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Food Reformulation Task Force:

Benchmarking the salt content of pizza sold in the foodservice sector in 2023

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Food Reformulation Task Force: Benchmarking the salt content of pizza sold in the foodservice sector in 2023

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Glossary

Term	Text
EC	European Commission
EFSA	European Food Safety Authority
FSAI	Food Safety Authority of Ireland
g	gram (s)
GPAL	Public Analyst's Laboratory, Galway
IQR	interquartile range
mg	milligram (s)
min-max	minimum and maximum values
n	number of sample products
NCDs	noncommunicable diseases
OOH	out-of-home
SD	standard deviation
SRP	Salt Reduction Programme
UK	United Kingdom
WHO	World Health Organization

1. Introduction

1.1 Purpose

The purpose of this survey is to establish a 2023 benchmark of the salt content of pizza sold in Irish foodservice¹ outlets. This benchmark will be used to establish maximum per serving salt targets for pizza sold in the foodservice sector.

1.2 Background

Overconsumption of salt is associated with increased blood pressure and consequently diet-related noncommunicable diseases (NCDs) such as cardiovascular disease, stroke, and coronary heart disease (World Health Organization, 2023a). As a result, health-based upper thresholds for dietary salt intake have been established. The World Health Organization (WHO) recommends that adults consume less than 2000 mg/day of sodium (equivalent to less than 5 g/day of salt) (WHO, 2023a). The Food Safety Authority of Ireland (FSAI) has set a pragmatic population salt upper limit of 6 g/day for adults living in Ireland, as described in the [Salt and Health: Review of the Scientific Evidence and Recommendations for Public Policy in Ireland \(Revision 1\)](#) report (FSAI, 2016). The [Food Reformulation Task Force Progress Report 2023](#) highlighted that dietary intakes of salt are decreasing across the Irish population; however, they remain above the FSAI 6 g/day population level target and WHO 5 g/day threshold (FSAI, 2024; WHO, 2023a).

To reduce population dietary salt intakes, in 2003 the FSAI commenced a Salt Reduction Programme (SRP). This programme aimed to reduce the salt content of 11 food categories, which were significant contributors to dietary salt intakes in the Irish population. The SRP predominantly targeted prepacked foods and led to progress in salt reduction, which is described in the [Monitoring Sodium and Potassium in Processed Foods](#) report (FSAI, 2022). More recently, in 2021, the [Roadmap for Food Product Reformulation in Ireland](#) was published (Department of Health, 2021). An objective of the Roadmap is to build on progress made in salt reformulation since 2003, by reducing the content of salt in 25 priority food categories by 10% between 2015 and 2025 (Department of Health, 2021). This target is applicable across the food industry including food manufacturers, food retailers, ingredient suppliers and the foodservice sector (Department of Health, 2021).

The foodservice sector refers to catering establishments that offer food and drink for purchase and immediate consumption outside of the home, including takeaway and home delivery. This is a

¹ Foodservice or out-of-home (OOH) sector are terms commonly used to describe any establishment where food and drink are prepared for immediate consumption outside the home.

diverse sector that comprises a range of food outlet types such as restaurants, hotels, cafés, delicatessens, takeaways, food trucks, central kitchens, and food provided by home delivery services (WHO, 2022). The [Roadmap for Food Product Reformulation in Ireland](#) requires the foodservice sector to play its part in reducing population dietary intakes of target nutrients, including salt. The Roadmap states; “the eating out of home sector is expected to procure and/or make products that meet the relevant targets” (Department of Health, 2021). The foodservice sector in Ireland has seen growth in popularity over recent years (Bord Bia, 2023; 2020). A survey completed by Bord Bia found that pizza is the most popular home delivery food choice amongst consumers purchasing food from the foodservice sector (Bord Bia, 2020).

Research shows that consuming foods from foodservice outlets is associated with higher dietary salt intakes (Gesteiro *et al.*, 2022; WHO, 2022). One food category which has been shown to be high in salt when purchased from the foodservice sector is pizza. Research commissioned by *safefood* in 2012, found pizzas purchased from the foodservice sector in Ireland had a high average salt content across pizza varieties including cheese and tomato (4.6 g/pizza), Hawaiian pizza (6.8 g/pizza) and pepperoni pizza (6.5 g/pizza) (*safefood*, 2012). Similarly, in the United Kingdom (UK) the average salt content of pizzas sold in foodservice outlets was 7.9 g/pizza (Action on Salt, 2023). Both studies found pizzas sold in the foodservice sector contained more salt than prepacked pizzas sold in supermarkets and convenience stores (*safefood*, 2012; Action on Salt, 2023).

