



Nutrient analysis survey of biscuits, buns, cakes and pastries

Summary report

Nutrient analysis survey of biscuits, buns, cakes and pastries

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Description	This survey forms part of the Department of Health's rolling programme of nutrient analysis which provides up-to-date and reliable information on the nutrient content of foods. The results are incorporated into nutrient databanks which support the National Diet and Nutrition Survey and other national dietary surveys used to monitor the nations diet. Any data queries will be dealt with on a case by case basis.
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Nutrient analysis survey of biscuits, buns, cakes and pastries

Prepared by the Diet and Nutrition Surveys Team, Health Improvement and Protection

Directorate

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Executive summary

A survey to determine the nutrient composition of a range of biscuits, buns, cakes and pastries has been carried out.

The survey forms part of the Department of Health's¹ rolling programme of nutrient analysis that provide up-to-date and reliable information on the nutrient content of foods². The work was carried out by a consortium led by the Institute of Food Research (IFR).

The results of this survey and similar surveys of food composition are incorporated into the Department's nutrient databanks used in dietary surveys to monitor the nation's diet, the Composition of Foods Integrated Dataset³ and future publications of *McCance and Widdowson's The Composition of Foods* series.

62 composite samples of a range of different brands were analysed for energy and a range of nutrients including fat, protein, carbohydrate, fibre and a full range of vitamins and minerals. Amongst the foods analysed were sweet and savoury biscuits, buns, cakes, pastries, tarts, fruit pies and doughnuts. While nutrient levels were within the ranges expected for these types of foods, levels of *trans* fat have reduced considerably compared with previous analyses of similar foods last carried out over the last 15-30 years.

Background

The Department undertakes a rolling programme of nutrient analysis surveys to secure reliable, up-to-date information on the nutritional value of foods. This is used in conjunction with food consumption data collected in the National Diet and Nutrition Survey (NDNS) and other dietary surveys to assess nutrient intakes and monitor the nutritional value of the nation's diet. Therefore, these nutrient surveys need to provide a single robust set of nutrient values that is indicative of the potentially broad choice available to the consumer when selecting any particular type of food. As a result, composite samples made up of a number of different brands have been analysed for this survey rather than samples made up of single brands, and a generic name is given to each composite.

The aim of this particular survey was to provide up-to-date nutrient composition data for a range of biscuits, buns, cakes and pastries for which the Department does not have up-to-date, detailed information as most of these foods were last analysed more than 15 years ago. For most foods this data will update and extend the information currently held by providing composition data on a wider range of products (e.g. providing separate data for filo, flaky and shortcrust pastry). Some of the foods included in the analysis represent relatively newer product types on the market (e.g. reduced-fat biscuits, toasted minibreads), or have undergone recent reformulation to reduce the saturated fat, *trans* fat or sodium content (e.g. some sweet and semi-sweet biscuits).

Methodology

A list of composite samples to be analysed was determined by reviewing existing data held on biscuits, buns, cakes and pastries. Higher priority was given to foods that had not previously been analysed or were analysed a long time ago and varieties frequently consumed in the UK⁴. The list of composite samples was finalised following consultation with industry. Market share information was used to determine which sub-samples were included in each composite.

402 individual food samples were purchased from retail outlets in the Norwich area, unless unavailable in which case they were purchased from the Leicestershire or London area or online. Samples were purchased between September and December 2008⁵. The retail outlets included supermarkets, high street bakeries and an online bakery. The food samples consisted of various biscuits, buns, cakes and pastries such as sweet and savoury biscuits, cereal bars, flapjacks, scones, cakes, Danish, Greek and cream-filled pastries, fruit pies, doughnuts and various plain pastry.

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The food samples were combined into 62 composite samples for analysis. Each composite was made up of between 5 and 12 sub-samples, combined on an equal weight basis. This process allows a single, robust set of nutrient values to be derived for each product type, covering an appropriate cross-section of retail products available. Samples requiring preparation/cooking were prepared in accordance with manufacturer's instructions and using normal domestic practices. A full list of the composite food samples analysed is given in Annex A. The full sampling report is available at www.dh.gov.uk/publications.

The samples were analysed between November 2008 and January 2009. The composite samples were analysed for energy and a range of nutrients including a range of fatty acids, protein, carbohydrate, fibre and a full range of vitamins and minerals. The choice of nutrients for analysis depended on the importance of the particular food as a dietary source for each nutrient, and existing compositional data available.

