



**Pilot Project – Salt in Pizza
Final Report
December 2009**

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Date: December 2009

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1. Executive Summary

- 1.1. The aims of this project were to identify where small catering businesses could make changes to reduce salt in pizza and to help them to do so. Specifically, to recruit 20 independent and small-chain pizza restaurants within a sample area and to purchase and test the salt content of four popular cooked pizzas (Cheese & Tomato, Pepperoni, Ham and Pineapple, Meat Feast/Supreme) and three un-cooked samples of the core ingredients (dough, sauce and cheese). Based on this analysis and data collected on the restaurants' kitchen and procurement habits a toolkit, comprising of an information leaflet and a poster, was developed to help restaurants reduce salt levels in their pizzas. After the toolkit was delivered and the results of the initial analysis explained, the restaurants were given four weeks to make any changes they felt necessary before the same seven samples were purchased and re-tested for comparison. The project sought to achieve some initial reductions by these restaurants, and assessed the potential of the toolkit approach in achieving reductions in a wider sample by selecting 20 further pizza restaurants and distributing the toolkit by post, with no face to face intervention. The effectiveness of this approach was then evaluated and compared to the effectiveness with face to face intervention.
- 1.2. The analysis of pizza samples and the core ingredients from the 20 recruited restaurants have shown average reduction in the levels of salt used although the results did not reach statistical significance. It was found that when restaurants received an explanation of the content of the toolkit, the information was received well and positive feedback was obtained, with 60% of participants stating that they would use the tips on reducing salt. The poster was displayed by 10% of participants and feedback was gained as to how it might be made more effective. When the toolkit was trialled by post without support as anticipated a lower percentage of restaurants responded positively, but still 33%, of restaurants stated that they would use the salt reduction tips. None of these restaurants displayed the poster.
- 1.3. Overall the project indicates the basic advice issued went some way to bring about behavioural changes in practice, and in any future work the dissemination route for the advice should be taken into account as it is critical to the outcome.

2. Aims and Objectives

- 2.1. The aims of this project were to identify where small businesses could make changes to reduce salt and then to help them to do so. Specifically, to work with independent and small-chain pizza restaurants within a sample area to develop a toolkit that would help restaurants reduce salt levels in their pizzas. The project sought to achieve some initial reductions by these restaurants, and assessed the potential of the toolkit approach in achieving reductions in a wider sample and over a sustained period.

3. Method

Restaurant Selection

- 3.1. It was agreed that the pilot project would be carried out in a small area of London, focusing on independent and small chain restaurants. Initially an internet search of pizza restaurants by area in London was carried out and the West End and North West London were chosen due to the high volume of appropriate restaurants to target. A variety of pizza restaurants were chosen including Italian style, American style and take-away.
- 3.2. Meetings were set up in advance with the proprietor of the restaurants, providing an opportunity to discuss the aims of the project, answer any questions and gain a commitment from the restaurant to participate. Restaurants agreeing to participate included two take-away American-style, three small chain Italian restaurants (with two, three and five restaurants respectively), two lunchtime café style outlets, and 13 independent Italian restaurants.
- 3.3. The recruitment process required the project officer to reach the 'decision-maker', that being the proprietor or head chef of the restaurant. Once the project was explained to the decision maker commitment to participate in the project was gained. On just one occasion did the proprietor decline to participate due to lack of time to give it his full attention.

Sample and evidence collection

- 3.4. Four cooked pizzas (Cheese & Tomato, Pepperoni, Ham and Pineapple, Meat Feast/Supreme) and three un-cooked samples of the core ingredients (dough, sauce and cheese) were purchased. The four pizza varieties were chosen as these reflect the most popular pizzas in the UK (Source: Mintel, February 2000). The samples were couriered to, and analysed for sodium by, Eurofins Laboratories Ltd who hold UKAS/ISO17025 accreditation.
- 3.5. During the process of data collection, it was evident that these four pizza varieties were either not always available, or that it was not easy to identify a direct comparison, from the menus in all independent and small chain pizza restaurants sampled. In these cases substitutions were made as follows:
 - Where pepperoni pizza was not available, a pizza was chosen with one meat topping;
 - Where meat feast/supreme was not available, pizzas with multiple meat toppings were chosen or 'extra toppings' were added to create a meat feast/supreme. Five restaurants did not have a multiple meat option or offer extra toppings as a menu option and therefore it was not possible to make comparisons in these cases.
 - Where ham & pineapple was unavailable on the menu, ham & mushroom was selected. The assumption was made that any differences in the salt content between a ham & mushroom and ham & pineapple pizza would be minimal as both mushroom and pineapple naturally contain only trace levels of sodium. Furthermore, Mintel lists ham & mushroom pizza variety as the fifth most popular pizza topping.
- 3.6. In addition the following two lines of investigation were considered, but discontinued when it became apparent they were not valid.

- It was anticipated that the Cheese & Tomato pizza could be used as a reference to compare to other varieties and to calculate the contributions toppings made to the saltiness of the pizza. However the per 100g analysis revealed that other pizzas were not simply a Cheese and Tomato pizza with additional toppings and so this line of investigation was not valid. It seems probable from the analysis that more cheese or sauce is added to a Cheese & Tomato pizza than to the other varieties of pizza.
- It was intended to calculate the percentage salt contribution the dough makes to a cheese and tomato pizza and so the portion of dough provided for analysis was requested to be equivalent to that used for one pizza. After analysing and taking into account potential weight lost through water evaporation during cooking, it became apparent that the weight of some of the dough samples could not be accurate for one pizza portion. Therefore this data has been omitted from the results section.

Comparison Data

- 3.7. To compare the data with pizzas available in the supermarkets and large chain restaurants, information was obtained on the salt content of the same four pizza varieties from the three largest pizza restaurant chains in the UK and eight leading supermarkets. All data has been coded to remain anonymous.
- 3.8. *Large Chain Restaurants:* Information was collected from the company website, product packaging or laboratory analysis where neither of the former was available. Information for two of the large chain pizza restaurants was available on the company website. The third restaurant did not provide any information either on the website or in the restaurant, instead pizzas were purchased and sent for laboratory analysis.
- 3.9. *Supermarkets:* Supermarkets offer a range of 'own brand' pizza types including fresh, chilled and frozen, all of which were compared. Information was clearly provided on salt content and recommended portion sizes on the packaging, with the exception of 'fresh' pizzas made in-store. These 'fresh' pizzas were purchased and sent for laboratory analysis.

Toolkit Development

- 3.10. In order to better understand the factors affecting salt content of pizza evidence on current kitchen practices and procurement was collected for independent or small-chain restaurants. This was carried out either by speaking with the proprietor directly and observing in the kitchen, or telephoning and asking for information. Based on this a 'toolkit' was developed comprising of an information booklet *5 simple steps to reduce salt in pizza* and an A3 poster. It provided practical advice on how to reduce the salt content of pizza ingredients produced in the restaurant kitchen. The toolkit included advice on procurement, kitchen practice and menu planning, and was trialled and evaluated with 3 restaurants before going to print and rolling out. An example of the toolkit is provided at Appendix D and E.

Intervention

- 3.11. The toolkit was delivered to each of the participating restaurants, along with the specific restaurant's salt analytical results. These were explained in detail, putting the results into context by comparing their data with the other restaurants, large chains

and supermarkets, then areas to focus on were highlighted. Ongoing support was offered, with the direct telephone number and email of the project officer provided and the restaurants were given one month to make any changes they considered were appropriate and practical for their business before the re-testing was to commence. No prior warning was given as to the exact date of the re-test.

Re- testing, sample and evidence collection

- 3.12. Approximately four weeks after delivery of the toolkit the same four cooked pizzas (Cheese & Tomato, Pepperoni, Ham and Pineapple, Meat Feast/Supreme) and three un-cooked samples of the core ingredients (dough, sauce and cheese) were collected. The samples were couriered to, and analysed for sodium by, Eurofins Laboratories Ltd.
- 3.13. Samples were not available for re-testing from Restaurant 10 and so its data was discounted from the comparisons. The three core ingredients (dough, sauce, cheese) from all restaurants were re-tested and compared per 100g.
- 3.14. The project and toolkit were qualitatively evaluated during a follow up visit or phone call with the restaurant using a semi-structured questionnaire (see Appendix A).

Assessing alternative use of the toolkit

- 3.15. In order to provide evidence as to best practice for extending the project more widely on a national level, the tool-kit was also sent out by post to 20 independent pizza restaurants in central London that had not been recruited for the project. This alternative use of the toolkit was intended to assess the viability of sending information out to restaurant proprietors 'cold' in order to assess the impact of the toolkit without the face to face interaction. During a follow up visit the effectiveness of this approach was assessed using a qualitative semi-structured questionnaire (see Appendix B). No pizza or ingredient samples were collected.

4. Results

Full data sheets are provided at Appendix C.

It is important to note the following points in relation to all the data analysis:

- Restaurant 10 results have been omitted from the data sheets as their portion sizes do not compare.
- For the Meatfeast pizzas, five other restaurants' final data was not included in the statistical analysis as the end products were not directly comparable/the data was not provided.
- The level of expanded uncertainty in the laboratory test carried out for sodium is 7.54%. This is not taken into account in the significance testing detailed below.
- A conversion factor of 2.5 was used to convert sodium to salt.
- The initial and re-tested results from Eurofins were analysed using a paired T-Test in SPSS. P is statistically significant at the 5% level ($p < 0.05$).
- None of the results obtained gained statistical significance. The results highlighted show a non-significant trend only. This is considered further in the discussion.

Range of salt content of pizzas, per 100g:

Cheese and Tomato:

Range of data from 19 independent and small chain restaurants:

Start Data	0.87g - 2.24g salt per 100g	Average 1.34g
End Data	0.65g - 1.70g salt per 100g	Average 1.19g

Average reduction from start data to end data = 0.145g

($p=0.081$: Confidence Interval (CI) (95%) for the difference in means from -0.02 – 0.31)

% Average reduction = 10.8%

Comparison:

Large chain restaurants	1.35g - 1.5g salt per 100g
Supermarkets	0.6g - 1.27g salt per 100g

Ham and Pineapple:

Range of data from 19 independent and small chain restaurants:

Start Data	0.98g - 1.97g salt per 100g	Average 1.33g
End Data	0.77g - 2.01g salt per 100g	Average 1.26g

Average reduction = 0.066g ($p=0.408$: CI (95%) -0.1 – 0.23)

% Average reduction = 5%

Comparison:

Large chain restaurants	1.1g - 1.43g salt per 100g
Supermarkets	0.7g - 1.39g salt per 100g

Pepperoni:

Range of data from 19 independent and small chain restaurants:

Start Data	1.05g - 2.64g salt per 100g	Average 1.60g
End Data	0.90g - 2.15g Salt per 100g	Average 1.52g

Average reduction = 0.091g ($p=0.245$: CI (95%) -0.07 – 0.25)

% Average reduction = 5.7%

Comparison:

Large chain restaurants	1.2g - 1.67g salt per 100g
Supermarkets	0.9g - 1.90g salt per 100g

Meat Feast/Supreme:

Range of data from 14 independent and small chain restaurants:

Start Data 0.93g - 2.41g salt per 100g Average 1.55g

End Data 0.90g - 2.10g salt per 100g Average 1.49g

Average reduction = 0.059 (p=0.382: CI (95%) -0.08 – 0.20)