Given the high salt content of pizza offered by Irish foodservice outlets in 2012, and the popularity of pizza amongst Irish consumers, the aim of this survey was to establish a 2023 benchmark of the salt content of pizzas sold in the foodservice sector. This benchmark will be used to inform the development of maximum per serving salt targets for pizza served in the foodservice sector.

2. Aim and Objectives

2.1 Aim

The aim of this survey was to determine the salt content (g/100 g, g/pizza, g/slice) in a convenience sample of pizzas sold in the foodservice sector in Ireland in September 2023.

2.2 Objectives

The objectives of this survey were:

1. To collect a convenience sample of adult and children's pizzas commonly offered on foodservice outlet menus for takeaway and delivery, in September 2023.
2. To establish a 2023 benchmark of the salt content (g/100 g, g/pizza, g/slice) of adult and children's pizzas commonly offered on foodservice outlet menus for takeaway and delivery, in September 2023.
3. To determine the accuracy of the declared salt content of pizzas on menus (where declared by foodservice outlets) against the European Commission (EC) Guideline Nutrition Labelling Tolerances (European Commission, 2012).

3. Methodology

3.1 Sample selection, categorisation, and collection

In September 2023, a convenience sample² of pizza, a subcategory of the priority food category “Savouries”, was collected from Irish foodservice outlets. Three subcategories of pizzas were prioritised for sampling based on their popularity on menus, including, cheese-only pizza³, pizza with pepperoni, salami, meatballs, beef, or sausage⁴, and pizza with other toppings⁵. Children’s pizzas were defined as pizza variants labelled as “children”, “kids” or “junior” pizza on foodservice outlet menus. While adult pizzas were categorised as those that were not explicitly labelled with an age on menus. Pizzas were selected based on what was most commonly offered on foodservice outlet menus and the following types of pizzas were included for sampling: available as a main course, available in regular or medium size and regular, thin, Romano or Italian style base and crust.

Pizza samples (n=60) were purchased for delivery from a range of restaurants⁶ (n=7) and takeaways⁷ (n=7) in Dublin City in September 2023. In the purchased sample of pizzas, each restaurant and takeaway outlet was represented once. Delivery application services (including Deliveroo, Just Eat and Uber Eats) were used to collect samples and deliver them to the FSAI. Each sample was made up of one complete product (pizza). Following collection, samples were labelled with a unique identifier code and sample code. Photographs of all samples and corresponding weight measurements were captured and stored electronically. All samples were packed in sealed protective packaging and transported under refrigeration by a courier to the Public Analyst’s Laboratory, Galway (GPAL) for sodium analysis.

² Please note that there was no specific randomised approach employed for sampling.

³ Samples of cheese-only pizza include plain classic margherita, mozzarella, or a single cheese and tomato-based pizza without any additional toppings.

⁴ Samples of pizza with pepperoni, salami, meatballs, beef, or sausage, either individually or in various combinations of these meat toppings. If a pizza includes ham in addition to any of these specified meat toppings such as pepperoni, salami, meatballs, beef, or sausage, it is classified within this subcategory.

⁵ Samples of pizza with other toppings include pizza topped with ingredients such as chicken, ham, pineapple, fruits, or vegetables. This subcategory also includes Four Cheese-based pizzas, due to their variety of cheeses and higher salt content.

⁶ Restaurants refer to any full-service or fast-chain establishment that offers food for on-site consumption.

⁷ Takeaways refer to any establishment with or without limited seating, that offers food for off-site consumption.

3.2 Laboratory sample analysis

All samples were analysed by GPAL using an in-house validated analytical method, as referred in the [Schedule of Accreditation Irish National Accreditation Board Registration Number: 9T](#). The samples were initially homogenised as aqueous slurries, dried and then ashed in a muffle furnace (at a temperature of 520 °C, \pm 20 °C). Nitric acid was added to the ash, which was then acid-digested on a steam bath. The solution was diluted, if necessary, and analysed for sodium using flame photometry (also known as atomic emission spectrophotometry).

