Pentachloroaniline
Aldicarb	Cyprodinil	Flusilazole	Cis-Permethrin 1
Aldicarb Sulfone	Cyromazine	Fluvalinate	Trans-Permethrin 2
Aldicarb Sulfoxyde	Dacthal (chlorthal-dimethyl)	Folpet	Phenthoate
Aldrin	Delta HCH	Fonofos	Phorate
Allidochlor	Deltamethrin	Heptachlor	Phorate sulfone
Ametryn	delta-trans-allethrin	Heptachlor epoxide endo	Phosalone
Aminocarb	Demeton-O	Heptanophos	Phosmet
Aramite	Demeton-S	Hexachlorobenzene	Phosphamidon
Aspon	Demeton-S-methyl	Hexaconazole	Piperonyl butoxide
Atrazine	Des-ethyl Atrazine	Hexazinone	Pirimicarb
Azinphos-ethyl	Desmetryn	Imazalil	Pirimiphos-ethyl
Azinphos-methyl	Di-allate	Iodofenphos	Pirimiphos-methyl
Azoxystrobin	Dialofos	Iprobenfos	Prochloraz
Benalaxyl	Diazinon	Iprodione	Procymidone
Bendiocarb	Diazinon o analogue	Iprodione metabolite	Prodiamine
Benfluralin	Dichlobenil	Isazophos	Profenophos
Benodanil	Dichlofluanid	Isofenphos	Profluralin
Benzoylprop-ethyl	Dichloran	Isopropalin	Prometon
ALPHA-BHC	Dichlormid	Isoprothiolane	Prometryne
BETA-BHC	Dichlorovos	Kresoxim-methyl	Pronamide
Bifenox	Diclobutrazole	Leptophos	Propachlor
Bifenthrin	Diclofenthion	Lindane	Propanil
Biphenyl	Diclofop-methyl	Linuron	Propargite
Bromacil	Dicofol	Malaoxon	Propazine
Bromophos	Dicrotophos	Malathion	Propetamphos
Bromophos-ethyl	Dieldrin	Mecarbam	Propham
Bromopropylate	Diethatyl-ethyl	Metalaxyl	Propiconazole
Bufencarb	Dimethachlor	Metazachlor	Propoxur
Bupirimate	Dimethoate	Methamidophos	Prothiophos
Buprofezin	Dinitramine	Methidathion	Pyracarbolid
Butachlor	Dioxacarb	Methiocarb	Pyrazophos
Butralin	Dioxathion	Methiocarb Sulfoxyde	Pyridaben
Butylate	Diphenamid	Methomyl	Quinalphos
Captafol	Diphenylamine	Methoprotryne	Quinomethionate
Captan	Disulfoton	Methoxychlor	Quintozene
CAPmet	Disulfoton sulfone	Methyl - trithion	Schradan

Carbaryl	Edifenphos	Methyl Pentachlorophenyl sulphide	Secbumeton
Carbetamide	Alpha-Endosulfan	Metobromuron	Simazine
Carbofenthion	Beta-Endosulfan	Metolachlor	Simetryn
Carbofuran	Endosulfan sulphate	Metribuzin	Sulfallate
Carboxin	Endrin	c-Mevinophos	Sulfotep
Chlorbenside	EPN	t-Mevinophos	Sulprophos
Chlorbenzilate	EPTC	Mexacarbate	TCMTB
Chlorbromuron	Erbon	Mirex	Tebuconazole
Chlorbufam	Esfenvalerate	Monocrotophos	Tecnazene
Cis Chlordane	Etaconazole	Monolinuron	Terbacil
Trans Chlordane	Ethalfluralin	Myclobutanil	Terbufos
Chlordimeform	Ethion	Naled	Terbumeton
Chlorfenson	Ethofumesate	Nitralin	Terbutryne
Chlorfenvinphos	Ethoprophos	Nitrapyrin	Terbutylazine
Chlorflurenol-methyl	Ethylan	Nitrofen	Tetrachlorvinphos
Chloridazon	Etridiazole	Nitrothal-isopropyl	Tetradifon
Chlormephos	Etrimfos	Norflurazon	Tetraiodoethylene
Chloroneb	Fenamiphos	Nuarimol	Tetramethrin
Chloropropylate	Fenamiphos sulfone	o,p-DDD	Tetrasul
Chlorothalonil	Fenamiphos Sulfoxyde	o,p-DDE	Thiobencarb
Chlorpropham	Fenarimol	o,p-DDT	Tolclofos-methyl
Chlorpyrifos	Fenbuconazole	Octhilinone	Tolyfluanid
Chlorpyrifos-methyl	Fenchlorophos	Omethoate	Triadimefon
Chlorthiamid	Fenfuram	Oxadiazon	Triadimenol
Chlorthion	Fenitrothion	Oxadixyl	Tri-allate
Chlorthiophos	Fenpropathrin	Oxamyl	Triazophos
Chlozolinate	Fenpropimorph	Oxycarboxin	Tribufos
Clomazone	Fenson	Oxychlordane	Tricyclazole
Coumaphos	Fensulfothion	Oxyfluorfen	Trifloxystrobin
Crotoxyphos	Fenthion	p,p-DDD	Triflumizole
Crufomate	Fenvalerate	p,p-DDE	Trifluralin
Cyanazine	Flamprop-isopropyl	p,p-DDT	Vernolate
Cyanophos	Flamprop-methyl	Paraoxon	Vinclozolin
Cycloate	Fluchloralin	Parathion	

