



## **COORDINATED SAMPLING PROJECT 22- Frozen Slush Drinks**

*Conducted March 2018 with Local Government's across Metropolitan Perth, Western Australia*



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## Executive Summary

This Coordinated Sampling Project (CSP) focused on the level of sugar content in frozen slush drinks. Frozen carbonated drinks are a common variation that are a mixture of flavoured syrup, carbon dioxide and water that is combined and frozen in a specific machine. The aim of this project was to measure the content of sugar present in frozen slush drinks sold throughout the metropolitan area of Perth, Western Australia (WA). The main purpose of this CSP was to create awareness, among Australian consumers, of the high amount of sugar in frozen slush drinks and the associated potential health impacts. The second purpose of this CSP was to compare the sugar content accuracy against the nutritional information provided by the producer. It is important that consumers in WA have access to products that contain nutritional composition that is accurate with published claims to allow for informed purchasing decisions.

The Local Health Authorities Analytical Committee (LHAAC) worked with Western Australian Local Government Authorities (LGA) to execute this project. Western Australian Environmental Health Officers submitted 87 frozen slush drink samples for assessment to Agrifood Technology (Agrifood) or Analytical Reference Laboratory (ARL), the two appointed analysts to LHAAC, in March 2018. Samples were submitted by LGA's located in the metropolitan area of Perth, Western Australia. The results from analysis were assessed against daily dietary guidelines and nutritional information provided online by the producer.

Overall, the average and maximum sugar content per 100g differed between the flavours and within the majority of the flavour categories. The average sugar content in the frozen slush drinks was 13.4g per 100g. Furthermore, the analysed sugar content ranged from 7.5g per 100g to 18.5g per 100g. The highest sugar content observed was in the cola flavour, which can be sold in a size of 1150 mL, containing an estimated sugar content of up to 39 teaspoons. Of the 87 samples analysed, 54 have nutritional information published online. More than half of the analysed frozen slush drink samples contained a sugar content in deviation of +/- 20% variance of the declared sugar content. The results from this CSP suggest there are high levels of sugar content in frozen slush drinks. It is further suggested that the sugar content in frozen slush drinks may be inconsistent with expected values. Therefore, it is possible the consumer cannot rely on information available online regarding the expected sugar content in these types of beverages. It is recommended that LGA's take follow up action regarding the frozen slush drink samples that demonstrated inconsistent results compared with the expected sugar content.

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## List of Abbreviations

CSP	Coordinated Sampling Project
g	Gram
LGA	Local Government Authorities
LHAAC	Local Health Authorities Analytical Committee
NHMRC	National Health and Medical Research Council
WA	Western Australia
WHO	World Health Organisation

## Introduction

This specific CSP was conducted to collect analytical information on the sugar content in frozen slush drinks. The aim of this CSP was to assist Live Lighter Western Australia (WA) as part of their Rethink Sugary Drink campaign, which aims to encourage healthier lifestyle choices (Live Lighter, 2018a). Frozen slush drinks generally contain a high content of sugar, are easily accessible and cheaply sold at the price of \$1 from certain premises (Live Lighter, 2018a). Sugar-sweetened beverages are popular in Australia, a previous study identified that they are the most consumed product out of the added sugar food type groups (Lei, Rangan, Flood & Louie, 2016). Evidence has found an association between the consumption of sugar-sweetened beverages and increased weight gain (National Health and Medical Research Council [NHMRC], 2013). Obesity rates and overweight rates are on the rise in Australia. In 2014-2015, 63% of Australian adults were either overweight or obese (Australian Institute of Health and Welfare, 2017). This is a major public health concern since being overweight is a risk factor for several diseases and conditions including diabetes, cancer and cardiovascular disease (World Health Organisation [WHO], 2018).

It is advised that the average Australian should not consume in excess of 8,700 kJ (approximately 2,071 Calories) per day to maintain their weight (Eat for Health, 2015). In accordance with Australian guidelines, there is limited evidence to outline an exact amount of added sugar that a person should consume to maintain good health, but overall it is advised that daily intake should be limited (NHMR, 2013). International guidelines are more specific. The Dietary Guidelines for Americans recommend that added sugar should not exceed 10% of a person's consumed calories per day (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). In the United Kingdom, the Scientific Advisory Committee on Nutrition (2015) recommend that intake of free sugars should not exceed 5% of a person's total dietary intake. The World Health Organisation (2016) guidelines similarly advocate that sugar intake should not exceed 5% of a person's total daily energy intake.