3.3 Data and statistical analysis

The results were analysed using RStudio 2023.06.0. The sodium content and subsequent determination of salt equivalent per 100 g of pizza (g/100 g) and per portion size (whole pizza and pizza slice) was determined using the following statistical tests: mean, (standard deviation (SD)), median (interquartile range (IQR)) and minimum and maximum values (min-max).

The results per 100 g and per portion sizes (whole pizza and pizza slice) were calculated. The results per portion sizes were determined by individual adjustments of the salt content based on the weight of each whole pizza and pizza slice. The statistical analysis was disaggregated by adult and children's pizzas.

Throughout this report, the salt equivalent is referred to as salt content (g/100 g, g/pizza, g/slice). To convert sodium to salt, the sodium value was multiplied by 2.54. The term "statistical significance" is used in assessing if a set of results or observations reflects a real pattern or one related to chance. In all tables, the statistical significance is set at $p \leq 0.05$ (95% confidence interval) and all values are rounded to the nearest two decimal places.

3.4 Accuracy of salt declarations on menus

A comparison between the sample products with declared salt values on menus (n=19) and analysed salt content of foodservice pizzas, disaggregated by pizza subcategory, was completed by testing for statistically significant differences and assessing against the EC Guideline Nutrition Labelling Tolerances for total salt (European Commission, 2012). Salt labelling tolerances were calculated by setting initial bounds and using the EC guidance tolerance, defined as <1.25 g of salt per 100 g \pm 0.375 g, and ≥ 1.25 g of salt per 100 g \pm 20% for foods without a nutrition or health claim. The tolerance permitted for salt content and amount was applied (no claim was made on all pizza samples), and the accuracy was defined as conformance with EC Guideline Nutrition Labelling Tolerances.

4. Results

4.1 Description of samples

In total, n=60 (n=47 adult's pizzas and n=13 children's pizzas) pizzas were sampled. Of these, n=16 (n=12 adult's pizzas and n=4 children's pizzas) were cheese-only pizzas, n=25 (n=21 adult's pizzas and n=4 children's pizzas) were pizzas with pepperoni, salami, meatballs, beef or sausage, and n=19 (n=14 adult's pizzas and n=5 children's pizzas) were pizzas with other toppings. All pizzas were sampled from restaurants (n=7) and takeaways (n=7). This is shown in Figure 1.

