



Acrylamide and Furan in Retail Products

Report by Fera Science Ltd.

October 2023



1. Acrylamide and Furan in Retail Products (Year 1)

Report of Analysis of Retail Products for Acrylamide and Furan for Food Standards Agency – Year 1 Fera Science Ltd.

Title: Acrylamide and Furan in Retail Products, Year 1

Customer : Food Standards Agency

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Report Number : Report FR_002164 Acrylamide and Furan Y1

Fera Project Number: FR/002164

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3. Glossary

2DMF	2,5 dimethylfuran
2MF	2-methylfuran
3MF	3-methylfuran
ALARA	As low as reasonably achievable
EFSA	European Food Safety Authority
EURL	European Reference Laboratory
Fapas®	Food Analysis Performance Assessment Scheme (Proficiency Testing)
FSA	Food Standards Agency
GC-MS	Gas Chromatography Mass Spectrometry
HS-GC-MS	Headspace Gas Chromatography Mass Spectrometry
IS	Internal Standard
LC-MS/MS	Liquid Chromatography Tandem Mass Spectrometry
LOQ	limit of quantification
MOE	Margin of Exposure
NRL	National Reference Laboratory
UKAS	United Kingdom Accreditation Service

4. Executive Summary

This study was commissioned as a result of a call from the Food Standards Agency to produce data on acrylamide, furan and alkyl furans in food in response to the European Commission monitoring recommendations and to gain information on the occurrence of these contaminants in UK foods. The study will run over two consecutive years to allow trending of data year on year. This report summarises the findings of Year 1.

A sampling plan of target foodstuffs was agreed. One hundred and thirty samples were analysed for acrylamide and 60 samples for furans. Samples for acrylamide analysis were selected to be representative of foods from the Annex in Commission Recommendation (EU) 2019/1888, and the products listed in Commission Regulation (EU) 2017/2158.

Analysis for acrylamide was carried out using a method that is accredited to ISO 17025. A method was developed and validated for 2-methylfuran, 3-methylfuran, 2,5-dimethylfuran, 2-ethylfuran and 2-pentylfuran in foods. Target limit of quantification (LOQ) not higher than 5 µg/kg for foods and 20 µg/kg for coffee, were achieved. The method has been accredited to ISO 17025 using Flexible Scope.

As furan and its methyl analogues such as 2-methyl furan and 3-methyl furan are highly volatile, some furan samples were prepared according to the manufacturers' instructions prior to analysis. These samples will be tested as received and as consumed to allow for any losses during preparation.

This survey is intended to be exploratory and to gather data. It should be borne in mind that many of the products included in this survey are listed in Commission Recommendation (EU) 2019/1888 of 7 November 2019 on the monitoring of the presence of acrylamide in certain foods (2), this includes foods that do not fall within the description categories in Regulation (EU) 2017/2158 (1) and therefore benchmark levels do not apply to many of the products sampled.

The first year has been successfully completed. In total 162 samples were purchased, 130 were analysed for acrylamide and 60 were analysed for furans using methods accredited to ISO17025.

The majority of samples analysed for acrylamide do not have Benchmark Levels set. The highest levels of acrylamide were observed in vegetable crisps, (beetroot components contained the highest levels) an extruded veggie straw product, coffee, and a sample of dried apricots. Coffee drinks prepared from the ground or instant coffee contained low

levels of acrylamide, which when calculated for the preparation method gave similar levels of acrylamide for the instant or ground coffee used to prepare them.

There are no guidance levels or action levels for furans. The majority of samples contained low levels of furans. The highest levels were observed in coffee, both ground and instant. When these were used to prepare beverages the resulting furan levels were much reduced, typically around 1-2% of the levels in the dry coffee. For foods such as baby ready meals, and ready to eat soups, low levels of furan were found, but again these typically reduced during heating or preparation.

This data gives a snapshot of the levels of processing contaminants in a range of products. The results will be used to inform the sampling plan for the second year of the study. Data from the study will be compiled into a format compatible with EFSA's Guidance on Standard Sample Description (SSD) for Food and Feed to ensure it is available in a standardised format. The results from Year 1 will be used to inform and develop the sampling plan for Year 2.

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5. Introduction

5.1 Background to the study

Acrylamide, furan and alkyl furans (for example, 2-methyl furan and 3-methyl furan) are organic chemicals produced when food is heated to high temperatures during cooking and food processing. EFSA published risk assessments of acrylamide and furan in food in 2015 and 2017 respectively. The Food Standards Agency (FSA) has concluded that exposure to these process contaminants should be as low as reasonably achievable (ALARA) and has previously funded monitoring of acrylamide and furans to gather occurrence data in UK retail foods. This study will build on the previous studies by providing analytical data on the occurrence of acrylamide and furan, 2-methylfuran and 3-methylfuran, as well as other alkylfurans, namely 2,5-dimethylfuran, 2-pentylfuran and 2-ethylfuran in selected foodstuffs.

European Commission Regulation (EU) 2017/2158 ⁽¹⁾, established mitigation measures and 'benchmark levels' for the reduction of the presence of acrylamide in food. Member States and food business operators are required to monitor acrylamide levels in the foodstuffs listed in Annex IV of the regulation. In addition, Commission Recommendation (EU) 2019/1888 ⁽²⁾, published in November 2019, suggested a non-exhaustive list of products for monitoring. Commission Recommendation 2007/196/EC ⁽³⁾ sets out a recommendation for the monitoring of the presence of furan, 2-methylfuran and 3-methylfuran in foodstuffs.

5.2 Acrylamide

Acrylamide is a natural chemical that is formed when starchy foods such as bread and potatoes are cooked for long periods at high temperature. When these foods are cooked (fried, baked, roasted, toasted or grilled) to above 120°C acrylamide can be formed. Acrylamide is formed mainly from sugars and the amino acid asparagine which are both found naturally in foods as a result the chemical process, the Maillard Reaction. Acrylamide does not usually occur in foods that have been cooked using lower temperatures such as boiling, but it has been found in a wide range of processed and home-cooked foods including potato crisps and chips (fries), bread, crispbreads and coffee.

5.3 Furan and alkyl furans

Furan and furan analogues are formed naturally in foods during roasting or heating. Furans are produced from several precursors including ascorbic acid, amino acids, carbohydrates, unsaturated fatty acid and carotenoids. They can be found in a variety of foods including coffee, and canned or jarred foods. An EFSA Scientific Opinion published in 2017 ⁽⁴⁾ reviewed occurrence data for furan but reported no occurrence data was available for methyl furans (2-methylfuran, 3-methylfuran and 2,5-dimethylfuran), therefore no assessment of exposure to these compounds could be made. The highest exposures of furan were estimated to occur in the youngest population group, i.e. infants. Furan was assessed as being potentially nephrotoxic, hepatotoxic and due to some indications of genotoxicity the CONTAM Panel decided it was not appropriate to establish a tolerable daily intake, instead they used a Margin of Exposure approach. The calculated MOE was smaller than 10,000 which would indicate a health concern. Due to the fact that methyl furans occur together and the potential for chronic dietary exposure to these compounds EFSA stated that methylfurans may add significantly to the overall exposure and therefore increase the cause for concern for hepatotoxicity. The CONTAM Panel recommended that additional data on the occurrence of methylfurans in food as well as changes in concentration of furan and methylfurans during the different steps of coffee preparation should be produced.

5.4 Aims and Objectives of the Study

This study was commissioned as a result of a specific call from the Food Standards Agency to produce data on acrylamide, furan and alkyl furans in food in response to the European Commission monitoring recommendations and to gain information on the occurrence of these contaminants in UK foods.

A sampling plan of target foodstuffs was agreed with the FSA. Approximately 130 samples will be analysed for acrylamide and 60 samples for furans on each of two survey years, to allow trending of data year on year. Samples for acrylamide analysis were selected to be representative of foods from the Annex in Commission Recommendation (EU) 2019/1888 ⁽²⁾, and the products listed in Commission Regulation (EU) 2017/2158 ⁽¹⁾.

Analysis for acrylamide was carried out using a method that fully meets the requirements in Annex III of Commission Regulation (EU) 2017/2158 ⁽¹⁾ and is accredited to ISO 17025. For 2-methylfuran, 3-methylfuran, 2,5-dimethylfuran, 2-ethylfuran and 2-pentylfuran in foods, a method will be validated, with a target limit of quantification (LOQ) not higher than

5 µg/kg for foods and 20 µg/kg for coffee, and accredited to ISO 17025 (UKAS) based on guidelines from Commission Recommendations 2007/331/EC ⁽⁵⁾ and 2007/196/EC ⁽³⁾.

As furan and its methyl analogues such as 2-methyl furan and 3-methyl furan are highly volatile, some furan samples will be prepared according to the manufacturers' instructions prior to analysis. These samples will be tested as received and as consumed to allow for any losses during preparation.

Data from the study will be compiled into a database to meet EFSA's Guidance on Standard Sample Description (SSD) for Food and Feed and the results reported to EFSA by 1 October of each year. The study will run over two years, this report summarises the results of the Year 1 sampling plan.

This survey is intended to be exploratory and to gather data. It should be borne in mind that many of the products included in this survey are listed in Commission Recommendation (EU) 2019/1888 of 7 November 2019 on the monitoring of the presence of acrylamide in certain foods ⁽²⁾, this includes foods that do not fall within the description categories in Regulation (EU) 2017/2158 ⁽¹⁾ and therefore benchmark levels do not apply to many of the products sampled.

6. Methodology

6.1 Samples

Sample purchase and collection was subcontracted to HallMark Veterinary & Compliance Services. A draft sampling plan was provided by the Food Standards Agency, this was used to plan purchase and collection of samples. The detailed sampling plan was agreed in advance by the Food Standards Agency before sampling started. Samples were collected from a number of regions throughout the UK over a 6 week period in July and August 2020. Samples were purchased from a broad range of retailers and included a variety of brands. Products were broadly categorised according to the food descriptions in Commission Regulation (EU) 2017/2158 ⁽¹⁾. In addition, Commission Recommendation (EU) 2019/1888⁽²⁾ sets out a list of food types that should be monitored for the presence of acrylamide and samples of these products were also included.

6.2 Sample preparation

Samples were prepared and stored according to the Food Standards Agency “Guidelines for undertaking surveys” ⁽⁶⁾.

For samples requiring acrylamide analysis only, the whole sample was homogenised and split into portions for analysis and storage. Potato products such as croquettes and potato based meals and other vegetable chips such as onion rings and sweet potato fries samples were cooked before analysis following the instructions on the packaging. If more than one procedure was provided the sample was split evenly and a different condition used for each portion of the sample, for example, oven and microwave cooking. The cooked samples were homogenised separately and split into aliquots for analysis and storage.

For samples that required both furan and acrylamide analysis, the samples were split equally. A homogenised sample was prepared from one portion for acrylamide analysis. Samples for furan were kept intact and opened and mixed in cooled conditions before being placed immediately in cooled headspace vials for analysis. Where appropriate, samples for furan analysis were also analysed as purchased and as consumed. For example, ready to eat soup and some foods for young children and infants were sampled and analysed immediately from the container after opening and after heating according to the manufacturers’ instructions.

Coffee was analysed as purchased and as consumed. Coffee brews were prepared following packet instructions, the exact sample weight and volume of hot water were recorded during preparation.

6.3 Analysis for acrylamide

Analysis for acrylamide was carried out using an ISO 17025 accredited method. The method is based on the CEN/TS 17083:2017 Foodstuffs - Determination of acrylamide in food and coffee by gas chromatography-mass spectrometry (GC-MS) ⁽⁷⁾. Quality control samples including procedural blanks, in-house reference samples and spiked samples were included in each batch.

6.4 Analysis for Furan and alkyl furans

A method for furan, 2-methyl furan and 3-methyl furan was already in place in the laboratory. The method was expanded to include furan, 2-methyl furan, 3-methyl furan,

2,5-dimethylfuran, 2-ethylfuran, 2-pentylfuran, 2-butylfuran and 2-propylfuran Method development to investigate the most appropriate conditions for different matrices was carried out. Satisfactory validation was obtained for all analytes except 2-pentylfuran, 2-butylfuran and 2-propylfuran, and where reported these results are for information and are not accredited.

Isotopically labelled standards for furan, 2-methyl furan and 3-methyl furan, and 2-5-dimethyl furan were used in the analysis.

Quality control samples including procedural blanks, in-house reference samples and spiked samples were included in each batch. Results are UKAS accredited (ISO 17025), following accreditation of the method via Flexible Scope.

7. Results and Discussion

7.1 Sampling

All 162 samples planned to be collected samples were collected during the 6 week sample collection period. There were no significant deviations in terms of the samples per retailer and areas, some minor deviations were due to occasional unavailability of the sample or insufficient quantity available at the selected supermarkets. When this was the case, initially pre-assigned retailers were swapped for samples on three online retailers and two small retailers, always minimising the impact and trying to reduce the market share percentage. All samples were transferred to the laboratory under appropriate conditions, for example, chilled or frozen, samples were couriered using cold boxes and were immediately placed in fridges or freezer on receipt. Samples were logged in using a Laboratory Information Management System (LIMS) and were each assigned a unique number.