The purpose of this CSP was to assess the level of sugar in frozen slush drinks and to compare this with the average recommended daily energy intake outlined by the WHO. This CSP aimed to raise public awareness regarding the amount of sugar within frozen slush drinks. The second purpose of this CSP was to determine the accuracy of the sugar content in frozen slush drinks compared with available nutritional information. It is important for the consumer to have access to accurate nutritional information in order to make informed purchasing decisions. A recent study in New Zealand found a likely correlation between the consumer viewing nutritional information labels and purchasing healthier products (Ni Mhurchu, Eyles, Jiang, & Blakely, 2018). This finding reinforces the importance of the consumer accessing accurate information regarding sugar content in food.

## Methodology

LGA's were provided with a set of sampling instructions including a schedule of which frozen slush drink products were to be collected from certain outlets, in order to avoid duplications (Appendix A). This CSP involved a limited number of LGA's located in the metropolitan area of Perth since these areas typically host more of the major chain fast food outlets. The outlets for sampling in this CSP were McDonalds, Hungry Jacks, KFC, Caltex, Coles Express, Grand Cinemas and 7 Eleven. Three samples of the same product were requested to be collected by the LGA over the space of a 48-hour period, to check consistency with the result. The preferred cup size for purchase was small or medium. The frozen slush drink samples could be submitted to the laboratory chilled in the plastic cups in which they were sold or transferred into a more secure container for transport.

In March 2018, samples of frozen slush drinks were collected by the LGA's and submitted to Agrifood or ARL (Appendix B). Agrifood and ARL analysed the sugar content in the frozen slush drinks after they were defrosted utilising National Association of Testing Authorities (NATA) accredited methods (Appendix D). The sugar level analysed in the samples was compared with the nutritional information for the product that was available online.

The nutritional composition values provided by the manufacturer are often presented as an average value in order to allow for seasonal variation and other factors that can slightly influence the variation in results (Fabiansson, 2006). With this expected variation in mind, the LHAAC set a +/- 20% standard for accuracy for analysed sugar results. There is no acceptable limit established under Australian legislation, however a +/-20% discrepancy is often permitted in other countries. The United States Food and Drug Administration (2018) stipulate that the sugar content in food must not exceed 20% of the value declared on the products label. Correspondingly, the European Union specify an uncertainty of +/- 20% for the analysed value provided for the nutritional declaration of sugars (European Commission, 2012).

## Results

At the end of the sampling period, 87 frozen slush drink samples were submitted to the approved analysts by 10 LGA's located in metropolitan Perth (Appendix B). The samples were predominantly Coke flavoured, followed by Pepsi and Mountain Dew (Figure 1).

The average and maximum sugar content per 100g differed between flavours and within the flavour categories, with the exception of Coke Spider (Figure 2). Overall, the average sugar content in the frozen slush drinks (n = 87) was 13.4 g per 100g.

Of the 87 samples analysed, the nutritional information for 54 products is published online and available for public access. The declared sugar content is presented as a figure in either g per 100ml or in g per 100g. More than half of the analysed frozen slush drink samples contained a sugar content in deviation of +/- 20% variance from the declared sugar content (Figure 3). Forty-three percent of the frozen slush drinks contained sugar levels greater than 20% variance from the amount advertised online. Additionally, 13% contained sugar levels in less than 20% variance from the declared value.

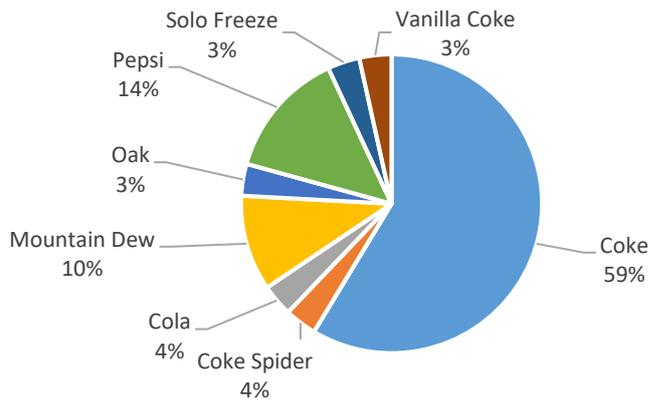


Figure 1. The percentage of frozen slush drink samples (n = 87) categorised by flavour.

