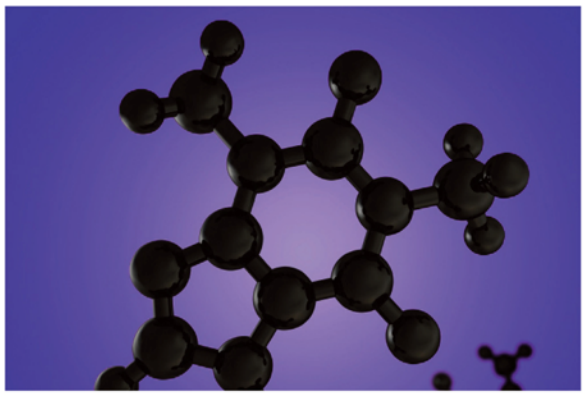
Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Food Safety Action Plan

REPORT

2009-2010 Targeted Surveys

Chemistry



Food Colours Used in the Production of Manufactured Foods

TS-CHEM-09/10-05

Canada

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Executive Summary

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

The main objectives of the food colours survey were:

- To provide baseline surveillance data for synthetic colouring agents in food
- To validate an analytical method for detecting fat-soluble food colouring agents

This survey looked to quantify food colouring agents intentionally added to products, not food colours that were naturally occurring in a commodity. One hundred samples were collected and each sample was analyzed for 194 water-soluble and 18 fat-soluble food colours. No fat soluble colours were detected using the newly validated analytical method; all residues detected were water soluble. Overall, 59% of samples did not contain detectable levels of food colours. Of the remaining 41%, 34 samples contained permitted colours below maximum levels established by the *Food and Drugs Act & Regulations* and seven samples contained levels of colours that were above the permissible levels and therefore were in violation.

Of the seven violative samples, four samples contained permitted food colours above maximum levels: chicken tandoori seasoning (USA), lumpfish (USA), horseradish with beets (Canada), and cheddar cheese (Canada). Two samples were in violation due to the presence of non-permitted food colours: almond paste (Belgium) and curing powder[*] (Thailand). The last violative sample, dried papaya (Canada), contained both a permitted colour at levels exceeding regulations and a non-permitted food colour. Appropriate follow up actions were taken for each violative sample.

Many samples contained multiple food colours. Accounting for 93% of colours found in this survey were Sunset yellow, Tartrazine, Brilliant blue, Allura red, and Amaranth. Few food colours were detected in spices & flavours. It should be re-iterated that samples were selected due to their high likelihood of containing food colouring agents, and that prevalence in the food categories selected are not necessarily representative of the prevalence of synthetic food colours in all foodstuffs available at retail. That being said, the food categories sampled for this survey with the highest prevalence of food colours were sweets & jelly, beverages, animal-based foods, and sauces & condiments.

[*] Curing powder is generally used as a food preservative for meat and fish.

1. Introduction

1.1 Food Safety Action Plan

The Food Safety Action Plan (FSAP) aims to modernize and enhance Canada's food safety system. The FSAP unites multiple partners in providing safe foods for Canadians.

Within FSAP, the Canadian Food Inspection Agency (CFIA) gained increased authority to monitor potential food risks and to prevent unsafe food products from entering the Canadian marketplace. The CFIA fulfils this mandate through an enhanced surveillance initiative, which includes targeted surveys.

1.2 Targeted Surveys

Targeted surveys are pilot surveys used to gather information regarding the potential occurrence of chemical residues in defined commodities. The surveys are designed to answer specific questions therefore, unlike monitoring activities, testing of a particular chemical hazard is targeted to commodity types and/or geographical areas. Due to the vast number of chemical hazards and food commodity combinations, it is not possible, nor should it be necessary, to use targeted surveys to identify and quantify all chemical hazards in foods. To identify food-hazard combinations of greatest potential health risk, the CFIA uses a combination of media reports, scientific literature and/or a risk-based model developed by the Food Safety Science Committee (FSSC). Initially this survey was prompted by media reports of potential adverse health effects related to the consumption of synthetic food colours. Through further consultation with Health Canada, who is currently proposing changes to the way in which food colours are declared in ingredient lists, examination of food colouring agents in artificially coloured foods was considered a high priority in 2009-2010.

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 & Regulations* (FDAR). The CFIA evaluates the compliance to these restrictions with regards to contaminants and pesticide residues in foods.

The regulations that cover food colours in Canada are in Part B, Division 6 of the *Food and Drug Regulations*[1]. Section B.06.002 below specifically outlines the food colours which are permitted in food and their maximum levels (ML).