Table B-3 List of analytes (32) included in third party method for pesticide analysis in dairy products

Alachlor	Beta-Endosulfan	o,p-DDE
Aldrin	Endosulfan sulphate	o,p-DDT
Alpha-BHC	Endrin	Oxychlordane
Beta-BHC	Fenchlorophos	p,p-DDD
Cis Chlordane	Heptachlor	p,p-DDE
Trans Chlordane	Heptachlor epoxide endo	p,p-DDT
Chlorpyrifos	Hexachlorobenzene	Cis-Permethrin 1
Cyfluthrin	Lindane	Trans-Permethrin 2
Dicofol	Methoxychlor	Quizalofop-ethyl
Dieldrin	Mirex	Tefluthrin
Alpha-Endosulfan	o,p-DDD	

Table B-4 Analytes (16) included in method entitled, "Carbamates in tissue"

aldicarb	oxamyl
aldicarb sulfone	methiocarb
aldicarb sulfoxide	carbofuran
dioxacarb	carbaryl
isoprocarb	bufencarb
propoxur	bendiocarb
promecarb	methiocarb sulfoxide
methomyl	3-hydroxycarbofuran

9 Appendix C

Table C-1 Levels of metals observed in the product types tested.

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Aluminum	Biscuits	39		39	0.930	40.084	4.971
	Cereal	93	4	89	0.189	18.880	4.380
	Cereal bars	14		14	2.074	11.450	4.714
	Dairy (other)	6	1	5	0.100	0.961	0.378
	Desserts	26	1	25	0.111	2.493	0.502
	Fruit & Veg Snacks	9		9	2.331	15.896	4.546
	Fruit or Vegetable Juice	25	3	22	0.125	1.559	0.469
	Meat Combinations	124	4	120	0.101	4.603	0.687
	Pasta & Vegetables	13		13	0.168	34.663	3.247
	Pureed Fruits	170	14	156	0.055	3.198	0.645
	Pureed Fruits & Cereals	10		10	0.252	4.088	1.007
	Pureed Vegetables	111	13	98	0.101	4.890	0.557
	Rice Snacks	24	1	23	0.400	7.780	3.032
	Yogurt	32	2	30	0.073	1.270	0.247
Antimony	Biscuits	39	31	8	0.001	0.017	0.007
	Cereal	93	50	43	0.0008	0.026	0.008
	Cereal bars	14	7	7	0.002	0.013	0.008
	Dairy (other)	6	5	1	0.005	0.005	0.005
	Desserts	26	21	5	0.0007	0.002	0.001
	Fruit & Veg Snacks	9	9		-	-	-
	Fruit or Vegetable Juice	25	17	8	0.0005	0.002	0.001
	Meat Combinations	124	123	1	0.0002	0.0002	0.0002
	Pasta & Vegetables	13	13		-	-	-
	Pureed Fruits	170	141	29	0.0001	0.002	0.001
	Pureed Fruits & Cereals	10	9	1	0.0002	0.0002	0.0002
	Pureed Vegetables	111	106	5	0.0001	0.004	0.001
	Rice Snacks	24	15	9	0.002	0.007	0.004
	Yogurt	32	32		-	-	-