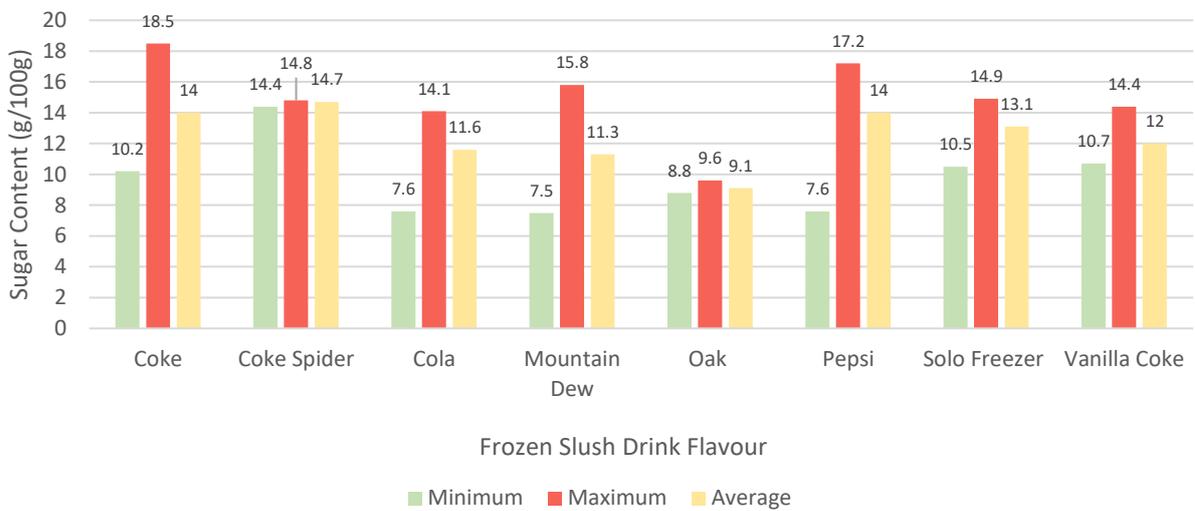


Figure 2. The average sugar content, minimum sugar and maximum sugar categorised by the different frozen slush drink flavours.

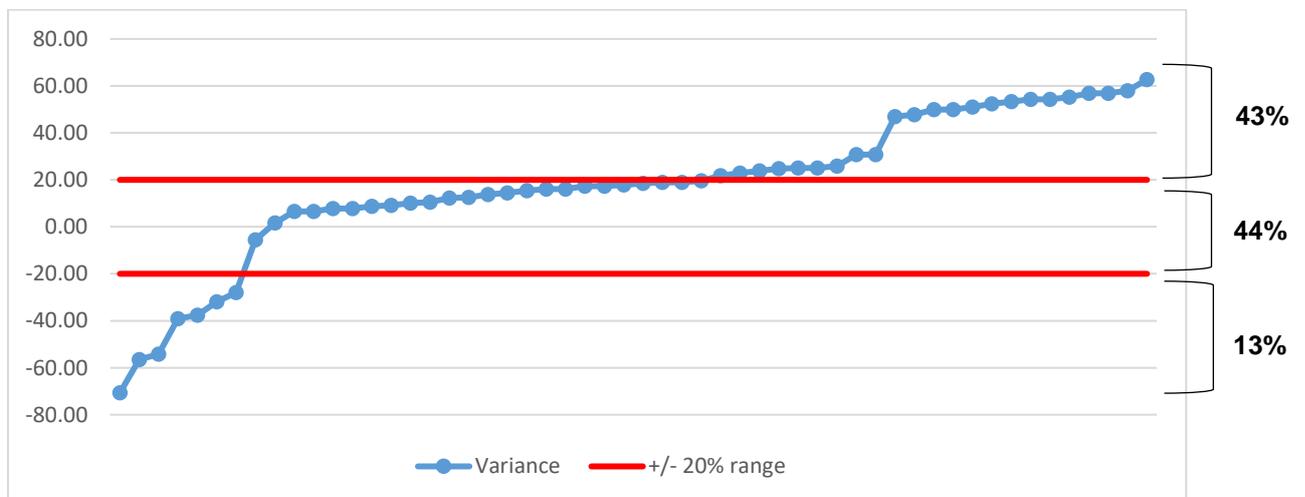


Figure 3. Chart demonstrating the variance difference (%) between the analysed sugar level in the samples and the expected sugar levels.

## Discussion

### Estimated Sugar Levels

All of the analysed frozen slush drinks (n = 87) contained high levels of sugar, ranging from 7.5g per 100g to 18.5g per 100g. Table 1 demonstrates the maximum and average amount of sugar present in frozen slush drinks, per flavour, based off the results from this CSP.