7.2 Sample preparation

Samples for acrylamide analysis only were homogenised using the most suitable equipment, and if necessary, using cryomilling. Stones and brine were removed from products in jars.

Baby foods were prepared according to the manufacturers for instructions, using water to reconstitute dried products where required. For vegetable crisps and chips, the packets

were opened, and the samples sorted into the individual vegetable varieties. These were homogenised and analysed separately.

All sample homogenisation methods have been previously shown to produce an acceptably homogenous sample as they are used routinely for the preparation of proficiency test samples.

7.3 Acrylamide analysis by GC-MS

The method is based on CEN TS 17083:2017 Foodstuffs – Determination of acrylamide in food and coffee by Gas Chromatography-Mass Spectrometry (GC-MS) ⁽⁷⁾ and is accredited to ISO 17025.

For analysis the test portion was extracted with hot water, isotopically labelled acrylamide was added as an internal standard. High fat samples were defatted with hexane, cleared with Carrez solution and centrifuged.

Sample extracts were brominated and extracted with ethyl acetate. Following removal of the ethyl acetate and evaporation, triethylamine is added to partially debrominate, after which the sample extracts were injected onto a GC/MS system for quantification using selected ion monitoring.

7.4 Furan and alkyl furan analysis by Headspace GC-MS

Samples were analysed by headspace GC-MS, using isotopically labelled standards where they are available. At the time of the study internal standards for 2-ethylfuran, 2-pentylfuran, 2-butylfuran and 2-propylfuran were not available and therefore 2,5-dimethylfuran IS was used for 2-ethyl furan. Since completing the analysis isotopically labelled internal standards for 2-ethyl furan and 2-pentyl furan have been obtained. Further validation will be carried out to include these in the method for analysis of samples from the next phase of sampling.

7.5 Analytical quality assurance

All analyses were performed by trained staff in a UKAS accredited laboratory. All test methods were validated in house. Analysis for acrylamide was already accredited to ISO17025. Analysis for furans was in-house validated during this study and will be accredited by Flexible Scope.

Each batch of samples included procedural blanks, in-house reference samples and / or spiked samples. Isotopically labelled standards were used to control the methods where they were available.

The laboratory also participated in the Fapas® proficiency testing scheme for acrylamide and furan (Series 30). Six rounds were undertaken during Year 1 of the survey, five rounds for acrylamide in a variety of food products (all included in this survey) and one round for furans in coffee. All results were satisfactory. Round 30108 for furans included furan, 2-methylfuran, 3-methylfuran, 2,5-dimethylfuran and 2-ethylfuran. The Z-score for 2-ethylfuran was given for information only. All results are given in Table 32. QC data for acrylamide and furan analyses are given in Tables 33 and 34 respectively.

For samples found to contain higher concentration residues, or where residues were close to or above relevant Benchmark levels, the analysis was repeated in duplicate to confirm the initial finding. All confirmed results are the mean of at least 3 determinations.

7.6 Acrylamide results

7.6.1 Bread samples

Twelve samples of 'Bread' samples were analysed for acrylamide. These included five pumpernickel, ciabatta with olives and onion bread (speciality breads), four types of rolls and three samples of pitta bread. Ten samples were below the LOQ of 30 µg/kg acrylamide. The two samples that contained acrylamide above the LOQ were S20-033759, a pumpkin sourdough bread that contained 78 µg/kg and S20-033723 a ciabatta with olives that contained 89 µg/kg. The results are given in Table 13. A Benchmark level of 50 µg/kg is given for 'soft bread – wheat-based bread' in Commission Regulation (EU) 2017/2158 ⁽¹⁾. Both of these products listed wheat as their main ingredient, however it is not clear if they meet the definition of 'soft bread'. It is possible that the inclusion of olives as an ingredient in sample S20-033723 contributed to the acrylamide content, as acrylamide has been reported in olives ⁽⁸⁾ and was also found in the black olive sample tested in this survey. However, this cannot be confirmed as the sample was homogenised and analysed as a whole product

7.6.2 Breakfast Cereals (excluding porridge)

Five samples, two honey roasted muesli and three other traditional breakfast cereals, were analysed and results are given in Table 14. Acrylamide levels found ranged from 49 µg/kg in a sample of cornflakes (S20-033826) to 278 µg/kg in a wheat biscuit (S20-033827).

Benchmark levels range from 100 µg/kg for maize, oat, spelt, barley and rice based products to 300 µg/kg for bran products, whole grain cereals and wheat and rye based products. All samples were below their respective Benchmark levels.

7.6.3 Fine Bakery Wares (excluding cakes and pastry)

Twenty-three samples of fine bakery wares were analysed for acrylamide. Results are presented in Table 15. Five samples each of croissants, doughnuts, pancakes and other products (for example, crackers) and three samples of churros were included.

Four croissants did not contain acrylamide above the LOQ, and one sample (S20-033766) contained a low level just above it (31 µg/kg).

Acrylamide was not found above the LOQ in any of the doughnut samples.

One of the five pancake samples (S20-033769) contained acrylamide at a level of 73 µg/kg. The three churros samples contained acrylamide levels ranging from <30 µg/kg to 71 µg/kg. The other products included samples of shortbread, cream crackers, rye cracker bread, oat cakes and wholegrain crackers. Of these, the shortbread did not contain acrylamide above the LOQ (<30 µg/kg), the other four products contained levels from 42 to 236 µg/kg. The highest level was found in the oatcake sample (S20-033830).

There are Benchmark levels for biscuits (350 µg/kg), crackers (400 µg/kg) and crispbread (350 µg/kg), none of the samples that fit in these categories exceeded the Benchmark levels. The remainder of samples in the Fine Bakery Wares group contained no detectable or very low levels of acrylamide, all contained <100 µg/kg acrylamide. There are no Benchmark levels for these products.

7.6.4 Coffee

Ten samples of coffee, four instant and six ground were analysed for acrylamide, both as purchased then 'as consumed'. Acrylamide levels in the instant coffee – 'as bought' ranged from 646 to 884 µg/kg, the highest level was found in a sample of decaff coffee (S20-033834). Although this result is above the benchmark level of 850 µg/kg, it is not beyond reasonable doubt when measurement uncertainty is taken into account. The Benchmark level applies to the product as sold.

The acrylamide levels in the drinks prepared from these samples, the 'as consumed' samples, ranged from 4.7 to 7.7 µg/L. This calculates to levels of 535 to 894 µg/kg in the product as sold, showing a high level of agreement with the levels found in the dry product. This is expected as for instant coffee the dry sample is dissolved in water, and so any acrylamide present will be transferred into the drink prepared from it.

For the ground coffee the acrylamide levels ranged from 163 to 356 µg/kg, the Benchmark level for roast coffee is 400 µg/kg. None of the samples exceeded this. The levels in the corresponding 'as consumed' samples ranged from 9.3 to 11.6 µg/L, corresponding to calculated levels of 158 to 299 µg/kg in the dry coffee. Again, this was in good agreement with the initial results and was expected as during analysis acrylamide is extracted from the sample using hot water, which is the same as the brewing process. The levels in 'as consumed' beverages were higher than the instant coffees as a larger amount of coffee is used to prepare the beverage from roast coffee than for instant. Typically, 15 g was brewed in 250 ml water for roast coffee, whereas for instant 5 g was used. Results are presented in Table 16.

7.6.5 Coffee substitutes - Products not based on chicory or cereals

Five samples of coffee substitute were analysed for acrylamide, results are given in Table 17. One sample (S20-033846) contained acrylamide above the reporting limit at a level of 57 µg/kg. There are Benchmark levels for coffee substitutes in Regulation (EU) 2017/2158, but these apply for products made from chicory or cereals. There are no applicable Benchmarks for the products analysed in this study.

The samples were also prepared following the packaging instructions and analysed 'as consumed'. Two brewed samples contained <0.3 µg/L (S20-033847 and S20-033848), the other three samples contained 0.6 µg/L to 2.1 µg/L. Acrylamide was not detected above the reporting limit in samples S20-033844 and S20-033845 that contained 0.6 and 1.9 µg/L respectively. Sample S20-033846 that contained 2.1 µg/L acrylamide in the beverage was the only coffee substitute that contained acrylamide above the reporting limit in the dry product.

7.6.6 Other products based on cereals and potatoes – cereal products

Three samples of Mexica tortillas (wraps) and ten samples of cereal snacks (for example, Rice Cakes, Rice Crackers, Maize Crackers etc.) were analysed for acrylamide (Table 18). The three tortilla samples did not contain acrylamide above the reporting limit of 30 µg/kg. There is no Benchmark level for this type of product.

Of the other ten samples, four were rice cakes, and one was a rice and corn cake. Levels in these samples ranged from 90 to 222 µg/kg. There were three rice cracker samples, two contained no acrylamide above the LOQ, and one (sample S20-033731) contained 70 µg/kg. The two other samples were a sample of corn cakes (S20-033733) that

contained 215 µg/kg and a sample of corn thins (S20-033736) that contained 414 µg/kg. There are no Benchmark levels for these products.

7.6.7 Other products based on cereals and potatoes – potato products

Ten potato products for example, rosti, croquettes, were analysed. These products were cooked following the instructions on the packet. For oven cooking, new cooking trays, lined with clean aluminium foil were used for cooking the samples. Oven temperatures were checked using a calibrated thermometer. The time and temperature given on the packet were followed, and where more than one option for cooking was given these were followed, two samples were deep fried and two were heated in the microwave. All results are given in Table 19.

Sample S20-033810 (potato gratin) contained the lowest level, when warmed in microwave acrylamide was not found above the LOQ, the level found after oven cooking was 39 µg/kg. Two samples of potato croquettes cooked in the oven also contained low levels of <30µg/kg (S20-033807) and 39 µg/kg (S20-033809), however sample S20-033807 contained a higher level after deep frying (409 µg/kg). The levels found in the other products ranged from 58 µg/kg for sample S20-033814, crispy potato pops to 1097 µg/kg in a frozen jacket potato (S20-033806) heated in the oven. The same sample had a level of 228 µg/kg after microwave cooking.

Five potato based ready meals (for example, potato and cheese, casserole, potato and meat) were also analysed. Potato Dauphinoise (S20-033817) and the sausage and mash meal both contained <30 µg/kg acrylamide. The cottage pie sample (S20-033820) contained 34 µg/kg. A sample of cheese & bacon potato skins (S20-033816) contained 104 µg/kg after microwave cooking and 130 µg/kg after oven cooking. The highest level of 218 µg/kg was found in a sample of crispy potato slices (S20-033818).

Regulation (EU) 2017/2158 contains a benchmark level of 500 µg/kg for French Fries (ready to eat), i.e. as sold direct to consumers from takeaways. None of these products would be categorised as ready to eat and so the Benchmark does not apply. It is most likely that any possible future Benchmark level for these type of products would be set for products as sold, rather than as consumed. Acrylamide levels are likely to be lower in uncooked products than those reported here. However all of the potato samples, except the oven baked jacket potato were below 500 µg/kg.

7.6.8 Snacks intended for infants and young children

Fifteen samples of snacks marketed for young children were included in the study. These included a selection of products such as rice cakes, oat bars, extruded vegetable snacks and puffed corn. There is a Benchmark level of 150 µg/kg acrylamide for biscuits and rusks for infants and young children, however the definition of these products is as defined in Regulation (EU) 609/2013⁽⁹⁾. Six samples were rice cakes or oat bars and would fit the definition from Regulation (EU) No 609/2013 of 'processed cereal-based food - rusks and biscuits which are to be used either directly or, after pulverisation, with the addition of water, milk or other suitable liquids'. The other products included in the survey, for example carrot sticks or chickpea and carrot puffs, while marketed for children, do not meet this definition and therefore the Benchmark levels do not apply.

Nine samples contained <30 µg/kg acrylamide, (Table 20), all six samples that the Benchmark would apply to were in this category. Three samples contained levels between 41 and 96 µg/kg these were chickpea and carrot puffs, apple & carrot rice crispy sticks and sweetcorn and carrot melty sticks. Two samples contained 144 µg/kg (S20-033790, banana puffcorn) and 182 µg/kg (S20-033776, carrot sticks). The highest level of 2439 µg/kg was found in sample S20-033784, veggie straws. This result is an average of five determinations as the analysis was repeated to confirm the unexpected result.

7.6.9 Others – vegetable crisps and vegetable fries or chips

Five samples of vegetable crisps were included in the survey, results are given in Table 21. Where the product was a mixture of vegetables, these were hand sorted into the individual types and these analysed separately.

The sample of hummus chips contained no acrylamide (S20-033849, <30µg/kg), and the sample of lentil bites (S20-033853) contained 95 µg/kg.