% Average reduction = 3.8%

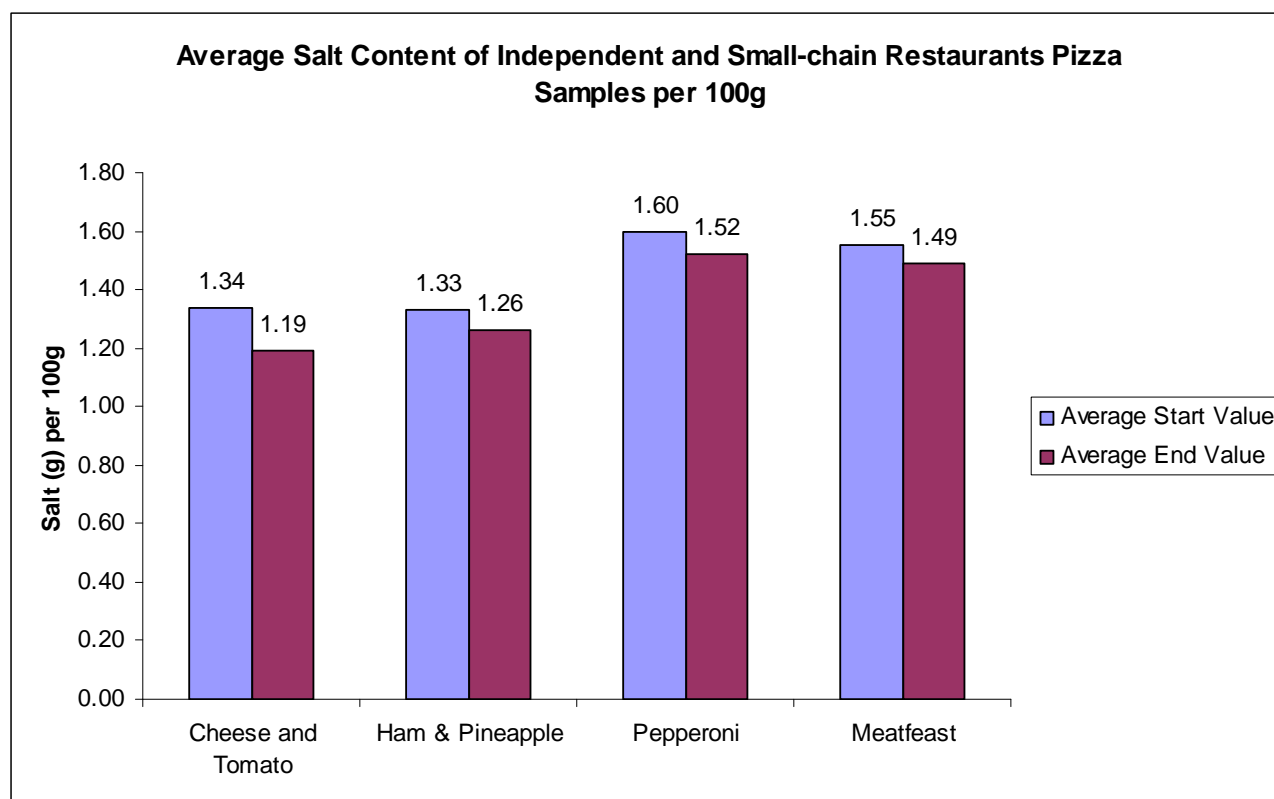
Comparison:

Large chain restaurants 1.87g - 1.9g salt per 100g

Supermarkets 0.9g - 1.78g salt per 100g

- 4.1. Cheese & Tomato pizzas were the least salty pizzas and pepperoni (or equivalent) the saltiest per 100g. The greatest range of the salt content was observed in Cheese and Tomato pizzas with the saltiest pizza containing more than four times the salt levels of the lowest salt comparison at the start of the project.
- 4.2. On average the restaurants have reduced the salt in all four of the pizza varieties. Chart 1 below shows that the average salt content per 100g has fallen in each of the four pizza categories from between 0.06g and 0.15g. This equates to an average reduction of between 3.8 and 10.8 percent salt per 100g.

Chart 1



Salt content of pizzas, per portion:

Cheese and Tomato:		
Range of data from 19 independent and small chain restaurants (whole pizza):		
Start Data	2.99g - 7.05g salt per portion	Average 4.94g (mean)
End Data	2.51g - 6.03g salt per portion	Average 4.34g (mean)
Average reduction = 0.608g (p=0.072: CI (95%) -0.61 – 1.28)		
% Average reduction = 12.3%		
Comparison:		
Large chain restaurants	2.03g - 4.0g salt per portion (whole pizza)	
Supermarkets	1.1g - 5.40g salt per portion (Portion size range from whole to one-third of a pizza)	

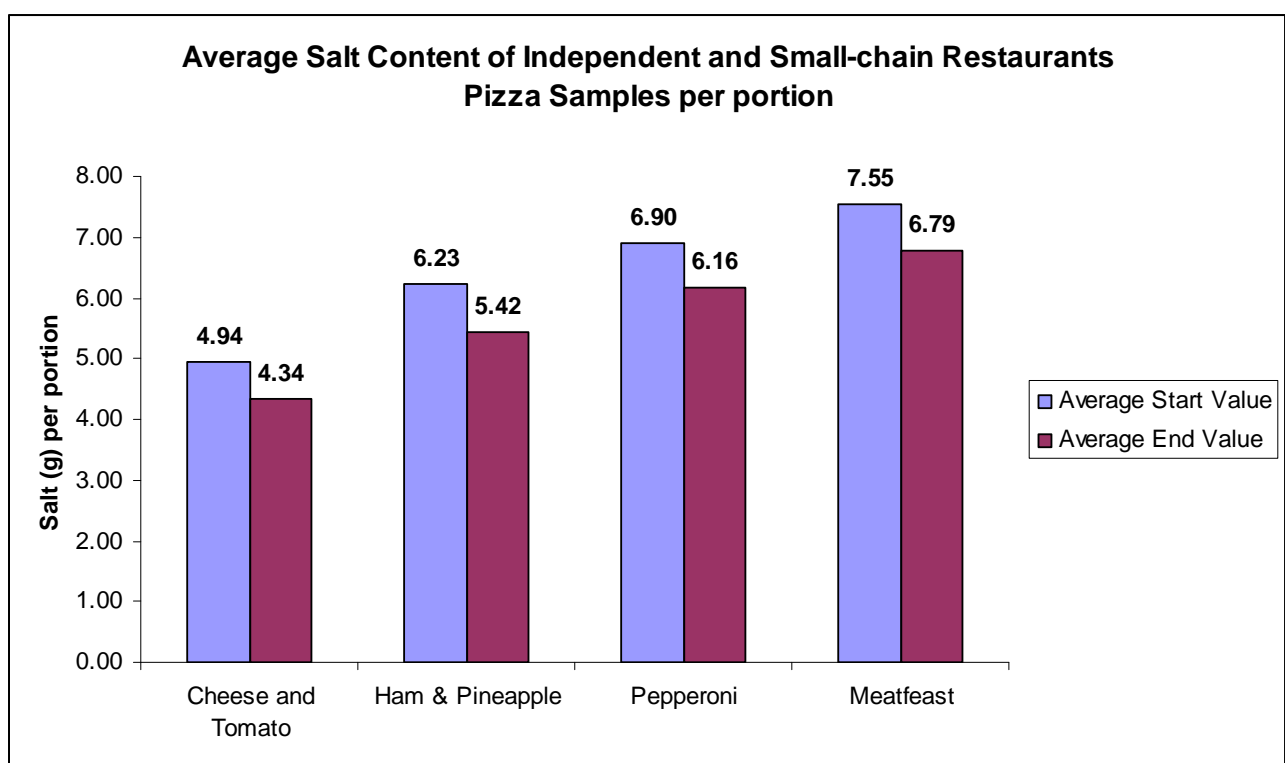
Ham and Pineapple:		
Range of data from 19 independent and small chain restaurants (whole pizza):		
Start Data	3.75g - 9.44g salt per portion	Average 6.23g
End Data	3.16g - 8.85g salt per portion	Average 5.42g
Average reduction = 0.87g (p=0.055: CI (95%) -0.21 – 1.76)		
% Average reduction = 13.8%		
Comparison:		
Large chain restaurants	3.0g - 4.51g salt per portion (whole pizza)	
Supermarkets	1.10 - 6.59g salt per portion (Portion size range from whole to one-third of a pizza)	

Pepperoni:		
Range of data from 19 independent and small chain restaurants (whole pizza):		
Start Data	3.96g - 10.65g salt per portion	Average 6.90g
End Data	3.43g – 8.64g salt per portion	Average 6.16g
Average reduction = 0.733g (p=0.084: CI (95%) -0.11 – 1.58)		
% Average reduction = 10.6%		
Comparison:		
Large chain restaurants	4.0g - 4.8g salt per portion (whole pizza)	
Supermarkets	1.1g - 6.93g salt per portion (Portion size range from whole to one-third of a pizza)	

Meat Feast/Supreme:		
Range of data from 14 independent and small chain restaurants (whole pizza):		
Start Data	4.56g - 11.61g salt per portion	Average 7.55g
End Data	4.73g - 10.50g salt per portion	Average 6.79g
Average reduction = 0.791g (p=0.18:CI (95%) -0.42 – 2.00)		
% Average reduction = 10.5%		
Comparison:		
Large chain restaurants	3.5g - 6.38g salt per portion (whole pizza)	
Supermarkets	1.6g - 6.81g salt per portion (Portion size range from whole to one-third of a pizza)	

- 4.3. The amount of salt in supermarket pizza, per portion was far lower than that seen in the independent and small-chain restaurants; however, the recommended portion sizes vary, especially in the supermarket pizzas. All recommended portion sizes can be found in the full data spread-sheets in Appendix C.
- 4.4. On average the restaurants involved in this project have reduced the salt in all four of the pizza varieties. Chart 2 below shows that the average salt content per portion has fallen in each of the four pizza categories from between 0.6g and 0.81g. This equates to an average reduction of between 10.5 and 13.8 percent salt per pizza portion. Cheese & Tomato pizzas had the lowest levels of salt and Meat Feast/Supreme (or equivalent) had the highest levels of salt per portion.

Chart 2



Range of salt content of the core ingredients per 100g:

Dough:

Range of data from 20 independent and small chain restaurants:

Start Data	0.48g - 1.95g salt per 100g	Average 1.14g
End Data	0.48g - 2.23g salt per 100g	Average 1.10g
Average reduction = 0.043g (p=0.661: CI (95%) -0.11 – 1.58)		
% Average reduction = 3.8%		

Sauce:

Range of data from 20 independent and small chain restaurants:

Start Data	0.02g - 1.77g salt per 100g	Average 0.76g
End Data	0.09g - 1.64g salt per 100g	Average 0.74g
Average reduction = 0.012g (p=0.865: CI (95%) -0.11 – 1.58)		
% Average reduction = 1.5%		

Cheese:

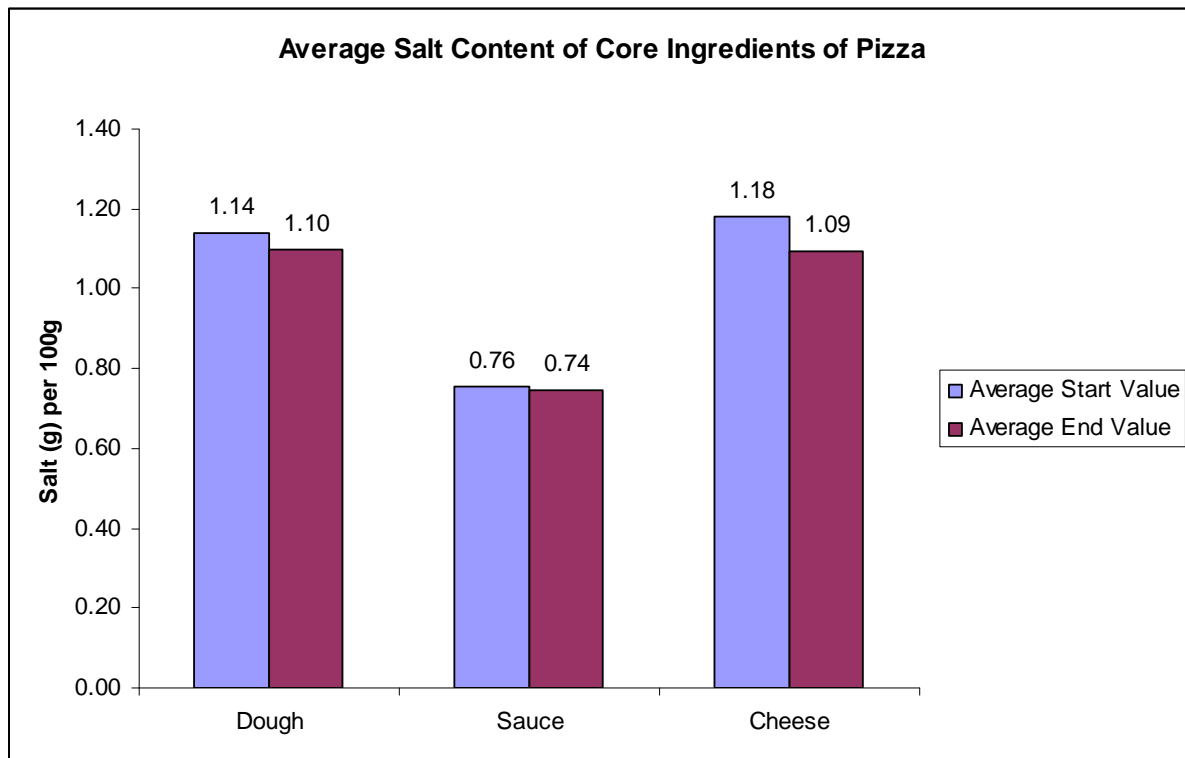
Range of data from 20 independent and small chain restaurants:

Start Data	0.16g - 1.77g salt per 100g	Average 1.18g
End Data	0.21g - 1.76gg salt per 100g	Average 1.09g
Average reduction = 0.087g (p=0.271: CI (95%) -0.11 – 1.58)		
% Average reduction = 7.4%		

(All samples un-cooked)

- 4.5. When comparing the start data of the core ingredients, there is more than a four-fold difference in the dough, and an 11-fold difference between the lowest and highest salt Mozzarella. The sauce recipes varied the most with one sample containing only 0.02g salt per 100g, whereas the highest contained 1.77g salt per 100g.
- 4.6. Some individual restaurants core ingredients have higher salt content in the end data, however a downward trend was observed overall. On average the restaurants have reduced the salt in all three of the core ingredients. We have found on average that a reduction of between 1.5 and 7.4 percent salt per 100g has been obtained with the biggest reduction in cheese equating to 0.09g. The variability of salt content in mozzarella means this result should be viewed with caution.
- 4.7. The individual dough and cheese data collected from individual restaurants had a greater range of results, with a higher individual range in the end data, compared to pizzas. However, on average the results were lower, indicating a reduction overall. These results and potential reasons for the average reduction have been highlighted in the discussion.

Chart 3



Assessment of Kitchen Practices in Independent and Small Chain Pizza Restaurants prior to Intervention

- 4.8. Nineteen of the twenty restaurants prepared their dough on the premises and one sourced its dough externally. Six restaurants weighed a portion of dough for each pizza, whereas 13 of the restaurants portioned enough dough for one pizza by sight. The restaurant that sourced its dough externally received the dough already portioned per pizza. In the 19 restaurants making their own dough, salt is added to dough as a ratio to the flour used, and the salt added is weighed.
- 4.9. Tomato sauce is made on the premises of all restaurants except one. Eighteen restaurants added salt to the sauce by sight, then adjusted to taste, whilst one restaurant started with a measured portion of salt and then seasoned to taste. The amount of tomato sauce to spread over the pizza base is measured in ladles. Generally, restaurants added one ladle and added further sauce if required.
- 4.10. All restaurants added cheese by hand, determining the amount to add by sight.

Assessment of Kitchen Practices in Independent and Small Chain Pizza Restaurants after Intervention

- 4.11. While the basic kitchen practice of preparing the core ingredients in-house (for 19 of the 20 restaurants) and cooking the pizzas to order has not changed, some of the suggested salt reduction tips outlined in the toolkit have been adopted. Specifically five of the restaurants had trialled lower salt dough with their customers and received no negative feedback. Four of the restaurants said they intend to trial a reduced salt sauce, and four of the restaurants mentioned their intention of sourcing a lower salt mozzarella with their suppliers. Each of the restaurants highlighted the fact that they are nervous about making drastic changes as they cannot afford to lose regular custom, therefore the advice on making small gradual changes was appealing.

Procurement

- 4.12. Restaurants were asked about their procurement habits for their ingredients and provided their current suppliers for Mozzarella, meat, fish, vegetables and other ingredients such as olives and flour.
- 4.13. Restaurants selected and alternated between suppliers based on a number of criteria such as; cost, availability of the required products, quality, location and general preference. Large, national suppliers were not used, hence a large variety of suppliers were identified by each restaurant for different ingredients. Meat, vegetables and other ingredients such as olives and flour were sourced from a wide range of suppliers with little overlap. Fish and mozzarella were sourced from a lower number of suppliers suggesting more specialism in those areas.

Toolkit and Project Evaluation

4.14. The following evaluation data was collected from the 20 pilot restaurants using a semi structured questionnaire.

Question	No (%)	Yes (%)
Prior to this project did you worry about the amount of salt you use in your pizzas?	75	25
Do you now have any concerns about the amount of salt you use in you use in your pizzas?	35	65
Since receiving the information pack, do you have a better understanding the issues surrounding salt and health?	15	85
Have you displayed the poster?	90	10
Are you likely to use any of the salt reduction suggestions outlined in the booklet?	40	60
Do you feel that you have benefitted by participating in this project?	10	90
Would you participate in a similar project in the future?	10	90

4.15. The following evaluation data was collected from 18 of the 20 restaurants who were sent the toolkit by post, using a semi-structured questionnaire. The remaining 2 restaurants could not be contacted.

Question	No (%)	Yes (%)
Have you received the '5 simple steps to reduce salt in pizza' information pack?	33	67
Have you read the booklet?	50% of those that received it	50% of those that received it

All 18 restaurants were able to answer the remaining questions having been shown the toolkit in the face to face evaluation:

Question	No (%)	Yes (%)
Prior to receiving this information did you worry about the amount of salt you use in your pizzas?	89	11
Have you displayed the poster?	100% of those that received it	0% of those that received it
Are you likely to use any of the salt reduction suggestions outlined in the booklet?	67	33
Do you feel that you have benefitted by receiving this information?	6	94

5. Discussion

Pizza Analysis

- 5.1. On average it was found that there was a decrease in the amount of salt used in all three core ingredients (dough 4%, sauce 1.5%, cheese 7% per 100g) as well as in all four pizza varieties (Cheese & Tomato 12%, Ham & Pineapple 14%, Pepperoni 11%, Meatfeast 10% per pizza) after intervention. Forty seven pizza samples (out of 71) showed a decrease in salt content, and the average salt content fell across all seven categories studied. Twenty eight pizza samples (out of 71) showed an increase in salt content.
- 5.2. If the changes in the pizzas' salt contents were due to normal fluctuations, we would not expect to see an overall average increase or decrease and therefore consider that there has been deliberate effort to reduce salt by some of the small business operators. However the results from the pilot study were not statistically significant, which may have been due to a number of factors:
 - The research was designed as a pilot study; as such the sample size was lower than required for statistical analyses.
 - As the pizzas are made by hand, there may be natural variations day to day, with toppings being added by sight rather than being weighed
 - There may also be product differences and/or inherent analytical error
 - In addition, the level of expanded uncertainty for Eurofins sample analysis is 7.54% for sodium which is not taken in to account in the statistics.
- 5.3. As the core ingredients of dough, tomato sauce and cheese are used in all pizzas, any reduction in salt levels seen in each of these ingredients would make a large contribution to reducing the total salt content of different pizza varieties. However, it is hard to draw conclusions from the results as to the effectiveness of the intervention on any single ingredient due to the small reductions seen per 100g and the inherent variability of these products.
- 5.4. Both the analysis and the qualitative results, discussed later, indicate that awareness of the issue of salt was raised and that the restaurants responded in a positive way by reducing the amount of salt used in their recipes. One restaurant has taken the meatfeast/supreme option off the menu due to the high salt content, and one restaurant was able to reduce the salt content of their meatfeast option by a half. The restaurants that trialled lower salt pizzas did not report any dissatisfaction with their technical function or any complaints from their customers.
- 5.5. Within three of the four pizza varieties, a lower percentage reduction of salt per 100g than per portion was reported, which was not statistically significant. This can be attributed to several of the initial samples collected weighing more than the end of project samples. The difference in weight may be due to; a deliberate use of smaller portion sizes, our recommendation for reducing the amount of topping used, or normal kitchen variation.

Toolkit Analysis

- 5.6. The toolkit was evaluated by way of a questionnaire, using both open and closed questions. The open questions generated positive feedback on both the content and design of the information booklet. The poster gained both positive and negative feedback.
- 5.7. There were both positive and negative comments on the toolkit which can be summarised as follows:
- Positive: The booklet is clear, concise, simple to follow, practical, well designed and useful.
 - Negative: The booklet is limited only to salt, whereas information on fats would also be useful. The poster is informative, but it is too big, too much writing, a 'cheesy' design, not fire-proof and not made of a wipe clean material therefore not suitable for use in the kitchen. It was also pointed out that it is 'hidden away' in the back cover of the booklet therefore it is 'not very obvious'.
- 5.8. The negative comments reflect the low uptake of the poster. Only 10% of the recruited restaurants and 0% of the restaurants that received the toolkit cold said that they had displayed it.

Other Feedback

- 5.9. The responses to the closed questions revealed that the number of restaurants concerned over the amount of salt used in their pizzas increased from 25% to 65% after receiving the toolkit. Also that 85% of the restaurants felt that they had a better understanding of the issues surrounding salt and health since receiving the information.
- 5.10. Sixty per cent of the restaurants felt that they would use one or more of the suggestions outlined in the toolkit, and 90% of the restaurants felt that they had benefitted from participating in the project and that they would do so again if approached in the future. Whilst additional support was offered to each of the restaurants, none has since been requested.
- 5.11. When the alternative delivery method for the toolkit was assessed, whereby 20 restaurants received the information in the post, addressed to the proprietor, the toolkit was discussed with these restaurants, regardless of whether they had previously read the information.
- It was found that 67% of the information reached the person it was targeted at, and of those that received the information, half of those read the toolkit unprompted.
 - Whilst only 11% of these restaurants considered the amount of salt they use in their pizzas a worry, 94% of the restaurants felt that they had benefitted from receiving the information. This does not translate to action, as only 33% of the restaurants visited stated that they were likely to use any of the salt reduction suggestions.
 - The reasons that were repeatedly given were that they were short of time, afraid to alienate their customers by making changes and that customers add salt at the table anyway.

- 5.12. The information sent out with no face to face intervention did not result in the same positive action as with the pilot restaurants, with only 33% of all of the restaurants visited stating that they were likely to use any of the salt reduction suggestions at present. This would seem to indicate that dissemination methods have an impact on the likelihood that any information provided is actioned by the business.

Reflection and Improvements for Future Projects

- 5.13. Restaurant proprietors faced two main barriers were present that caused resistance from to participating in this project, and embracing the suggested changes. The first was time constraints, which proprietors cited as a barrier. Future projects should include clear guidance as to the time required by the small business to implement any changes, and should try to ensure that the time needed is minimum.
- 5.14. Secondly, the timing of this project has coincided with a time of great uncertainty for small businesses due to the recession. Proprietors repeatedly voiced concerns about making recipe changes at the risk of alienating their customers. Their main focus at the present time is on staying afloat financially rather than tweaking recipes. According to the feedback received from the evaluation of restaurants that received the toolkit 'cold', 12 out of 18 responses stated this as a reason not to take on board the suggested changes.
- 5.15. The method of the project worked well, however there are some improvements which could be made in the future as follows:
- The recruitment process was intensive due to the difficulty in reaching the 'decision-maker' in the restaurant. The project's efficiency would be increased by first identifying the registered proprietor, then arranging a meeting with them directly.
 - It may be beneficial to take photos of each of the pizza samples so that the toppings can be compared. This would work for comparing different restaurants samples, as well as for comparing before and after samples, and may help identify why some of the variance occurs.
 - In order to address financial concerns it may be beneficial to highlight any potential cost savings that following the tips will make, alongside their health benefit, for example using accurate portion control to limit the amount of toppings added also increases profit margins.
 - In order to undertake a more in-depth qualitative evaluation, it would be beneficial to have the final sample sodium results for the restaurant available to the evaluator. This would allow the evaluator to focus on how specific results were accomplished. Additionally, detailed feedback relating to each of the specific tips in the toolkit would be useful, in order to gain detailed data on why information is being accepted or rejected by the participant.
 - The same person collected the first and second samples. This may potentially have alerted the restaurants to the reason for the order. Although the restaurants prepare their sauce and dough in advance, therefore limiting the ability to alter the samples, it could affect the amount of toppings used on the

pizza samples, thereby potentially reducing the salt content. In future it may be better to have different people doing the start and end sample collection.

- To obtain statistically valid results, consideration of sample size required, repeated sampling on different days, and multiple testing of samples would be needed to account for natural variation.

