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Food Reformulation Task Force: Monitoring Sugar in Processed Foods

July 2022 to June 2023



Food Reformulation Task Force: Monitoring Sugar in Processed Foods

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Abbreviations

EFSA	European Food Safety Authority
FRT	Food Reformulation Task Force
FSAI	Food Safety Authority of Ireland
GPAL	Public Analyst's Laboratory, Galway
HPAEC/PAD	high-performance anion-exchange chromatography/pulsed amperometric detection
IQR	Interquartile range
LOQ	limit of quantitation
Min–Max	minimum and maximum values
NCDs	non-communicable diseases
QC	quality control
TE	total energy
WHO	World Health Organization

Version history

Title	Date published	Description
Food Reformulation Task Force: Monitoring Sugar in Processed Foods in 2022	29/9/2023	<ul style="list-style-type: none">• Categories added: soups and sauces
Food Reformulation Task Force: Monitoring Sugar in Processed Foods July 2022 to June 2023	29/08/2024	<ul style="list-style-type: none">• Categories added: sugar-sweetened carbonated beverages

Purpose

The purpose of this report is to provide an overview of the results obtained in the Food Reformulation Task Force (FRT) sugar monitoring surveys. These surveys commenced in 2022 and will continue until 2025. This report will be updated annually to reflect the findings of these annual sugar surveys.

Introduction

The European Food Safety Authority (EFSA) Scientific Opinion on a tolerable upper intake level for dietary sugars concluded that free and added sugar intake contribute to increased risk of obesity and some non-communicable diseases (NCDs) such as type 2 diabetes, hypertension and high blood cholesterol. Based on this the EFSA recommends free and added sugar intake should be kept as low as possible whilst meeting nutritional needs (EFSA, 2022). The World Health Organization (WHO) recommends dietary intakes of free sugar should not exceed 10% of total energy (TE), with a conditional recommendation of <5% TE (WHO, 2015). In Ireland, it is estimated that 105 to 141 deaths per 100,000 population are related to dietary intakes (Ashkan *et al.*, 2017). High rates of overweight, obesity and dietary-related NCDs in the Irish population, alongside dietary intakes of free sugar above the WHO conditional recommendation of <5% TE, mean there is a need to reduce sugar consumption.

[The Obesity Policy and Action Plan – A Healthy Weight for Ireland](#) published in 2016, outlines ten steps to be taken within a 10-year time frame to prevent overweight and obesity in Ireland (Department of Health, 2016). Step three of the plan relates to food reformulation and aims to ‘secure appropriate support from the commercial sector to play its part in obesity prevention and agree food industry reformulation targets and review progress’. To achieve this a Food Reformulation Subgroup of the Obesity Policy Implementation and Oversight Group developed [A Roadmap for Food Product Reformulation in Ireland](#) which was published in 2021 (Department of Health, 2021).

To implement the Roadmap, the Food Reformulation Task Force (FRT), a strategic partnership between the Food Safety Authority of Ireland (FSAI) and Healthy Ireland at the Department of Health, was established. The Roadmap sets out that food products and non-alcoholic beverages, which are significant contributors to sugar in the Irish diet, will reduce their sugar content by 20%. Any reformulation that occurred between 2015–2025 will count towards meeting this target.

An analysis of the [Irish national food consumption surveys](#) identified 15 food categories and five non-alcoholic beverage categories which are significant contributors to dietary intakes of sugar in

people aged 1–90 years¹. These priority food categories and the methodology used to identify them is outlined in the [Food Reformulation Task Force: Priority Food Categories for Reformulation in Ireland](#) V3 report (FSAI, 2023a).

A significant role of the FRT is to monitor food reformulation progress in reducing energy (calories) and target nutrients (salt, saturated fat, and sugar) in 40 priority food categories. The [Reformulation Task Force 2022 Progress Report](#) summarises the proposed monitoring approach, including food categories for laboratory analysis (FSAI, 2023b). The FRT has adapted the sampling and analysis methodology followed in the Salt Reduction Programme ([see report here](#)) to monitor the sugar content of foods and non-alcoholic beverages for the duration of the food reformulation Roadmap implementation between the years 2022–2025 (FSAI, 2023c).