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Arsenic	Biscuits	39	25	14	0.009	0.102	0.030
	Cereal	93	18	75	0.010	0.230	0.066
	Cereal bars	14	7	7	0.009	0.063	0.027
	Dairy (other)	6	5	1	0.004	0.004	0.004
	Desserts	26	22	4	0.004	0.039	0.015
	Fruit & Veg Snacks	9	1	8	0.012	0.028	0.020
	Fruit or Vegetable Juice	25	13	12	0.003	0.024	0.007
	Meat Combinations	124	71	53	0.004	0.020	0.008
	Pasta & Vegetables	13	11	2	0.007	0.009	0.008
	Pureed Fruits	170	125	45	0.003	0.030	0.009
	Pureed Fruits & Cereals	10	6	4	0.004	0.008	0.006
	Pureed Vegetables	111	74	37	0.004	0.021	0.008
	Rice Snacks	24		24	0.038	0.335	0.086
	Yogurt	32	6	26	0.010	0.071	0.020
Beryllium	Biscuits	39	36	3	0.002	0.003	0.002
	Cereal	93	62	31	0.002	0.008	0.003
	Cereal bars	14	13	1	0.002	0.002	0.002
	Dairy (other)	6	6		-	-	-
	Desserts	26	26		-	-	-
	Fruit & Veg Snacks	9	9		-	-	-
	Fruit or Vegetable Juice	25	19	6	0.0003	0.002	0.001
	Meat Combinations	124	123	1	0.001	0.001	0.001
	Pasta & Vegetables	13	13		-	-	-
	Pureed Fruits	170	170		-	-	-
	Pureed Fruits & Cereals	10	10		-	-	-
	Pureed Vegetables	111	111		-	-	-
	Rice Snacks	24	24		-	-	-
	Yogurt	32	32		-	-	-
Boron	Biscuits	39		39	0.205	5.150	0.984
	Cereal	93		93	0.301	18.671	2.483
	Cereal bars	14		14	1.436	8.956	2.575
	Dairy (other)	6		6	0.129	0.467	0.250
	Desserts	26		26	0.033	6.877	1.339
	Fruit & Veg Snacks	9		9	1.420	26.105	9.544
	Fruit or Vegetable Juice	25		25	0.374	8.375	3.298
	Meat Combinations	124		124	0.076	2.426	0.929
	Pasta & Vegetables	13		13	0.515	1.622	0.931
	Pureed Fruits	170		170	0.227	10.458	3.951
	Pureed Fruits & Cereals	10		10	2.839	6.923	4.380
	Pureed Vegetables	111		111	0.239	2.781	1.304
	Rice Snacks	24		24	0.276	3.144	0.983
	Yogurt	32		32	0.142	1.050	0.300

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Cadmium	Biscuits	39	2	37	0.005	0.051	0.020
	Cereal	93	14	79	0.005	0.044	0.016
	Cereal bars	14		14	0.008	0.046	0.016
	Dairy (other)	6	4	2	0.006	0.015	0.011
	Desserts	26	26		-	-	-
	Fruit & Veg Snacks	9	4	5	0.002	0.012	0.008
	Fruit or Vegetable Juice	25	24	1	0.007	0.007	0.007
	Meat Combinations	124	39	85	0.002	0.019	0.007
	Pasta & Vegetables	13		13	0.005	0.020	0.012
	Pureed Fruits	170	148	22	0.001	0.008	0.004
	Pureed Fruits & Cereals	10	10		-	-	-
	Pureed Vegetables	111	73	38	0.002	0.025	0.007
	Rice Snacks	24	13	11	0.001	0.047	0.023
	Yogurt	32	32		-	-	-
Chromium	Biscuits	39	4	35	0.035	0.952	0.184
	Cereal	93	6	87	0.028	1.266	0.193
	Cereal bars	14		14	0.055	0.491	0.203
	Dairy (other)	6	3	3	0.024	0.058	0.037
	Desserts	26	14	12	0.006	0.077	0.028
	Fruit & Veg Snacks	9		9	0.074	0.997	0.229
	Fruit or Vegetable Juice	25	6	19	0.010	0.631	0.067
	Meat Combinations	124	36	88	0.020	2.716	0.066
	Pasta & Vegetables	13		13	0.021	0.088	0.039
	Pureed Fruits	170	29	141	0.008	0.224	0.041
	Pureed Fruits & Cereals	10	2	8	0.010	0.064	0.036
	Pureed Vegetables	111	48	63	0.006	0.178	0.041
	Rice Snacks	24	6	18	0.033	0.646	0.215
	Yogurt	32	22	10	0.010	0.029	0.017
Cobalt	Biscuits	39	3	36	0.003	0.056	0.014
	Cereal	93	3	90	0.003	0.122	0.020
	Cereal bars	14		14	0.006	0.061	0.018
	Dairy (other)	6	4	2	0.002	0.002	0.002
	Desserts	26	7	19	0.001	0.012	0.004
	Fruit & Veg Snacks	9		9	0.009	0.016	0.013
	Fruit or Vegetable Juice	25	4	21	0.001	0.011	0.003
	Meat Combinations	124	2	122	0.001	0.035	0.005
	Pasta & Vegetables	13		13	0.001	0.011	0.005
	Pureed Fruits	170	15	155	0.0008	0.018	0.004
	Pureed Fruits & Cereals	10		10	0.002	0.009	0.004
	Pureed Vegetables	111	14	97	0.001	0.052	0.005
	Rice Snacks	18		18	0.005	0.234	0.042
	Yogurt	3	3		-	-	-