Further Work

- 5.16. Across each of the four pizza types tested, some already met Agency 2012 salt targets for pizza indicating the targets are achievable for small businesses. However there was also a large range of results, with a greater than two-fold difference between the lowest to highest salt content in each pizza type indicating ongoing work may be appropriate in order to consistently enable small businesses to bring salt levels down. The method of delivery of the toolkit is also critical to the outcome therefore further work is needed to establish its effectiveness in achieving reductions in a wider sample over a sustained period of time. Further work may be carried out as follows:
- 5.17. *Working with suppliers.* One third of the individual pizzas that failed to obtain lower salt results were of the meatfeast/supreme variety, this highlights the need to work with meat suppliers to reduce the amount of salt used during processing. During this project it was not considered likely that significant change could be achieved within the timescale. In future, working with suppliers alongside small businesses is likely to increase the success of any small business salt reduction strategy and should be considered, for example by enabling the procurement of lower salt products through increased buying power.
- 5.18. *Trialling of other methods of distribution.* The added support of a recognisable industry expert such as Trading Standards or Environmental Health Officers explaining the importance of the information could be extremely beneficial in initiating salt reduction strategies in independent and small-chain restaurants.
- 5.19. *Adapt to different sectors of the catering industry.* It may be a useful exercise to extend the research on receiving the information 'cold' to a larger audience as bulk mail, and evaluate the response. The relevant toolkit could be distributed at a very low cost, thereby enabling evaluation of the effectiveness of the approach on a much wider scale.
- 5.20. *Include information on other nutrients.* The project was focused on salt, which was highlighted as an issue for some of the restaurant proprietors. If a further project included another nutrient such as fat, this would provide information on a wider range of public health issues and offer restaurants support in producing healthier offerings.
- 5.21. *Evaluate over a longer time frame.* Small incremental changes are recommended for salt reduction in order to avoid customer detection. Therefore it may be beneficial to re-visit the 20 recruited restaurants after a longer period of time, perhaps six months, in order to re-test their core ingredients and pizzas. This would allow measurement of improvements through changes in procurement or cooking practices over time.

6. Conclusion

- 6.1. The aims of this project were to identify where small businesses could make changes to reduce salt and to help them to do so. This project has shown that a targeted approach focused on practical interventions for small business, which is tailored to the products they sell, the composition of their own products and their kitchen practices can be successful in changing practices with regards to salt reduction.
- 6.2. There are some difficulties in this type of intervention, primarily due to the natural variation in the type of product being looked at, and the method of production, but overall there did seem to be a trend in reduction in salt. Two-thirds of the pizza samples showed a decrease in salt content, and the average salt content fell across all seven categories studied. Although the results were not statistically significant, the general downwards trend in salt content does suggest that the advice was pointing businesses in the right direction. This indicates that the pilot study intervention has been successful and is worth pursuing.
- 6.3. The basic advice issued went some way to bring about behavioural changes in practice over the duration of the trial; however it is the dissemination route for the advice that needs to be taken into account and is critical to the outcome. It was found that when restaurants received an explanation of the content of the toolkit, the information was received well and positive feedback was obtained. When the toolkit was trialled without expert support, the response was not as positive, although the toolkit was still successful in raising awareness of the issue of salt. The added support of an expert explaining the importance of the information could hold the key to initiating salt reduction strategies in independent and small-chain restaurants.

Appendices

Appendix A. Project Evaluation form

Understanding and concern about salt

- 1) Prior to this project, what was your understanding of the issues surrounding salt and health?
- 2) Prior to this project did you worry about the amount of salt you use in your pizzas?
Y/N
- 3) If yes, what were your concerns?
- 4) If no, do you have any concerns now? Y/N
- 5) If Yes, what are they?
- 6) Since receiving the information pack, do you have a better understanding of the issues surrounding salt and health? Y/N
- 7) If no, what are your questions, and who would you normally ask?

Effectiveness of the literature

- 8) What are your views on the '5 simple steps to reduce salt in pizza' booklet?
Content -
Design -
- 9) If you could how would you improve the booklet?
Content -
Design -
- 10) Have you displayed the poster? Y/N
- 11) If yes, where?
- 12) If no, why?
- 13) What are your views on the '5 simple steps to reduce salt in pizza' poster?

Content -

Design -

14) If you could how would you improve the poster?

Content -

Design -

Changes to kitchen practice/procurement

15) Are you likely to use any of the salt reduction suggestions outlined in the booklet?

Y/N

16) If yes, please describe the changes

17) If no, why?

18) Do you have any other salt reduction ideas that were not included in the booklet?

Review of project

19) Do you feel that you have benefitted by participating in this project?

Y/N

20) If yes, please describe the benefits

21) What improvements could have made this project more useful for you?

22) Did you find the face to face feedback helpful?

23) If we had sent the information pack to you through the post, would you have made any changes?

24) What other ways are there to get information to you? (trading standards/environmental health visits, email, magazine articles, tradeshow, supplier catalogues trade association such as PAPA?)

25) Would you participate in a similar project in the future?

Y/N

Appendix B. Non-Project Evaluation form

This was used with restaurants who received information in the post and were not part of the pilot group.

Understanding and concern about salt

- 1) Have you received the '5 simple steps to reduce salt in pizza' information pack?
Y/N
- 2) Have you read the booklet? Y/N
- 3) If no, why?
- 4) What was your understanding of the issues surrounding salt and health?
- 5) Did you worry about the amount of salt you use in your pizzas? Y/N
- 6) If yes, what were your concerns?
- 7) If no, do you have any concerns now? Y/N
- 8) If Yes, what are they?
- 9) Since receiving the information pack, do you have a better understanding of the issues surrounding salt and health? Y/N
- 10) If no, what are your questions, and who would you normally ask?

Effectiveness of the literature

- 11) What are your views on the '5 simple steps to reduce salt in pizza' booklet?

Content -

Design -

- 12) How would you improve the booklet?

Content -

Design -

- 13) Have you displayed the poster? Y/N

14) If yes, where?

15) If no, why?

16) What are your views on the '5 simple steps to reduce salt in pizza' poster?

Content -

Design -

17) How would you improve the poster?

Content -

Design -

Changes to kitchen practice/procurement

18) Are you likely to use any of the salt reduction suggestions outlined in the booklet?

Y/N

19) If yes, please describe the changes (dough, sauce, cheese, menu, procurement)

20) If no, why?

21) Do you have any other salt reduction ideas that were not included in the booklet?

Review of project

22) What other ways are there to get information to you? (trading standards/environmental health visits, email, magazine articles, tradeshow, supplier catalogues trade association such as PAPA?)

23) Do you feel that you have benefited by receiving this information?

Y/N

24) If yes, please describe the benefits

Appendix C. Nutrition Analysis Data

Cheese & Tomato												
Restaurant/ Brand/ Retailer Code	Base	Product description	Pizza weight (g)	Recommended portion	Portion size (g)	Sodium (g) per 100g	Sodium (g) per portion	Salt (g) per 100g	Salt (g) per portion	Date sample received	Method of obtaining information	Notes
Independent/ Small Chain Restaurants - START DATA												
1	Thin	Topped with fresh tomato, fresh mozzarella & basil	488.93	Whole Pizza	488.93	0.446	2.181	1.13	5.52	14/04/2009	Analysis	
2	Thin	Oregano, mozzarella, tomato	307.36	Whole Pizza	307.36	0.480	1.475	1.22	3.75	14/04/2009	Analysis	
3	Thin	Tomato & mozzarella	418.81	Whole Pizza	418.81	0.569	2.383	1.45	6.07	14/04/2009	Analysis	
4	Thin	Tomato, mozzarella and oregano	361.01	Whole Pizza	361.01	0.497	1.794	1.26	4.55	14/04/2009	Analysis	
5	Thin	Mozzarella, tomato & basil	343.39	Whole Pizza	343.39	0.343	1.178	0.87	2.99	17/04/2009	Analysis	
6	Thin	Mozzarella & tomato	357.30	Whole Pizza	357.30	0.604	2.158	1.53	5.47	14/04/2009	Analysis	
7	Thin	Tomato, mozzarella, basil	331.12	Whole Pizza	331.12	0.708	2.344	1.80	5.96	14/04/2009	Analysis	
8	Thin	Classic tomato sauce topped with mozzarella cheese	396.18	Whole Pizza	396.18	0.576	2.282	1.46	5.78	17/04/2009	Analysis	
9	Thin	Tomato, mozzarella & basil	360.03	Whole Pizza	360.03	0.467	1.681	1.19	4.28	14/04/2009	Analysis	
10	Thin	Margherita	149.94	Pizza slice	149.94	0.212	0.310	0.54	0.91	17/04/2009	Analysis	
11	Thin	Margherita	349.89	Whole Pizza	349.89	0.628	2.198	1.60	5.60	14/04/2009	Analysis	
12	Thin	Tomato sauce base with mozzarella and pepperoni	377.32	Whole Pizza	377.32	0.554	2.090	1.41	5.32	20/04/2009	Analysis	
13	Thin	Mozzarella, tomato & oregano	333.59	Whole Pizza	333.59	0.450	1.501	1.14	3.80	14/04/2009	Analysis	
14	Deep Pan	Mozzarella cheese & tomato sauce	426.38	Whole Pizza	426.38	0.388	1.654	0.99	4.22	14/04/2009	Analysis	
15	Thin	Mozzarella, tomato sauce & fresh basil	341.71	Whole Pizza	341.71	0.471	1.609	1.20	4.10	18/06/2009	Analysis	
16	Thin	Tomato, mozzarella, parmesan cheese and basil	391.40	Whole Pizza	391.40	0.648	2.536	1.65	6.46	18/06/2009	Analysis	
17	Thin	Tomato & mozzarella	458.03	Whole Pizza	458.03	0.372	1.704	0.94	4.31	18/06/2009	Analysis	
18	Thin	Tomato, mozzarella and basil	374.91	Whole Pizza	374.91	0.419	1.571	1.06	3.97	18/06/2009	Analysis	
19	Thin	Cheese & tomato	370.68	Whole Pizza	370.68	0.503	1.865	1.28	4.74	29/06/2009	Analysis	
20	Thin	Tomato & mozzarella	314.60	Whole Pizza	314.60	0.881	2.772	2.24	7.05	08/07/2009	Analysis	
Independent/ Small Chain Restaurants - END DATA												
1	Thin	Topped with fresh tomato, fresh mozzarella & basil	379.39	Whole Pizza	379.39	0.434	1.647	1.10	4.17	23/09/2009	Analysis	
2	Thin	Oregano, mozzarella, tomato	292.15	Whole Pizza	292.15	0.504	1.472	1.28	3.74	23/09/2009	Analysis	
3	Thin	Tomato & mozzarella	411.21	Whole Pizza	411.21	0.574	2.380	1.46	6.00	23/09/2009	Analysis	
4	Thin	Tomato, mozzarella and oregano	319.82	Whole Pizza	319.82	0.488	1.581	1.24	3.97	18/09/2009	Analysis	
5	Thin	Mozzarella, tomato & basil	380.70	Whole Pizza	380.70	0.528	2.002	1.34	5.10	18/09/2009	Analysis	
6	Thin	Mozzarella & tomato	305.16	Whole Pizza	305.16	0.399	1.218	1.01	3.08	18/09/2009	Analysis	
7	Thin	Tomato, mozzarella, basil	376.70	Whole Pizza	376.70	0.810	3.051	2.06	7.76	25/09/2009	Analysis	
8	Thin	Classic tomato sauce topped with mozzarella cheese	386.00	Whole Pizza	386.00	0.255	0.984	0.65	2.51	25/09/2009	Analysis	
9	Thin	Tomato, mozzarella & basil	345.40	Whole Pizza	345.40	0.401	1.385	1.02	3.52	25/09/2009	Analysis	
10	Thin	Margherita	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not re-tested as non menu
11	Thin	Margherita	347.39	Whole Pizza	347.39	0.346	1.202	0.88	3.06	18/09/2009	Analysis	
12	Thin	Tomato sauce base with mozzarella and pepperoni	368.70	Whole Pizza	368.70	0.398	1.459	1.01	3.70	18/09/2009	Analysis	
13	Thin	Mozzarella, tomato & oregano	335.49	Whole Pizza	335.49	0.350	1.174	0.89	2.99	18/09/2009	Analysis	
14	Deep Pan	Mozzarella cheese & tomato sauce	452.70	Whole Pizza	452.70	0.379	1.716	0.96	4.35	18/09/2009	Analysis	
15	Thin	Mozzarella, tomato sauce & fresh basil	343.42	Whole Pizza	343.42	0.589	2.023	1.50	5.15	18/09/2009	Analysis	
16	Thin	Tomato, mozzarella, parmesan cheese and basil	360.72	Whole Pizza	360.72	0.630	2.273	1.60	5.77	18/09/2009	Analysis	
17	Thin	Tomato & mozzarella	448.42	Whole Pizza	448.42	0.411	1.843	1.04	4.66	22/09/2009	Analysis	
18	Thin	Tomato, mozzarella and basil	339.31	Whole Pizza	339.31	0.293	0.904	0.74	2.51	22/09/2009	Analysis	
19	Thin	Cheese & tomato	363.23	Whole Pizza	363.23	0.467	1.696	1.19	4.32	22/09/2009	Analysis	
20	Thin	Tomato & mozzarella	354.68	Whole Pizza	354.68	0.668	2.369	1.70	6.03	23/09/2009	Analysis	
Large Chain Restaurants												
1L	Personal Pizza	Topped with 100% mozzarella cheese and Domino's own tomato sauce	No data	Whole Pizza	No data	No data	0.81	No data	2.03	18/03/2009	Company Website	
2L	Classic Pizza	Mozzarella and tomato sauce	269.03	Whole Pizza	269.03	0.530	1.426	1.35	3.63	22/04/2009	Analysis	
3L	Individual Italian	Traditional style base is hand-stretched to order to create the perfect thickness with mozzarella cheese and tomato sauce	No data	Whole Pizza	No data	No data	No data	1.5	4.0	18/03/2009	Company Website	
3L	Individual Pan	Thick and fluffy pan baked pizza with mozzarella cheese and tomato sauce	No data	Whole Pizza	No data	No data	No data	1.1	3.2	18/03/2009	Company Website	
Supermarkets												
1S	Deep	Cheese & Tomato	424.82	Whole Pizza	424.82	0.500	2.124	1.27	5.40	22/04/2009	Analysis	Fresh' pizza. Analysis for un-cooked pizza
1S	Thin	Cheese & Tomato	355.01	Whole Pizza	355.01	0.480	1.704	1.22	4.33	20/04/2009	Analysis	Fresh' pizza. Analysis for un-cooked pizza
1S	Stone baked (thin)	An Italian pizza base topped with a rich tomato sauce and mozzarella	300	Half Pizza	150	0.29	0.43	0.7	1.1	17/04/2008	Packaging	Frozen' pizza. Analysis for cooked pizzas
2S	Italian Inspiration	Stone baked pizza topped with tomato sauce, mozzarella, emmental and cheddar cheese	350	Half Pizza	175	0.3	0.5	0.8	1.3	20/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizzas
3S	Italian style stone baked	Thin & crispy stone baked pizza, topped with tomato sauce, sliced mozzarella cheese, cherry tomatoes, basil sauce, emmental cheese, medium fat hard cheese, coloured cheddar, cheddar, gouda and edam cheese	400	Half Pizza	200	0.3	0.5	0.7	1.3	20/04/2009	Packaging	Frozen' pizza. Analysis for cooked pizzas
4S	Stone baked (thin)	A handcrafted stone baked base topped with a rich tomato sauce & a blend of mozzarella & cheddar cheeses	365	Half Pizza	183	0.40	0.73	1.00	1.83	17/04/2009	Packaging	Chilled' pizza. Analysis for un-cooked pizzas
5S	Thin		395.98	Whole Pizza	395.98	0.280	1.109	0.71	2.81	17/04/2009	Analysis	Fresh' pizza. Analysis for un-cooked pizza
6S	Thin & Crispy	A thin & crispy pizza base covered with tomato sauce, mozzarella and cheddar cheeses, garnished with parsley	275	Half Pizza	138	0.34	0.51	0.85	1.28	17/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizzas
7S	Italian	A light and aerated Italian style base with tomato sauce, hand topped with mozzarella and cheddar cheese	342	Half Pizza	171	0.3	0.4	0.6	1.1	19/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizzas
8S	Deep and crispy	A light and crisp Deep Pan pizza base topped with tomato sauce, mozzarella and cheddar cheese, marinated tomato and a sprinkle of parsley	360	Half Pizza	180	0.43	0.77	1.08	1.93	22/04/2009	Packaging	Chilled' pizza. Analysis for un-cooked pizzas
8S	Thin and crispy	A thin and crispy pizza base topped with chopped tomatoes, mozzarella and cheddar cheeses	305	Half Pizza	153	0.42	0.64	1.05	1.60	22/04/2009	Packaging	Chilled' pizza. Analysis for un-cooked pizzas