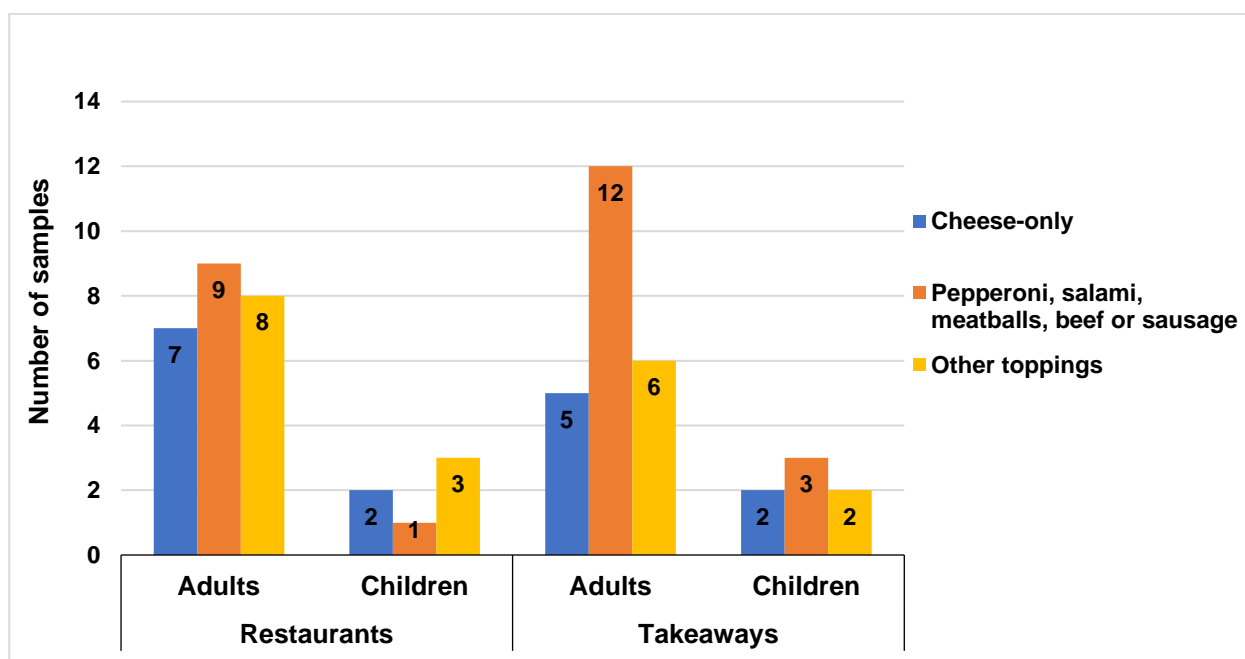


Figure 1: Number of pizzas sampled, disaggregated by pizza subcategory, population type and foodservice type

4.2 Analysed salt content in pizza per 100 g

The mean salt content of adult pizza per 100 g was 1.46 g/100 g, and for pizza sold for children was 1.37 g/100 g. The pizza subcategory containing pizza with pepperoni, salami, meatballs, beef, or sausage contained the highest mean salt content per 100 g for both adults at 1.63 g/100 g, and children at 1.51 g/100 g. The mean salt content in all pizza subcategories is described in Table 1.

Table 1: Analysed salt content in pizza per 100 g by population type

			Salt content in pizza per 100 g ^(a)		
Population type	Pizza subcategory	(n)	Mean (SD) salt content	Median (IQR) salt content	Min-max salt content
Adults	All categories	47	1.46 (0.25)	1.47 (0.30)	0.97–2.08
	Cheese-only	12	1.37 (0.17)	1.42 (0.21)	1.02–1.60
	Pepperoni, salami, meatballs, beef, or sausage	21	1.63 (0.22)	1.57 (0.30)	1.30–2.08
	Other toppings	14	1.28 (0.21)	1.28 (0.29)	0.97–1.60
Children	All categories	13	1.37 (0.28)	1.35 (0.33)	0.91–1.88
	Cheese-only	4	1.26 (0.23)	1.19 (0.13)	1.07–1.60
	Pepperoni, salami, meatballs, beef, or sausage	4	1.51 (0.25)	1.41 (0.19)	1.35–1.88
	Other toppings	5	1.34 (0.33)	1.24 (0.30)	0.91–1.78

Data provided as mean and standard deviation (SD), median and interquartile range (IQR), and minimum and maximum values (min-max). **(a)** All foodservice pizza samples were analysed as sold.

4.3 Analysed salt content in pizza per portion

In both adult and children's pizza types, variation in both weight and portion sizes was observed. There was variation in the size of an adult's whole pizza, ranging from 9 inches to 14.5 inches in diameter, with a whole pizza measuring 11.5 inches on average, across all pizza subcategories and foodservice types. Additionally, there was variation in the weight of an adult's whole pizza, ranging from 280 g to 719 g, with an average whole pizza weighing 500 g. The weight of a pizza slice also varied, ranging from 36 g to 167 g, with a pizza slice weighing 72 g on average, across all pizza subcategories and foodservice types.

There was variation in the size of a child's whole pizza, ranging from 5.5 inches to 10.3 inches in diameter, with a whole pizza measuring 7.6 inches in diameter on average, across all pizza subcategories and foodservice types. Additionally, there was variation in the weight of a child's whole pizza ranging from 110 g to 384 g, with a whole pizza weighing 202 g on average. The weight of a pizza slice also varied, ranging from 25 g to 136 g, with a pizza slice weighing 58 g on average, across all pizza subcategories and foodservice types.

The mean salt content per whole pizza for adults was 7.27 g and per whole pizza for children was 2.73 g, this is shown in Figure 2.