The other three samples were mixtures of beetroot, carrot and parsnip (S20-033850), beetroot, parsnip and sweet potato (S20-033851 and S20-033852). For sample S20-033850 the lowest acrylamide concentration was found in the parsnip component (160µg/kg), while the carrot contained 830 µg/kg and the beetroot contained 1249 µg/kg. For S20-033851 the sweet potato component contained 536 µg/kg, the parsnip 726 µg/kg and the beetroot 1349 µg/kg. For S20-033852 the sweet potato contained 1668 µg/kg, the parsnip 2293 µg/kg and the beetroot 2634 µg/kg. In all three samples the beetroot component contained the highest amount of acrylamide. Most results for the mixed crisps were the average of 3 results as the analysis was repeated to confirm the initial finding.

Five samples of vegetable chips or fries, and onion rings were analysed. As for the potato products, samples were prepared according to manufacturers instructions. The mixed root

vegetable sample was split into the vegetable types before analysis. The sample of onion rings (S20-033823) cooked in the oven contained <30 µg/kg, the same product contained 63 µg/kg when deep fried. Sample S20-033824, sweet potato fries, contained 35 µg/kg, while a sweet potato chips samples S20-033825 contained 321 µg/kg. The three vegetables in mixed root vegetable sample S20-033822 contained 108 µg/kg (parsnip), 229 µg/kg (carrot) and 249 µg/kg (beetroot). The highest level found was 433 µg/kg in S20-033821, honey glazed parsnips.

There are no Benchmark levels applicable for any of these products.

7.6.10 Others – miscellaneous products

A small number of each of the following products listed in the Annex of Recommendation (EU) 2019/1888 were included in the survey: Roasted Nuts, Roasted Oilseeds, Dried Fruits, Roasted cocoa beans and derived products, Olives in brine, and Confectionary for example, fudge, caramel, nougat. Four samples of roasted nuts were analysed, three contained no acrylamide above the LOQ, one sample (S20-033744) contained 92 µg/kg. The three roasted oilseeds did not contain acrylamide (all <30 µg/kg). Five dried fruit samples were analysed, three contained <30 µg/kg, the sample of chopped dates (S20-033791) contained 48 µg/kg and the sample of apricots (S20-033792) contained 454 µg/kg (average of 3 analyses).

The four confectionary samples, and two of the three olives samples did not contain acrylamide. The third olive sample (S20-033737) contained 281 µg/kg. This was a sample of black olives in brine, the two samples that did not contain acrylamide were green olives. Three samples of cocoa nibs were analysed, one (S20-033797) did not contain acrylamide, while the other two (S20-033796 and S20-033798) contained 264 and 364 µg/kg respectively, both results the average of 3 determinations.

There are no Benchmark levels set for any of these products, the analysis was carried out to obtain data for these products in response to the Recommendation (EU) 2019/1888.

7.7 Furan and alkyl furan results

7.7.1 Potato crisps, snacks, crackers and other potato products from potato dough

Five samples of potato products were analysed for furans, results are in Table 23. Furan was detected in all samples in the range 11 µg/kg to 77 µg/kg. The lowest level was found in potato crisps (S20-033854), the highest in 'popped potato chips' (S20-033857). Low concentrations of 2-methylfuran were found in four of the samples, one sample contained

a very low concentration of 3-methylfuran just above the LOQ of 5 µg/kg (S20-033856). Ethyl-furan was found in all samples at levels from 20 to 147 µg/kg, the highest level was found in sample S20-033722 which contained furan and 2-methyl furan but no 3-methylfuran. None of the samples contained 2,5-dimethylfuran or propylfuran above the LOQ.

7.7.2 Other breakfast cereals

Three samples of traditional breakfast cereal were analysed for furans (Table 24). All three samples contained low levels of furan and 2-methylfuran, while the extruded multigrain hoops also contained low levels of 3-methylfuran and ethylfuran. None of the samples contained 2,5-dimethylfuran or propylfuran above the LOQ.

The cornflake sample (S20-033826) contained 55 µg/kg furan and 19 µg/kg 2-methylfuran. The wheat biscuit (S20-033827) contained 21 µg/kg furan and 15 µg/kg 2-methylfuran, while the multigrain hoops (S20-033828) contained 35 µg/kg (furan), 17 µg/kg (2-MF), 5 µg/kg 3MF and 14 µg/kg (ethylfuran).

7.7.3 Other fine bakery products (Crackers, biscuits etc)

Five samples of crackers, rye bread, oat cakes and shortbread were analysed (Table 25). No furans were detected in the shortbread sample (S20-033833). Furan levels in the other four samples ranged from 5 to 158 µg/kg. Four samples contained 2MF, from 6 to 116 µg/kg, two samples contained 3MF and two contained ethylfuran, although it was not the same samples. Propyl furan was not detected in any sample, and 2-DMF was found in only one sample at a very low level (S20-033832, dark rye bread). This sample also contained the highest levels of furan (158 µg/kg) and 2MF (116 µg/kg), as well as lower amounts of 3MF (36 µg/kg) and 2DMF (5 µg/kg).

7.7.4 Coffees as sold and as consumed

Six ground coffees and four instant coffees were analysed 'as sold' and also 'as consumed', after making a beverage following the manufacturers instructions. All results are given in Table 26.

For the instant coffees, propylfuran was not found in any of the samples above the LOQ. This was higher for some samples (<20 µg/kg) due to background interferences in these matrices. Furan was found in all samples in the range 74 µg/kg (S20-033840) to 691 µg/kg (S20-033838). Sample S20-033840 contained 231 µg/kg 2MF and 22 µg/kg 2,5-dimethyl

furan, but none of the other furans were detected in this sample. No furans were detected above the LOQ (<5 µg/kg) in the beverage prepared from this sample.

2-methylfuran was the compound found at the highest concentrations in the instant coffee samples at levels from 231 to 3837 µg/kg. 3MF was found in three of the four instant coffee samples at levels from 84 to 145 µg/kg, ethylfuran was only found in one instant coffee at 23 µg/kg, while 2,5-dimethyl furan was detected in all four samples at levels from 22 to 253 µg/kg. In all cases virtually no furans were detected in the coffee beverages, three samples contained 2MF at low levels (maximum 13 µg/kg), while none of the other compounds were present above the LOQ of 5 µg/kg.

The levels of furan were much higher in the roast coffee samples, however propylfuran was not detected in any sample above the LOQ of 20 µg/kg. Furan concentrations ranged from 2120 to 5076 µg/kg, 2MF levels ranged from 7666 to 20920 µg/kg, 3MF levels were from 461 to 825 µg/kg, ethylfuran levels were from 149 to 307 µg/kg, and 2DMF levels were from 717 to 1827 µg/kg. Sample S20-033839 contained the highest levels of all furans except furan itself. Sample S20-033837 contained the highest concentration of furan.

The prepared beverages from the ground samples contained very low levels of furans compared to the product as sold. Ethylfuran and propylfuran were not detected at an LOQ of 5 µg/kg, 3MF and 2DMF were detected in 11 / 12 results, but at levels just above the LOQ (range from 6 to 11 µg/kg). All six samples analysed 'as consumed' contained furan and 2MF, but at levels from 29 to 75 µg/kg and 84 to 255 µg/kg, which were approximately 1-2% of the concentration in the dry ground coffee as sold.

7.7.5 Coffee substitutes - Products not based on chicory or cereals

Five coffee substitutes not based on chicory or cereals were analysed as sold and as consumed (Table 27). These samples proved very difficult to analyse and despite repeated attempts data could not be obtained for two of the samples. Of the other three samples, no furans were detected in the samples as sold (LOQ for all analytes <20 µg/kg), or as consumed (LOQ for all analytes <5 µg/kg). The only sample that any furan was measured in was sample S20-033845, an acorn coffee substitute. This contained 1948 µg/kg furan, 1985 µg/kg 2MF, 43 µg/kg 3MF, 26 µg/kg ethylfuran and 193 µg/kg 2DMF. Propylfuran was not detected (<20 µg/kg). After preparing the sample 'as consumed' furan and 2MF were detected just above the LOQ at 6 µg/kg each, no other furans were above the LOQ (<5 µg/kg).

7.7.6 Baby food, ready meal pouches etc.

Ten samples of baby ready meals were analysed, as sold and also following preparation following the manufacturers instructions as requested in Recommendation 2007/196/EC. All heating conditions were used to prepare the as consumed samples. Results are given in Table 28. The levels of furans found in the samples were low, the range of furan concentrations in the as purchased samples was from 22 to 42 µg/kg, 2DMF and propyl furan were not detected in any sample. Low levels of 2MF and 3MF were found, but none exceeded 19 µg/kg, and for some samples these compounds were not detected. All samples contained ethylfuran, there was quite a broad range of concentrations from 8 to 259 µg/kg, three samples contained levels between 179 and 259 µg/kg, while the rest of the samples ranged from 8 to 67 µg/kg. The results for the samples 'as consumed' were generally either very similar or lower than the as sold levels. For the three samples with the highest ethylfuran levels the ethylfuran level in the heated products was considerably lower than the in the as sold sample, for sample S20-033859 it reduced from 259 µg/kg to 30 and 32 µg/kg for the two cooking methods used. There was one exception, sample S20-033863, the ethylfuran level in the portion of this sample heated over water increased from 8 to 70 µg/kg, however the portion warmed in the microwave reduced to less than LOQ for all furans except furan which was the same in the as sold and both as consumed portions.

7.7.7 Processed cereal based food intended for infants and young children

Ten samples of cereal based baby food were analysed, samples that would be reconstituted were analysed both as sold and as consumed. Results are reported in Table 29.

Three of the six porridge or breakfast cereal type products did not contain any furans as the dry cereal or after reconstitution. Two dry cereals contained very low levels of furans, but after reconstitution none were found above the LOQ. One sample of creamed porridge, sold as a wet food contained low levels furan, 2MF and ethylfuran, after warming only furan was detected, at a similar level to the original sample.

Four samples of snacks were analysed, no furans were detected in two of the samples. Of the other samples one contained furan, 2MF and ethyl furan just above the LOQ (5 to 7 µg/kg), while the other contained 33 µg/kg furan and 8 µg/kg 2MF.

7.7.8 Vegetable crisps

Five samples of vegetable crisps were analysed (Table 30). As for acrylamide analysis missed products were split into their single vegetable components before analysis. Furan and ethylfuran were detected in all samples, furan levels ranged from 5 to 44 µg/kg and ethylfuran levels ranged from 7 to 29 µg/kg. 2MF was the next most frequently detected, found in 10 out of 11 samples analysed, levels range from 5 to 65 µg/kg where it was detected. 3MF was detected in 5 out of 11 samples at levels from 5 to 10 µg/kg, 2DMF was only detected in one sample at 8 µg/kg and propylfuran was not detected in any of the samples. The beetroot samples tended to have the highest concentration of furans, but this is not conclusive as it was a very small sample set.

7.7.9 Other miscellaneous samples

Two samples of soup and five fruit based drinks were also analysed (Table 31). No furans were detected in the fruit juices.

The soups were analysed as sold and as consumed, low levels of furans were found in both soups, in both cases these levels decreased when the soup was heated. The results for some of the ethylfuran analysis for these products are indicative as the recovery for this batch of samples was outside the accepted range.

8. Summary and Conclusions

8.1 The first year of a sampling study to produce data on the occurrence and levels of acrylamide and furans has been successfully completed.

8.2 In total 162 samples were purchased, 130 were analysed for acrylamide and 60 were analysed for furans using methods accredited to ISO17025.

8.3 A method was developed and validated to expand the scope of furan testing. The method includes the compounds furan, 2MF, 3MF, ethylfuran, 2DMF and propylfuran. The method has been accredited to ISO17025 using Flexible Scope.

8.4. The majority of samples analysed for acrylamide were chosen to address the need for more data set out in Recommendation (EU) 2019/1888 and therefore do not have Benchmark Levels set. The highest levels of acrylamide were observed in vegetable crisps, a veggie straw product, coffee, and a sample of dried apricots. Unsurprisingly, when coffee is used to prepare a beverage a similar level of acrylamide is found compared to the instant or ground coffee used to prepare it.

8.5 There are no guidance levels or action levels for furans, the data from this study will be used to provide information where there are gaps in current understanding of occurrence. The majority of samples contained low levels of furans. The highest levels were observed in coffee, both ground and instant. When these were used to prepare beverages the resulting furan levels were much reduced, typically around 1-2% of the levels in the dry coffee. For foods such as baby ready meals, and ready to eat soups, low levels of furan were found, but again these typically reduced during heating or preparation.

8.6 This data gives a snapshot of the levels of processing contaminants in a range of products. The results will be used to inform the sampling plan for the second year of the study.

9. Acknowledgements

Thanks to HallMark Veterinary & Compliance Services for purchasing the samples.

Thanks also to the following staff at Fera who contributed to this project: Isabel Grijalvo Diego, Lisa Bryce, Irene Leon, Stephen Chapman, Danny Chan, Antony Lloyd.