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Copper	Biscuits	39		39	0.669	4.618	1.974
	Cereal	93		93	0.659	8.224	2.513
	Cereal bars	14		14	1.248	3.571	1.925
	Dairy (other)	6		6	0.059	0.742	0.311
	Desserts	26		26	0.039	0.962	0.189
	Fruit & Veg Snacks	9		9	0.094	2.843	1.488
	Fruit or Vegetable Juice	25	2	23	0.031	0.588	0.149
	Meat Combinations	124		124	0.170	1.702	0.600
	Pasta & Vegetables	13		13	0.390	0.984	0.700
	Pureed Fruits	170		170	0.078	1.319	0.615
	Pureed Fruits & Cereals	10		10	0.451	0.967	0.582
	Pureed Vegetables	111		111	0.108	1.383	0.562
	Rice Snacks	24		24	1.127	2.901	1.737
	Yogurt	32		32	0.046	0.229	0.093
Iron	Biscuits	39		39	4.371	251.426	47.466
	Cereal	93		93	18.402	397.047	282.081
	Cereal bars	14		14	22.339	176.910	51.140
	Dairy (other)	6		6	0.454	6.485	2.619
	Desserts	26	1	25	0.369	4.166	1.525
	Fruit & Veg Snacks	9		9	0.767	45.067	14.478
	Fruit or Vegetable Juice	25	2	23	0.409	3.004	1.124
	Meat Combinations	124		124	1.106	19.744	5.309
	Pasta & Vegetables	13		13	2.092	7.132	4.051
	Pureed Fruits	170		170	0.462	6.308	2.028
	Pureed Fruits & Cereals	10		10	2.639	52.839	11.569
	Pureed Vegetables	111		111	0.943	12.897	3.803
	Rice Snacks	24		24	3.085	605.997	114.668
	Yogurt	32	2	30	0.363	2.400	0.686
Lead	Biscuits	39	7	32	0.002	0.045	0.012
	Cereal	93	13	80	0.002	0.097	0.013
	Cereal bars	14		14	0.002	0.017	0.009
	Dairy (other)	5	2	3	0.001	0.0102	0.004
	Desserts	26	11	15	0.001	0.011	0.003
	Fruit & Veg Snacks	9		9	0.003	0.026	0.009
	Fruit or Vegetable Juice	25	5	20	0.001	0.042	0.006
	Meat Combinations	124	26	98	0.001	0.025	0.004
	Pasta & Vegetables	13	2	11	0.001	0.014	0.004
	Pureed Fruits	170	66	104	0.001	0.010	0.003
	Pureed Fruits & Cereals	10	4	6	0.001	0.006	0.003
	Pureed Vegetables	111	33	78	0.001	0.030	0.005
	Rice Snacks	24	9	15	0.005	0.057	0.013
	Yogurt	32	24	8	0.001	0.029	0.010