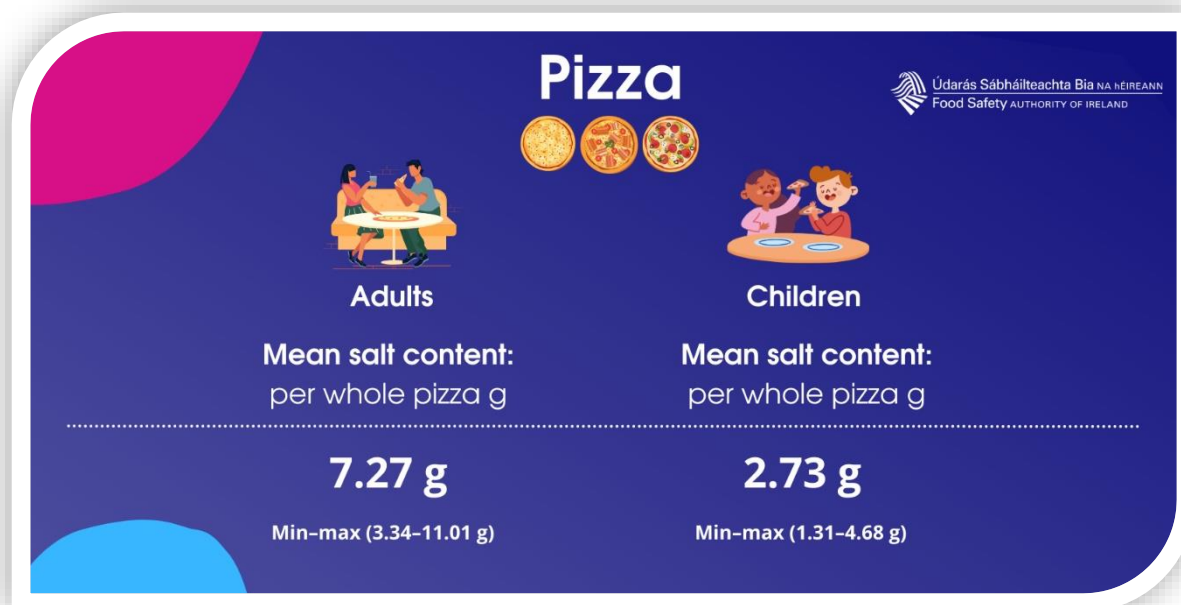


Figure 2: Mean salt content per whole pizza by population type

The mean salt content per pizza slice for adults was 1.05 g and per pizza slice for children was 0.79 g, this is shown in Figure 3.

