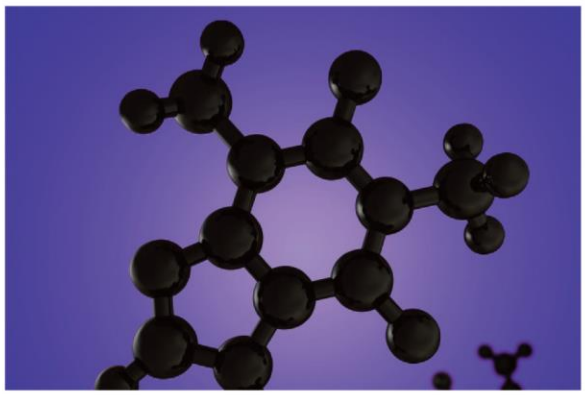
Canadian Food Inspection Agency
Agence canadienne d'inspection des aliments

Food Safety Action Plan

REPORT

2012-2013 Targeted Surveys

Allergens



Sulphites in Imported Fresh Fruit

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Canada

Executive Summary

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

Sulphites can cause an allergic like reaction in sensitive people. In Canada they are not permitted for use on any fresh fruit or vegetable intended to be consumed raw, with the exception of grapes. Sulphites are sulphur-based substances used as preservatives to prevent spoilage and discoloration during storage and distribution of foods. In the fresh produce industry, sulphur dioxide (SO_2) gas is commonly used to fumigate table grapes against decay during storage, or is used in packaging material for grapes for slow-emission of SO_2 during transportation. CFIA has previously posted a notice to industry on its web site reminding importers that fresh produce such as longan and lychee are not permitted to be treated with sulphiting agents prior to being exported to Canada. This survey aimed to collect data in 2012-2013 to determine the prevalence of sulphites in fresh fruit available in Canada.

The main objectives of the sulphites in fresh imported fruit survey were:

- to obtain baseline information regarding the presence and levels of sulphites in fresh custard apple, longan, lychee and rambutan fruit, and
- to identify potential food safety concerns relating to sulphites on fresh custard apple, longan, lychee and rambutan fruit.

The data from this survey provided information on the use and levels of sulphites in the rind and flesh of imported fresh fruit including custard apple, longan, lychee and rambutan. A total of 219 samples of fresh lychee, longan, custard apple and rambutan were analyzed for the presence of sulphites. Overall, sulphites were present in the rind of 148 samples (68%) and the flesh of 16 samples (7%). All of the longan rind samples and 87% of the lychee, 40% of the custard apple and 34% of the rambutan rind samples contained sulphites. Longan had the highest percentage (16%) of samples that had sulphites on the rind and in the flesh, custard apple (4%) and lychee (5%) a smaller percentage of sulphites on the rind and flesh and rambutan had no positives in the flesh.

Positive results were followed up by the CFIA. Follow up actions may involve a food safety investigation, including a health risk assessment conducted by Health Canada and a recall or one of the following: notification to manufacturer/importer and/or additional sampling.

1 Introduction

1.1 The Food Safety Action Plan

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

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

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

1.2 Targeted Surveys

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

Sulphites are sulphur-based substances used as preservatives to prevent spoilage and discoloration during storage and distribution of foods. In the fresh produce industry, sulphur dioxide (SO_2) gas is commonly used to fumigate grapes against decay during storage, or is used in packaging material for grapes for slow-emission of SO_2 during transportation. Grapes are permitted to be treated with sulphur dioxide as there was no known substitute. The risk to sulfite-sensitive people is mitigated by well-publicized information that grapes may contain sulphites.

The CFIA had previously posted a notice to industry reminding them that sulphites are not permitted on fresh fruit and vegetables, with the exception of grapes, intended to be consumed raw. This notice was issued as a result of several cases of the non-permitted use of sulphites being followed up by CFIA. The presence of non-permitted and/or undeclared sulphite in fresh produce consumed raw can pose a serious health risk to sulphite sensitive individuals.