B.06.002. No person shall sell a food, other than a synthetic colour, mixture, preparation or flavouring preparation, that contains, when prepared for consumption according to label directions, more than

(*a*) 300 parts per million of Allura Red, Amaranth, Erythrosine, Indigotine, Sunset Yellow FCF or Tartrazine or any combination of those colours unless a higher maximum level of use is specified in column III of item 3 of Table III to section B.16.100;

(*b*) 100 parts per million of Fast Green FCF or Brilliant Blue FCF or any combination of those colours;

(*c*) 300 parts per million of any combination of the synthetic colours named in paragraphs (*a*) and (*b*) within the limits set by those paragraphs; or

(*d*) 150 parts per million of Ponceau SX

All results from this targeted survey are compared to the ML's outlined above. Levels at or below ML's are in compliance with Canadian Regulations and do not require further action. Levels above ML's are identified as violations and are assessed by Health Canada for potential health risk to consumers. Follow-up actions are initiated in a manner which reflects the magnitude of the health risk. Actions may include notification of the producer or importer, follow-up inspections, additional directed sampling, and recall of products.

Targeted surveys may be used to identify emerging food-hazard issues. In the case of food additives, such surveys can be useful in determining if there are foods on the Canadian market that are non-compliant with the food additive provisions in the *Food and Drug Regulations*. Results from targeted surveys can provide data which may be used to perform health risk assessments for these non-compliant foods.

2. Food Colours Survey

2.1 Rationale

The National Chemical Residue Monitoring Program (NCRMP) is the CFIA's monitoring program for chemical residues of pesticides, veterinary drugs and contaminants in foods. The presence of colours in food has been occasionally examined by the CFIA's Imported and Manufactured Foods Division. However the CFIA does not have a regular monitoring program for these compounds. The present survey was designed to gain insight into the use of synthetic colours in food. Its specific aims were to: 1) examine the presence and levels of permitted and non-permitted food colours in commodities highly susceptible to containing food colours; and 2) perform a pilot study for an analytical method which specifically detects fat-soluble food colours.

With increasing multiculturalism and market globalization, consumers can find an ever-increasing array of processed foods available at retail. Food colours are generally considered more prevalent in processed foods than fresh foods, as these compounds are knowingly added to restore colours lost during the preparation of processed foods or to enhance the appeal of a processed product. Exposure to food colours has likely increased as a result. Therefore, enhanced surveillance of food colours through targeted surveys is timely.

2.2 Food colours

Colours permitted in food are either synthetic or natural. Synthetic colours are produced by chemical synthesis and have no counterpart in nature[2] (e.g. tartrazine). Natural colours exist in nature, and may be extracted from foods or reproduced by chemical synthesis (e.g. anthocyanins). Natural colours are generally less vibrant in colour, and are more sensitive to light, temperature, and pH than synthetic colours.

Food colours are widely used as food additives in the food industry. Bright and vibrant colours are frequently used in sweets and candies to denote flavour. Colours are also added to seemingly 'natural' foods to compensate for natural colour losses during processing, achieve a uniform product colour or make the food more appealing[2].

The recent finding in the United Kingdom and the EU of hazardous non-permitted food colours in imported foods is of concern[3]. The presence of non-permitted colours, such as Sudan, may pose a risk to the consumer as many of these colours are potential carcinogens[4]. Para Red, an industrial dye chemically similar to Sudan I, has been implicated in the contamination of a variety of processed foods including cooking sauces, spices, seasonings and chips[5].

Health concerns have also been alleged with permitted synthetically produced food colours, specifically relating to the presence of toxic impurities in the reagents or toxic by-products formed during processing or storage[6]. Some studies have linked consumption of food colours to Attention Deficit/Hyperactivity Disorder (ADHD) in children[7]. This area of research is controversial and the evidence corroborating this claim is not concrete. No exact mechanism of action has been elucidated, and therefore information related to this potential health effect must be further investigated before any definite conclusions can be made.

It should also be noted that a very small subset of the population has been shown to exhibit sensitivities or allergic reactions to certain food colours. Effects can include hives, flushing, asthma, dizziness and fainting when exposed to food colours[2].

2.3 Sample Choice

The 2009-2010 Food Colour Survey was designed to specifically target commodities which are likely to contain food colours. A total of 100 samples of both domestic and imported origin were purchased. It is important to note that a domestic product may or

may not contain ingredients from Canada. In some cases, imported ingredients may be used for the manufacture of a product in Canada. Samples were divided into the following seven food categories based on their everyday use: spices & flavours, sauces & condiments, sweets & jelly, plant-based foods, beverages, animal-based foods, and miscellaneous. The distribution of samples by food category is depicted in Figure 1. The complete list of samples can be found in Appendix A.