*Table 1.* The maximum and average amount of sugar (in grams and teaspoons) analysed in different frozen slush drinks per flavour in a large size. Note: the figures presented may be within the range of +/- 20%.

Information		Sugar Content			
Flavour	Large Size (mL) <sup>a</sup>	Maximum (g)	Maximum (teaspoons) <sup>b</sup>	Average (g)	Average (teaspoons) <sup>b</sup>
Coke	660	122.1	29	92.4	22
Coke Spider	660	97.7	23	97	23
Cola	1150	162.1	39	133.4	32
Mountain Dew	413	65.3	16	46.7	11
Oak	305	29.3	7	27.8	7
Pepsi	340	58.5	14	47.6	12
Solo Freezer	515	76.7	18	67.5	16
Vanilla Coke	385	55.4	13	46.2	11

a = Based off online information obtained in October 2018 or the average sample submission size.

b = The WHO list a teaspoon as the equivalent of 4.2 grams (WHO, 2016).

The maximum and average sugar content observed in all of the eight flavour categories exceeds the World Health Organisation's guidelines for sugar consumption that recommend that a person should limit their daily sugar intake to approximately 26 grams, which is about 6 teaspoons (WHO, 2016). The maximum sugar content was observed in the Cola flavour with an 1150 mL size estimated to contain up to 39 teaspoons of sugar (162.1g) which is nearly a weeks' worth of recommended sugar intake in one serving. The 660mL coke and coke spider flavours contain an average of 22 and 23 teaspoons of sugar, respectively. In accordance with the WHO's guidelines the average serving of coke and coke spider contain over 3 days' worth of recommended sugar (WHO, 2016). The amount of sugar in a teaspoon is visualised in Figure 4, this image portrays 17 teaspoons of sugar which is approximately the average sugar analysed in Solo Freezer flavoured slush drinks in this study.

The high level of sugar observed in frozen slush drinks is a public health concern. There is evidence suggesting that sugar sweetened beverage consumption is contributing to increased weight gain (NHMRC, 2013). Overweight and obesity are risk factors for a range of non-communicable disease including diabetes, cancers and cardiovascular disease (WHO, 2018). It is imperative that public awareness regarding the excessive amount of sugar available in frozen slush drinks is increased.

It is advised that the consumer limit their consumption of frozen slush drinks, in accordance with the Australian dietary guidelines that recommend that the consumer limit their intake of added sugars (NHMRC, 2013).



Figure 4. A visual representation of 17 teaspoons of sugar. Image adapted from Live Lighter (2018b).

#### **Comparison with Expected Values**

The results from this study suggest that 43% (n = 23) of the frozen slush samples contained sugar levels in excess of the declared sugar levels published online under nutritional information.

Furthermore, the range of sugar varied significantly within each flavour, for instance the sugar content in the cola flavour ranged from 7.6 g per 100g to 14.1 g per 100g. This result suggests there is a likely inaccuracy in the sugar content of frozen slush drinks. Just over half (56%) of the samples contained sugar in deviation of +/-20% variance of the declared sugar content. Inconsistent claims regarding sugar content in food is a concern for consumers who have the right to make informed decisions regarding the food they eat.

Inaccurate nutritional information is an ongoing issue that has previously been identified in a wide variety of food types sold throughout Western Australia. In 2000 - 2002, the Department of Health (2005) identified that sugars were the least accurately declared nutrient from analysis of 142 food products including biscuits, breakfast food, cake mix, frozen food, muffins, microwave meals and soup. Over 50% of analysed samples contained sugar in a variance greater than 75% from the declared values (Department of Health, 2005). A previous Australian study found 33% (n = 31) of analysed food samples, purchased from supermarkets, contained sugar in excess of provided values (Fabiansson, 2006). Comparably, the LHAAC's CSP14 determined that more than 20% of imported food samples (n = 200), including jam, cereals, confectionary and sauces, contained sugar levels inconsistent with the provided nutritional information (LHAAC, 2014).

## **Limitations**

This CSP had a number of limitations. Majority of the products analysed are frozen carbonated beverages that are produced in an automated machine that adds the exact amount of ingredients. Unidentified factors relating to the machine or the manufacturing process could potentially be an influencing factor on the resulting sugar content levels. Secondly, a number of limitations are associated with the small study design. The sample size was limited since this project was intended to be introductory research on the topic. Further research is required with a bigger sample size and with a more randomised element of sampling. It would be beneficial to analyse frozen slush drink products sold from a wider variety of premises, including smaller suppliers. Furthermore, this study was limited to the metropolitan area of Perth and a wider study analysing the sugar content in drinks sold in non-metropolitan areas would be useful.