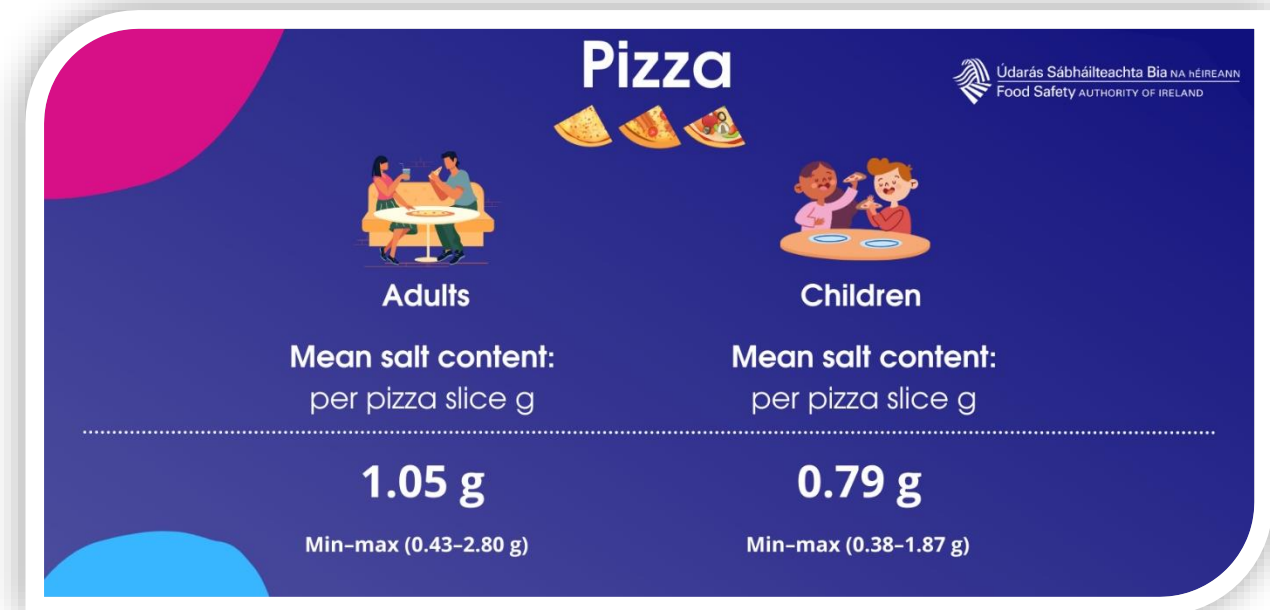


Figure 3: Mean salt content per pizza slice by population type

Table 2 provides an overview of the mean (SD), median (IQR), minimum-maximum (min-max) salt content of both a whole and a slice of adult pizza and a whole and a slice of children's pizza. The adult whole pizza with pepperoni, salami, meatballs, beef, or sausage had the highest mean (SD) salt content of 8.44 (1.92) g/pizza. The children's whole pizza with other toppings had the highest mean (SD) salt content of 2.87 (1.33) g/pizza. A large variation was observed in the salt content of adult whole pizzas across all subcategories; for example, the salt content of adult whole pizzas with pepperoni, salami, meatballs, beef, or sausage ranged from 4.54–11.01 g/pizza.

Table 2: Analysed salt content in pizza per portion by population type

Salt content in pizza per portion ^(a)			per whole pizza (g/pizza)			per pizza slice (g/slice)		
Population type	Pizza subcategory	(n)	Mean (SD) salt content	Median (IQR) salt content	Min-max salt content	Mean (SD) salt content	Median (IQR) salt content	Min-max salt content
Adults	All categories	47	7.27 (2.02)	7.28 (3.16)	3.34–11.01	1.05 (0.45)	0.99 (0.41)	0.43–2.80
	Cheese-only	12	5.92 (1.69)	6.63 (3.06)	3.34–8.05	0.85 (0.32)	0.80 (0.30)	0.43–1.55
	Pepperoni, salami, meatballs, beef or sausage	21	8.44 (1.92)	8.66 (2.00)	4.54–11.01	1.17 (0.46)	1.12 (0.42)	0.55–2.80
	Other toppings	14	6.69 (1.46)	6.80 (1.73)	4.63–9.44	1.03 (0.49)	0.92 (0.28)	0.59–2.61
Children	All categories	13	2.73 (1.10)	2.39 (1.95)	1.31–4.68	0.79 (0.43)	0.64 (0.46)	0.38–1.87
	Cheese-only	4	2.60 (1.24)	2.64 (1.92)	1.31–3.82	0.83 (0.37)	0.77 (0.40)	0.47–1.31
	Pepperoni, salami, meatballs, beef or sausage	4	2.69 (0.94)	2.43 (0.60)	1.87–4.04	0.94 (0.65)	0.72 (0.65)	0.45–1.87
	Other toppings	5	2.87 (1.33)	2.09 (1.90)	1.69–4.68	0.63 (0.27)	0.49 (0.34)	0.38–1.03

Data presented as mean and standard deviation (SD), median and interquartile range (IQR), and minimum and maximum values (min-max). **(a)** All foodservice pizza samples were analysed as sold.

4.4 Comparison of declared and analysed salt content in pizza

4.4.1 Comparison of median salt content in all pizzas and by pizza subcategories

A comparison between the declared and analysed salt content of pizza (n=19) sold in foodservice outlets with declared salt content, disaggregated by pizza subcategory, found no statistically significant difference in the declared and analysed salt content within each pizza subcategory, (cheese-only pizza (n=5; $p=0.31$), pizza with pepperoni, salami, meatballs, beef, or sausage (n=8; $p=0.74$) and pizza with other toppings (n=6; $p=0.09$)). This is outlined in Table 3.

Table 3: Comparison of declared and analysed salt content in pizza overall and by subcategory

			Salt content in pizza per 100 g ^(a)		
Pizza subcategory	(n)	Source of nutrition information	Median (IQR) salt content	Min-max salt content	Statistical significance ^(b)
Cheese-only	5	Analysed	1.27 (0.08)	1.19–1.47	$p=0.31$
		Declared	1.25 (0.10)	0.99–1.31	
Pepperoni, salami, meatballs, beef or sausage	8	Analysed	1.54 (0.13)	1.32–1.88	$p=0.74$
		Declared	1.52 (0.32)	1.10–6.61	
Other toppings	6	Analysed	1.28 (0.12)	1.24–1.52	$p=0.09$
		Declared	1.21 (0.43)	0.61–1.40	

Data presented as median and interquartile range (IQR), and minimum and maximum values (min-max). **(a)** All foodservice pizza samples were analysed as sold. **(b)** Statistical significance was set at $p \leq 0.05$ (95% confidence interval) and assessed using the Wilcoxon signed-rank test.