This targeted survey gathered data on the presence of sulphites in imported fresh fruit including custard apple, longan, lychee and rambutan. Longan and lychee were chosen as previously there have been instances where the CFIA identified the presence of sulphites on those fresh fruit. Custard apple and rambutan were also included as they are grown and imported from similar regions. The information gathered provided baseline information regarding the presence and levels of sulphites in custard apple, longan, lychee and rambutan.

1.3 Acts and Regulations

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

The use of sulphites in food is regulated under the FDA. Sulphites are permitted for use in certain foods as preservatives, pH adjusters, starch modifiers, bleaching agents and dough conditioners.

Section B.11.001.1 of the FDRs prohibits the sale of " any fruit or vegetable that is intended to be consumed raw, except grapes, if sulphurous acid or any salt there of has been added thereto." [1] CFIA has posted a notice to Canadian importers of fresh lychees and longans reminding them that the use of sulphites on fresh fruit is not permitted. [2]

2 Allergens Survey

2.1 Rationale

The presence of sulphites in a food is not a health concern for the majority of Canadians. However, sulphites may represent a serious or life threatening health risk for sensitive individuals. Sulphites are sulphur-based substances used as preservatives to prevent spoilage and discoloration during storage and distribution of foods.

The use of sulphites is not permitted on fresh fruits and vegetables intended to be consumed raw, except grapes. The objective of this survey was to obtain baseline information regarding the presence and levels of sulphites in fresh fruit, and to identify potential food safety concerns relating to sulphites on fresh custard apple, longan, lychee and rambutan. The information gathered provided information on the compliance of the industry with respect to the use of sulphites.

2.2 Hazard: Sulphites

True allergic reactions only occur after exposure to an allergenic protein. Since sulphites are not proteins, a reaction to sulphites is not due to an allergy but to sensitivity. A sulphite-sensitive person may experience the same life-threatening symptoms during a reaction to sulphites as occurs during an allergic reaction.

It has been estimated that in Canada sulphite sensitivity affects approximately 200,000 people. [3] Individuals with asthma are most at risk to sulphite sensitivity. [4] The severity of a reaction to sulphites may range from mild to very serious including symptoms such as flushed face, hives,

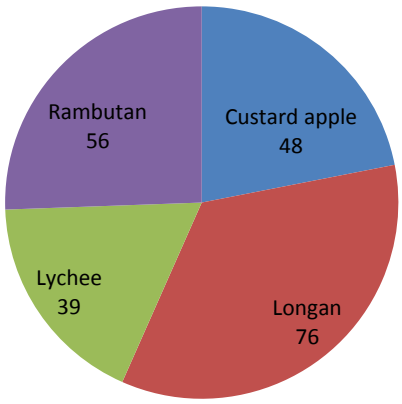
vomiting, rapid heart beat and loss of consciousness. [4] For individuals with sulphite sensitivity, consumption of a food with a total amount of sulphites lower than 10 ppm is unlikely to lead to a reaction. [5]

There is no cure for sulphite sensitivity, and the most important strategy for a person with sulphite sensitivity, or a person choosing food for an individual with sulphite sensitivity, is avoidance of sulphites. Fresh fruits and vegetables are often sold in bulk generally do not have label, therefore there is no mechanism to warn sensitive individuals.

2.3 Sample Distribution

This survey targeted fresh imported custard apple, lychee, longan and rambutan available on the market from various exporting counties at the time of sample collection. Samples were from major retail stores as well as smaller and ethnic retailers. A total 219 samples were collected. The distribution of samples by type is listed in Figure 1.

Figure 1: Distribution of Fresh Fruit Samples



2.4 Limitations

A total of 219 samples of fresh custard apple, lychee, longan and rambutan were collected and analysed in 2012 and 2013. Samples were purchased as available from retail locations nationally; samples may not be reflective of the range of countries that export these fruit to Canada.