Two further rounds of micronutrient analysis were performed on selected composite samples during December 2009 and January 2010 respectively⁶. The composite samples were stored under suitable conditions to preserve the nutrients until they were required for analysis. The purpose of this additional analysis was to generate further data on the micronutrient composition of these selected composite samples, as the values could not be easily estimated from other composite samples.

Composite samples of plain pastry products were initially analysed for nutrients in their uncooked state (samples 57, 58 and 61). To produce the cooked composite samples, the sub-samples were initially prepared according to manufacturers instructions and were then homogenised. Nutrients were assigned for these varieties (samples 59, 60 and 62), according to the weight loss on cooking.

A full list of nutrients is given in Annex B. The methods used to conduct the analyses are included at Annex E.

Values provided by analytical laboratories were compiled in Excel spreadsheets for data evaluation. Where possible, analytical values were compared to other sources of comparable data, such as UK Food Composition tables, other food composition tables and information from manufacturers and retailers. Ingredients lists were also evaluated to check that the values reported corresponded to the ingredients included in the samples. Where analytical values appeared incorrect or questionable, data was checked against original laboratory reports and re-analysed if necessary.

Results

As each of the composite samples was analysed for an extensive range of nutrients, this project generated a large number of individual results. A summary of results for energy, protein, carbohydrate, fat and fatty acids, fibre and cholesterol are provided in Annex C. A summary of results for micronutrients are provided in Annex D. The full set of results are provided in the analytical report which is available at www.dh.gov.uk/publications.

The aim of this survey was to provide up-to-date nutrient composition data for a diverse range of foods for which the Department does not have up to date information. Where comparable, nutrient levels were in line with those found previously in similar foods. In all samples, where previous data were available for comparison, levels of *trans* fat had reduced considerably compared with previous analyses of similar foods carried out over the last 15-30 years.

Interpretation

This survey has generated much new data where none were previously available, updated and extended existing data, and has provided information on products that have become more popular and widely available in recent years. The data from this survey will enable us to more accurately monitor the nutritional value of the nation's diet. The results of this survey will be incorporated into the Department's nutrient databanks for current and future surveys, together with future publications in the *McCance and Widdowson's The Composition of Foods* series.

Further Information

The report of this survey (entitled Nutrient analysis survey of biscuits, buns, cakes and pastries) is available at www.dh.gov.uk/publications

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Annex A: Details of composite samples analysed

Sample	Food group
1	Short, sweet biscuits
2	Semi-sweet biscuits
3	Ginger nut biscuits
4	Digestives, plain
5	Wafer, plain ice cream wafer, not filled
6	Reduced-fat plain biscuits
7	Shortbread
8	Digestives with oats, plain
9	Jam filled biscuits
10	Fig rolls
11	Short or sweet biscuits, half coated in chocolate
12	Digestives, half coated in chocolate
13	Iced biscuits
14	Short or sweet biscuits, fully chocolate coated
15	Cream biscuits, fully chocolate coated
16	Chocolate coated biscuits with marshmallow
17	Chocolate wafer biscuits, fully coated
18	Cream sandwich biscuits
19	Flapjacks, retail
20	Chocolate chip standard cookies and biscuits
21	American-style chocolate chip cookies
22	Fruit biscuits
23	Cereal bars, with fruit and/or nuts, with chocolate, not fortified
24	Cereal bars, with fruit and/or nuts, no chocolate, not fortified
25	Cream crackers
26	Biscuits, cheese flavoured
27	Rye crisp bread
28	Oatcakes
29	Cheese straws/twists
30	Toasted minibreads
31	Breadsticks
32	Scones, plain
33	Iced buns
34	Fruit cake
35	Chocolate cake with filling and icing

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36	Cake with jam and butter cream
37	Soft iced cakes
38	Loaf cakes
39	Chocolate-covered and filled Swiss rolls
40	Battenberg cake
41	Carrot cake, iced
42	Caramel shortcake
43	Eccles cakes
44	Fancy iced cakes, individual
45	Cakes from 'healthy eating' ranges
46	Danish pastries
47	Greek pastries
48	Cream filled pastries
49	Cream filled chocolate pastries
50	Bakewell tarts, iced
51	Jam tarts
52	Custard tarts, individual
53	Small fruit pies
54	Mince pies
55	Doughnuts, filled with jam
56	Doughnuts, ring, iced
57	Shortcrust pastry, uncooked
58	Pastry flaky/puff pastry, uncooked
59	Shortcrust pastry, cooked
60	Pastry flaky/puff pastry, cooked
61	Filo pastry, uncooked
62	Filo pastry, cooked