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Magnesium	Biscuits	39		39	108.548	1035.538	380.012
	Cereal	93		93	50.174	1870.695	911.380
	Cereal bars	14		14	246.618	2235.878	661.171
	Dairy (other)	6		6	25.561	152.338	70.092
	Desserts	26		26	13.372	243.678	65.013
	Fruit & Veg Snacks	9		9	73.305	1006.852	433.892
	Fruit or Vegetable Juice	25		25	9.994	95.253	47.871
	Meat Combinations	124		124	64.604	219.065	125.255
	Pasta & Vegetables	13		13	95.655	162.709	128.683
	Pureed Fruits	170		170	15.048	308.375	109.428
	Pureed Fruits & Cereals	10		10	111.878	185.828	146.963
	Pureed Vegetables	111		111	38.053	282.442	132.361
	Rice Snacks	24		24	91.210	1555.785	536.930
	Yogurt	32		32	91.140	173.600	135.268
Manganese	Biscuits	39		39	2.459	18.589	7.690
	Cereal	93		93	1.590	51.167	18.311
	Cereal bars	14		14	5.031	20.269	14.102
	Dairy (other)	6	2	4	0.021	2.437	1.015
	Desserts	26		26	0.048	5.065	1.508
	Fruit & Veg Snacks	9		9	0.390	14.769	4.613
	Fruit or Vegetable Juice	25		25	0.054	3.520	0.477
	Meat Combinations	124		124	0.050	3.982	1.127
	Pasta & Vegetables	13		13	0.744	1.800	1.306
	Pureed Fruits	170		170	0.171	7.369	1.252
	Pureed Fruits & Cereals	10		10	1.870	3.131	2.595
	Pureed Vegetables	111		111	0.163	8.510	1.231
	Rice Snacks	24		24	3.432	45.386	14.338
	Yogurt	32		32	0.053	0.719	0.149
Mercury	Biscuits	39	39		-	-	-
	Cereal	93	93		-	-	-
	Cereal bars	14	13	1	0.004	0.004	0.004
	Dairy (other)	6	5	1	0.002	0.002	0.002
	Desserts	26	25	1	0.002	0.002	0.002
	Fruit & Veg Snacks	9	9		-	-	-
	Fruit or Vegetable Juice	25	25		-	-	-
	Meat Combinations	124	122	2	0.002	0.002	0.002
	Pasta & Vegetables	13	13		-	-	-
	Pureed Fruits	170	167	3	0.002	0.002	0.002
	Pureed Fruits & Cereals	10	10		-	-	-
	Pureed Vegetables	111	110	1	0.002	0.002	0.002
	Rice Snacks	24	22	2	0.002	0.004	0.003
	Yogurt	32	32		-	-	-

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Molybdenum	Biscuits	39		39	0.149	0.777	0.435
	Cereal	93		93	0.184	2.511	0.821
	Cereal bars	14		14	0.226	0.728	0.404
	Dairy (other)	6		6	0.012	0.069	0.035
	Desserts	26		26	0.005	0.145	0.028
	Fruit & Veg Snacks	9		9	0.010	0.615	0.199
	Fruit or Vegetable Juice	25		25	0.003	0.095	0.014
	Meat Combinations	124		124	0.008	0.599	0.148
	Pasta & Vegetables	13		13	0.039	0.269	0.101
	Pureed Fruits	170		170	0.007	0.130	0.027
	Pureed Fruits & Cereals	10		10	0.040	0.121	0.077
	Pureed Vegetables	111		111	0.007	1.079	0.131
	Rice Snacks	24		24	0.147	1.027	0.433
	Yogurt	32		32	0.035	0.076	0.054
Nickel	Biscuits	39		39	0.038	0.862	0.216
	Cereal	93	1	92	0.047	3.231	0.786
	Cereal bars	14		14	0.233	1.921	0.514
	Dairy (other)	6		6	0.007	0.089	0.025
	Desserts	26		26	0.006	0.125	0.034
	Fruit & Veg Snacks	9		9	0.043	0.803	0.292
	Fruit or Vegetable Juice	25	3	22	0.006	0.176	0.033
	Meat Combinations	124		124	0.007	2.478	0.191
	Pasta & Vegetables	13		13	0.031	0.201	0.082
	Pureed Fruits	170	5	165	0.008	2.519	0.131
	Pureed Fruits & Cereals	10		10	0.096	0.326	0.185
	Pureed Vegetables	111		111	0.008	2.463	0.244
	Rice Snacks	24		24	0.087	0.972	0.335
	Yogurt	32	21	11	0.007	0.070	0.028
Selenium	Biscuits	39		39	0.014	0.745	0.153
	Cereal	93		93	0.011	0.745	0.191
	Cereal bars	14		14	0.050	0.441	0.155
	Dairy (other)	6	1	5	0.005	0.139	0.046
	Desserts	26	11	15	0.003	0.030	0.012
	Fruit & Veg Snacks	9	5	4	0.007	0.122	0.067
	Fruit or Vegetable Juice	25	17	8	0.001	0.007	0.003
	Meat Combinations	124		124	0.005	0.473	0.053
	Pasta & Vegetables	13		13	0.021	0.117	0.053
	Pureed Fruits	170	80	90	0.001	0.071	0.010
	Pureed Fruits & Cereals	10		10	0.008	0.024	0.016
	Pureed Vegetables	111	42	69	0.003	0.054	0.012
	Rice Snacks	24	4	20	0.020	0.194	0.074
	Yogurt	32	4	28	0.021	0.081	0.039