Ham & Pineapple												
Restaurant/ Brand/ Retailer code	Base	Product description	Pizza weight (g)	Recommended portion	Portion size (g)	Sodium (g) per 100g	Sodium (g) per portion	Salt (g) per 100g	Salt (g) per portion	Date sample received	Method of obtaining information	Notes
Independent/ Small Chain Restaurants - START DATA												
1	Thin	Ham & Mushroom	436.97	Whole Pizza	436.97	0.490	2.141	1.24	5.42	14/04/2009	Analysis	
2	Thin	Ham, pineapple, mozzarella, tomato	423.88	Whole Pizza	423.88	0.389	1.649	0.99	4.20	14/04/2009	Analysis	
3	Thin	Tomato, mozzarella, ham, mushrooms & pineapple	632.70	Whole Pizza	632.70	0.548	3.467	1.39	8.79	14/04/2009	Analysis	
4	Thin	Tomato, mozzarella, ham, pineapple and sweet corn	537.11	Whole Pizza	537.11	0.647	3.475	1.64	8.81	14/04/2009	Analysis	
5	Thin	Mozzarella, tomato, cooked ham and mushrooms	382.96	Whole Pizza	382.96	0.386	1.478	0.98	3.75	17/04/2009	Analysis	
6	Thin	Ham, mushroom, pineapple, mozzarella & tomato	513.34	Whole Pizza	513.34	0.544	2.793	1.38	7.08	14/04/2009	Analysis	
7	Thin	Tomato, mozzarella, ham, mushrooms	479.95	Whole Pizza	479.95	0.675	3.240	1.71	9.21	14/04/2009	Analysis	
8	Thin	Tomato sauce, ham, pineapple and mozzarella cheese	548.81	Whole Pizza	548.81	0.531	2.914	1.35	7.41	17/04/2009	Analysis	
9	Thin	Tomato, mozzarella, ham and mushroom	390.46	Whole Pizza	390.46	0.477	1.862	1.21	4.72	14/04/2009	Analysis	
10	Thin	Prosciutto & Mushroom	236.64	Pizza slice	236.64	0.462	1.093	1.17	2.77	17/04/2009	Analysis	
11	Thin	Ham & pineapple	473.14	Whole Pizza	473.14	0.577	2.730	1.47	6.96	14/04/2009	Analysis	
12	Thin	Tomato sauce, mozzarella and freshly sliced San Daniele ham	414.11	Whole Pizza	414.11	0.727	3.011	1.85	7.66	20/04/2009	Analysis	
13	Thin	Ham & pineapple	390.48	Whole Pizza	390.48	0.405	1.581	1.03	4.02	14/04/2009	Analysis	
14	Deep pan	Ham & pineapple	497.62	Whole Pizza	497.62	0.508	2.528	1.29	6.42	14/04/2009	Analysis	
15	Thin	Mushrooms w/ mozzarella, cotta ham and tomato	438.49	Whole Pizza	438.49	0.457	2.004	1.16	5.09	18/06/2009	Analysis	
16	Thin	Tomato, mozzarella, ham and mushrooms	483.94	Whole Pizza	483.94	0.409	1.979	1.04	5.03	18/06/2009	Analysis	
17	Thin	Tomato, mozzarella, ham & mushrooms	527.81	Whole Pizza	527.81	0.411	2.169	1.04	5.49	18/06/2009	Analysis	
18	Thin	Tomato, mozzarella, pancetta, mushrooms, onions	484.78	Whole Pizza	484.78	0.401	1.944	1.02	4.94	18/06/2009	Analysis	
19	Thin	Mushroom, ham & pineapple	423.92	Whole Pizza	423.92	0.563	2.387	1.43	6.06	29/06/2009	Analysis	
20	Thin	Ham, pineapple and sweetcorn	479.26	Whole Pizza	479.26	0.714	3.709	1.97	9.44	08/07/2009	Analysis	
Independent/ Small Chain Restaurants - END DATA												
1	Thin	Ham & Mushroom	356.18	Whole Pizza	356.18	0.454	1.617	1.15	4.10	23/09/2009	Analysis	
2	Thin	Ham, pineapple, mozzarella, tomato	330.37	Whole Pizza	330.37	0.458	1.513	1.16	3.83	23/09/2009	Analysis	
3	Thin	Tomato, mozzarella, ham, mushrooms & pineapple	627.55	Whole Pizza	627.55	0.557	3.495	1.41	8.85	23/09/2009	Analysis	
4	Thin	Tomato, mozzarella, ham, pineapple and sweet corn	422.84	Whole Pizza	422.84	0.494	2.089	1.25	5.29	18/09/2009	Analysis	
5	Thin	Mozzarella, tomato, cooked ham and mushrooms	457.19	Whole Pizza	457.19	0.581	2.585	1.42	6.49	18/09/2009	Analysis	
6	Thin	Ham, mushroom, pineapple, mozzarella & tomato	421.12	Whole Pizza	421.12	0.405	1.706	1.03	4.34	18/09/2009	Analysis	
7	Thin	Tomato, mozzarella, ham, mushrooms	418.60	Whole Pizza	418.60	0.793	3.319	2.01	8.41	25/09/2009	Analysis	
8	Thin	Tomato sauce, ham, pineapple and mozzarella cheese	435.90	Whole Pizza	435.90	0.302	1.316	0.77	3.36	25/09/2009	Analysis	
9	Thin	Tomato, mozzarella, ham and mushroom	469.60	Whole Pizza	469.60	0.406	1.907	1.03	4.84	25/09/2009	Analysis	
10	Thin	Prosciutto & Mushroom	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not re-tested as non menu
11	Thin	Ham & pineapple	435.85	Whole Pizza	435.85	0.478	2.082	1.21	5.27	18/09/2009	Analysis	
12	Thin	Tomato sauce, mozzarella and freshly sliced San Daniele ham	390.67	Whole Pizza	390.67	0.611	2.387	1.55	6.06	18/09/2009	Analysis	
13	Thin	Ham & pineapple	381.42	Whole Pizza	381.42	0.402	1.533	1.02	3.89	18/09/2009	Analysis	
14	Deep pan	Ham & pineapple	458.44	Whole Pizza	458.44	0.389	1.783	0.99	4.54	18/09/2009	Analysis	
15	Thin	Mushrooms w/ mozzarella, cotta ham and tomato	389.14	Whole Pizza	389.14	0.547	2.129	1.39	5.41	18/09/2009	Analysis	
16	Thin	Tomato, mozzarella, ham and mushrooms	433.92	Whole Pizza	433.92	0.708	3.072	1.80	7.81	18/09/2009	Analysis	
17	Thin	Tomato, mozzarella, ham & mushrooms	498.15	Whole Pizza	498.15	0.481	2.396	1.22	6.08	22/09/2009	Analysis	
18	Thin	Tomato, mozzarella, pancetta, mushrooms, onions	394.88	Whole Pizza	394.88	0.313	1.236	0.80	3.16	22/09/2009	Analysis	
19	Thin	Mushroom, ham & pineapple	412.80	Whole Pizza	412.80	0.433	1.787	1.10	4.54	22/09/2009	Analysis	
20	Thin	Ham, pineapple and sweetcorn	412.00	Whole Pizza	412.00	0.641	2.641	1.63	6.72	23/09/2009	Analysis	
Large Chain Restaurants												
1L	Personal Pizza	Ham, pineapple, mushrooms	No data	Whole Pizza	No data	No data	1.21	No data	3.0	18/03/2009	Website	
2L	Classic Pizza	Mozzarella and tomato sauce with prosciutto cotto ham, olives and mushrooms	315.60	Whole Pizza	315.60	0.563	1.777	1.43	4.51	22/04/2009	Analysis	
3L	Individual Italian	Traditional style base is hand stretched to order to create the perfect thickness with tomato sauce, mozzarella, ham slices and pineapple	No data	Whole Pizza	No data	No data	No data	1.3	3.6	18/03/2009	Website	
3L	Individual Pan	Thick and fluffy pan baked pizza with tomato sauce, mozzarella, ham slices and pineapple	No data	Whole Pizza	No data	No data	No data	1.1	3.2	18/03/2009	Website	
Supermarkets												
1S	Deep	Ham & Pineapple	474.23	Whole Pizza	474.23	0.546	2.589	1.39	6.59	20/04/2009	Analysis	Fresh' pizza. Analysis for un-cooked pizza
1S	Thin	Ham & Mushroom	424.66	Whole Pizza	424.66	0.530	2.251	1.35	5.73	20/04/2009	Analysis	Fresh' pizza. Analysis for un-cooked pizza
1S	Stone baked (thin)	An authentic Italian thin and crispy pizza base topped with a rich tomato sauce, creamy mozzarella, sweet and juicy pineapple and ham	426	Half Pizza	213	0.35	0.75	0.9	1.9	17/04/2009	Packaging	Frozen' pizza. Analysis for cooked pizza
1S	Deep	A deep pan pizza base loaded with a rich tomato sauce, mozzarella, ham and sweet pineapple chunks	402	Half Pizza	201	0.28	0.58	0.7	1.5	17/04/2009	Packaging	Frozen' pizza. Analysis for cooked pizza
2S	Italian inspiration	Stone baked pizza topped with tomato sauce, cheese, ham and pineapple (3% ham)	350	Half Pizza	175	0.4	0.6	0.9	1.5	20/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizza
3S	Italian style stone baked	Thin & crispy stone baked pizza, topped with tomato sauce and grated mozzarella cheese, smoked formed ham and succulent pineapple pieces	410	Half Pizza	205	0.3	0.6	0.8	1.6	20/04/2009	Packaging	Frozen' pizza. Analysis for cooked pizza
3S	Deep Pan	A deep pan pizza base topped with tomato sauce, Mozzarella cheese, reformed smoke flavoured ham and sliced mushrooms	400	Third of a pizza	133	0.3	0.4	0.8	1.10	20/04/2009	Packaging	Frozen' pizza. Analysis for cooked pizza
4S	Stone baked (thin)	A handcrafted stone baked base topped with a rich tomato sauce, mozzarella cheese, smoked ham & pineapple pieces	375	Half Pizza	188	0.42	0.79	1.05	1.98	17/04/2009	Packaging	Chilled' pizza. Analysis for un-cooked pizza
5S	Thin	Ham & Pineapple	368.47	Whole Pizza	368.47	0.472	1.739	1.20	4.42	17/04/2009	Analysis	Fresh' pizza. Analysis for un-cooked pizza
6S	Thin & Crispy	A thin & crispy pizza base covered with tomato sauce, a blend of mozzarella and cheddar cheeses topped with smoke flavoured reformed ham with added water and juicy pineapple pieces	330	Half Pizza	165	0.37	0.68	0.93	1.71	17/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizza
7S	Deep Crust Pizza	A pizza base with tomato sauce, mozzarella cheese, reformed ham with added water and pineapple	495	Half Pizza	248	0.4	1.1	1.1	2.7	19/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizza
7S	Italian	A light and aerated Italian style base hand topped with mozzarella cheese, slices of Italian ham and pineapple	364	Half Pizza	182	0.3	0.5	0.7	1.3	19/04/2009	Packaging	Chilled' pizza. Analysis for cooked pizza
8S	Deep and crispy	A light and crisp deep pan pizza base topped with a barbecue sauce, mozzarella and cheddar cheeses, ham, pineapple and a sprinkle of parsley	360	Half Pizza	180	0.47	0.85	1.18	2.13	22/04/2009	Packaging	Chilled' pizza. Analysis for un-cooked pizza
8S	Thin and crispy	A thin and crispy pizza base topped with mozzarella and cheddar cheeses, ham and pineapple	260	Half Pizza	130	0.47	0.61	1.18	1.53	22/04/2009	Packaging	Chilled' pizza. Analysis for un-cooked pizza