¹ National Preschool Nutrition Survey – NPNS (2011 – 2012; n500; ages 1-4 years), National Children’s Food Survey II - NCFS II (2017-18; n600; ages 5-12 years), the National Teens’ Food Survey II - NTFS II (2019-20; n428; ages 13-18 years) and the National Adult Nutrition Survey - NANS (2008-09; n1500; ages 18-90years)

Method

1. Sample collection

- In July and August 2022, a convenience sample was taken of the food category called 'Soups, sauces & miscellaneous foods' (see [Table 1](#)).²
- In May and June 2023, a convenience sample was taken of the food category called 'Carbonated beverages' (see [Table 1](#)).² As only sugar-sweetened varieties were sampled for the purposes of this study, they are referred to throughout the report as sugar-sweetened carbonated beverages.
- Samples were collected from a range of supermarkets and convenience retail stores in County Dublin, within the locality of the sampling officers and the Dublin 1 area.
- Samples were prioritised for collection based on the following criteria: if sugar content was above the 'low sugar' nutrition claim condition of use³ and contained 'free sugars' and/or 'added sugars' based on the World Health Organization⁴ and European Food Safety Authority's definitions.⁵
- Following collection, samples were labelled with a unique identifier survey code and sample code which corresponded to a populated Excel spreadsheet (that includes the FSAI reference code, sample number and product label information).
- Photographs of all sides of the product label were taken, uploaded, and stored electronically.
- Samples were transported by courier to the Public Analyst's Laboratory, Galway (GPAL) for sugar analysis.

² Please note that there was no specific randomised approach employed for sampling. Only sugar-sweetened varieties were sampled for the purposes of this study.

³ **Low sugar nutrition claim** 'A claim that a food is low in sugars, and any claim likely to have the same meaning for the consumer, may only be made where the product contains no more than 5 g of sugars per 100 g for solids or 2,5 g of sugars per 100 ml for liquids. (Regulation (EC) No 1924/2006)

⁴ WHO definition "**free sugars** all monosaccharides and disaccharides added to foods by the manufacturer, cook or consumer, plus sugars naturally present in honey, syrups and fruit juices" WHO definition - "**Added sugars** include all added sugars such as sucrose, table sugar and/or other sugars in processed foods." (WHO, 2015)

⁵ EFSA definition "**Free sugars** are defined as added sugars plus sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates." EFSA definition "**Added sugars** are defined as mono- and disaccharides added to foods as ingredients during processing or preparation at home, and sugars eaten separately or added to foods at the table." (EFSA, 2022)

2. Sample analysis

- All samples were analysed by GPAL [Irish National Accreditation Board Registration Number: 009T](#).
- The GPAL used high-performance anion-exchange chromatography/pulsed amperometric detection (HPAEC/PAD) to accurately determine sucrose, galactose, glucose, fructose, lactose and maltose concentrations in food and beverage samples. This analytical method is an in-house method and is accredited to [ISO 17025](#) since November 2019.
- Food samples were mixed or homogenized before analysis. A test portion was extracted with carrez solution. The sample extract was vortexed for ~15s to thoroughly mix the contents and centrifuged at 3000 rpm for 20 minutes at ambient temperature and filtered. The filtered extract was then analysed using HPAEC/PAD to accurately determine sucrose, galactose, glucose, fructose, lactose and maltose concentrations in the food samples.
- Carbonated beverage samples were degassed by sonicating for at least 15 minutes before analysis. A test portion was diluted and filtered. The filtered extract was then analysed using HPAEC/PAD to accurately determine sucrose, glucose, fructose and maltose (if present) concentrations in the samples.
- The method was performed using a Thermo Scientific Dionex ICS 5000+HPIC system using a Dionex CarboPac SA10-4µm (4 × 250 mm) column with a Dionex CarboPac SA10G-4µm (4 × 50 mm) guard column and a Dionex IonPac NG1 column (4 × 35 mm)(IonPac is only used when analysing for maltose).
- The limit of quantitation (LOQ) for each sugar based on a 1/11 dilution of the sample extracts was 0.06 g/ 100 g for food samples and 0.06 g/ 100 ml for sugar-sweetened carbonated beverages.
- The 'Total sugar' result for each sample was based on the summation of the individual sugars results (in cases where 1 or more of the individual sugars results used in the summation are >LOQ, results below the LOQ of the individual sugars was set to zero).