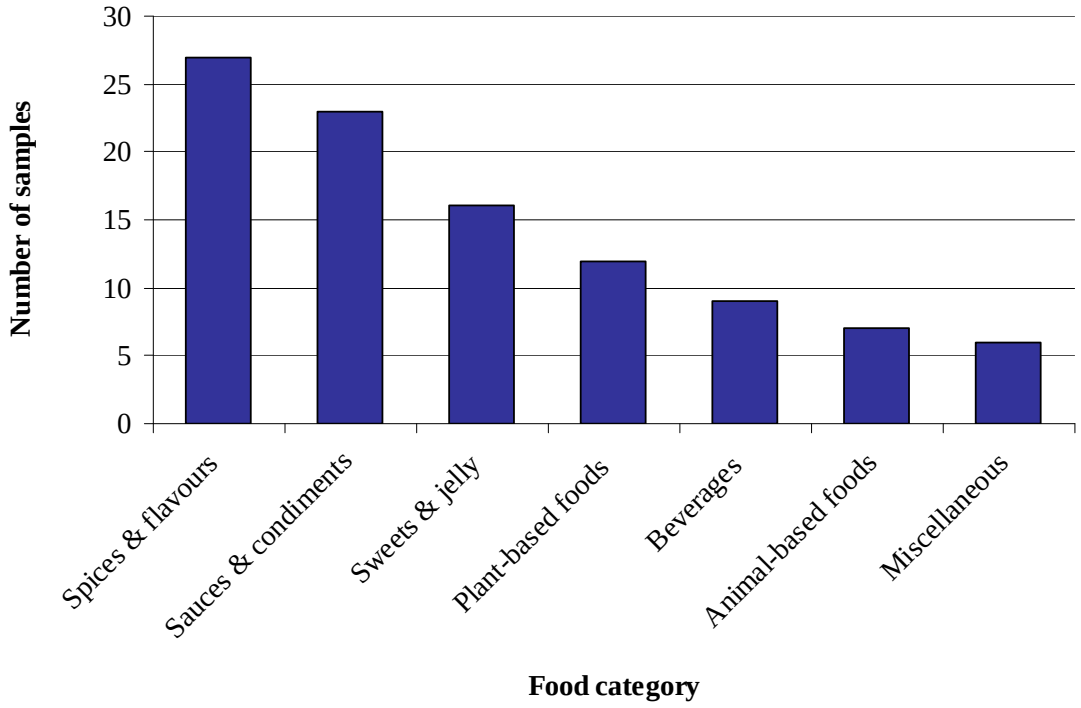

Figure 1 Distribution of samples by food category

2.4 Analytical methods

CFIA laboratories continuously develop and validate new analytical methods for the detection of food chemicals hazards and compounds of interest (such as food colours). Analytical methods become accredited upon meeting validation parameters pertaining to recovery, selectivity, specificity, accuracy, linearity, range, precision, repeatability or reproducibility, limit of quantification (LOQ), and limit of detection (LOD).

Samples from this targeted survey were analyzed at the CFIA Longueuil Laboratory using two analytical methods, one to quantify aqueous food colours and the other to quantify fat-soluble food colours. Aqueous food colours are generally classified as dyes that are water soluble. They can be used in beverages, dry mixes, baked goods, dairy products, etc. Fat soluble dyes are not actually soluble in oils; rather they are dyes that have been combined with salts to make them oil-dispersible. These dyes are generally used due to their ability to resist bleeding and migration of colour. Typically these types of dyes are used in cake and dougnut mixes, hard candies, chewing gums, etc.[8].

The first method, designated LCAQ-016, allows the identification and quantification of aqueous food colours by high performance liquid chromatography (HPLC) and photodiode array detection. This method measures 194 distinct food colours. A complete list of food colours detected by this method can be found in Appendix B. The second method, designated LCAQ-107, allows the identification and quantification of fat-soluble food colours by HPLC and photodiode array detection. This method measures 18 different food colours. It has thus far been validated for use in sauces, pastes, powdered spices, and eggs. A complete list of food colours detected by this method can be found in Appendix C.

2.5 Limitations

The food colours targeted survey was designed to provide a snapshot of the levels of colours in foods available in Canada. Based on the total number of products containing food colouring agents available to the public, 100 samples is considered a relatively small sample size. Therefore, care must be taken when interpreting results. The data cannot be considered representative of food colours found in all food categories or from specific countries of origin. Regional differences, impact of product shelf-life or cost of the commodity on the open market (i.e. correlations between product price and presence/absence of certain colours) are not examined in this survey.