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Annex 1: Samples

Table 1. Proposed Sampling Plan for Acrylamide and Furan survey – Year 1

Group Descriptor	Descriptor	Acrylamide	Furan, Alkylfurans
Potato Crisps, snacks, crackers and other potato products from potato dough	-	-	5
Bread	For example, Pumpernickel, Ciabatta with olives, onion bread	5	-
	for example, Rolls (milk rolls)	4	-
	for example, Pita bread	3	-
Breakfast Cereals excluding porridge	Honey roasted muesli	2	-
	Other breakfast cereals	3	3
Fine Bakery Wares (excluding cakes and pastry)	Croissants	5	-
	Doughnuts	5	-
	Pancakes	5	-
	Churros	3	-
	Other fine bakery products (Crackers, biscuits etc)	5	5
Coffee	as sold and as consumed	10	10
Coffee Substitutes	Products not based on chicory or cereals	5	5
Baby Food	-	-	10
Processed cereal based food intended for infants and young children.	for example, Ready meals; (pouches, jars etc)	-	10

Table 1. Contd. Proposed Sampling Plan for Acrylamide and Furan survey – Year 1

Group Descriptor	Descriptor	Acrylamide	Furan, Alkylfurans
Other products based on cereals and potatoes	Mexican Tortillas	3	-
	Cereal Snacks (for example, Rice Cakes, Rice Crackers, Maize Crackers etc)	10	-
	Potato Products for example, rosti, croquettes	10	-
	Potato based ready meals (for example, potato and cheese, casserole, potato and meat)	5	-
Others	Roasted Nuts	4	-
	Roasted Oilseeds	3	-
	Dried Fruits	5	-
	Roasted cocoa beans and derived products	3	-
	Olives in brine	3	-
	Confectionary for example, fudge, caramel, nougat	4	-
	Vegetable Crisps	5	5
	Vegetable Fries/chips	5	-
	Snacks intended for infants and young children	15	-
	Ready to eat soup (as consumed)	-	2
-	Fruit Juices	-	5
-	Estimated Total Samples	130	60

Table 2. Details Potato Crisps, snacks, crackers and other potato products from potato dough

Potato Crisps, snacks, crackers and other potato products from potato dough

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033854	#	Sea Salted Crinkle Cut Crisps	Seabrook	28/11/2020	R2 12:030216	Not declared	Hailsham	11/08/2020
S20-033855	#	Pringles Original	Pringles	21/07/2021	L 0112035760 1724 5179/5260/5281	Belgium	Nottingham	05/08/2020
S20-033722	#	French Fries	Walkers	10/10/2020	GBC 904 181 Q	Not declared	Hull	21/07/2020
S20-033856	#	Hula Hoops Original	KP	31/10/2020	YHFW3 0181 21:39	UK	Uckfield	11/08/2020
S20-033857	#	Popped Potato Chips Sea Salt	Pop Chips	11/06/2021	F14:45 P1 24	EU	Uckfield	11/08/2020

Table 3. Details for Bread samples

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033758	Pumpernickel, Ciabatta with olives, onion bread	Whole Grain Rye Bread	Schneider Brot	26/08/2020	26.8.A2	Germany	Uckfield	11/08/2020
S20-033759	Pumpernickel, Ciabatta with olives, onion bread	Pumpkin Seed Sourdough Bread	The Polish Bakery	21/08/2020	0105	UK	Hull	17/08/2020
S20-033723	Pumpernickel, Ciabatta with olives, onion bread	Kalamata Olive Ciabatta	Sainsburys Taste The Difference	15/07/2020	1744521	UK	Newcastle upon Tyne	13/07/2020
S20-033760	Pumpernickel, Ciabatta with olives, onion bread	Cranberry, Raisin & Cashew Bloomer Loaf	Tesco	09/07/2020	028396001800	UK	Glasgow	08/07/2020
S20-033761	Pumpernickel, Ciabatta with olives, onion bread	Organic Millet Wholegrain Bread	Biona	10/02/2021	1611141	Non EU	Stroud	18/08/2020

Table 3. Contd. Details for Bread samples

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033747	Rolls (milk rolls)	Milk Roll Sliced White Bread	Warburtons	14/08/2020	6KZNW EKHF8	UK	Hailsham	11/08/2020
S20-033748	Rolls (milk rolls)	Bon Appetit Milk Brioche Rolls	Aldi	23/07/2020	L06 23:12 N 176	Not declared	London	07/07/2020
S20-033749	Rolls (milk rolls)	Brioche Rolls	Brioche Pasquier	29/07/2020	L06 10:40 UK2 182	UK	Sudbury	20/07/2020
S20-033750	Rolls (milk rolls)	Maitre Jean Pierre Brioche Rolls	Lidl	29/07/2020	B2201722 0050	UK	Crowborough	15/07/2020
S20-033751	Pitta bread	Wholemeal Pittas	Asda	22/08/2020	LINE B	UK	Cardiff	12/08/2020
S20-033752	Pitta bread	Pitta Breads Stone Baked	BFree	20/11/2020	205 20 L1	Ireland	London	04/08/2020
S20-033753	Pitta bread	Grains & Goodness Pitta	The Food Doctor	01/09/2020	5060021080912	UK	Crewe	10/08/2020

Table 4. Details for Breakfast Cereals excluding porridge

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033754	Honey roasted muesli	Simply Granola	Jordans	08/10/2021	LA 0191 15:26	UK	Nottingham	05/08/2020
S20-033755	Honey roasted muesli	Honey Granola	Dorset Cereal	17/04/2021	MHP0169 R 18:17	Not declared	Uckfield	11/08/2020
S20-033826	Other cereal	Cornflakes	Kellogg's	23/07/2021	L 0205 0346 04 09:17	Not declared	Nottingham	05/08/2020
S20-033827	Other cereal	Weetabix	Weetabix	25/07/2021	0206 17:54 4	Not declared	Crewe	10/08/2020
S20-033828	Other cereal	Cheerios	Nestle	01/03/2021	P1B2 00910953 03:30	UK	Sudbury	20/07/2020

Table 5. Details for Fine Bakery Wares (excluding cakes and pastry)

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033762	Croissants	Reduced Fat All Butter Croissants	Marks & Spencer	07/08/2020	M 0502 597 S	France	Nottingham	05/08/2020
S20-033763	Croissants	Luxury All-Butter Croissants	Iceland	11/07/2020	5010482633752	Not declared	London	07/07/2020
S20-033764	Croissants	Vegan Croissants	La Boulangere	13/07/2020	Emb C - 332 - 169 - 07:57	France	Craigavon	06/07/2020
S20-033765	Croissants	Croissants	Tesco	14/07/2020	M1 01:14	UK	Glasgow	08/07/2020
S20-033766	Croissants	All Butter Croissants	Aldi	04/08/2020	00563309	Not declared	Bristol	03/08/2020
S20-033724	Doughnuts	Doughnuts (ring)	Krispy Kreme	05/08/2020	5060094480008	Not declared	Bristol	03/08/2020
S20-033725	Doughnuts	Raspberry Jam Doughnuts	Sainsbury's	05/08/2020	04 08 / 6018 2012	UK	London	04/08/2020
S20-033726	Doughnuts	Chocolate Flavoured Iced Ring Doughnuts	Tesco	15/07/2020	0285403001209	UK	Stoke-on-Trent	14/07/2020
S20-033772	Doughnuts	Custard Filled Doughnuts	Co-op	20/08/2020	5000128793063	UK	Stonehouse	19/08/2020
S20-033727	Doughnuts	Jam Filled Doughnuts	Lidl	Not declared	Not declared	UK	Nottingham	13/07/2020

Table 5. contd. Details for Fine Bakery Wares (excluding cakes and pastry)

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033767	Pancakes	Scotch Pancakes	Asda	25/07/2020	LH7 0 200 01 15	UK	Colchester	20/07/2020
S20-033768	Pancakes	Pancakes	Warburtons	04/08/2020	3TX MW FGGF3	Not declared	Bristol	03/08/2020
S20-033769	Pancakes	Village Bakery Scotch Pancakes	Aldi	26/07/2020	5195 19:29 P2	UK	Sudbury	20/07/2020
S20-033770	Pancakes	Scotch Pancakes	Hovis	13/08/2020	XO1 P EH	Not declared	Nantwich	10/08/2020
S20-033771	Pancakes	Large Buttermilk Pancakes	Sainsburys	15/08/2020	0217 9:00 P1	UK	Nantwich	10/08/2020
S20-033803	Churros	Mini Churros	Sol & Mar	31/07/2021	126 20 3	Spain	Hedon	21/07/2020
S20-033804	Churros	Churros Lazo	Chulaz	23/07/2021	LOTE 020023	Spain	Bristol	11/08/2020
S20-033805	Churros	Churros with Cinnamon Sprinkle & Chocolate Dip	M&S	09/08/2020	M0392464S	Not declared	Bristol	03/08/2020

Table 5 contd. Details for Fine Bakery Wares (excluding cakes and pastry)

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033829	Crackers, biscuits etc.	Cream Crackers	Jacob's	23/01/2021	0199 14:12	Not declared	Bristol	03/08/2020
S20-033830	Crackers, biscuits etc.	Orkney Thick Oatcakes	Stockan's	15/02/2021	004922	UK	London	04/08/2020
S20-033831	Crackers, biscuits etc.	Gluten Free Wholegrain Crackers	Nairns	26/01/2021	2630 14:38	UK	Bristol	03/08/2020
S20-033832	Crackers, biscuits etc.	Dark Rye Crunchy Rye Breads	Ryvita	10/08/2021	40136 00:27	UK	Sudbury	20/07/2020
S20-033833	Crackers, biscuits etc.	Deluxe Scottish Shortbread	Lidl	30/06/2021	F16	UK	Crowborough	15/07/2020

Table 6. Details for Coffee samples

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033834	Coffee	Decaff Coffee (instant)	Kenco	14/05/2022	LHB0102042 16:57	Not declared	Croydon	07/07/2020
S20-033835	Coffee	Machu Picchu Ground Coffee	Café Direct	15/07/2021	30139 160021 00:06	EU	Bristol	03/08/2020
S20-033836	Coffee	Classic Roast Ground Coffee	Illy	01/05/2022	L080520 14:35	Non EU	Tunbridge Wells	15/07/2020
S20-033837	Coffee	Americano Organic Ground Coffee	Percol	01/05/2021	20 10 00 020 3 08	UK	Crewe	10/08/2020
S20-033838	Coffee	Origins Alta Rica Coffee (instant)	Nescafe Gold	31/05/2022	01320814C1	Not declared	London	07/07/2020
S20-033839	Coffee	Rich Italian Ground Coffee	Taylors	01/09/2021	0120 70 10:42	UK	Crewe	14/07/2020
S20-033840	Coffee	Instant Coffee	Aldi Alcafe	01/05/2022	L0146 03:52	UK	Sudbury	20/07/2020
S20-033841	Coffee	Qualita Rossa (Ground coffee)	Lavazza	30/05/2022	AC17FL 20:29	Italy	London	04/08/2020
S20-033842	Coffee	Mocha Italia Signature Blend (Ground)	Costa Coffee	04/06/2021	20155 R3 14:54	UK	Uckfield	11/08/2020
S20-033843	Coffee	Pure Gold Instant Coffee	Douwe Egberts	03/07/2020	15 38 L0165	Not declared	Bristol	22/07/2020

Table 7. Details for Coffee substitutes (Products not based on chicory or cereals)

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033844	Products not based on chicory or cereals	Dandelion Coffee Compound	Symingtons	01/04/2021	BN 133568	UK	Tunbridge Wells	15/07/2020
S20-033845	Products not based on chicory or cereals	Acorn Coffee Substitute	Health Embassy	27/06/2022	6490164941631	UK	On-line	10/08/2020
S20-033846	Products not based on chicory or cereals	Organic Latte Turmeric Gold	Pukka	01/08/2020	BN 9033	UK	Stoke-on-Trent	14/07/2020
S20-033847	Products not based on chicory or cereals	Turmeric Latte Mix	Nature's Harvest	01/04/2022	LOT 20051383	Australia	On-line	19/08/2020
S20-033848	Products not based on chicory or cereals	Matcha Latte Mix	Naturals	01/06/2022	LOT#M154US	Not declared	On-line	18/08/2020

Table 8. Details for Baby Food, for example, Ready meals; (pouches, jars etc)