3. Statistical analysis

- Results were analysed using RStudio v4.3.0 in 2023 and 2024.
- Descriptive statistics (mean, standard deviation (SD), median, interquartile range (IQR) and minimum and maximum values (Min–max)) were determined to assess the sugar content of soups, sauces & miscellaneous foods and sugar-sweetened carbonated beverages.
- Results per average suggested serving size were calculated as follows:
 - retrieve each product’s suggested serving size
 - calculate the sugar content (monosaccharides, disaccharides, and total sugar) as per suggested serving size per product
 - determine descriptive statistics using the suggested serving size values for all sugars.

Table 1 Number of products collected in each food category and analysed for sugar content per 100 g/ml from July 2022 to June 2023

Category	2022	2023	Total
Soups	28		28
Sauces	35		35
Sugar-sweetened carbonated beverages		95	95
Total	63	95	158

Background: tables 2–7

- A priority food category called soups, sauces & miscellaneous foods was sampled between July 2022 and August 2022 to determine mean and median levels of sugars (monosaccharides, disaccharides, and total sugar) which is shown in Tables 2–5.
- No food products categorised under miscellaneous foods (stocks and gravy granules) were sampled. Sugar results for soups and sauces are displayed in this report.
- A priority food category called sugar-sweetened carbonated beverages was sampled between May 2023 and June 2023 to determine mean and median levels of sugars (monosaccharides, disaccharides, and total sugar) which are shown in Tables 6 and 7.
- Levels of sugars (monosaccharides, disaccharides, and total sugar) in soups, sauces, and sugar-sweetened carbonated beverages were based on single-product samples.
- The monosaccharides referred to in this report are glucose, fructose, and galactose.
- The disaccharides referred to in this report are lactose, sucrose, and maltose.
- All values are rounded to the nearest two decimal places. Trace results that were expressed with '<' symbol were divided by two to obtain a decimal number that can be used in the analysis (e.g. analysed laboratory value <0.01 g, the value used in the statistical tests was 0.005 g).
- Due to these conversions, the summation of monosaccharides and disaccharides does not equal the total sugar values.
- Products were categorised based on their label description.
- Results relate to both branded and own brand label products.
- Results relate to products as consumed (including products which require reconstitution before consumption e.g. dried soups)

Soups

This section looks at the analysed sugar content (monosaccharides, disaccharides, and total sugar) of soups⁶ collected in July 2022. Figure 1 provides a summary of the total sugar content of soups. Tables 2 and 3 describe the monosaccharides, disaccharides, and total sugar content of soups per 100 g, and per suggested serving size. These tables should be referred to when interpreting Figure 1.



Figure 1 Mean total sugar content of soups per 100 g and per suggested serving size with the teaspoon equivalent of total sugar per suggested serving size (g/suggested serving size)

⁶ Varieties of soup included: fresh soup packed in plastic pots, ambient soups packed in pouches, canned/tinned soup, and dried instant soup.

- The mean total sugar content per 100 g of soup was 3.95 g per 100 g.
- The mean total sugar content per suggested serving size of soup was 9.56 g⁷ (equivalent to 2.4 teaspoons of sugar).
- Twenty-five percent of products (n=7) did not provide a suggested serving size.
- The average suggested serving size was 230 g.

