

Non-Permitted Colours in Spices - April 1, 2019 to March 31, 2020

Food chemistry - Targeted surveys - Final report



Summary

Targeted surveys provide information on potential food hazards and enhance the Canadian Food Inspection Agency's (CFIA's) routine monitoring programs. These surveys provide evidence regarding the safety of the food supply, identify potential emerging hazards, and contribute new information and data to food categories where it may be limited or non-existent. They are often used by the agency to focus surveillance on potential areas of higher risk. Surveys can also help to identify trends and provide information about how industry complies with Canadian regulations.

Food adulteration is an increasing problem within the food industry. Food adulteration or misrepresentation is the intentional and deliberate substitution, dilution, counterfeiting or misrepresentation of food, ingredients or packaging, or labels containing false or misleading statements about the product itself for economic gain¹. This means that the consumer could be paying more for a product that isn't what it claims to be. This could pose a health risk to consumers if unidentified allergens or hazardous materials are added to food products.

Colours are added to foods to compensate for natural colour loss due to processing, to achieve a uniform product colour and to make food appear more appealing². This targeted survey is focused on non-permitted colours, Sudan I to IV, in red spices because they are potentially toxic and carcinogenic^{2,3}. Sudan I to IV are red dyes used for industrial products such as textiles, polish and paints and are banned for use in food².

A total of 63 red coloured spice samples such as paprika, sumac, chili powder and cayenne pepper were collected from retail and tested for non-permitted colours. None of the samples in this survey were found to contain detectable amounts of non-permitted colours.

What are targeted surveys

Targeted surveys are used by the CFIA to focus its surveillance activities on areas of highest health risk. The information gained from these surveys provides support for the allocation and prioritization of the agency's activities to areas of greater concern. Originally started as a project under the Food Safety Action Plan, targeted surveys have been embedded in our regular surveillance activities since 2013. Targeted surveys are a valuable tool for generating information on certain hazards in foods, identifying and characterizing new and emerging hazards, informing trend analysis, prompting and refining health risk assessments, highlighting potential contamination issues, as well as assessing and promoting compliance with Canadian regulations.

Food safety is a shared responsibility. We work with federal, provincial, territorial and municipal governments and provide regulatory oversight of the food industry to promote safe handling of foods throughout the food production chain. The food industry and retail sectors in Canada are responsible for the food they produce and sell, while individual consumers are responsible for the safe handling of the food they have in their possession.

Why did we conduct this survey

The main objective of this targeted survey was to generate information on the presence and levels of non-permitted colours in red spices available on the Canadian retail market.

In Canada, food colours are considered food additives and are regulated under marketing authorizations issued by the Minister of Health. Colours are added to foods to compensate for the natural colour loss due to processing, to achieve a uniform product colour and to make food appear more appealing².

The presence of non-permitted food colours, such as Sudan dyes I to IV, may pose a health risk to the consumer, as some are potentially damaging to DNA and carcinogenic^{2,3}. Non-permitted dyes have been used in the past as an adulterant that can give the appearance of a higher quality spice³. Sudan I to IV are red dyes used for industrial products such as textiles, polish and paints and are banned for use in food^{2,3}.

What did we sample

A variety of domestic and imported yellow and red coloured spices were sampled between April 1, 2019 and March 31, 2020. Samples of products were collected from local/regional retail locations located in 6 major cities across Canada. These cities encompassed 4 Canadian geographical areas:

- Atlantic (Halifax)
- Quebec (Montreal)
- Ontario (Toronto and Ottawa)
- West (Vancouver and Calgary)

The number of samples collected from these cities was in proportion to the relative population of the respective areas. The shelf life, storage conditions, and the cost of the food on the open market were not considered in this survey.

Table 1. Distribution of samples based on product type and origin

Product type	Number of domestic samples	Number of imported samples	Number of samples of unspecified origin^a	Total number of samples
Cayenne pepper	0	11	7	18
Chili powder	1	9	6	16
Paprika	0	13	3	16
Sumac	1	6	6	13
Grand total	2	39	22	63

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

How were samples analyzed and assessed

Samples were analyzed by an ISO/IEC 17025 accredited laboratory. Samples were analyzed for fat-soluble colours listed below:

- Citrus Red 2
- Chlorophylline
- Metanil Yellow
- Methyl Yellow
- Orange II
- Para Red
- Rhodamine B
- Solvent Blue 59
- Sudan Black B
- Sudan Blue II
- Sudan I
- Sudan II
- Sudan III
- Sudan IV
- Sudan Orange G
- Sudan Red 7B
- Sudan Red G
- Toluidine Red

The results presented represent finished food products as sold and not necessarily as they would be consumed, whether the product samples is considered an ingredient or requires preparation prior to consumption.

What were the survey results

All 63 spice samples analyzed in this survey were compliant and did not contain detectable amounts of non-permitted colours.

What do the survey results mean

The spice samples collected in this survey did not contain any non-permitted colours. This survey targeted red spices specifically to look for Sudan dyes (fat-soluble colours), however, previous CFIA surveys from 2013 and 2014 tested for both water-soluble and fat-soluble colours in a variety of spices^{4,5}. When comparing the results of this survey to previous surveys, only the fat-soluble results will be used.

Of the 135 spices from a 2013 CFIA survey, none of the samples contained non-permitted fat-soluble dyes⁴. Of the 248 dry spices and mixes from a 2014 CFIA survey, none of the samples contained non-permitted fat-soluble dyes⁵. Results from this survey were similar to previous surveys with no detection of non-permitted colours in spices.

References

1. [Codex Alimentarius International Food Standards](#). (2017). FAO/WHO.
2. Nisa, A., Zahra, N., Yasha, B. (2016). Sudan Dyes and Their Potential Health Effects. Pakistan Journal of Biochemistry and Molecular Biology, 49, pp. 29-35.
3. [Seeing Red: Detecting Illegal Sudan Dyes in Foodstuffs](#). (2015). ThermoFisher Scientific.
4. [Food Colours in Selected Foods – April 1, 2013 to March 31, 2014](#). (2019). Canada. Government of Canada.
5. [Food Colours in Beverages, Condiments, Soups, Pickled Vegetables, Dried Spices and Mixes, and Oils – April 1, 2014 to March 31, 2015](#). (2019). Canada. Government of Canada.