Pepperoni

Restaurant/ Brand/ Retailer code	Base	Product description	Pizza weight (g)	Recommended portion	Portion size (g)	Sodium (g) per 100g	Sodium (g) per portion	Salt (g) per 100g	Salt (g) per portion	Date sample received	Method of obtaining information	Notes
Independent/ Small Chain Restaurants - START DATA												
1	Thin	Tomato, cheese and spicy salami	353.62	Whole Pizza	353.62	0.735	2.520	1.07	7.17	14/04/2009	Analysis	
2	Thin	Chili peppers, pepperoni sausage, mozzarella, tomato	268.61	Whole Pizza	268.61	0.669	2.466	1.70	6.27	14/04/2009	Analysis	
3	Thin	Tomato, mozzarella, salami, red peppers & chili	527.83	Whole Pizza	527.83	0.580	3.080	1.47	7.78	14/04/2009	Analysis	
4	Thin	Tomato, mozzarella, pepperoni, and jalapeno peppers	443.56	Whole Pizza	443.56	0.672	2.981	1.17	9.19	14/04/2009	Analysis	
5	Thin	Tomato, mozzarella, Sardinian sausage, roasted peppers and origano	377.33	Whole Pizza	377.33	0.413	1.568	1.05	3.98	17/04/2009	Analysis	
6	Thin	Pepperoni sausage, sweet peppers, olives, mozzarella & tomato	400.49	Whole Pizza	400.49	0.637	2.511	1.59	6.37	14/04/2009	Analysis	
7	Thin	Tomato, mozzarella, hot salami, peppers	493.79	Whole Pizza	493.79	0.588	2.953	1.52	7.51	14/04/2009	Analysis	
8	Thin	Tomato sauce, Italian sausage, jalapenos and mozzarella cheese	604.29	Whole Pizza	604.29	0.584	3.529	1.48	9.94	17/04/2009	Analysis	
9	Thin	Tomato, mozzarella, pepperoni, chorizo & jalapeno peppers	440.15	Whole Pizza	440.15	0.607	2.672	1.56	8.78	14/04/2009	Analysis	
10	Thin	Spicy Salami & Chili	177.26	Pizza Slice	177.26	0.617	1.448	2.08	3.69	17/04/2009	Analysis	
11	Thin	Italian spicy sausage & onion	426.50	Whole Pizza	426.50	0.636	2.725	1.62	8.94	14/04/2009	Analysis	
12	Thin	tomato sauce, mozzarella and pepperoni	391.32	Whole Pizza	391.32	0.629	2.481	1.80	8.28	20/04/2009	Analysis	
13	Thin	Pepperoni, chili & garlic	358.06	Whole Pizza	358.06	0.490	1.719	1.22	4.37	14/04/2009	Analysis	
14	Deep pan	Double pepperoni & double mozzarella	452.95	Whole Pizza	452.95	0.649	2.940	1.65	7.47	14/04/2009	Analysis	
15	Thin	Spicy salami w aubergine, chopped basil & mozzarella	348.68	Whole Pizza	348.68	0.720	2.510	1.83	8.35	18/09/2009	Analysis	
16	Thin	Tomato, mozzarella, pepperoni sausage, chili and parmesan	426.47	Whole Pizza	426.47	0.658	2.819	1.67	7.16	18/09/2009	Analysis	
17	Thin	Tomato, ozzarella, pepperoni, green pepper & chili	497.16	Whole Pizza	497.16	0.427	2.123	1.08	5.37	18/09/2009	Analysis	
18	Thin	Tomato, mozzarella, spicy salami, chili	436.26	Whole Pizza	436.26	0.574	2.504	1.46	6.37	18/09/2009	Analysis	
19	Thin	Pepperoni, pepperoni, yet more pepperoni, topped with cheese	425.05	Whole Pizza	425.05	0.715	3.089	1.82	7.74	20/09/2009	Analysis	
20	Thin	Pepperoni	403.30	Whole Pizza	403.30	1.04	4.194	2.64	10.65	05/07/2009	Analysis	
Independent/ Small Chain Restaurants - END DATA												
1	Thin	Tomato, cheese and spicy salami	342.22	Whole Pizza	342.22	0.609	2.209	1.70	5.32	23/04/2009	Analysis	
2	Thin	Chili peppers, pepperoni sausage, mozzarella, tomato	345.27	Whole Pizza	345.27	0.769	2.840	1.95	8.69	23/04/2009	Analysis	
3	Thin	Tomato, mozzarella, salami, red peppers & chili	532.90	Whole Pizza	532.90	0.610	3.294	1.57	9.37	23/04/2009	Analysis	
4	Thin	Tomato, mozzarella, pepperoni, and jalapeno peppers	215.13	Whole Pizza	215.13	0.650	2.049	1.65	5.20	18/09/2009	Analysis	
5	Thin	Tomato, mozzarella, Sardinian sausage, roasted peppers and origano	404.07	Whole Pizza	404.07	0.583	2.356	1.49	5.95	18/09/2009	Analysis	
6	Thin	Pepperoni sausage, sweet peppers, olives, mozzarella & tomato	383.28	Whole Pizza	383.28	0.600	1.818	1.27	4.81	18/09/2009	Analysis	
7	Thin	Tomato, mozzarella, hot salami, peppers	450.20	Whole Pizza	450.20	0.708	3.400	1.80	8.64	25/09/2009	Analysis	
8	Thin	Tomato sauce, Italian sausage, jalapenos and mozzarella cheese	488.10	Whole Pizza	488.10	0.855	1.733	0.80	4.38	25/09/2009	Analysis	
9	Thin	Tomato, mozzarella, pepperoni, chorizo & jalapeno peppers	435.30	Whole Pizza	435.30	0.577	2.512	1.47	6.40	25/09/2009	Analysis	
10	Thin	Spicy Salami & Chili	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not re-tested as non menu
11	Thin	Italian spicy sausage & onion	483.83	Whole Pizza	483.83	0.813	2.379	1.30	6.05	18/09/2009	Analysis	
12	Thin	tomato sauce, mozzarella and pepperoni	391.70	Whole Pizza	391.70	0.462	1.810	1.17	4.55	18/09/2009	Analysis	
13	Thin	Pepperoni, chili & garlic	393.30	Whole Pizza	393.30	0.454	1.740	1.15	4.41	18/09/2009	Analysis	
14	Deep pan	Double pepperoni & double mozzarella	440.50	Whole Pizza	440.50	0.618	2.319	1.81	5.89	18/09/2009	Analysis	
15	Thin	Spicy salami w aubergine, chopped basil & mozzarella	367.83	Whole Pizza	367.83	0.697	2.564	1.77	6.51	18/09/2009	Analysis	
16	Thin	Tomato, mozzarella, pepperoni sausage, chili and parmesan	395.46	Whole Pizza	395.46	0.648	3.379	2.15	8.57	18/09/2009	Analysis	
17	Thin	Tomato, ozzarella, pepperoni, green pepper & chili	495.94	Whole Pizza	495.94	0.561	2.762	1.42	7.04	22/09/2009	Analysis	
18	Thin	Tomato, mozzarella, spicy salami, chili	346.68	Whole Pizza	346.68	0.389	1.349	0.88	3.43	22/09/2009	Analysis	
19	Thin	Pepperoni, pepperoni, yet more pepperoni, topped with cheese	391.72	Whole Pizza	391.72	0.654	2.562	1.66	6.50	22/09/2009	Analysis	
20	Thin	Pepperoni	369.00	Whole Pizza	369.00	0.614	3.166	2.07	9.05	22/09/2009	Analysis	
Large Chain Restaurants												
1L	Personal Pizza	Extra pepperoni and double mozzarella cheese on a Dorino's tomato sauce base	No data	Whole Pizza	No data	No data	1.58	No data	4.0	18/03/2009	Website	
2L	Classic Pizza	Mozzarella and tomato sauce with a big helping of pepperoni	284.50	Whole Pizza	284.50	0.697	1.869	1.67	4.75	22/04/2009	Analysis	
3L	Individual Italian	Traditional style base is hand-stretched to order to create the perfect thickness, with tomato sauce, mozzarella, double pepperoni and extra mozzarella	No data	Whole Pizza	No data	No data	No data	1.6	4.3	18/03/2009	Website	
3L	Individual Pan	Thick and fluffy pan baked pizza with tomato sauce, mozzarella, double pepperoni and extra mozzarella	No data	Whole Pizza	No data	No data	No data	1.2	4.0	18/03/2009	Website	
Supermarkets												
15	Deep	Pepperoni	436.39	Whole Pizza	436.39	0.623	2.721	1.58	6.93	20/04/2009	Analysis	Fresh pizza. Analysis for un-cooked pizzas
15	Thin	Pepperoni	314.26	Whole Pizza	314.26	0.749	2.364	1.80	5.97	20/04/2009	Analysis	Fresh pizza. Analysis for un-cooked pizzas
15	Stone baked (thin)	An authentic Italian stone baked thin and crispy pizza base topped with a rich tomato sauce, creamy mozzarella and spicy pepperoni	400	Half Pizza	200	0.50	1.00	1.3	2.5	17/04/2009	Packaging	Frozen pizza. Analysis for cooked pizzas
15	Deep	A deep pan pizza base loaded with a rich tomato sauce, mozzarella and pepperoni	267	Half Pizza	134	0.41	0.81	1.0	2.0	17/04/2009	Packaging	Frozen pizza. Analysis for cooked pizzas
25	Italian Inspiration	Stone baked pizza topped with tomato sauce, mozzarella cheese, and pepperoni	330	Half Pizza	165	0.4	0.7	1.0	1.7	20/04/2009	Packaging	Chilled pizza. Analysis for cooked pizzas
35	Italian style stone b	Thin & crispy stone baked pizza, topped with tomato sauce and grated mozzarella cheese, pepperoni salami, cherry tomatoes and onions	410	Half Pizza	205	0.4	0.8	1.1	2.0	20/04/2009	Packaging	Frozen pizza. Analysis for cooked pizzas
35	Deep Pan	A deep pan pizza base topped with tomato sauce, mozzarella cheese and pepperoni slices	288	Third of a Pizza	129	0.4	0.4	0.9	1.1	20/04/2009	Packaging	Frozen pizza. Analysis for cooked pizzas
45	Stone baked (thin)	A hand-rolled stone baked base topped with a rich tomato sauce, mozzarella cheese and 2 layers of pepperoni	270	Half Pizza	135	0.52	0.96	1.20	2.40	17/04/2009	Packaging	Chilled pizza. Analysis for un-cooked pizzas
55	Thin	Pepperoni	379.89	Whole Pizza	379.89	0.408	1.542	1.03	3.91	17/04/2009	Analysis	Fresh pizza. Analysis for un-cooked pizzas
65	Thin & Crispy	Thin & crispy pizza base covered with tomato sauce, a blend of mozzarella and cheddar cheeses topped with slices of pepperoni	295	Half Pizza	148	0.47	0.76	1.18	1.91	17/04/2009	Packaging	Chilled pizza. Analysis for cooked pizzas
75	Deep Crust Pizza	A pizza base with tomato sauce, mozzarella cheese and pepperoni	441	Half Pizza	221	0.5	1.1	1.2	2.7	18/04/2009	Packaging	Chilled pizza. Analysis for cooked pizzas
75	Italian	A light crumbed Italian style base topped with mozzarella cheese and pepperoni	372	Half Pizza	186	0.4	0.7	1.0	1.8	18/04/2009	Packaging	Chilled pizza. Analysis for cooked pizzas
85	Deep and crispy	A light and crisp deep pan pizza base topped with a salsa sauce, mozzarella and cheddar cheeses, slices of pepperoni and a sprinkle of parmesan	350	Half Pizza	175	0.52	0.91	1.20	2.25	22/04/2009	Packaging	Chilled pizza. Analysis for un-cooked pizzas
85	Thin and crispy	A thin and crispy pizza base topped with tomato sauce, mozzarella and cheddar cheeses and slices of pepperoni	260	Half Pizza	130	0.60	0.78	1.50	1.95	22/04/2009	Packaging	Chilled pizza. Analysis for un-cooked pizzas