⁷ For 75% of products for which suggested serving size was given on the product label.

Table 2 Mean (SD), median (IQR), min-max sugar content (monosaccharides, disaccharides, and total sugar) of soups per 100 g (g/100 g)

Sugar in soups per 100 g ^(a)	2022						
	Monosaccharides			Disaccharides			Total sugar
	Glucose	Fructose	Galactose	Lactose	Sucrose	Maltose	
Mean (SD)	1.09 (0.50)	1.12 (0.56)	0.02 (0.01)	0.18 (0.16)	1.50 (0.61)	0.09 (0.21)	3.95 (1.35)
Median (IQR)	1.10 (0.66)	1.16 (0.77)	0.03 (0.01)	0.15 (0.22)	1.46 (0.93)	0.03 (0.00)	3.70 (1.62)
Min–max	0.43–2.28	0.26–2.27	0.01–0.03	0.01–0.50	0.73–2.90	0.01–1.09	1.90–7.60
Total samples (n)	28						

(a) Unless otherwise indicated, all samples were analysed as sold. Varieties of soup included: fresh soup packed in plastic pots, ambient soups packed in pouches, canned/tinned soup, and dried instant soup. One of the dried soups was analysed as reconstituted product as per manufacturer’s instructions. Two dried soup samples were analysed as dry product and then based on the manufacturer’s dilution instruction i.e. ~1/11 sugar content in g/100 ml as prepared was calculated. As density was 1.0 these are reported as g/100 g.
SD= standard deviation; IQR= interquartile range; Min–max= minimum and maximum.

Table 3 Mean (SD), median (IQR), min-max sugar content (monosaccharides, disaccharides, and total sugar) of soups per suggested serving size (g/suggested serving size)

Sugar in soups per suggested serving size ^(a)	2022						
	Monosaccharides			Disaccharides			Total sugar
	Glucose	Fructose	Galactose	Lactose	Sucrose	Maltose	
Mean (SD)	2.70 (1.40)	2.84 (1.57)	0.06 (0.03)	0.43 (0.37)	3.54 (1.62)	0.10 (0.10)	9.56 (3.74)
Median (IQR)	2.45 (1.14)	2.56 (1.52)	0.06 (0.04)	0.41 (0.53)	3.10 (2.28)	0.06 (0.03)	8.60 (3.62)
Min-max	0.96–6.12	0.59–6.79	0.01–0.12	0.01–1.18	1.56–7.74	0.04–0.44	3.80–20.29
Total samples (n)	21 ^(b)						

(a) Unless otherwise indicated, all samples were analysed as sold. Varieties of soup included: Fresh soup packed in plastic pots, ambient soup packed in pouches, canned/tinned soup, and dried instant soup. Mean suggested serving size for soups was 230 g with a minimum of 190 g and a maximum of 390 g. Values for one of the dried soups was analysed as a reconstituted product as per manufacturer’s instructions. Two dried soup samples were analysed as dry product and then based on the manufacturer’s dilution instruction i.e. ~1/11 sugar content in g/100 ml as prepared, was calculated. As density was 1.0 these are reported as g/100 g.

(b) Soup (n=21) with a suggested serving size were included. Seven soups were excluded due to no suggested serving size present on the food label. SD= standard deviation; IQR= interquartile range; Min-max= minimum and maximum.

Sauces

This section looks at the sugar content (monosaccharides, disaccharides, and total sugar) of sauces⁸ collected in August 2022. Figure 2 provides a summary of total sugar in sauces. Tables 4 and 5 describe the monosaccharides, disaccharides and total sugar content of sauces per 100 g and per suggested serving size. These tables should be referred to when interpreting Figure 2.