## **Conclusion**

The results from this CSP demonstrate that frozen slush drinks contain high levels of sugar. Certain flavours contain up to 6 days' worth of a persons recommended sugar intake, in accordance with the WHO's guidelines for sugar consumption that recommend that a person should limit their daily sugar intake to approximately 26 grams. This is a public health concern since high levels of sugar intake have been linked with increasing rates of obesity. It is recommended that the results of this CSP be promoted to the public with the purpose of increasing awareness regarding this potential public health issue. Furthermore, this CSP identified that there is an indication of discrepancy between the analysed sugar levels and the expected sugar levels published online. Approximately 43% of the frozen slush drinks contained sugar levels greater than 20% variance of the expected sugar. This high occurrence of inconsistent claims is a potential concern for consumers who should have the right to make informed decisions regarding what they consume. Discrepancies between nutritional information and analysed content is not a new issue. This CSP highlights the importance of further research into the sugar content in sugar-sweetened beverages to monitor the discrepancy with available nutritional information. It is anticipated that follow-up action by LGA's, with cooperation with the food businesses to gather further information, will ensure that discrepancy with sugar content in frozen slush drinks is resolved.

## **Suggested Action on Inconsistent Products**

To help to ensure consistent follow-up action on inconsistent products the following action is recommended:

1. Inform the retail outlet in writing that there is an indication the relevant product has inconsistent sugar content compared to expected values.

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## Appendix A

Table 1A. The schedule list provided in the sampling instructions.

Retail Outlet	Product	LGA	Quantity (over 48 hours)
Coles Express	Frozen Coke	City of Armadale	3 samples
	Frozen Coke	City of Bayswater	3 samples
	Frozen Coke	City of Belmont	3 samples
	Frozen Coke	City of Canning	3 samples
	Frozen Raspberry	City of Cockburn	3 samples
	Frozen Raspberry	City of Gosnells	3 samples
Hungry Jacks	Frozen Coke Drink	City of Joondalup	3 samples
	Frozen Coke Drink	City of Melville	3 samples
	Frozen Coke Drink	City of Perth	3 samples
	Frozen Coke Drink	City of Stirling	3 samples
	Frozen Coke Drink	City of Swan	3 samples
	Frozen Coke Drink	City of Wanneroo	3 samples
McDonalds	Frozen Coke Drink	City of Armadale	3 samples
	Frozen Coke Drink	City of Bayswater	3 samples
	Frozen Coke Drink	City of Belmont	3 samples
	Frozen Coke Drink	City of Canning	3 samples
	Frozen Coke Drink	City of Cockburn	3 samples
	Frozen Coke Drink	City of Gosnells	3 samples
	Frozen Coke McSpider	City of Gosnells	3 samples
Star Mart (Caltex)	Frozen Oak	City of Joondalup	3 samples
	Frozen Coke Drink	City of Melville	3 samples
	Frozen Coke Drink	City of Perth	3 samples
	Frozen Coke Drink	City of Stirling	3 samples
	Frozen Coke Drink	City of Swan	3 samples

	Frozen Coke Drink	City of Wanneroo	3 samples
	Frozen Coke Drink	City of Melville	3 samples
	Frozen Coke Drink	City of Perth	3 samples
	Frozen Coke Drink	City of Stirling	3 samples
7 Eleven	Slurpee Cola	City of Armadale	3 samples
	Slurpee Tropical	City of Belmont	3 samples
	Slurpee Lychee Lemon	City of Canning (Canning Vale)	3 samples
	Slurpee Pine Lime Cream	City of Cockburn (Bibra Lake)	3 samples
	Slurpee Zilched S/P Grapefruit	City of Gosnells (S/River)	3 samples
	Slurpee Zilched Water Melon Punch	City of Joondalup	3 samples
Grand Cinemas	Frozen Coke	City of Joondalup	3 samples
	Other Samples as available	City of Joondalup	3 samples
KFC	Pepsi Freeze	City of Armadale	3 samples
	Mountain Dew Freeze	City of Bayswater	3 samples
	Solo Freeze	City of Belmont	3 samples
	Pepsi Freeze	City of Canning	3 samples
	Mountain Dew Freeze	City of Cockburn	3 samples
	Solo Freeze	City of Gosnells	3 samples
	Pepsi Freeze	City of Joondalup	3 samples



## Appendix B

### Raw Data

For further questions or inquiries about raw data contact LHAAC Co-ordinator Trevor Chapman:

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