3. Results and Discussion

3.1 General trends

Of the 100 samples collected, a total of 59 samples did not contain detectable levels of synthetic food colours (non-detected). Of the remaining 41 samples, 34 had detectable food colours at levels compliant with Canadian regulations (compliant positive). The remaining seven samples had levels that exceeded the ML's outlined in section B.06.002 of the FDR (violation). The overall compliance rate was 93% (Figure 2).

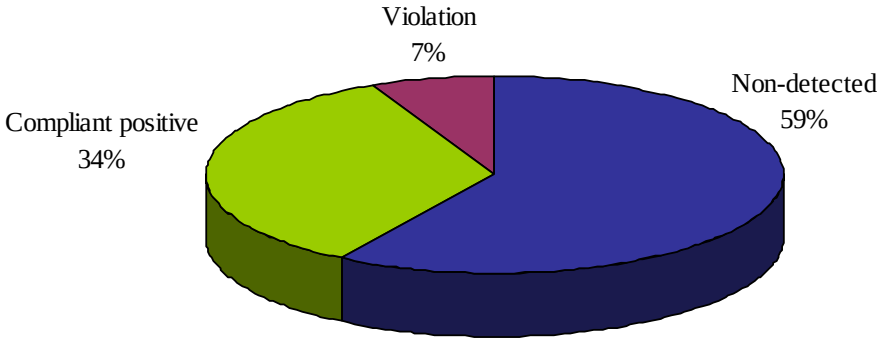

Figure 2 Distribution of samples by results

3.2 Violations

Seven samples were in violation of the *FDAR*. As described in section 1.3, samples were considered violative if they met one of the following criteria:

1) Singular permitted food colours are detected above the specified maximum limit (ML)
2) The sum of multiple permitted food colours in a sample is above the specified ML
3) Single or multiple non-permitted food colours are detected

A description of samples, food colour and test assessment for the seven violative samples is outlined in Table 1. Six of seven violative samples contained multiple violations (i.e. met more than one of the criteria outlined above). Five samples were in violation due to permitted food colours found at levels which exceed regulatory limits (ML). The specific violative samples were chicken tandoori seasoning (USA), lumpfish (USA), horseradish with beets (Canada), cheddar cheese (Canada), and dried papaya (Canada).

Three samples were in violation due to the presence of non-permitted food colours. These samples were almond paste (Belgium), curing powder (Thailand) and dried papaya (Canada). Four different non-permitted food colours were responsible for the three violative samples. The non-permitted food colours were Crocein orange (yellow), Chromotrope FB (red), Patent blue violet calcium (blue), and New coccine (red). Due to the small number of samples, no concrete conclusions about the relationship between food colour and food category can be reached.

Table 1. Sample description, food colour and assessment of food colour violations

Sample #	Sample description	Food Colour	Assessment
1	Chicken tandoori seasoning	Tartrazine	Above ML
		Allura red	Above ML
2	Lumpfish	Tartrazine	Above ML
		Brilliant blue FCF	Above ML
		Allura red	Above ML
3	Horseradish with beets	Amaranth	Above ML
4	Cheddar cheese	Tartrazine	Combination above ML
		Sunset yellow	Combination above ML
5	Dried papaya	Sunset yellow	Above ML
		Crocein orange	Non-permitted colour
6	Almond paste	Tartrazine	Below ML
		Chromotrope FB	Non-permitted colour
		Patent blue violet calcium	Non-permitted colour
7	Curing powder	Allura red	Below ML
		New coccine	Non-permitted colour

3.3 Food colour prevalence

It should be noted that the next section looks at the prevalence of food colours detected in samples taken for this survey. This discussion is specific to the samples herein and should not be inferred to be representative of food colour prevalence in all foodstuffs available at retail. Likewise, the presence of one or more distinct synthetic food colours is not of concern, as these food additives are approved for use in food so long as they do not exceed the guidelines set out in the FDAR.

Of the 41 samples containing food colours, eleven distinct colours (permitted and non-permitted) were found a total of 81 times. As illustrated in Figure 3, the most commonly found colours were yellow (Sunset yellow and Tartrazine), followed by blue (Brilliant blue FCF) and red (Allura red and Amaranth). Indigotine, Erythrosine and the four non-permitted food colours were each only detected once.

All detected food colours were water-soluble.