Meat Feast												
Restaurant/ Brand/ Retailer code	Base	Product description	Pizza weight (g)	Recommended portion	Portion size (g)	Sodium (g) per 100g	Sodium (g) per portion	Salt (g) per 100g	Salt (g) per portion	Date sample received	Method of obtaining information	Notes
Independent/ Small Chain Restaurants – START DATA												
1	Thin	Tomato, cheese, spicy salami, ham and chicken	475.96	Whole Pizza	475.96	0.772	3.674	1.95	9.33	16/04/2009	Analysis	
2	Thin	Ham, pepperoni sausage, mushroom, olives, onion, mozzarella, tomato	436.94	Whole Pizza	436.94	0.485	3.119	1.23	5.37	16/04/2009	Analysis	
4	Thin	Tomato, mozzarella, pepperoni, artichokes, mushrooms and Parma ham	449.63	Whole Pizza	449.63	0.634	3.951	1.61	7.24	16/04/2009	Analysis	
6	Thin	Pepperoni sausage, Parma ham, chicken, sweet peppers, olives, mozzarella & tomato	501.13	Whole Pizza	501.13	0.621	3.112	1.58	7.92	16/04/2009	Analysis	
7	Thin	Tomato, mozzarella, rocket, pecorino, Sardinian sausage, salami and ham	543.90	Whole Pizza	543.90	0.719	3.910	1.93	9.95	16/04/2009	Analysis	
8	Thin	Tomato sauce, Italian sausage, ham, beef, chicken, olives and mozzarella cheese	612.19	Whole Pizza	612.19	0.562	4.565	1.43	11.61	17/04/2009	Analysis	
9	Thin	Buffalo mozzarella, tomato, pepperoni, Sardinian sausage & salami Napoli	425.41	Whole Pizza	425.41	0.600	3.561	1.53	6.51	16/04/2009	Analysis	
10	Thin	Beef & Chilli	108.38	Pizza slice	208.38	0.483	1.036	1.23	2.46	17/04/2009	Analysis	
13	Thin	Ground beef, pepperoni, bacon, onions & garlic	447.01	Whole Pizza	447.01	0.455	2.030	1.35	5.19	16/04/2009	Analysis	
14	Deep pan	Spicy beef, ham, pepperoni & spicy pork	478.11	Whole Pizza	478.11	0.802	2.886	1.53	7.38	16/04/2009	Analysis	
15	Thin	Cuba Ham w. chorizo, salami, mozzarella & tomato sauce	385.25	Whole Pizza	385.25	0.683	2.485	1.73	8.32	16/06/2009	Analysis	
16	Thin	Tomato, mozzarella, pepperoni sausage, chili and parmesan plus cooked ham and Italian sausage	542.76	Whole Pizza	542.76	0.677	3.074	1.72	9.84	16/06/2009	Analysis	
17	Thin	Tomato, mozzarella, pepperoni, fresh sausage & ham	532.35	Whole Pizza	532.35	0.500	2.952	1.27	5.76	15/06/2009	Analysis	
18	Thin	Tomato, mozzarella, mushrooms, ham, artichokes, salami	490.15	Whole Pizza	490.15	0.356	1.794	0.93	4.56	15/06/2009	Analysis	
19	Thin	Ham, spicy beef, pepperoni, spicy pork	452.21	Whole Pizza	452.21	0.640	2.935	1.85	7.48	22/06/2009	Analysis	
20	Thin	Sausage, ham, pepperoni	440.15	Whole Pizza	440.15	0.950	4.257	2.41	10.00	05/07/2009	Analysis	
Independent/ Small Chain Restaurants – END DATA												
1	Thin	Tomato, cheese, spicy salami, ham and chicken	414.95	Whole Pizza	414.95	0.662	3.747	1.68	6.97	23/09/2009	Analysis	
2	Thin	Ham, pepperoni sausage, mushroom, olives, onion, mozzarella, tomato	369.11	Whole Pizza	369.11	0.557	2.050	1.41	5.19	23/09/2009	Analysis	
4	Thin	Tomato, mozzarella, pepperoni, artichokes, mushrooms and Parma ham	425.74	Whole Pizza	425.74	0.600	2.953	1.53	6.51	16/09/2009	Analysis	
6	Thin	Pepperoni sausage, Parma ham, chicken, sweet peppers, olives, mozzarella & tomato	379.94	Whole Pizza	379.94	0.558	2.120	1.42	5.40	16/09/2009	Analysis	
7	Thin	Tomato, mozzarella, rocket, pecorino, Sardinian sausage, salami and ham	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not re-tested as non menu
8	Thin	Tomato sauce, Italian sausage, ham, beef, chicken, olives and mozzarella cheese	580.80	Whole Pizza	580.80	0.356	2.058	0.90	5.23	25/09/2009	Analysis	
9	Thin	Buffalo mozzarella, tomato, pepperoni, Sardinian sausage & salami Napoli	487.00	Whole Pizza	487.00	0.524	2.952	1.33	6.48	25/09/2009	Analysis	
10	Thin	Beef & Chilli	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Not re-tested as non menu
13	Thin	Ground beef, pepperoni, bacon, onions & garlic	494.82	Whole Pizza	494.82	0.444	2.127	1.13	5.59	15/09/2009	Analysis	
14	Deep pan	Spicy beef, ham, pepperoni & spicy pork	484.77	Whole Pizza	484.77	0.545	2.091	1.38	6.81	16/09/2009	Analysis	
15	Thin	Cuba Ham w. chorizo, salami, mozzarella & tomato sauce	383.25	Whole Pizza	383.25	0.736	3.394	1.87	7.35	16/09/2009	Analysis	
16	Thin	Tomato, mozzarella, pepperoni sausage, chili and parmesan plus cooked ham and Italian sausage	527.60	Whole Pizza	527.60	0.785	4.142	1.99	10.50	16/09/2009	Analysis	
17	Thin	Tomato, mozzarella, pepperoni, fresh sausage & ham	534.91	Whole Pizza	534.91	0.646	3.486	1.65	8.53	22/09/2009	Analysis	
18	Thin	Tomato, mozzarella, mushrooms, ham, artichokes, salami	493.21	Whole Pizza	493.21	0.377	1.859	0.95	4.73	22/09/2009	Analysis	
19	Thin	Ham, spicy beef, pepperoni, spicy pork	481.69	Whole Pizza	481.69	0.614	2.345	1.56	5.90	22/09/2009	Analysis	
20	Thin	Sausage, ham, pepperoni	431.65	Whole Pizza	431.65	0.927	3.970	2.30	9.06	23/09/2009	Analysis	
Large Chain Restaurants												
3L	Personal Pizza	Domino's tomato sauce topped with pepperoni, ham, tasty ground beef, sausage, completed with onions, mushrooms and mozzarella cheese	No data	Whole Pizza	No data	No data	1.40	No data	3.5	15/03/2009	Website	
3L	Classic Pizza	Mozzarella and tomato sauce with deliciously hot with spicy beef, pepperoni, onions and Tabasco, with hot green or jalapeno peppers	341.05	Whole Pizza	341.05	0.736	2.517	1.97	6.38	22/04/2009	Analysis	
3L	Individual Italian	Traditional style base is hand-stretched to order to create the perfect thickness with tomato sauce, mozzarella, spicy pork, ham slices, pepperoni and spicy beef	No data	Whole Pizza	No data	No data	No data	1.9	8.0	18/03/2009	Website	
3L	Individual Pan	Thick and fluffy pan baked pizza with tomato sauce, mozzarella, spicy pork, ham slices, pepperoni and spicy beef	No data	Whole Pizza	No data	No data	No data	1.3	4.4	15/03/2009	Website	
Supermarkets												
15	Deep	Meat Feast	486.59	Whole Pizza	486.59	0.458	2.375	1.34	6.08	20/04/2009	Analysis	Fresh pizza. Analysis for un-cooked pizza
15	Thin	Meat Feast	336.42	Whole Pizza	336.42	0.602	2.328	1.75	5.90	20/04/2009	Analysis	Fresh pizza. Analysis for un-cooked pizza
15	Stone baked (thin)	Stone baked pizza base topped with tomato sauce, mozzarella, beef, jalapeno peppers, fried onions, red peppers, ham and pepperoni	450	Half Pizza	225	0.45	1.01	1.1	2.5	17/04/2009	Packaging	Frozen pizza. Analysis for cooked pizza
15	Deep	A deep pan pizza base loaded with a rich tomato sauce, mozzarella, pepperoni, spicy chili minced beef and ham	391	Half Pizza	196	0.40	0.81	1.0	2.0	17/04/2009	Packaging	Frozen pizza. Analysis for cooked pizza
25	Italian Inspiration	Stone baked pizza topped with tomato sauce, cheese, salami (5%), ground beef (5%), pepperoni (2%), cooked ham (2%) and jalapeno peppers	350	Half Pizza	175	0.4	0.7	1.0	1.8	20/04/2009	Packaging	Chilled pizza. Analysis for cooked pizza
25	American style deep pan	Ciabatta style pizza topped with tomato sauce, Mozzarella cheese, salami, formed ham, beef and pepperoni salami	500	Half Pizza	250	0.4	0.8	0.9	2.1	20/04/2009	Packaging	Frozen pizza. Analysis for cooked pizza
45	Stone baked (thin)	A handcrafted stone baked base topped with a rich tomato sauce, mozzarella cheese, spicy chicken breast, red peppers and pepperoni slices	380 382.77	Half Pizza	190 191.38	0.47 0.702	0.92	1.35 1.75	2.30 6.81	17/04/2009 17/04/2009	Packaging Analysis	Chilled pizza. Analysis for un-cooked pizza Fresh pizza. Analysis for un-cooked pizza
65	Thin & Crispy	Thin & crispy pizza base covered with tomato sauce, a blend of mozzarella and cheddar cheeses topped with slices of pepperoni, smoke flavoured reformed ham with added water, spicy beef and green chilies	327	Half Pizza	164	0.50	0.91	1.25	2.27	17/04/2009	Packaging	Chilled pizza. Analysis for cooked pizza
65	Deep & Loaded	A deep and light pizza base, topped with a rich tomato sauce, a blend of mozzarella and cheddar cheeses topped with slices of pepperoni, smoke flavoured reformed ham with added water, spicy beef and green chilies	378	Half Pizza	189	0.43	0.90	1.08	2.24	17/04/2009	Packaging	Chilled pizza. Analysis for cooked pizza
75	Deep Crust Pizza	A pizza base with tomato sauce, mozzarella cheese, reformed ham with added water, pepperoni, spicy beef and jalapeno peppers	464	Half Pizza	232	0.4	0.9	0.9	2.2	18/04/2009	Packaging	Chilled pizza. Analysis for cooked pizza
75	Italian	A light aerated Italian style base topped with spicy beef, pepperoni and jalapeno pepper	374	Half Pizza	187	0.3	0.7	0.9	1.6	18/04/2009	Packaging	Chilled pizza. Analysis for cooked pizza