Laboratory sample code	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033858	Chicken & Sweet Potato Curry	For Aisha	06/06/2021	5060398490178	EU	Hull	21/07/2020
S20-033859	Tomato & Courgette Pasta	Cow & Gate	07/06/2021	106936 /101131574	EU	Glasgow	08/07/2020
S20-033860	Cottage Pie with Veggie Mash	Kiddylicious	01/03/2021	0076 A 17:11/ 17:12/ 17:13	EU	Nottingham	05/08/2020
S20-033861	Veggie Lasagne	Ella's Kitchen	01/06/2021	G-0128 19:22	EU	Bristol	03/08/2020
S20-033862	Chicken & Vegetable Casserole	Organic Mamia Aldi	28/02/2021	FR27.679.115CE	France	London	07/07/2020
S20-033863	Spaghetti Bolognese	Heinz By Nature	01/07/2021	0021 0433	EU	Nottingham	05/08/2020
S20-033864	Organic Pasta Bolognese	Lupilu	20/03/2021	20/03/2021	France	Glasgow	08/07/2020
S20-033865	Organic Carrot, Sweet Potato & Butternut Squash	Piccolo	25/07/2021	E146 05:03	EU	Hull	17/08/2020
S20-033866	Organic Sweet Squash & Chicken	Hipp	01/10/2021	DE LA67513 P03/20 12:32	Germany	Stonehouse	03/08/2020
S20-033867	Butternut Squash, Carrot & Broccoli	Babease	13/11/2020	13 11 2020 3	UK	Uckfield	11/08/2020

Table 9. Details for Processed cereal based food intended for infants and young children

Laboratory sample code	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033868	Organic Apple & Banana Swiss Style Muesli	Hipp	30/11/2021	6139155 23:35 224B	Croatia	Cardiff	12/08/2020
S20-033869	Baby Rice	Cow & Gate	19/05/2021	03:29 L9	EU	Glasgow	08/07/2020
S20-033870	Creamy Porridge	Cow & Gate	16/05/2021	09:39 L9 / 10393252	Not declared	London	22/07/2020
S20-033871	Creamed Porridge	Heinz By Nature	01/08/2021	0055 0147 A16:33	EU	Crewe	05/08/2020
S20-033872	Banana & Cinnamon Muesli	Ella's Kitchen	03/12/2020	12:55 33819	EU	Crewe	10/08/2020
S20-033873	Organic Baby Rice	Aptamil	13/02/2021	00:31 L9	Not declared	London	07/07/2020
S20-033874	Teething Biscuits	Bickiepegs	31/07/2022	20031 08/2022	UK	Hull	21/07/2020
S20-033875	Biscotti Banana	Kiddylicious	01/04/2021	201703 07:40	UK	London	15/07/2020
S20-033876	Gingerbread Men	Organix	04/05/2021	L125 C 02:33	Not declared	Glasgow	08/07/2020
S20-033877	Rusks	Farleys	01/11/2021	0127 19:22:53	UK	Sudbury	20/07/2020

Table 10. Details for Other products based on cereals and potatoes

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033773	Mexican Tortillas	White Wraps	Weight Watchers	29/07/2020	0 191 03:52 T1B	Not declared	Stoke-on-Trent	14/07/2020
S20-033774	Mexican Tortillas	Wheat & White Wraps	Mission Deli	25/07/2020	SG7 47071 0178 22;09	UK	Crowborough	15/07/2020
S20-033775	Mexican Tortillas	Regular Tortillas Whole Wheat	Old El Paso	01/02/2021	17:39 L612 2505309494	Not declared	Nantwich	10/08/2020

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Table 10 cond. Details for Other products based on cereals and potatoes

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033728	Cereal Snacks	Rice Cakes	Marmite	06/06/2021	2016101:19C1	Not declared	Croydon	07/07/2020
S20-033729	Cereal Snacks	Salt & Vinegar Rice Cakes	Snack A Jacks	19/12/2020	GBS 4F2 141 04:20 4681	USA	Crowborough	15/07/2021
S20-033730	Cereal Snacks	Blueberry & Vanilla Low Fat Rice & Corn Cakes	Kallo	18/03/2021	21068 18:59 C1	UK	Newcastle upon Tyne	13/07/2020
S20-033731	Cereal Snacks	Sweet Chilli Rice Crackers	The Snack Organisation	30/08/2021	9417986941806	UK	Sudbury	20/07/2020
S20-033732	Cereal Snacks	Rice Cakes	Harvest Moon Aldi	09/08/2021	20167 14:14 C11	Not declared	London	07/07/2020
S20-033733	Cereal Snacks	Just Free GF Corn Cakes	Lidl	12/06/2021	B13NL 159	UK	Nottingham	13/07/202
S20-033734	Cereal Snacks	Belgian Dark Chocolate Rice Cakes	Nature's Store	28/04/2021	5060112548703	Not declared	Crewe	14/07/2020
S20-033735	Cereal Snacks	Thai Chilli Rice Crackers	Marks & Spencer	29/12/2020	20285	Thailand	Beckenham	04/08/2020
S20-033756	Cereal Snacks	Chilli Rice Crackers	Three Tigers	01/12/2020	LO168 16:24	Europe	Hull	17/08/2020
S20-033736	Cereal Snacks	Corn Thins	Real Food	31/03/2021	1 044 16:16	Australia	Craigavon	06/07/2020

*Cereal snacks – for example, Rice Cakes, Rice Crackers, Maize Crackers

Table 11. Details for Other products based on cereals and potatoes

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033806	Potato products	Jacket Potatoes	McCain	01/07/2021	W01072020 23:12	Not declared	Nottingham	13/07/2020
S20-033807	Potato products	Potato Croquettes	Iceland	20/05/2022	Lot: D07 20 142 20:11	Not declared	Stroud	19/08/2020
S20-033808	Potato products	Hash Browns	McCain	01/12/2021	W 12062020 10:14 02	Not declared	Nottingham	05/08/2020
S20-033809	Potato products	Potato Croquettes	Tesco	18/08/2020	L2 x 18:54	UK	Uckfield	11/08/2020
S20-033810	Potato products	Inspired Cuisine Potato Gratin	Aldi	30/08/2020	4088600246307	Not declared	Nottingham	13/07/2020
S20-033811	Potato products	Chef Select Sauteed potatoes with bacon & onions	Lidl	30/08/2020	B 20:00	Germany	Nottingham	13/07/2020
S20-033812	Potato products	Potato Waffles	Morrisons	01/06/2022	D14 2015906:10	Belgium	Croydon	18/08/2020
S20-033813	Potato products	Roasties	Aunt Bessie's	30/11/2021	L9319B2 0BJ 22:59	Not declared	London	21/07/2020
S20-033814	Potato products	Crispy Potato Pops	Tesco Hearty Food Co.	01/04/2021	D08 20 105 05:03	UK	Sudbury	20/07/2020
S20-033815	Potato products	Crisp & Golden Swiss Style Rosti	Waitrose	31/10/2021	08:20 L0191	Not declared	Uckfield	11/08/2020

Table 11 contd. Details for Other products based on cereals and potatoes

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033816	Potato based ready meal	Cheese & Bacon Potato Skins	Bannisters	04/12/2020	L0063 3:45	UK	Newcastle-upon-Tyne	13/07/2020
S20-033817	Potato based ready meal	Potato Dauphinoise	Tesco Finest	19/07/2020	8:45 BU4 L4	UK	Crewe	14/07/2020
S20-033818	Potato based ready meal	Nature's Pick, Crispy Potato Slices	Aldi	11/07/2020	348 09:48 F27	UK	Glasgow	08/07/2020
S20-033819	Potato based ready meal	Deluxe Cottage Pie	Lidl	24/08/2020	20284022	UK	Cardiff	18/08/2020
S20-033820	Potato based ready meal	Sausage & Mash	Tesco Hearty Food Co.	09/08/2020	08:51 L2	UK	London	04/08/2020

Table 12. Details for Others, miscellaneous products

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033740	Roasted Nuts	Roasted & Salted Pistachio Nuts	Cypressa	01/11/2020	20087	Not declared	Nottingham	13/07/2020
S20-033741	Roasted Nuts	Roasted & Salted Cashews	Stockwell	11/01/2021	LO195H305 22:27	Not declared	Crewe	10/08/2020
S20-033742	Roasted Nuts	Mixed Nuts	Aldi	04/04/2021	44 T 20172 09:16	Not declared	Nottingham	13/07/2020
S20-033743	Roasted Nuts	Roasted Peanuts	Tesco	17/12/2020	L 0160 HS1 18:15	Not declared	Glasgow	08/07/2020
S20-033744	Roasted Oilseeds	Toasted 3 Seed Mix	Tesco	01/01/2021	50333 -1-1- 1 10:39	Not declared	Uckfield	11/08/2020
S20-033757	Roasted Oilseeds	Toasted Pumpkin & Sunflower Seeds	Sainsbury's	TBC	TBC	Not declared	York	TBC
S20-033746	Roasted Oilseeds	Chilli Roasted Pumpkin & Sunflower Seeds	Munchy Seeds	30/11/2020	1 114	UK	London	04/08/2020
S20-033791	Dried fruit	Chopped Dates	Whitworths	28/02/2021	L0135/K 17:28	Turkey	Portadown	06/07/2020
S20-033792	Dried fruit	Organic Soft Apricots	Crazy Jack	01/08/2021	L0135/K 17:28	Turkey	Hull	17/08/2020
S20-033793	Dried fruit	Mango (Dried)	Urban Fruit	01/07/2021	20183 REBRA 14 16:33	Not declared	Nottingham	05/08/2020
S20-033794	Dried fruit	Strawberry Yoyos	Bear	01/05/2021	20141	Not declared	London	22/07/2020

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033795	Dried fruit	Alesto Dried Mango	Lidl	08/11/2020	L0575304	Burkina Faso	London	21/07/2020

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Table 12 contd. Details for Others, miscellaneous products

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033796	Roasted Cocoa Beans	Organic Cacao Nibs	Naturya	28/02/2022	W00448	Non EU	Newcastle upon Tyne	13/07/2020
S20-033797	Roasted Cocoa Beans	Raw Cacao Nibs	Creative Nature	01/02/2022	20050	UK	Cardiff	12/08/2020
S20-033798	Roasted Cocoa Beans	Natural Cacao Nibs	Food Thoughts	21/01/2022	211	UK	Hull	17/08/2020
S20-033737	Olives In brine	Black Pitted Olives in Brine	Cypressa	01/02/2023	L-0480/8561 19:55	Spain	Nottingham	13/07/2020
S20-033738	Olives In brine	Green Pitted Olives	Crespo	30/04/2023	L00328 09:10	Spain	London	04/08/2020
S20-033739	Olives In brine	Green Pitted Olives in Brine	Aldi	16/06/2023	A12L-1680 07:42	Not declared	Nottingham	14/07/2020
S20-033799	Confectionary	Clotted Cream Fudge	Bristows	20/02/2022	20202	UK	Hull	17/08/2020
S20-033800	Confectionary	Chewy Nougat	Barratt	07/07/2021	LE 0202 15:58	Not declared	Crewe	10/08/2020
S20-033801	Confectionary	Fabulous Vanilla Fudge	Thorntons	31/01/2021	164XE-161 1 08:17	UK	Crewe	10/08/2020
S20-033802	Confectionary	Toffee	Tesco	31/12/2020	0 157 07:10 C1	UK	Craigavon	06/07/2020

Table 12 contd. Details for Others, miscellaneous products

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033849	Vegetable Crisps	Hummus Chips	Eat Real	04/08/2021	L1/22211:52	UK	Cheltenham	20/08/2020
S20-033850	Vegetable Crisps	Veg Crisps	Tyrells	28/11/2020	16:20 20 203	UK	London	04/08/2020
S20-033851	Vegetable Crisps	Root Vegetable & Sea Salt Crisps	Aldi	03/10/2020	2 11:34 20 177	Not declared	London	15/07/2020
S20-033852	Vegetable Crisps	Lightly Salted Veg Chips	Kettle	05/12/2020	12:07 C194 055790	Netherlands	Nantwich	10/08/2020
S20-033853	Vegetable Crisps	Lentil Bites	The Foodie Market	05/01/2021	L2 /19107:33 Prod date 09.07.2020	UK	Hull	17/08/2020
S20-033821	Vegetable Fries/chips	Honey Glazed Parsnips	Aunt Bessie's	25/01/2022	Lot CB 01 0025 075 2307	Not declared	Hull	21/07/2020
S20-033822	Vegetable Fries/chips	Mixed Root Vegetable Fries	Strong Roots	09/06/2022	18L0161PA 21:32 EMB62863C	EU	Hull	17/08/2020
S20-033823	Vegetable Fries/chips	Four Seasons Battered Onion Rings	Aldi	01/01/2022	L20189 41911C	Not declared	Cardiff	12/08/2020
S20-033824	Vegetable Fries/chips	Crispy Sweet Potato Fries	McCain	29/04/2022	PD: 29 APR 2020 04:06	South Africa	Uckfield	11/08/2020
S20-033825	Vegetable Fries/chips	Sweet Potato Chips	Slimming World	28/02/2022	710059AV (1) 05:11	Not declared	Crewe	14/07/2020