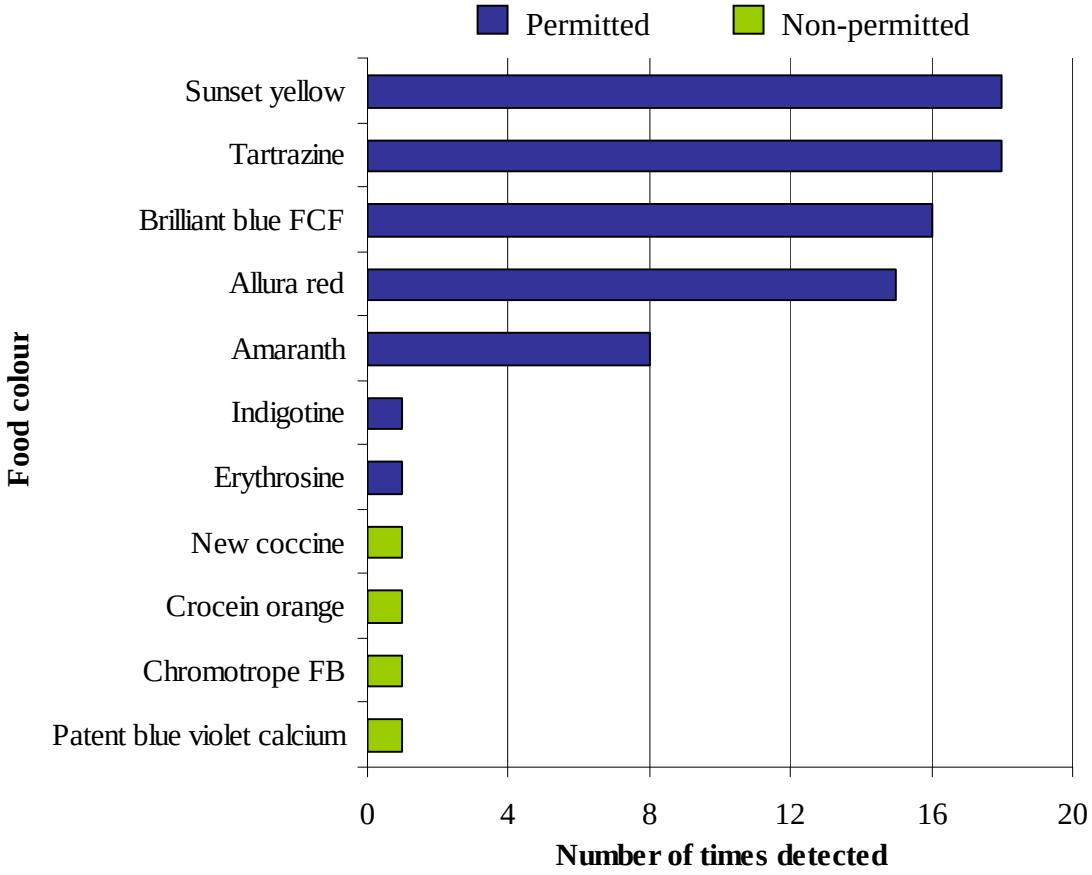

Figure 3 Prevalence of detected food colours in collected samples

The prevalence of detected food colours by food category is illustrated below in Figure 4. Fifteen of 16 (94%) sweets & jelly samples had detected food colours. The majority of samples in this food category had two distinct food colours per sample. One breakfast cereal sample had four different colours and one hard candy sample had five different colours. In both cases however, the sum of all food colours was below ML specified in B.06.002. Sweets & jelly accounted for approximately half of samples with detected Allura red (7 of 15), Brilliant blue (6 of 16), Sunset yellow (9 of 18), and Tartrazine (9 of 18). Specific products with detected permitted food colours included fruit jams, fruit fillings, vegetable spreads and candy.

Seven of nine (78%) beverage samples had detected food colours. The majority of beverages had two food colours per sample. Beverages accounted for an important fraction of samples with detected Amaranth (3 of 8) and Brilliant blue (6 of 16). These colours were used in thirst quenchers, flavoured-milk beverages, and mixed drinks.

Three of seven (43%) animal-based samples contained detectable levels of food colours. Samples contained either two or three food colours. Animal products with food colours included cheese, caviar, and smoked salmon.

Seven of 23 (30%) sauces & condiments samples had detected food colours. They contained either one or two food colours. Positive samples included relish, horseradish, dip, and spicy sauces.

Three of 12 (25%) plant-based samples had detected food colours. Positive samples consisted of dried or canned fruits and contained either one or two food colours. Only five of 27 (19%) spices & flavours samples had detected food colours. They consisted mainly of mixed seasonings and contained single or multiple food colours. Lastly, one of six (17%) miscellaneous samples (cheezees) contained three food colours.