Dough				Sauce				Cheese			
Salt (g) per 100g				Salt (g) per 100g				Salt (g) per 100g			
Restaurant Number	Start	Finish	Difference	Restaurant Number	Start	Finish	Difference	Restaurant Number	Start	Finish	Difference
1	1.03	1.03	0.00	1	0.61	0.22	-0.39	1	1.71	1.76	0.05
2	1.29	1.12	-0.17	2	1.17	1.15	-0.02	2	0.36	0.43	0.07
3	1.15	1.27	0.12	3	0.68	1.04	0.36	3	1.33	1.23	-0.10
4	0.88	0.48	-0.40	4	0.85	1.25	0.40	4	1.15	1.74	0.59
5	0.63	1.73	1.10	5	0.59	0.29	-0.30	5	0.78	0.87	0.09
6	0.89	0.83	-0.06	6	1.61	1.64	0.03	6	1.57	1.09	-0.48
7	1.95	2.23	0.28	7	0.33	0.19	-0.14	7	1.38	0.57	-0.81
8	1.13	0.12	-1.01	8	0.86	0.99	0.13	8	1.77	0.85	-0.92
9	0.86	0.90	0.04	9	1.77	1.03	-0.74	9	0.61	0.64	0.03
10	0.48	0.65	0.17	10	0.54	0.83	0.29	10	0.70	0.52	-0.18
11	1.51	1.67	0.16	11	1.03	1.24	0.21	11	1.37	1.56	0.19
12	1.46	0.92	-0.54	12	0.52	0.74	0.22	12	1.30	0.93	-0.37
13	0.94	0.84	-0.10	13	0.54	0.08	-0.46	13	1.43	1.37	-0.06
14	0.76	0.77	0.01	14	0.88	0.86	-0.02	14	1.41	1.4	-0.01
15	1.11	1.38	0.27	15	0.66	0.93	0.27	15	0.88	0.81	-0.07
16	2.23	2.15	-0.08	16	0.41	0.63	0.22	16	0.16	0.21	0.05
17	0.77	1.04	0.27	17	0.53	0.34	-0.19	17	1.16	1.35	0.19
18	1.32	0.59	-0.73	18	0.02	0.09	0.07	18	1.41	1.33	-0.08
19	0.67	0.65	-0.02	19	0.94	0.84	-0.10	19	1.68	1.62	-0.06
20	1.74	1.57	-0.17	20	0.58	0.51	-0.07	20	1.46	1.6	0.14
Average	1.14	1.10	-0.04	Average	0.76	0.74	-0.01	Average	1.18	1.09	-0.09

5 simple steps to reduce salt in pizza

Salt and Pizza

The Food Standards Agency is interested in the amount of salt found in pizzas. We commissioned CASH to investigate the amount of salt found in four popular pizza varieties, and the amounts in samples of dough, tomato sauce and cheese.

We sampled from 20 pizza restaurants in South, Central and North-West London and have provided you with the range of salt levels in all restaurants taking part in the project as well as the results for your restaurant. The results of the analysis are in the tables below.

Results:

	Dough Salt (g) per 100g	Sauce Salt (g) per 100g	Cheese Salt (g) per 100g
Al Parco	1.74	0.58	1.46
Range of all restaurants	0.48 – 2.23	0.02 – 1.77	0.16 – 1.77

	Margherita Salt (g) per 100g	Hawaiian Salt (g) per 100g	Salsiccia Salt (g) per 100g	Meat Supreme Salt (g) per 100g
Al Parco	2.24	1.97	2.64	2.41
Range of all restaurants	0.54 – 2.24	0.98 – 1.97	1.05 – 2.64	0.93 – 2.41

	Margherita Salt (g) per pizza	Hawaiian Salt (g) per pizza	Salsiccia Salt (g) per pizza	Meat Supreme Salt (g) per pizza
Al Parco	7.05	9.44	10.65	10.80
Range of all restaurants	2.99 – 7.05	3.75 – 9.44	3.96 – 10.65	4.56 – 11.61

Why think about salt?



Too much salt is bad for your health because it can raise your blood pressure. Adults should eat **no more than 6g a day** and children should have less.

The good news is that a number of companies have successfully reduced the salt content of their products by making small reductions over a period of time without their customers noticing.

Research has shown that 10-20% reductions in salt are not noticed. You can easily reduce the amount of salt without your customers tasting any difference.

What can I do?

Read the 5 step plan outlined in this booklet and make small reductions regularly over a period of a few months. Just a few simple changes will reduce the salt in your pizza, and give your customers choice.



What can I do to reduce salt in my pizzas without affecting the taste or my profits?

Step 1



Dough

Your dough recipe may contain too much salt. The lowest was 50g of salt for a 20kg batch of dough.

What can I do?

Preparing lower salt dough:

- ✓ Try using a ratio of 50g of salt per 20kg of dough
- ✓ Change your recipe gradually, week by week until you reach this target

Step 2



Tomato sauce

Salt in the tomato sauce may come either directly from a pinch of salt added or from ingredients used to make the sauce.

What can I do?

Preparing lower salt sauce:

- ✓ Buy salt free tinned tomatoes
- ✓ Buy salt free tomato purée
- ✓ Add less salt to the sauce mix
- ✓ When seasoning tomato sauce, try some of the following salt free alternatives:
 - Black pepper
 - Garlic
 - Onion
 - Coriander
 - Basil
 - Tarragon
 - Oregano
 - Chilli
 - Lemon juice
 - Lime juice
 - Vinegar
 - Wine



Step 3



Cheese

The Food Standards Agency has set a salt target for mozzarella cheese sold for commercial use. Your cheese should contain no more than 1.5g salt per 100g.

What can I do?

Buying lower salt cheese:

- ✓ When buying mozzarella check the salt content. Try to buy mozzarella with less than 1.5g salt per 100g.
- ✓ When adding grated mozzarella cheese to the pizza, drop from a height to gain an even spread
- ✓ Add less cheese, this will also save you money

Step 4



Giving your customers a choice

The changes outlined in this guide will help you to give your customers the choice to eat a lower salt pizza. Consumer taste palates in the UK are changing and customers are choosing and preferring lower salt foods. Be ready by giving them the option! In the event that a customer wants more salt, they can simply add it at the table.

What can I do?

- ✓ Include some pizzas with lower salt toppings on your menu
- ✓ Try to limit the number of pizzas on your menu with several high salt toppings
- ✓ Consider offering some high salt toppings such as olives and capers only if customers ask for them as an extra

Step 5



Buying lower salt ingredients

Some of the salt in your pizza will already be in the ingredients you buy, like the tinned tomatoes, mozzarella and lots of the toppings. By checking the label you may be able to choose a lower salt product for the same price.

Salt is made up of sodium and chloride. Some nutrition information labels on food packaging may list salt as sodium. To convert sodium to salt, multiply by 2.5. For example, if a product is labelled as 1g sodium per 100g, it contains 2.5g salt per 100g.

Remember, similar products can contain very different levels of salt - there may be as much as four times as much salt per 100 grams in one brand of bacon than in another brand. It is always important to check the labels and compare products.

The following table can be used as a guide to see which ingredients tend to be higher or lower in salt.

Low Salt Ingredients

Mushrooms
Artichoke (Fresh)
Sweetcorn
Peppers (capsicum)
Spinach
Egg
Onion
Tomato (fresh)
Asparagus (fresh)
Garlic
Pineapple
Jalapeño pepper

High Salt Ingredients

Anchovies
Artichoke (in brine)
Olives (in brine)
Capers
Pepperoni
Salami
Bacon
Sausage
Parma ham
Cooked ham
Prawns
Tuna
Cheese

What can I do?

- ✓ Compare the salt content per 100g of a few similar ingredients
- ✓ Choose a lower salt option
- ✓ Try using less of the toppings from the red list on your pizzas

5 simple steps to reduce salt in pizza



Step 1

Preparing lower salt dough:

- ✓ Try using a ratio of 50g of salt per 20kg of dough
- ✓ Change your recipe gradually, week by week until you reach this target



Step 4

Giving your customers a choice

- ✓ Include some pizzas with lower salt toppings on your menu
- ✓ Try to limit the number of pizzas on your menu with several high salt toppings
- ✓ Consider offering some high salt toppings such as olives and capers only if customers ask for them as an extra



Step 2

Preparing lower salt sauce:

- ✓ Buy salt free tinned tomatoes
- ✓ Buy salt free tomato purée
- ✓ Add less salt to the sauce mix
- ✓ When seasoning tomato sauce, try some of the following salt free alternatives:

- Black pepper
- Garlic
- Onion
- Coriander
- Basil
- Tarragon
- Oregano
- Chilli
- Lemon juice
- Lime juice
- Vinegar
- Wine

Step 5

Buying lower salt ingredients:

- ✓ Compare the salt content per 100g of a few similar ingredients
- ✓ Choose a lower salt option
- ✓ Try using less of the toppings from the red list on your pizzas

The following table can be used as a guide to see which ingredients tend to be higher or lower in salt.

Step 3

Buying lower salt cheese:

- ✓ When buying mozzarella check the salt content. Try to buy mozzarella with less than 1.5g salt per 100g
- ✓ When adding grated mozzarella cheese to the pizza, drop from a height to gain an even spread
- ✓ Add less cheese, this will also save you money

Low Salt Ingredients

- Mushrooms
- Artichoke (Fresh)
- Sweetcorn
- Peppers (capsicum)
- Spinach
- Egg
- Onion
- Tomato (fresh)
- Asparagus (fresh)
- Garlic
- Pineapple
- Jalapeño pepper

High Salt Ingredients

- Anchovies
- Artichoke (in brine)
- Olives (in brine)
- Capers
- Pepperoni
- Salami
- Bacon
- Sausage
- Parma ham
- Cooked ham
- Prawns
- Tuna
- Cheese