2.5 Methodology

Samples in the Undeclared Sulphites in Children's Foods targeted survey were analyzed by a third party laboratory accredited to ISO/IEC 17025:2005, General Requirements for the Competence of Testing and Calibration Laboratories by the Standards Council of Canada.

The samples were tested for the presence of added free sulphites plus the reproducible portion of bound sulphites using the AOAC International optimized Monier-Williams method (method number 990.28). Results were reported as sulphur dioxide. The reporting level for this method is 10 ppm, as results below this level may be outside the applicable range of the method and are not

considered as being reliable. Therefore, only results above 10 ppm are considered to be positive results.

3 Results and Discussion

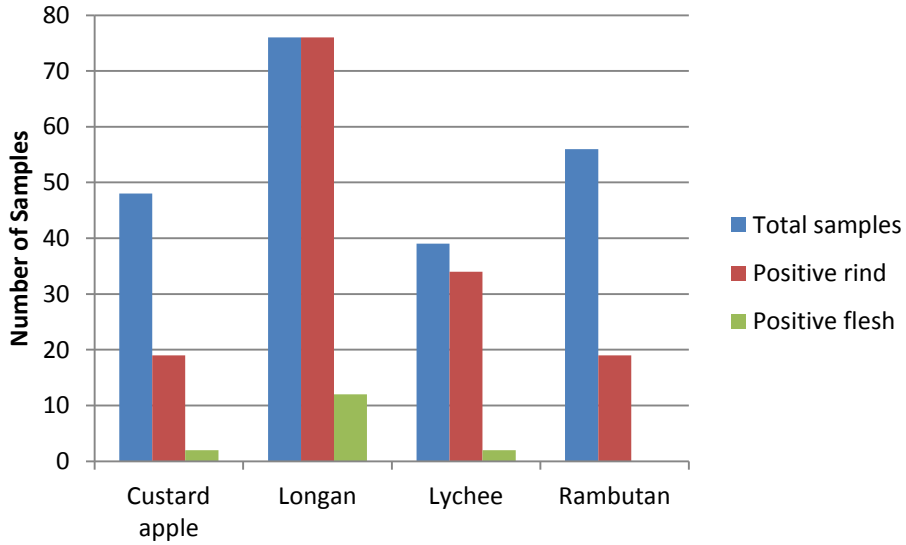
A total of 219 samples of imported fresh fruit were analysed for the presence of sulphites on the rind and in the flesh, separately. The samples were analysed separately as the presence of sulphites on the rind indicated that the fruit was treated with sulphites and the presence of sulphites in the flesh provided information on the concentration of sulphites that transferred to the edible portion. The concentration of sulphites that a sensitive individual could be exposed to would be in the edible part of the fruit, this information provided an indication of the health risk. A breakdown of samples by country of origin and positive results in the rind and flesh can be found in Table 1. Based on the number of samples with the presence of sulphites on the rind and in the flesh it appears that Canadians would be exposed to sulphites from these fruits available on the Canadian market.

Table 1: Samples by Type and Country of Origin

Sample Type	Country of Origin	Total	Positive Rind	Positive Flesh
Custard apple	Brazil	6	2	1
	Lebanon	1	0	0
	Peru	2	0	0
	Taiwan	2	1	0
	Thailand	13	9	0
	Vietnam	13	4	0
	Unknown	11	3	1
Total		48	19	2
Longan	China	2	2	0
	Thailand	45	45	7
	Vietnam	7	7	2
	Unknown	22	22	3
Total		76	76	12
Lychee	China	12	12	1
	Indonesia	1	0	0
	Madagascar	1	1	0
	Mexico	1	0	0
	Taiwan	3	2	0
	Thailand	6	4	0
	Unknown	15	15	1
Total		39	34	2
Rambutan	Thailand	33	11	0
	Vietnam	5	2	0
	Unknown	18	6	0
Total		56	19	0
Grand total		219	148	16

Of the 219 samples analysed 68% (148) had sulphites on the rind and 7% (16) had sulphites in the flesh. A breakdown of total samples and positive results by product type can be found in Figure 2. All of the longan rind samples, 87% of the lychee, 40% of the custard apple and 34% of the rambutan samples contained sulphites. Longan had the highest percentage of samples (16%) that had sulphites on both the rind and in the flesh, followed by custard apple (4%) and lychee (5%). In this study no rambutan samples were found with detectable levels in the flesh.