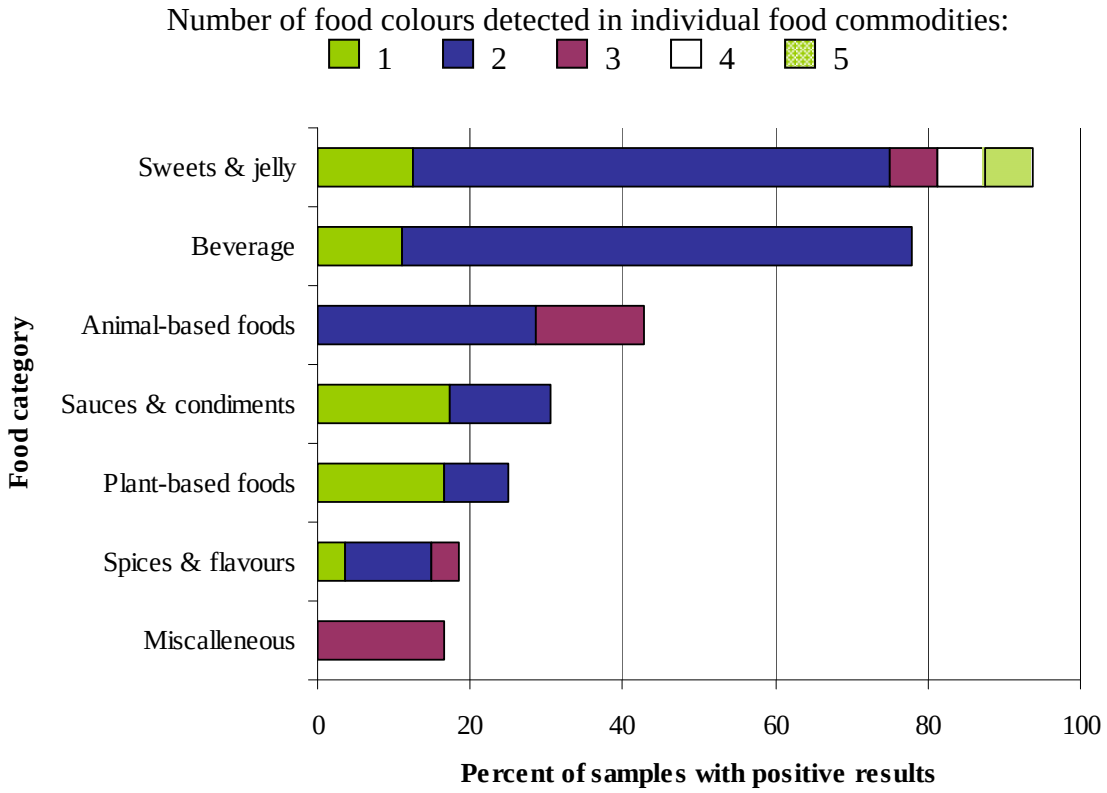

Figure 4 Prevalence of food colour by food categories

4. Conclusions

One hundred samples were collected and analyzed for food colours. By design, the samples selected were highly coloured, and therefore the presence of food colours was not unexpected. Overall, 59% of samples did not contain levels of food colours detectable with the methods used. Of the remaining 41%, 34 samples contained permitted colours at levels accepted by the FDAR and seven samples were in violation. Violations pertained to the presence of permitted food colours at levels exceeding the FDAR, the presence of non-permitted food colours, or both. Follow up actions were taken for each violative sample as appropriate.

Sunset yellow, Tartrazine, Brilliant blue, Allura red, and Amaranth accounted for 93% of all food colours detected in this survey. These colours were more prevalent in sweets & jelly, beverages, animal-based foods, and sauces & condiments.

Samples often contained multiple colours. These were either of similar tones (e.g. Tartrazine and Sunset yellow) or distinct primary colours (e.g. Brilliant blue and Allura red) to create new tones. All food colours detected were water-soluble. This suggests that the prevalence of fat-soluble food colours is lower than the prevalence of water-soluble food colours.

5. References

[1] Department of Justice. Food and Drug Regulations. 2010. Web. 12 April 2010 http://laws.justice.gc.ca/en/showtdm/cr/C.R.C.-c.870

[2] Food Safety Network, University of Guelph. Production & Processes: Food Additives. 2010. Web. 12 April 2010 http://www.foodsafetynetwork.ca/aspx/public/publication_detail.aspx?cID=441&id=48

[3] UK Government. Food Standards Agency. News Archives Sudan I Product list 21 and 22 February 2005. Web June 12, 2010. http://www.food.gov.uk/news/newsarchive/2005/feb/update

[4] Canadian Food Inspection Agency, *Imported and Domestic Foods Division. Work Specification 2008-2009. Food Colours (Non-permitted) in Imported Products, FS409*, RDIMS # 942898, March 2008.