4.4.2 Comparison of declared and analysed salt content in pizzas sold in foodservice outlets with EC Guideline Nutrition Labelling Tolerances

Across all pizzas (n=60) analysed, 31.7% (n=19) samples provided declared salt content. Of these, 84.2% (n=16) were conformant with the EC Guideline Nutrition Labelling Tolerances for salt. In the 15.8% (n=3) of pizzas analysed outside the EC Guideline salt labelling tolerance, two were above the tolerance and one was below. This is shown in Figure 4.

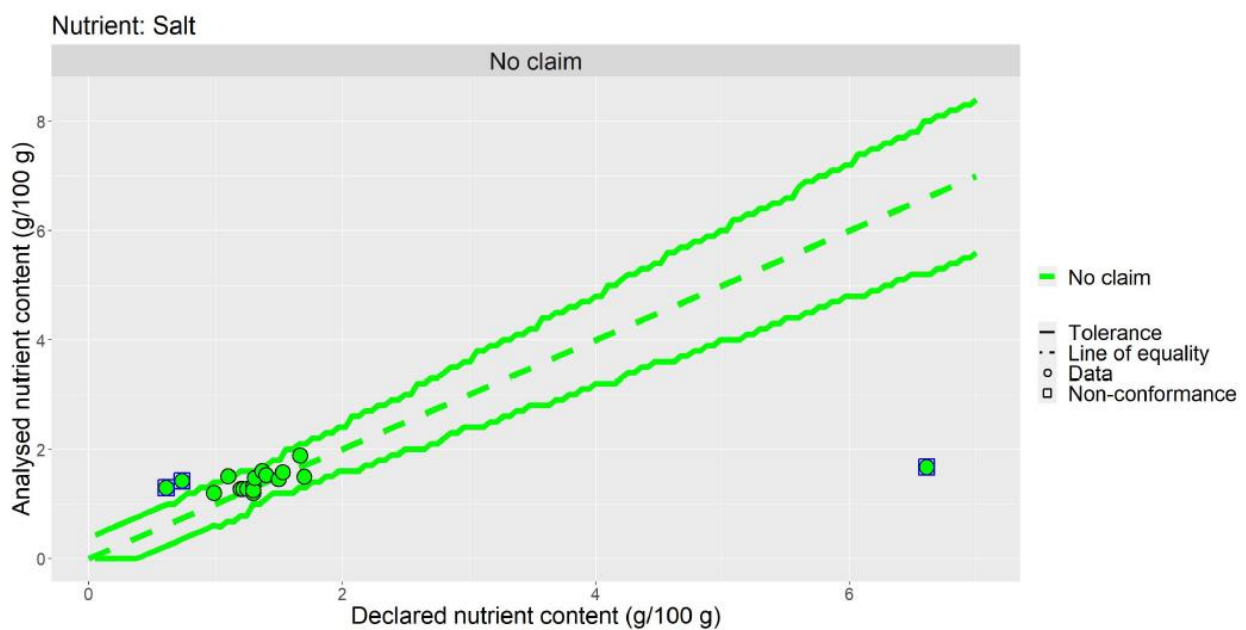


Figure 4: Trend in salt nutrition labelling tolerances for foodservice pizzas (n=19)

5. Discussion

5.1 Overview of the salt content in foodservice pizza

This survey revealed notably high salt content in foodservice pizzas. The findings are consistent with previous research by *safefood*, who found that cheese and tomato pizza contained an average of 4.6 g of salt per whole pizza and that pepperoni pizza contained an average of 6.5 g of salt per whole pizza sold in foodservice outlets (*safefood*, 2012). Similarly in the UK, a survey conducted in 2023 identified an average salt content of 7.9 g per pizza sold in the foodservice sector (Action on Salt, 2023). Notably, in the UK study both pepperoni and cheese pizzas had higher salt content levels compared to those observed in our survey, with pepperoni pizza containing on average of 9.3 g of salt per whole pizza and cheese pizza containing 6.7 g of salt per whole pizza (Action on Salt, 2023). Furthermore, a recent study in the UK found that the average salt content of a children's pizza as a complete main meal type, was 2.3 g per serving, with a range of 0.8–4.4 g of salt, which is similar to the findings of our survey (Action on Salt, 2024).