Table 12 contd. Details for Others, miscellaneous products

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033776	Snacks intended for infants and young children	Organic Carrot Sticks	Lupilu	31/10/2020	BK 23:44 F6 19	Not declared	Cardiff	12/08/2020
S20-033777	Snacks intended for infants and young children	Strawberry & Apple Oat Fingers	Ella's Kitchen	26/02/2021	0116N 01:31	Not declared	Hull	21/07/2020
S20-033778	Snacks intended for infants and young children	(Mini) Rice Cakes 12+ months	Marmite	18/04/2021	20 108	UK	Uckfield	11/08/2020
S20-033779	Snacks intended for infants and young children	Apple & Carrot Rice Crispy Sticks	Kiddylicious	22/04/2021	L121890/ 10:31	EU	London	18/08/2020
S20-033780	Snacks intended for infants and young children	Strawberry & Apple Soft Oaty Bars	Mamia Organic	22/01/2021	L 0A4221 08:35	Non EU	Stoke-on-Trent	14/07/2020
S20-033781	Snacks intended for infants and young children	Organic Blueberry Flavour Rice Cakes	Asda Little Angels	21/01/2021	2011212: 18 C4	Belgium	Colchester	20/07/2020
S20-033782	Snacks intended for infants and young children	So Yummy Tomato & Basil Straws	Heinz	26/09/2020	9270	Not declared	Nottingham	13/07/2020
S20-033783	Snacks intended for infants and young children	Apple Rice Cakes	Organix	21/05/2021	H 20142 A 23:14	Non EU	Hull	17/08/2020

Table 12 contd. Details for Others, miscellaneous products

Laboratory sample code	Group Descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033784	Snacks intended for infants and young children	Veggie Straws	Eat Real	10/06/2021	L21162	UK	Uckfield	11/08/2020
S20-033785	Snacks intended for infants and young children	Chickpea & Carrot Puffs	Tesco	09/07/2021	01:46	Non EU	Bristol	19/08/2020
S20-033786	Snacks intended for infants and young children	Raspberry & Apple Oaty Bars	Organix	01/10/2020	4 035 11:28	Switzerland	Glasgow	08/07/2020
S20-033787	Snacks intended for infants and young children	Sweetcorn & Carrot Melty Sticks	Ella's Kitchen	25/02/2021	13420 L7	EU	Bristol	27/06/2020
S20-033788	Snacks intended for infants and young children	Wheat, Oat & Tomato Cereal Snack	Nestle Cerelac	01/04/2021	L00160301	Not declared	Gloucester	19/08/2020
S20-033789	Snacks intended for infants and young children	Tomato, Paprika, Chickpea & Quinoa Smiles	Little Freddie	16/12/2020	50149343 18:38 351 19 3A	EU	London	18/08/2020
S20-033790	Snacks intended for infants and young children	Banana Puffcorn	Organix	18/11/2020	L0150	Italy	London	18/08/2020

Table 12 contd. Details for Others, miscellaneous products

Laboratory sample code	Group descriptor	Product description	Brand name	Best before date	Batch code	Country of origin	UK town where purchased	Date of purchase
S20-033878	Ready to eat soup	Cream of Tomato Soup	Heinz	01/07/2021	0089 14:48	EU	London	18/08/2020
S20-033879	Ready to eat soup	Spicy Parsnip Soup	Baxters	01/12/2022	SPS2 L256S 17:29	Not declared	Crewe	10/08/2020
S20-049834	Fruit juice	Cloudy Apple Juice	Copella	27/12/2020	CLX14:06	Not declared	York	20/11/2020
S20-033881	Fruit juice	Rooting For You Cold Pressed Juice	Lidl Naturis	24/11/2020	L2014820001 02231353	Not declared	London	22/07/2020
S20-033882	Fruit juice	Apple & Blackcurrant Squash	Robinsons	01/07/2021	K2L 0210 18:0	Not declared	Crewe	10/08/2020
S20-033883	Fruit juice	Smooth Orange Juice	The Juice Company	01/06/2021	X7 0170 11:45	Not declared	Glasgow	08/07/2020
S20-049835	Fruit juice	Pressed Apple Juice	Tropicana	11/12/2020	20TD 19AA	Not declared	York	20/11/2020

Annex B: Tables

Table 13. Acrylamide results for Bread products ($\mu\text{g}/\text{kg}$) corrected for recovery.

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$)
S20-033758	Whole Grain Rye Bread	Schneider Brot	Pumpernickel, Ciabatta with olives, onion bread	<30
S20-033759	Pumpkin Seed Sourdough Bread	The Polish Bakery	Pumpernickel, Ciabatta with olives, onion bread	78
S20-033723	Kalamata Olive Ciabatta	Sainsbury's Taste The Difference	Pumpernickel, Ciabatta with olives, onion bread	89
S20-033760	Cranberry, Raisin & Cashew Bloomer Loaf	Tesco	Pumpernickel, Ciabatta with olives, onion bread	<30
S20-033761	Organic Millet Wholegrain Bread	Biona	Pumpernickel, Ciabatta with olives, onion bread	<30
S20-033747	Milk Roll Sliced White Bread	Warburtons	Rolls (milk rolls)	<30
S20-033748	Bon Appetit Milk Brioche Rolls	Aldi	Rolls (milk rolls)	<30
S20-033749	Brioche Rolls	Brioche Pasquier	Rolls (milk rolls)	<30
S20-033750	Maitre Jean Pierre Brioche Rolls	Lidl	Rolls (milk rolls)	<30
S20-033751	Wholemeal Pittas	Asda	Pitta Bread	<30
S20-033752	Pitta Breads Stone Baked	BFree	Pitta Bread	<30
S20-033753	Grains & Goodness Pitta	The Food Doctor	Pitta Bread	<30

Commission Regulation (EU) 2017/2158 sets Benchmark levels for 'Bread' as follows:

- Soft bread
- (a) Wheat based bread 50 $\mu\text{g}/\text{kg}$
 - (b) Soft bread other than wheat based bread 100 $\mu\text{g}/\text{kg}$

Table 14. Acrylamide results for Breakfast cereals excluding porridge (µg/kg) corrected for recovery.

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg)
S20-033754	Simply Granola	Jordans	Honey roasted muesli	106
S20-033755	Honey Granola	Dorset Cereal	Honey roasted muesli	51
S20-033826	Cornflakes	Kellogg's	Other cereal	49
S20-033827	Weetabix	Weetabix	Other cereal	278
S20-033828	Cheerios	Nestle	Other cereal	132

Commission Regulation (EU) 2017/2158 sets Benchmark levels for 'Breakfast cereals (excl. porridge)' as follows:

Breakfast cereals (excl. porridge)

- bran products and whole grain cereals, gun puffed grain 300 µg/kg
- wheat and rye based products 300 µg/kg
- maize, oat, spelt, barley and rice based products 150 µg/kg

Table 15. Acrylamide results for Fine Bakery Wares (excluding cakes and pastry)
(µg/kg) corrected for recovery.

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg)
S20-033762	Reduced Fat All Butter Croissants	Marks & Spencer	Croissants	<30
S20-033763	Luxury All-Butter Croissants	Iceland	Croissants	<30
S20-033764	Vegan Croissants	La Boulangere	Croissants	<30
S20-033765	Croissants	Tesco	Croissants	<30
S20-033766	All Butter Croissants	Aldi	Croissants	31
S20-033724	Doughnuts (ring)	Krispy Kreme	Doughnuts	<30
S20-033725	Raspberry Jam Doughnuts	Sainsbury's	Doughnuts	<30
S20-033726	Chocolate Flavoured Iced Ring Doughnuts	Tesco	Doughnuts	<30
S20-033772	Custard Filled Doughnuts	Co-op	Doughnuts	<30
S20-033727	Jam Filled Doughnuts	Lidl	Doughnuts	<30

There are no Benchmark levels for doughnuts and croissants.

Table 15. Acrylamide results for Fine Bakery Wares (excluding cakes and pastry) ($\mu\text{g}/\text{kg}$) corrected for recovery.

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$)
S20-033767	Scotch Pancakes	Asda	Pancakes	<30
S20-033768	Pancakes	Warburtons	Pancakes	<30
S20-033769	Village Bakery Scotch Pancakes	Aldi	Pancakes	73
S20-033770	Scotch Pancakes	Hovis	Pancakes	<30
S20-033771	Large Buttermilk Pancakes	Sainsburys	Pancakes	<30
S20-033803	Mini Churros	Sol & Mar	Churros	<30
S20-033804	Churros Lazo	Chulaz	Churros	71
S20-033805	Churros with Cinnamon Sprinkle & Chocolate Dip	Marks & Spencer	Churros	60
S20-033829	Cream Crackers	Jacob's	Other - Crackers, biscuits etc.	66
S20-033830	Orkney Thick Oatcakes	Stockan's	Other - Crackers, biscuits etc.	236
S20-033831	Gluten Free Wholegrain Crackers	Nairns	Other - Crackers, biscuits etc.	42
S20-033832	Dark Rye Crunchy Rye Breads	Ryvita	Other - Crackers, biscuits etc.	218
S20-033833	Deluxe Scottish Shortbread	Lidl	Other - Crackers, biscuits etc.	<30

Commission Regulation (EU) 2017/2158 sets Benchmark levels as follows:

Biscuits and wafers 350 $\mu\text{g}/\text{kg}$

Crackers with the exception of potato based crackers 400 $\mu\text{g}/\text{kg}$

Crispbread 350 $\mu\text{g}/\text{kg}$

Ginger bread 800 $\mu\text{g}/\text{kg}$

Products similar to the other products in this category 300 $\mu\text{g}/\text{kg}$

**Table 16. Acrylamide results for Coffee – as sold and as consumed, ($\mu\text{g}/\text{kg}$)
corrected for recovery**

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$) As sold	Acrylamide Result ($\mu\text{g}/\text{L}$) As consumed
S20-033834	Decaff Coffee (instant)	Kenco	Coffee	884	4.7
S20-033835	Machu Picchu Ground Coffee	Café Direct	Coffee	245	11.6
S20-033836	Classic Roast Ground Coffee	Illy	Coffee	183	13.2
S20-033837	Americano Organic Ground Coffee	Percol	Coffee	163	9.3
S20-033838	Origins Alta Rica Coffee (instant)	Nescafe Gold	Coffee	688	5.7
S20-033839	Rich Italian Ground Coffee	Taylors	Coffee	178	9.5
S20-033840	Instant Coffee	Aldi Alcafe	Coffee	646	6.0
S20-033841	Qualita Rossa (Ground coffee)	Lavazza	Coffee	356	18.1
S20-033842	Mocha Italia Signature Blend (Ground)	Costa Coffee	Coffee	197	10.7
S20-033843	Pure Gold Instant Coffee	Douwe Egberts	Coffee	849	7.7

Commission Regulation (EU) 2017/2158 sets Benchmark levels as follows:
Roast coffee 400 $\mu\text{g}/\text{kg}$
Instant (soluble) coffee 850 $\mu\text{g}/\text{kg}$

The Benchmark level applies to the product as sold.

Table 17. Acrylamide results for Coffee substitutes (Products not based on chicory or cereals) – as sold and as consumed, (µg/kg) corrected for recovery

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg) As sold	Acrylamide Result (µg/L) As consumed
S20-033844	Dandelion Coffee Compound	Symingtons	Coffee substitute	<30	0.6
S20-033845	Acorn Coffee Substitute	Health Embassy	Coffee substitute	<30	1.9
S20-033846	Organic Latte Turmeric Gold	Pukka	Coffee substitute	57	2.1
S20-033847	Turmeric Latte Mix	Nature's Harvest	Coffee substitute	<30	<0.3
S20-033848	Matcha Latte Mix	Naturals	Coffee substitute	<30	<0.3

Commission Regulation (EU) 2017/2158 sets Benchmark levels as follows:

**Table 18. Acrylamide results for Other products based on cereals and potatoes
(µg/kg) corrected for recovery**

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg)
S20-033773	White Wraps	Weight Watchers	Mexican Tortillas	<30
S20-033774	Wheat & White Wraps	Mission Deli	Mexican Tortillas	<30
S20-033775	Regular Tortillas Whole Wheat	Old El Paso	Mexican Tortillas	<30
S20-033728	Rice Cakes	Marmite	Cereal Snacks	222
S20-033729	Salt & Vinegar Rice Cakes	Snack A Jacks	Cereal Snacks	90
S20-033730	Blueberry & Vanilla Low Fat Rice & Corn Cakes	Kallo	Cereal Snacks	153
S20-033731	Sweet Chilli Rice Crackers	The Snack Organisation	Cereal Snacks	70
S20-033732	Rice Cakes	Harvest Moon Aldi	Cereal Snacks	183
S20-033733	Just Free GF Corn Cakes	Lidl	Cereal Snacks	215
S20-033734	Belgian Dark Chocolate Rice Cakes	Nature's Store	Cereal Snacks	152
S20-033735	Thai Chilli Rice Crackers	Marks & Spencer	Cereal Snacks	<30
S20-033756	Chilli Rice Crackers	Three Tigers	Cereal Snacks	<30
S20-033736	Corn Thins	Real Food	Cereal Snacks	414