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[6] Gennaro MC, Abrigo C, and Cipolla G. High-Performance liquid chromatography of food colours and its relevance in forensic chemistry. *Journal of chromatography* A 674 (1994): 281-299.

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[8] International Foodcraft Corporation. A Basic Guide to Food Color Concentrates. 2010. Web. May 28, 2010. http://www.intlfoodcraft.com/food-color.html

Appendix A

Food products (100) sampled and analyzed by food category. Red items indicate samples with food colouring agents in violation of B. 006.002 of the FDAR.

Spices & flavours (27)	**Sauces & condiments (23)**
Algae, dry	Cocktail sauce
Almond paste	Dip, cherry
Annatto seeds	Dip, taramosalata
Artitificial flavouring, orange	Guacamole
Bacon bits	*Horseradish, with beets*
Chili powder	Mustard
Chili powder, mexican	Oil, African palm
Curing powder	Oil, palm
Curry paste, mild	Oil, palm
Curry powder	Oil, wasabi stir fry
Green curry paste	Relish, sweet
Mesquite smoke flavouring	Salad dressing, tamari and sesame
Paprika	Salsa
Paprika	Sauce, BBQ spicy
Paprika	Sauce, chicken wing
Paprika	Sauce, chili
Red curry paste	Sauce, Hoisin
Red curry paste	Sauce, Hoisin
Red curry paste	Sauce, oyster
Red pepper paste	Sauce, red pepper and chili pasta
Red pepper powder	Sauce, Szechwan
Salt	Sauce, Tao
Seasoning, cajun	Sauce, Worcestershire
Seasoning, couscous	
Seasoning, spaghetti	
Seasoning, tandoori chicken	
Turmeric, ground	
Sweets & jelly (16)	**Plant-based foods (12)**
Breakfast cereal	Cappucino moka mix
Candy	Consomme
Candy, menthol	Fruit snack, canned
Candy, strawberry	*Papaya, dried*

Cherry filing	Peanuts
Ice cream, mint and cholocate chips	Soup, celery creamed
Jam, blueberry	Soup, chicken creamed
Jam, strawberry and blackberry	Soup, mushroom creamed
Jelly, mint	Soup, tomato
Jelly, strawberry	Soup, tomato
Mango, sliced	Soup, tomato
Maraschino cherry, green	Soup, tomato and basil, creamed
Pudding, prepared	
Raspberry coulis	
Spread, peach and mango	
Wafers	
Beverages (9)	**Animal-based foods (7)**
Alcoholic beverage, mixed drink	*Cheddar, grated*
Alcoholic beverage, wine	Smoked salmon
Alcoholic beverage, wine	Egg
Juice, carrot	*Lumpfish*
Juice, pomegranate	Shelled duck eggs
Milk beverage, strawberry	Shelled duck eggs
Soda, grape	Shelled duck eggs
Thirst quencher, grape	
Thirst quencher, lime	
Miscellaneous (6)	
Chips (cheezees)	
Lasagna, spinach	
Prepared diner, vegetable & pork	
Prepared dinner, beef	
Prepared dinner, chicken & vegetable paella	
Prepared dinner, tikka masala	

Appendix B

List of analytes (194) detected by the HPLC method LCAQ-016 (Identification and quantification of aqueous food colours by HPLC in food products) at the CFIA Longueuil Laboratory.