Figure 2 Mean total sugar content of sauces per 100 g and per suggested serving size with the teaspoon equivalent of total sugar per suggested serving size (g/suggested serving size)

⁸ Sauces included in this sample were cooking sauces and condiments. Varieties of cooking sauces included: sweet & sour, bolognese, curry, and other Asian style sauces. Varieties of condiments included: tomato ketchup, salad cream, mayonnaise, and brown sauce.

- The mean total sugar content per 100 g of sauces was 16.83 g per 100 g.
- The mean total sugar content per suggested serving size of sauces was 10.33 g⁹ (equivalent to 2.6 teaspoons of sugar).
- Fourteen percent (n=5) of sampled sauces did not provide a suggested serving size on the label.
- The average suggested serving size of cooking sauces was 88.46 g.
- The average suggested serving size of condiments was 14.90 g.

⁹ For 86% of products for which suggested serving size was given on the product label.

Table 4 Mean (SD), median (IQR), min-max sugar content (monosaccharides, disaccharides, and total sugar) of sauces per 100 g (g/100 g)

Sugars in sauces per 100 g ^(a)	2022						
	Monosaccharides			Disaccharides			Total sugar
	Glucose	Fructose	Galactose	Lactose	Sucrose	Maltose	
Mean (SD)	4.86 (4.14)	4.77 (3.92)	0.04 (0.01)	0.10 (0.22)	7.06 (4.73)	0.09 (0.25)	16.83 (9.07)
Median (IQR)	3.40 (3.62)	3.40 (3.24)	0.05 (0.02)	0.05 (0.02)	6.80 (7.60)	0.05 (0.02)	15 (13.40)
Min-max	0.10–16.70	0.07–16.80	0.01–0.05	0.03–1.20	0.44–15.60	0.01–1.50	1.60–38
Total samples (n)	35						

(a) Unless otherwise indicated, all samples were analysed as sold. Sauces included in this sample were cooking sauces and condiments. Varieties of cooking sauces included: sweet & sour, bolognese, curry, and other Asian style sauces. Varieties of condiments included: tomato ketchup, salad cream, mayonnaise, and brown sauce. One dried sauce was included in this sample. SD= standard deviation; IQR= interquartile range; Min-max= minimum and maximum.

Table 5 Mean (SD), median (IQR), min-max sugar content (monosaccharides, disaccharides and total sugar) of sauces per suggested serving size (g/suggested serving size)

Sugars in sauces per suggested serving size ^(a)	2022						
	Monosaccharides			Disaccharides			Total sugar
	Glucose	Fructose	Galactose	Lactose	Sucrose	Maltose	
Mean (SD)	2.96 (2.58)	2.93 (2.45)	0.03 (0.02)	0.10 (0.29)	4.25 (3.96)	0.09 (0.31)	10.33 (6.70)
Median (IQR)	2.13 (1.86)	2.24 (1.73)	0.03 (0.03)	0.03 (0.02)	2.90 (4.65)	0.03 (0.03)	8.49 (10.41)
Min–max	0.01–10.02	0.01–10.08	0.00–0.06	0.00–1.39	0.20–15.96	0.00–1.69	0.22–24
Total samples (n)	30 ^(b)						

(a) Unless otherwise indicated, all samples were analysed as sold. Sauces included in this sample were cooking sauces and condiments. Varieties of cooking sauces included: sweet & sour, bolognese, curry and other Asian style sauces. Varieties of condiments included: tomato ketchup, salad cream, mayonnaise, and brown sauce. Mean suggested serving size for cooking sauces was 88.46 g with a minimum of 35.60 g and a maximum of 125 g. Mean suggested serving size for condiments was 14.90 g with a minimum of 14 g and a maximum of 15.30 g. Values for one of the dried sauces was analysed as per reconstituted product as per manufacturer’s instructions.