Metal Analyte	Product Type	Total # samples	Total # negative	Total # positive	Min (ppm)	Max (ppm)	Mean[1] (ppm)
Tin	Biscuits	39	32	7	0.020	0.772	0.193
	Cereal	93	64	29	0.011	0.301	0.067
	Cereal bars	14	8	6	0.010	0.044	0.022
	Dairy (other)	6	5	1	0.173	0.173	0.173
	Desserts	26	15	11	0.006	0.183	0.096
	Fruit & Veg Snacks	9	9		-	-	-
	Fruit or Vegetable Juice	25	16	9	0.003	0.212	0.092
	Meat Combinations	124	80	44	0.101	0.293	0.151
	Pasta & Vegetables	13	12	1	0.116	0.116	0.116
	Pureed Fruits	170	83	87	0.002	0.584	0.155
	Pureed Fruits & Cereals	10	8	2	0.002	0.236	0.119
	Pureed Vegetables	111	31	80	0.102	0.271	0.164
	Rice Snacks	24	17	7	0.010	0.026	0.016
	Yogurt	32	32		-	-	-
Titanium	Biscuits	39		39	0.049	4.594	1.020
	Cereal	93		93	0.025	8.166	1.901
	Cereal bars	14		14	0.095	3.947	1.147
	Dairy (other)	6		6	0.096	0.443	0.242
	Desserts	26		26	0.005	0.381	0.098
	Fruit & Veg Snacks	9		9	0.169	1.400	0.662
	Fruit or Vegetable Juice	25	5	20	0.004	0.117	0.050
	Meat Combinations	124		124	0.037	0.699	0.292
	Pasta & Vegetables	13		13	0.142	3.380	0.522
	Pureed Fruits	170	3	167	0.004	0.393	0.101
	Pureed Fruits & Cereals	10		10	0.006	0.245	0.187
	Pureed Vegetables	111		111	0.006	0.631	0.182
	Rice Snacks	24	4	20	0.031	2.710	0.676
	Yogurt	32	2	30	0.058	0.463	0.130
Zinc	Biscuits	39		39	2.275	27.224	9.874
	Cereal	93		93	8.655	40.090	18.441
	Cereal bars	14		14	6.603	64.677	18.499
	Dairy (other)	6		6	0.574	6.218	3.654
	Desserts	26	3	23	0.078	2.135	0.734
	Fruit & Veg Snacks	9	1	8	0.235	28.543	8.965
	Fruit or Vegetable Juice	25	9	16	0.090	1.357	0.355
	Meat Combinations	124		124	0.898	27.383	4.622
	Pasta & Vegetables	13		13	1.733	3.826	2.756
	Pureed Fruits	170	5	165	0.094	3.052	0.771
	Pureed Fruits & Cereals	10		10	1.343	2.102	1.718
	Pureed Vegetables	111		111	0.327	5.575	1.984
	Rice Snacks	24		24	5.461	230.957	51.070
	Yogurt	32		32	2.941	10.910	4.813

[1] Mean of the positive samples.