**Table 19. Acrylamide results for Other products based on cereals and potatoes
(µg/kg) corrected for recovery**

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg)
S20-033806	Jacket Potatoes	McCain	Potato products (microwave)	228
S20-033806	Jacket Potatoes	McCain	Potato products (oven)	1097
S20-033807	Potato Croquettes	Iceland	Potato products (deep fried)	409
S20-033807	Potato Croquettes	Iceland	Potato products (oven)	<30
S20-033808	Hash Browns	McCain	Potato products	176
S20-033809	Potato Croquettes	Tesco	Potato products	39
S20-033810	Potato Gratin	Aldi	Potato products (microwave)	<30
S20-033810	Potato Gratin	Aldi	Potato products (oven)	39
S20-033811	Sauteed potatoes with bacon & onions	Lidl	Potato products	322
S20-033812	Potato Waffles	Morrisons	Potato products (Deep fried)	328
S20-033812	Potato Waffles	Morrisons	Potato products (Oven)	82
S20-033813	Roasties	Aunt Bessie's	Potato products (Deep fried)	152
S20-033813	Roasties	Aunt Bessie's	Potato products (Oven)	86
S20-033814	Crispy Potato Pops	Tesco	Potato products	58
S20-033815	Crisp & Golden Swiss Style Rosti	Waitrose	Potato products	374

Table 19 contd. Acrylamide results for Other products based on cereals and potatoes ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$)
S20-033816	Cheese & Bacon Potato Skins	Bannisters	Potato based ready meal (microwave)	104
S20-033816	Cheese & Bacon Potato Skins	Bannisters	Potato based ready meal (oven)	130
S20-033817	Potato Dauphinoise	Tesco Finest	Potato based ready meal	<30
S20-033818	Nature's Pick, Crispy Potato Slices	Aldi	Potato based ready meal	218
S20-033819	Deluxe Cottage Pie	Lidl	Potato based ready meal	34
S20-033820	Sausage & Mash	Tesco Hearty Food Co.	Potato based ready meal (microwave)	<30
S20-033820	Sausage & Mash	Tesco Hearty Food Co.	Potato based ready meal (oven)	<30

Table 20. Table. Acrylamide results for Other products based on cereals and potatoes ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$)
S20-033776	Organic Carrot Sticks	Lupilu	Snacks intended for infants and young children	182
S20-033777	Strawberry & Apple Oat Fingers	Ella's Kitchen	Snacks intended for infants and young children	<30
S20-033778	(Mini) Rice Cakes 12+ months	Marmite	Snacks intended for infants and young children	<30
S20-033779	Apple & Carrot Rice Crispy Sticks	Kiddylicious	Snacks intended for infants and young children	68
S20-033780	Strawberry & Apple Soft Oaty Bars	Mamia Organic	Snacks intended for infants and young children	<30
S20-033781	Organic Blueberry Flavour Rice Cakes	Asda Little Angels	Snacks intended for infants and young children	<30
S20-033782	So Yummy Tomato & Basil Straws	Heinz	Snacks intended for infants and young children	<30
S20-033783	Apple Rice Cakes	Organix	Snacks intended for infants and young children	<30
S20-033784	Veggie Straws	Eat Real	Snacks intended for infants and young children	2439*
S20-033785	Chickpea & Carrot Puffs	Tesco	Snacks intended for infants and young children	41
S20-033786	Raspberry & Apple Oaty Bars	Organix	Snacks intended for infants and young children	<30
S20-033787	Sweetcorn & Carrot Melty Sticks	Ella's Kitchen	Snacks intended for infants and young children	96
S20-033788	Wheat, Oat & Tomato Cereal Snack	Nestle Cerelac	Snacks intended for infants and young children	<30
S20-033789	Tomato, Paprika, Chickpea & Quinoa Smiles	Little Freddie	Snacks intended for infants and young children	<30
S20-033790	Banana Puffcorn	Organix	Snacks intended for infants and young children	144

*n=5

Table 21. Acrylamide results for Other products based on cereals and potatoes (µg/kg) corrected for recovery

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg)
S20-033849	Hummus Chips	Eat Real	Vegetable Crisps	<30
S20-033850	Veg Crisps - Beetroot	Tyrells	Vegetable Crisps	1249*
S20-033850	Veg Crisps - Carrot	Tyrells	Vegetable Crisps	830*
S20-033850	Veg Crisps - Parsnip	Tyrells	Vegetable Crisps	160
S20-033851	Root Vegetable & Sea Salt Crisps - Beetroot	Aldi	Vegetable Crisps	1349*
S20-033851	Root Vegetable & Sea Salt Crisps - Parsnip	Aldi	Vegetable Crisps	726*
S20-033851	Root Vegetable & Sea Salt Crisps - Sweet Potato	Aldi	Vegetable Crisps	536
S20-033852	Lightly Salted Veg Chips - Beetroot	Kettle	Vegetable Crisps	2634*
S20-033852	Kettle Lightly Salted Veg Chips- Parsnip	Kettle	Vegetable Crisps	2293*
S20-033852	Kettle Lightly Salted Veg Chips -Sweet Potato	Kettle	Vegetable Crisps	1668*
S20-033853	Lentil Bites	The Foodie Market	Vegetable Crisps	95

*n=3

Table 21 contd. Acrylamide results for Other products based on cereals and potatoes ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$)
S20-033821	Honey Glazed Parsnips	Aunt Bessie's	Vegetable Fries/chips	433
S20-033822	Mixed Root Vegetable Fries - Beetroot	Strong Roots	Vegetable Fries/chips	249
S20-033822	Mixed Root Vegetable Fries - Carrot	Strong Roots	Vegetable Fries/chips	229
S20-033822	Mixed Root Vegetable Fries - Parsnip	Strong Roots	Vegetable Fries/chips	108
S20-033823	Four Seasons Battered Onion Rings	Aldi	Vegetable Fries/chips (oven)	<30
S20-033823	Four Seasons Battered Onion Rings	Aldi	Vegetable Fries/chips (deep fried)	63
S20-033824	Crispy Sweet Potato Fries	McCain	Vegetable Fries/chips	35
S20-033825	Sweet Potato Chips	Slimming World	Vegetable Fries/chips	321

Table 22. Acrylamide results for Other miscellaneous products ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result ($\mu\text{g}/\text{kg}$)
S20-033740	Roasted & Salted Pistachio Nuts	Cypressa	Roasted Nuts	<30
S20-033741	Roasted & Salted Cashews	Stockwell	Roasted Nuts	<30
S20-033742	Mixed Nuts	Aldi	Roasted Nuts	<30
S20-033743	Roasted Peanuts	Tesco	Roasted Nuts	92
S20-033744	Toasted 3 Seed Mix	Tesco	Roasted Oilseeds	<30
S20-033757	Toasted Pumpkin & Sunflower Seeds	Sainsbury's	Roasted Oilseeds	<30
S20-033746	Chilli Roasted Pumpkin & Sunflower Seeds	Munchy Seeds	Roasted Oilseeds	<30
S20-033791	Chopped Dates	Whitworths	Dried fruit	48
S20-033792	Organic Soft Apricots	Crazy Jack	Dried fruit	454
S20-033793	Mango (Dried)	Urban Fruit	Dried fruit	<30
S20-033794	Strawberry Yoyos	Bear	Dried fruit	<30
S20-033795	Alesto Dried Mango	Lidl	Dried fruit	<30

**Table 22 contd. Acrylamide results for Other miscellaneous products (µg/kg)
corrected for recovery**

Laboratory sample code	Product description	Brand name	Group Descriptor	Acrylamide Result (µg/kg)
S20-033796	Organic Cacao Nibs	Naturya	Roasted Cocoa Beans	264
S20-033797	Raw Cacao Nibs	Creative Nature	Roasted Cocoa Beans	<30
S20-033798	Natural Cacao Nibs	Food Thoughts	Roasted Cocoa Beans	364
S20-033737	Black Pitted Olives in Brine	Cypressa	Olives In brine	281
S20-033738	Green Pitted Olives	Crespo	Olives In brine	<30
S20-033739	Green Pitted Olives in Brine	Aldi	Olives In brine	<30
S20-033799	Clotted Cream Fudge	Bristows	Confectionary	<30
S20-033800	Chewy Nougat	Barratt	Confectionary	<30
S20-033801	Fabulous Vanilla Fudge	Thorntons	Confectionary	<30
S20-033802	Toffee	Tesco	Confectionary	<30

Table 23. Furan results for potato snacks ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033854	Sea Salted Crinkle Cut Crisps	Seabrook	11	8	<5	38	<5	<5
S20-033855	Pringles Original	Pringles	17	<5	<5	20	<5	<5
S20-033722	French Fries	Walkers	23	12	<5	147	<5	<5
S20-033856	Hula Hoops Original	KP	36	10	5	40	<5	<5
S20-033857	Popped Potato Chips Sea Salt	Pop Chips	77	10	<5	32	<5	<5

Table 24. Furan results of other breakfast cereals ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033826	Cornflakes	Kellogg's	55	19	<5	<5	<5	<5
S20-033827	Weetabix	Weetabix	21	15	<5	<5	<5	<5
S20-033828	Cheerios	Nestle	35	17	5	14	<5	<5

Table 25. Furan results of Fine Bakery Wares (excluding cakes and pastry), other - Crackers, biscuits etc ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033829	Cream Crackers	Jacob's	57	59	<5	7	<5	<5
S20-033830	Orkney Thick Oatcakes	Stockan's	5	29	36	<5	<5	<5
S20-033831	Gluten Free Wholegrain Crackers	Nairns	25	6	<5	<5	<5	<5

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033832	Dark Rye Crunchy Rye Breads	Ryvita	158	116	21	36	5	<5
S20-033833	Deluxe Scottish Shortbread	Lidl	<5	<5	<5	<5	<5	<5

Table 26. Furan Results of Coffee, as sold and as consumed ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033834	Decaff Coffee (instant) - as sold	Kenco	673	1936	84	<20	113	<5*
S20-033834	Decaff Coffee (instant) - as consumed	Kenco	<5	7	<5	<5	<5	<5
S20-033835	Machu Picchu Ground Coffee - as sold	Café Direct	2120	7666	462	149	717	<20
S20-033835	Machu Picchu Ground Coffee - as consumed	Café Direct	29	84	5	<5	7	<5
S20-033836	Classic Roast Ground Coffee - as sold	Illy	4477	14900	736	289	1687	<20
S20-033836	Classic Roast Ground Coffee - as consumed	Illy	61	189	8	<5	10	<5
S20-033837	Americano Organic Ground Coffee - as sold	Percol	5076	13100	713	305	1741	<20
S20-033837	Americano Organic Ground Coffee - as consumed	Percol	63	194	8	<5	10	<5

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033838	Origins Alta Rica Coffee (instant) – as sold	Nescafe Gold	691	3837	145	23	253	<20
S20-033838	Origins Alta Rica Coffee (instant) – as consumed	Nescafe Gold	<5	13	<5	<5	<5	<5

*Recovery outside acceptable range

Table 26 contd. Furan Results of Coffee, as sold and as consumed ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033839	Rich Italian Ground Coffee – as sold	Taylors	4907	20920	825	307	1827	<20
S20-033839	Rich Italian Ground Coffee – as consumed	Taylors	75	255	10	<5	11	<5
S20-033840	Instant Coffee – as sold	Aldi Alcafe	74	231	<20	<20	22	<5*
S20-033840	Instant Coffee – as consumed	Aldi Alcafe	<5	<5	<5	<5	<5	<5
S20-033841	Qualita Rossa (Ground coffee) – as sold	Lavazza	2247	10561	604	222	1074	<20
S20-033841	Qualita Rossa (Ground coffee) – as consumed	Lavazza	37	118	6	<5	8	<5
S20-033842	Mocha Italia Signature Blend (Ground – as sold	Costa Coffee	2306	9091	461	150	796	<20
S20-033842	Mocha Italia Signature Blend (Ground) - as consumed	Costa Coffee	37	108	<5	<5	7	<5
S20-033843	Pure Gold Instant Coffee – as sold	Douwe Egberts	495	2116	102	<20	130	<20*
S20-033843	Pure Gold Instant Coffee – as consumed	Douwe Egberts	<5	11	<5	<5	<5	<5

* Recovery outside acceptable range

Table 27. Furan Results of Coffee substitutes, ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Preparation	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033844	Dandelion Coffee Compound	Symingtons	As bought	<20	<20	<20	<20	<20	<20
S20-033845	Acorn Coffee Substitute	Health Embassy	As bought	1948	1985	43	26	193	<20
S20-033846	Organic Latte Turmeric Gold	Pukka	As bought	<20					
S20-033847	Turmeric Latte Mix	Nature's Harvest	As bought	<20	<20	<20	<20	<20	<20
S20-033848	Matcha Latte Mix	Naturals	As bought	<20					
S20-033844	Dandelion Coffee Compound	Symingtons	As consumed	<5	<5	<5	<5	<5	<5
S20-033845	Acorn Coffee Substitute	Health Embassy	As consumed	6	6	<5	<5	<5	<5
S20-033846	Organic Latte Turmeric Gold	Pukka	As consumed	<5					
S20-033847	Turmeric Latte Mix	Nature's Harvest	As consumed	<5	<5	<5	<5	<5	<5
S20-033848	Matcha Latte Mix	Naturals	As consumed	<5					