Figure 2: Distribution of Samples by Fruit Type and Sulphites on the Rind and in the Flesh



The range of concentrations of sulphites on the rind by product type is shown in Figure 3. Longan had the highest percentage of samples with sulphites on the rind as well as generally the highest concentration of sulphites.

Figure 3: Distribution of Positive Results for Sulphite on the Rind by Fruit Type

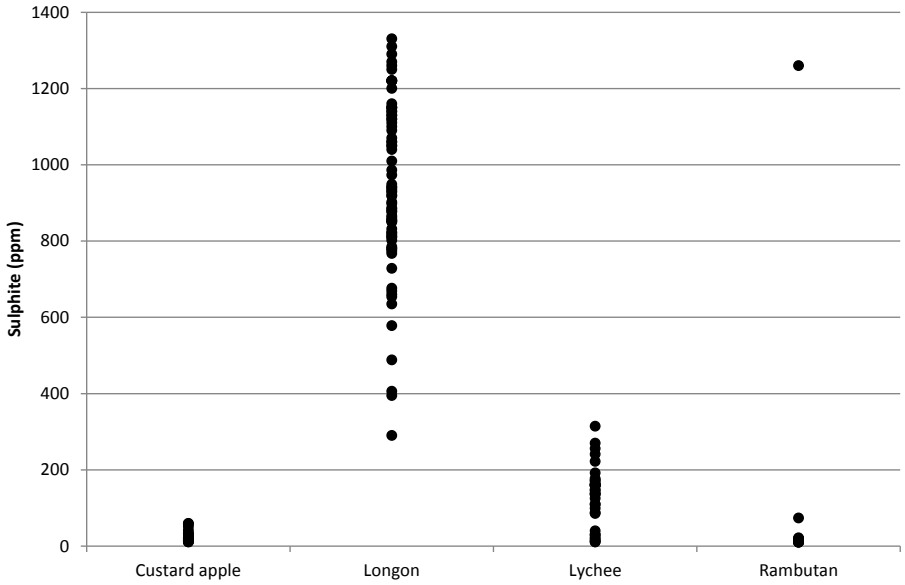
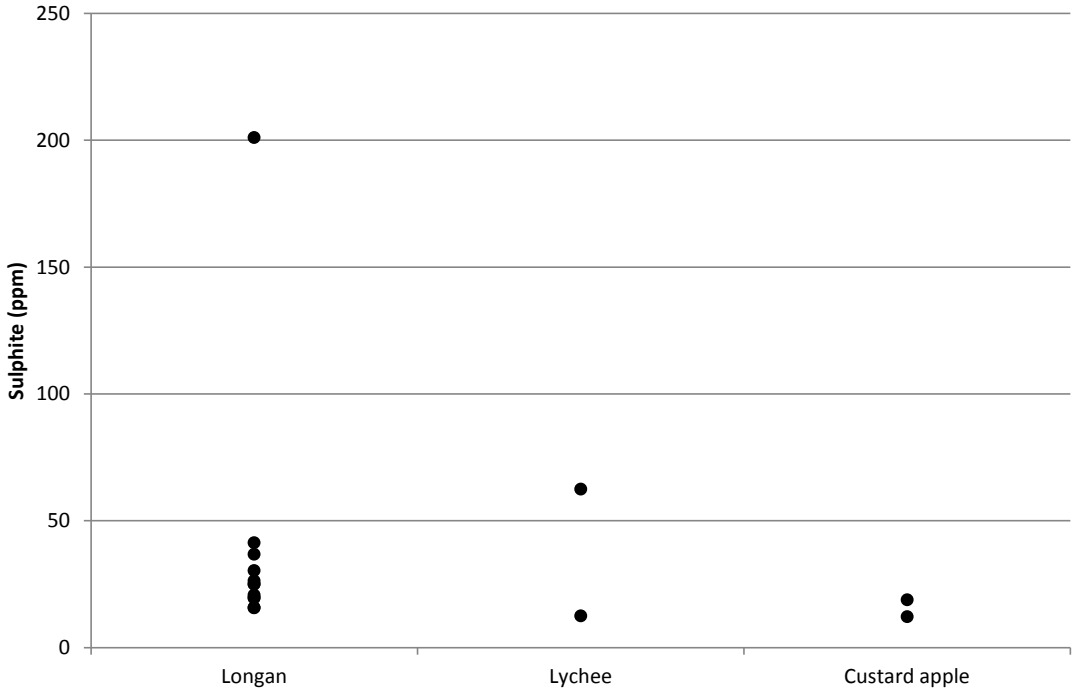