4,4-dihydroxyazobenzene-3,3'-dicarboxylic Acid (sodium salt)	Celestine Blue	Mordant Orange 6
4-amino-1,1'-azobenzene-3,4'-disulfonic Acid (sodium salt)	Chicago sky Blue 6B	Mordant Red 19
4-phenylazophenol (98%)	Chlorophyllin coppered (trisodium)	Mordant Yellow 10
Acid Black 24	Chrome Azurol S	Mordant Yellow 12
Acid Blue 113	Chromotrope 2R	Mordant Yellow 7
Acid Blue 120	Chromotrope FB	Naphthol Blue Black
Acid Blue 129	Chromoxane Cyanine R	Naphthol Green B
Acid Blue 161	Chrysoidine G	Naphthol Yellow S
Acid Blue 25	Chrysophenine	Napthochrome Green
Acid Blue 29	Cibacron Brilliant Red 3BA	New Coccine (Ponceau 4R)
Acid Blue 40	Cibacron Brilliant Yellow 3GP	Nitrazine Yellow
Acid Blue 41	Citrus Red 2	NuclearFast Red
Acid Blue 92	Congo Red	Orange 1
Acid Fuchsin	Crocein Orange G	Orange G
Acid Green 25	Crocin	Orange GCN
Acid Green 27	Crystal Ponceau 6R	Orange ll
Acid Orange 51	Crystal Violet	Orange lV
Acid Orange 63	D & C Brown 1	Orange OT
Acid Orange 74	D & C Green	Palatine Chrome Black 6BN
Acid Orange 8	D & C Green 8	Palatine Fast Black wan
Acid Red 1	D & C Red 39	Palatine Fast Yellow BLN
Acid Red 106	D & C Red 8	Patent Blue VF
Acid Red 114	Direct Blue 71	Patent Blue Violet Calcium
Acid Red 151	Direct Orange 31	Phenol Red
Acid Red 183	Direct Red 23	Phloxine B
Acid Red 33	Direct Red 75	Plasmocorinth B
Acid Red 37	Direct Red 81	Polar Yellow
Acid Red 4	Direct Violet 51	Ponceau 3R
Acid Red 40	Direct Yellow 27	Ponceau 6R (Ponceau GR)

Acid Red 8	Direct Yellow 50	Ponceau S
Acid Red 88	Direct Yellow 62	Ponceau SS
Acid Red 97	Direct Yellow 8	**Ponceau SX**
Acid Violet 5	Disperse Yellow 7	Primuline
Acid Violet 7	Eosin B	Protoporphyrin IX
Acid Yellow 17	Eosin Y	Quinoline Yellow (spirit soluble)
Acid Yellow 25	Eriochrome Black T	Quinoline Yellow (water soluble)
Acid Yellow 29	Eriochrome Blue Black B	Reactive Black 5
Acid Yellow 34	**Brilliant blue FCF**	Reactive Blue 15
Acid Yellow 38	**Erythrosine**	Reactive Blue 2
Acid Yellow 42	Ethyl Eosin	Reactive Blue 4
Acid Yellow 65	Fast Garnet GBC (base)	Reactive Orange 16
Acid Yellow 76	**Fast Green FCF**	Red FB
Acid Yellow 99	Fast Red E (Echtrot E)	Remazol Brilliant Blue R
Alizarin Blue Black B	Flavazin L	Rhodamine B
Alizarin Red S monohydrate	Fluoresceine	Rose Bengal
Alizarin Violet 3R	Gallocyanine	Scarlet GN
Alkali Blue 6B	Guinea Green B	Solochrome Violet RS
Allura Red	Hematoporphyrin IX	Sudan I
Alphazurine A	Hematoxylin	Sudan IV
Amaranth	Indigo (synthetic)	Sudan Orange G
Annatto (bixin / norbixin)	**Indigotine**	Sulforhodamine B
AzoCarmine B	Lapachol (98%)	Sulforhodamine G
Benzopurpurin 4B	Light Green SF Yellowish	**Sunset Yellow FCF**
Benzyl Violet 4B	Lissamine Green B	**Tartrazine**
Biebrich Scarlet	Metanil Yellow	Thiazol Yellow G
Black 7984	Methyl Eosin	Tropalotin O
Black BN	Methyl Orange	Trypan Blue
Bordeaux R	Methyl Red (sodium salt)	Victoria Blue B
Brilliant Blue G	Methyl Violet 2B	Violamine R
Brilliant Blue R	Methyl Yellow	Violet BNP
Brilliant Crocein MOO	Methylene Blue	Xylidine Ponceau 2R
Brilliant Yellow	Mordant Blue 9	Yellow 27175
Brown Chocolate (natural)	Mordant Brown 1	Yellow RFS
Calcomine Orange 2RS	Mordant Orange 1	Yellow RY
Carminic Acid	Mordant Orange 10	

Note: Food colours in bold are permitted in Canada

Appendix C

List of analytes (18) detected by the HPLC method LCAQ-107-00 (Method for detecting fat-soluble food colouring agents) at the CFIA Longueuil Laboratory.

Sudan I	Sudan Red G	Para Red
Sudan II	Sudan Orange G	Methyl Yellow
Sudan III	Sudan Black B	Metanil Yellow
Sudan IV	Sudan Blue II	Orange II
Sudan Red B	Solvent Blue 59	Acid Red I
Sudan Red 7B	Toluidine Red	Rhodamine B