Table 28. Furan Results of Baby food, ready meals pouches etc (µg/kg) corrected for recovery

Laboratory sample code	Product description	Brand name	Preparation	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033858	Chicken & Sweet Potato Curry	For Aisha	As purchased	26	6	15	12	<5	<5
S20-033858	Chicken & Sweet Potato Curry	For Aisha	Microwave	18	<5	9	6	<5	<5
S20-033858	Chicken & Sweet Potato Curry	For Aisha	Hob	14	<5	7	5	<5	<5
S20-033859	Tomato & Courgette Pasta	Cow & Gate	As purchased	33	13	5	259	<5	<5
S20-033859	Tomato & Courgette Pasta	Cow & Gate	Microwave	10	<5	<5	30	<5	<5
S20-033859	Tomato & Courgette Pasta	Cow & Gate	Water	13	<5	<5	32	<5	<5
S20-033860	Cottage Pie with Veggie Mash	Kiddylicious	As purchased	25	5	<5	232	<5	<5
S20-033860	Cottage Pie with Veggie Mash	Kiddylicious	Microwave	31	<5	<5	58	<5	<5
S20-033861	Veggie Lasagne	Ella's Kitchen	As purchased	35	14	19	179	<5	<5
S20-033861	Veggie Lasagne	Ella's Kitchen	Water	20	5	7	22	<5	<5
S20-033861	Veggie Lasagne	Ella's Kitchen	Hob	16	<5	6	23	<5	<5

Table 28 contd. Furan Results of Baby food, ready meals pouches etc (µg/kg) corrected for recovery

Laboratory sample code	Product description	Brand name	Preparation	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033862	Chicken & Vegetable Casserole	Organic Mamia Aldi	As purchased	19	<5	<5	13	<5	<5
S20-033862	Chicken & Vegetable Casserole	Organic Mamia Aldi	Water	14	<5	<5	23	<5	<5
S20-033862	Chicken & Vegetable Casserole	Organic Mamia Aldi	Microwave	14	<5	<5	17	<5	<5
S20-033863	By Nature Spaghetti Bolognese	Heinz	As purchased	22	9	5	8	<5	<5
S20-033863	By Nature Spaghetti Bolognese	Heinz	Water	20	<5	<5	70	<5	10
S20-033863	By Nature Spaghetti Bolognese	Heinz	Microwave	21	<5	5	<5	<5	<5
S20-033864	Organic Pasta Bolognese	Lupilu	As purchased	27	6	8	16	<5	<5
S20-033864	Organic Pasta Bolognese	Lupilu	Microwave	19	<5	<5	13	<5	<5

Table 28 contd. Furan Results of Group 8, Baby food, ready meals pouches etc (µg/kg) corrected for recovery

Laboratory sample code	Product description	Brand name	Preparation	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033865	Organic Carrot, Sweet Potato & Butternut Squash	Piccolo	As purchased	26	8	5	22	<5	<5
S20-033865	Organic Carrot, Sweet Potato & Butternut Squash	Piccolo	Water	22	<5	<5	47	<5	<5
S20-033866	Organic Sweet Squash & Chicken	Hipp	As purchased	22	6	<5	67	<5	<5
S20-033866	Organic Sweet Squash & Chicken	Hipp	Water	19	<5	<5	48	<5	<5
S20-033866	Organic Sweet Squash & Chicken	Hipp	Microwave	21	<5	<5	11	<5	<5
S20-033867	Butternut Squash, Carrot & Broccoli	Babease	As purchased	42	5	<5	60	<5	<5
S20-033867	Butternut Squash, Carrot & Broccoli	Babease	Water	42	5	<5	60	<5	<5

Table 29. Furan Results of Cereal based food for infants and young children, ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Preparation	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033868	Organic Apple & Banana Swiss Style Muesli	Hipp	Dry baby cereal	8	<5	<5	11	<5	<5
S20-033868	Organic Apple & Banana Swiss Style Muesli	Hipp	Dry baby cereal + milk	<5	<5	<5	<5	<5	<5
S20-033869	Baby Rice	Cow & Gate	Dry baby cereal	<5	<5	<5	<5	<5	<5
S20-033869	Baby Rice	Cow & Gate	Dry baby cereal + milk	<5	<5	<5	<5	<5	<5
S20-033870	Creamy Porridge	Cow & Gate	Dry baby cereal	<5	<5	<5	<5	<5	<5
S20-033870	Creamy Porridge	Cow & Gate	Dry baby cereal + milk	<5	<5	<5	<5	<5	<5
S20-033871	Creamed Porridge	Heinz By Nature	Wet baby food	30	11	<5	11	<5	<5
S20-033871	Creamed Porridge	Heinz By Nature	Wet baby food as consumed	26	5	<5	<5	<5	<5
S20-033872	Banana & Cinnamon Muesli	Ella's Kitchen	Dry baby cereal	15	5	<5	32	<5	5
S20-033872	Banana & Cinnamon Muesli	Ella's Kitchen	Dry baby cereal + milk	<5	<5	<5	<5	<5	<5
S20-033873	Organic Baby Rice	Aptamil	Dry baby cereal	<5	<5	<5	<5	<5	<5
S20-033873	Organic Baby Rice	Aptamil	Dry baby cereal + milk	<5	<5	<5	<5	<5	<5

Table 29 contd. Furan Results of Cereal based food for infants and young children, ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033874	Teething Biscuits	Bickiepegs	33	8	<5	<5	<5	<5
S20-033875	Biscotti Banana	Kiddylicious	<5	<5	<5	<5	<5	<5
S20-033876	Gingerbread Men	Organix	7	5	<5	6	<5	<5
S20-033877	Rusks	Farleys	<5	<5	<5	<5	<5	<5

Table 30. Furan Results of others, vegetable crisps, ($\mu\text{g}/\text{kg}$) corrected for recovery

Laboratory sample code	Product description	Brand name	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033849	Hummus Chips	Eat Real	5	5	<5	17	<5	<5
S20-033850	Veg Crisps - Beetroot	Tyrells	20	21	<5	9	<5	<5
S20-033850	Veg Crisps - Carrot	Tyrells	11	17	<5	7	<5	<5
S20-033850	Veg Crisps - Parsnip	Tyrells	5	7	<5	10	<5	<5
S20-033851	Root Vegetable & Sea Salt Crisps - Beetroot	Aldi	34	42	5	10	<5	<5
S20-033851	Root Vegetable & Sea Salt Crisps - Parsnip	Aldi	6	10	<5	24	<5	<5
S20-033851	Root Vegetable & Sea Salt Crisps - Sweet Potato	Aldi	6	10	7	13	<5	<5
S20-033852	Lightly Salted Veg Chips - Beetroot	Kettle	44	65	5	13	8	<5
S20-033852	Kettle Lightly Salted Veg Chips- Parsnip	Kettle	12	21	7	22	<5	<5
S20-033852	Kettle Lightly Salted Veg Chips - Sweet Potato	Kettle	12	22	10	24	<5	<5
S20-033853	Lentil Bites	The Foodie Market	7	<5	<5	29	<5	<5

Table 31. Furan Results of others – ready to eat soup and fruit juice (µg/kg) corrected for recovery

Laboratory sample code	Product description	Brand name	Preparation	Furan	2MF	3MF	Ethyl	2DMF	Propyl
S20-033878	Cream of Tomato Soup	Heinz	As bought	22	14	9	6	<5	<5
S20-033878	Cream of Tomato Soup	Heinz	microwave	14	9	5	<5	<5	<5
S20-033878	Cream of Tomato Soup	Heinz	hob	9	5	<5	<5	<5	<5
S20-033879	Spicy Parsnip Soup	Baxters	As bought	50	<5	<5	18	<5	<5
S20-033879	Spicy Parsnip Soup	Baxters	microwave	37	<5	<5	19	<5	<5
S20-033879	Spicy Parsnip Soup	Baxters	hob	28	<5	<5	26	<5	<5
S20-049834	Cloudy Apple Juice	Copella	As bought	<5	<5	<5	<5	<5	<5
S20-033881	Rooting For You Cold Pressed Juice	Lidl Naturis	As bought	<5	<5	<5	<5	<5	<5
S20-033882	Apple & Blackcurrant Squash	Robinsons	As bought	<5	5	<5	<5	<5	<5
S20-033882	Apple & Blackcurrant Squash	Robinsons	As consumed	<5	<5	<5	<5	<5	<5
S20-033883	Smooth Orange Juice	The Juice Company	As bought	<5	<5	<5	<5	<5	<5
S20-049835	Pressed Apple Juice	Tropicana	As bought	<5	<5	<5	<5	<5	<5

Results for ethyl furan indicative as recovery values were outside acceptable range.

Table 32. Results of Fapas® PT rounds undertaken during Year 1 (Z-score)

Fapas® Round and matrix	Acrylamide	Furan	2-Methylfuran	3-Methylfuran	2,5-Dimethylfuran	2-Ethylfuran
30101 Veg crisps	1.6	-	-	-	-	-
30104 Biscuit	0.9	-	-	-	-	-
30105 French fries	1.0	-	-	-	-	-
30107 Coffee	1.7	-	-	-	-	-
30108 Coffee	-	-0.3	0.0	0.8	0.6	<i>0.8 (info only)</i>
30109 Potato crisps	0.2	-	-	-	-	

Table 33. Quality control data for acrylamide analysis

Fera Analysis Batch No.	Average Recovery (%)	n	IHR	Z-Score*
PC20-03343	100	4	3084	0.5
PC20-03447	99	2	3084	0.44
PC20-03540	101	2	3084	0.49
PC20-03657	96	3	3084	0.32
PC20-03687	103	2	3084	0.68
PC20-03718	105	5	3091	0.4
PC20-03784	103	2	3099	0.36
PC20-03851	96	1	3095	0.1
PC20-03967	94	1	3095	0.23
PC20-04035	92	3	3091	0.08
PC20-04086	90	3	n/a	n/a
PC20-04162	104	2	n/a	n/a
PC20-04188	102	3	3095	0.61
PC20-04236	94	2	3091	0

*Z-Score calculated from analytical result compared to assigned value for the In-House Reference material. A Z-score between -2 and +2 is acceptable.

Table 34. Recovery data for Furan analysis (Recovery %)

Fera Analysis Batch No.	Matrix	spike level ug/kg	Furan	2MF	3MF	Ethyl	2DMF	Propyl
PC20 04846	Coffee	100	94	71	85	84	83	55
PC20 04888	Coffee	25	94	85	89	100	94	95
PC20 04888	Coffee as consumed	100	94	85	89	100	94	95
PC20 04894	Coffee Substitute	100	117	127	89	98	102	76
PC20 04895	Coffee Sub as consumed	25	96	95	96	111	103	112
PC20 04945	Coffee	100	96	94	88	101	99	77
PC20-04955	Coffee as consumed	25	90	80	102	92	79	101
PC20-04971	Wet Baby food	25	66	107	68	164	88	82
PC20-05012	Dry baby cereal - recons.	25	108	88	102	247	77	205
PC20-05014	Dry baby cereal	25	66	78	87	97	77	84
PC20-05052	Soup etc.	25	87	75	71	626	94	335
PC20-05052	Drinks	25	108	101	103	150	95	113
PC20-05056	Dry baby snacks	25	71	68	88	159	50	65
PC20-05058	Veg crisps	25	81	75	69	79	70	111
PC20-05247	Wet baby food - as consumed	25	75	101	42	129	91	72

Annex C: References

1. Commission Regulation (EU) 2017/2158 of 20 November 2017 [establishing mitigation measures and benchmark levels for the reduction of the presence of acrylamide in food](#)
2. Commission Recommendation (EU) 2019/1888 of 7 November 2019 [on the monitoring of the presence of acrylamide in certain foods](#)
3. Commission Recommendation of 28 March 2007 [on the monitoring of the presence of furan in foodstuffs](#), 2007/196/EC.
4. EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain), Knutsen HK, Alexander J, Barregard L, Bignami M, Bruschweiler B, Ceccatelli S, Cottrill B, Dinovi M, Edler L, Grasl-Kraupp B, Hogstrand C, Hoogenboom LR, Nebbia CS, Oswald IP, Petersen A, Rose M, Roudot A-C, Schwerdtle T, Vleminckx C, Vollmer G, Chipman K, De Meulenaer B, Dinovi M, Mennes W, Schlatter J, Schrenk D, Baert K, Dujardin B and Wallace H, 2017. Scientific opinion on the risks for public health related to the presence of furan and methylfurans in food. EFSA Journal 2017;15(10):5005, 142 pp. <https://doi.org/10.2903/j.efsa.2017.5005> ISSN: 1831-4732
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