(b) Sauces (n=30) with serving size recommendations were included. Five sauces were excluded due to no suggested serving size present on the food label. SD= standard deviation; IQR= interquartile range; Min–max= minimum and maximum

Sugar-sweetened carbonated beverages

This section looks at the sugar content (monosaccharides, disaccharides, and total sugar) of sugar-sweetened carbonated beverages¹⁰ collected in May and June 2023. Figure 3 provides a summary of total sugar in sugar-sweetened carbonated beverages. Tables 6 and 7 describe the monosaccharides, disaccharides and total sugar content of sugar-sweetened carbonated beverages per 100 ml and per suggested serving size. These tables should be referred to when interpreting Figure 3.



Figure 3 Mean total sugar content of sugar-sweetened carbonated beverages per 100 ml and per suggested serving size with the teaspoon equivalent of total sugar per suggested serving size (g/suggested serving size)

¹⁰ Sugar-sweetened carbonated beverages included in this sample were cola, citrus and fruit flavoured, energy drinks and tonics.

- The mean total sugar content per 100 ml of sugar-sweetened carbonated beverages was 5.09 g per 100 ml.
- The mean total sugar content per suggested serving size of sugar-sweetened carbonated beverages was 15.45 g¹¹ (equivalent to 3.9 teaspoons of sugar).
- Twenty percent (n=19) of sampled sugar-sweetened carbonated beverages did not provide a suggested serving size.
- The average suggested serving size of sugar-sweetened carbonated beverages was 296.30 ml.

¹¹ For 80% of products for which suggested serving size was given on the product label.

Table 6 Mean (SD), median (IQR), min-max sugar content (monosaccharides, disaccharides, and total sugar) of sugar-sweetened carbonated beverages per 100 ml (g/100 ml)

Sugars in sugar-sweetened carbonated beverages per 100 ml ^(a)	2023				
	Monosaccharides		Disaccharides		Total sugar
	Glucose	Fructose	Sucrose	Maltose	
Mean (SD)	1.33 (1.10)	1.11 (0.92)	2.56 (1.98)	0.44 (0.73)	5.09 (2.39)
Median (IQR)	1.01 (1.46)	0.82 (1.12)	2.37 (2.43)	0.03 (0.30)	4.70 (0.90)
Min-max	0.03–4.92	0.03–5.01	0.03–12.70	0.03–1.93	1.50–14
Total samples (n)	95	95	95	19	95

(a) Unless otherwise indicated, all samples were analysed as sold. Sugar-sweetened carbonated beverages included in this sample were cola, fruit and citrus flavoured, energy drinks and tonics.

SD= standard deviation; IQR= interquartile range; Min-max= minimum and maximum.

Table 7 Mean (SD), median (IQR), min-max sugar content (monosaccharides, disaccharides and total sugar) of sugar-sweetened carbonated beverages per suggested serving size (g/suggested serving size)

Sugars in sugar-sweetened carbonated beverages per suggested serving size ^(a)	2023				
	Monosaccharides		Disaccharides		Total sugar
	Glucose	Fructose	Sucrose	Maltose	
Mean (SD)	3.90 (4.33)	3.10 (2.97)	8.14 (9.01)	1.86 (2.67)	15.45 (12.16)
Median (IQR)	2.21 (4.33)	1.86 (2.95)	7.31 (5.14)	0.25 (3.35)	11.75 (2.98)
Min–max	0.08–24.60	0.08–12.53	0.08–63.50	0.08–7.33	4–70
Total samples (n)	76	76	76	14	76

(a) Unless otherwise indicated, all samples were analysed as sold. Sugar-sweetened carbonated beverages included in this sample were cola, fruit and citrus flavoured, energy drinks and tonics. Mean suggested serving size for sugar-sweetened carbonated beverages was 296.30 ml with a minimum of 250 ml and a maximum of 500 ml. Sugar-sweetened carbonated beverages (n=76) with suggested serving size recommendations were included. Nineteen sugar-sweetened carbonated beverages were excluded due to no suggested serving size present on the food label.
SD= standard deviation; IQR= interquartile range; Min–max= minimum and maximum.

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