Dietary salt intake is a modifiable risk factor for reducing diet-related NCDs such as cardiovascular diseases (WHO, 2023a). Given this, the reduction of dietary salt intake is a priority action in the work of the Food Reformulation Task Force. The mean salt content of the majority of adult pizza varieties included in this survey exceeded the WHO maximum salt intake threshold of 5 g/day for an adult, and in some instances the salt content was double this maximum salt intake threshold (WHO, 2023a). Furthermore, the salt content in some children's pizza varieties exceeded the adequate intake levels for sodium in children set at 1.1 g/day for 1–3 years, 1.3 g/day for 4–6 years, 1.7 g/day for 7–10 years and 2.0 g/day for 11–17 years, as established by the European Food Safety Authority (EFSA, 2019). The findings of this survey indicate that pizza is a food category which requires particular attention for salt reduction.

5.2 Level of variation in the salt content in foodservice pizza

A diverse range of pizza types, weights, and portion sizes were observed within samples included in this survey. Across the three subcategories of pizzas for adults and children, a wide variation was found in the mean analysed salt content. For example, the salt content per whole pizza for adults ranged from 3.34–11.01 g/pizza, while the salt content per whole pizza for children ranged from 1.31–4.68 g/pizza. Additionally, a large variation in the salt content across pizza subcategories was found. For example, the maximum salt content per whole cheese-only pizza for adults was 8.05 g/pizza, and per whole pizza with pepperoni, salami, meatballs, beef, or sausage for adults was 11.01 g/pizza. The presence of pizzas with lower salt contents in each subcategory demonstrates that it is technically feasible and acceptable to consumers for the foodservice sector to offer pizza with a lower salt content. This finding supports a recent study which highlighted that reducing the

salt content of pizza dough by up to 10% does not change its organoleptic properties (Campo *et al.*, 2020). Additionally, pizza toppings can contribute to the level of variation in the salt content of pizza. The selection of lower salt toppings and using smaller quantities of toppings can help facilitate salt reduction (Action on Salt, 2023).

5.3 Accuracy of salt declarations on foodservice menus

The accuracy of salt declarations on foodservice menus included in this survey was good. Of the pizza samples (n=19) with a declared salt content, 84.2% (n=16) were conformant with the EC Guideline Nutrition Labelling Tolerances (European Commission, 2012). However, it was observed that the remaining pizza samples (n=41) had no declared salt content available. The FSAI recommends “structures and methods to monitor the salt content of processed food and food prepared in the foodservice sector”, as described in the [Salt and Health: Review of the Scientific Evidence and Recommendations for Public Policy in Ireland \(Revision 1\)](#) report (FSAI, 2016). As well as this, the WHO recommends that “menu labelling in foodservice facilities enable healthier consumer choices” (WHO 2023b). Therefore, due to the considerable variation in the salt content of pizza, the availability and accuracy of labelled declarations of salt are imperative for consumers to make an informed decision about the salt content of pizza and to help them choose lower salt options (WHO, 2023b).

5.4 Conclusion

Given the health risks associated with overconsumption of salt, efforts are warranted by Irish foodservice outlets to reduce the salt content of pizza. This survey establishes a 2023 benchmark of the salt content in a variety of pizzas sold in restaurants and takeaway outlets in Ireland. We found that pizzas sold in foodservice outlets included in this survey are high in salt, and in some instances were more than double the WHO maximum daily intake threshold of 5 g/day (WHO, 2023a). Our findings are in agreement with similar surveys completed in Ireland in 2012 and the UK in 2023 (safefood, 2012; Action on Salt, 2023). This survey data will inform the development of draft maximum per serving salt targets in foodservice pizza, as required by the [Roadmap for Food Product Reformulation in Ireland](#) (Department of Health, 2021).

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