Figure 4 shows the range of sulphite concentrations in positive flesh samples. In all cases the level of sulphite in the flesh was lower than in the rind, for the longan 11 of the 12 samples that had sulphite in the flesh contained less than 6% of the concentration found on the rind.

Figure 4: Distribution of Positive Results for Sulphite in the Flesh by Fruit Type



Not all positive results reported represent a health risk to sulphite sensitive individuals. As the time elapse between sample collection and analysis was sufficiently long, fresh product from the same lot was not available for confirmatory testing. As a result, direct follow up activities including, food safety investigation, additional sampling and recall were undertaken only for those products that would have represented a severe health risk.

4 Conclusion

This survey met the objective of gathering baseline information on the occurrence of sulphites in imported fresh custard apple, longan, lychee and rambutan available at retail throughout the year. The sample size was not large, however, the results demonstrated that many fresh custard apple, longan, lychee and rambutan have sulphites on the rind and some also contain sulphite in the flesh. The presence of sulphites on the rind and in the flesh of fresh fruits, other than grapes, is not permitted in Canada. A sulphite sensitive individual would not be protected as these types of imported fresh fruits are often sold loose and do not have a label or other warning mechanism relating to the presence of sulphites.

Sulphites are not permitted for use on fresh fruit, except grapes, in Canada and the results from this survey indicate that there needs to be further follow up with importers of custard apple, longan, lychee and rambutan.

5 References

[1] Canadian Food Inspection Agency. The Use of Sulphites in Fresh Produce. Notice to: Canadian Importers of Fresh Lychees and Longans. (Online) Accessed July 16, 2013. http://www.inspection.gc.ca/english/fssa/frefra/safsal/sulfitee.shtml

[2] Canadian Food Inspection Agency. The Use of Sulphites in Fresh Produce. Notice to: Canadian Importers of Fresh Lychees and Longans. (Online) Accessed July 16, 2013. http://www.inspection.gc.ca/english/fssa/frefra/safsal/sulfitee.shtml

[3] Health Canada. *Project 1220 Enhanced Labelling for Food Allergen and Gluten Sources and Added Sulphites.* (Online) Accessed January 22, 2014. http://www.hc-sc.gc.ca/fn-an/label-etiquet/allergen/proj1220-modifications-eng.php#a4

[4] Zarkadas, M., Fraser, S., Salminen, J. and A. ham Pong. (1999) Common Allergenic Foods and their Labelling in Canada- A Review. Canadian Journal of Allergy and Clinical Immunology. 4(3):118-141.

[5] Canada Gazette, Regulations Amendingthe Food and Drug Regulations (1220- Enhanced Labelling for Food Allergen and Gluten Sources and Added Sulphites). (Online) Accessed July 16, 2013. http://gazette.gc.ca/rp-pr/p2/2011/2011-02-16/html/sor-dors28-eng.html#13