Annex B: List of nutrients analysed

Proximates	Water Protein (nitrogen and nitrogen factor) Fat Dry Ash content
Fatty acids	Individual fatty acids (<i>cis</i> & <i>trans</i> isomers, positional isomers, branched chain) (expressed as percentage total fatty acids and per 100g food)
Sterols	Cholesterol
Carbohydrate	(All expressed as monosaccharide equivalents) Starch, total sugars, total carbohydrate, glucose, fructose, sucrose, maltose, lactose, galactose
Fibre	As non-starch polysaccharide i.e. Englyst method, and AOAC method
Inorganics	Sodium, potassium, calcium, magnesium, manganese, phosphorus, iron, zinc, copper, iodide, selenium, chloride, aluminium
Water soluble vitamins	Thiamin, vitamin B ₆ , niacin, folate, riboflavin, vitamin B ₁₂ , biotin, pantothenic acid, tryptophan (to calculate niacin equivalent), vitamin C
Vitamin A	All <i>trans</i> retinol, carotenoids (alpha and beta-carotene, beta-cryptoxanthin)
Other carotenoids	Lutein, lycopene, zeaxanthin
Vitamin D	Vitamin D ₃
Vitamin E	α -tocopherol

Note: Each of the samples was analysed for a range of nutrients in the above list, depending on existing compositional data available and the importance of the particular food as a dietary source of each nutrient

Annex C: Analytical data – macronutrients

Composite sample number	Sample description	Water g/100g	Protein g/100g	Total fat g/100g	Ash g/100g	Carbohydrate g/100g	Energy (kcal)/100g	Energy (kJ)/100g	Englyst fibre g/100g	AOAC fibre g/100g	Starch g/100g	Total sugars g/100g	Glucose g/100g	Fructose g/100g	Sucrose g/100g	Maltose g/100g	Lactose g/100g	Galactose g/100g	Oligosaccharides g/100g	Saturated fatty acids g/100g	Cis-monounsaturated fatty acids g/100g	Cis-n3 fatty acids g/100g	Cis-n6 fatty acids g/100g	Cis-polyunsaturated fatty acids g/100g	Trans fatty acids g/100g	Cholesterol milligrams/100g
1	Short, sweet biscuits	2.9	5.6	20.9	1.5	71.7	479	2016	1.6	2.2	48.0	23.8	0.6	0.6	22.0	0.6	<0.1	<0.1	N/A	10.05	7.46	0.07	2.09	2.16	0.05	10
2	Semi-sweet biscuits	2.0	6.4	15.1	1.5	75.4	444	1874	1.9	2.7	55.1	20.3	0.6	<0.1	19.7	<0.1	<0.1	<0.1	N/A	5.08	7.42	0.12	1.76	1.88	0.01	5
3	Ginger nut biscuits	3.3	4.8	15.7	1.4	75.3	443	1867	1.5	2.2	44.0	31.3	3.0	2.4	22.6	3.3	<0.1	<0.1	N/A	7.26	5.92	0.05	1.68	1.73	0.01	3
4	Digestives, plain	2.8	6.2	21.3	1.9	65.6	463	1943	2.7	3.8	48.1	17.5	<0.1	<0.1	17.5	<0.1	<0.1	<0.1	N/A	7.71	10.18	0.08	2.19	2.28	0.01	2
5	Wafer, plain ice cream wafer, not filled	5.7	10.5	3.0	1.1	79.7	368	1565	2.1	3.4	76.2	3.5	<0.1	<0.1	3.5	<0.1	<0.1	<0.1	N/A	0.59	0.94	0.16	1.15	1.31	<0.01	4
6	Reduced-fat plain biscuits	3.1	6.6	13.5	1.8	75.7	432	1823	2.7	4.4	54.5	21.2	0.9	<0.1	20.3	<0.1	<0.1	<0.1	N/A	4.31	6.63	0.08	1.77	1.86	0.01	2
7	Shortbread	3.5	5.3	29.0	1.3	62.2	515	2158	1.3	2.2	46.5	15.6	<0.1	<0.1	15.6	<0.1	<0.1	<0.1	N/A	17.45	6.29	0.28	0.95	1.23	0.74	82
8	Digestives with oats, plain	3.0	6.4	22.9	1.5	66.4	480	2017	4.4	7.2	40.5	25.9	1.2	0.9	23.9	<0.1	<0.1	<0.1	N/A	5.94	12.72	0.12	2.93	3.05	0.01	10
9	Jam filled biscuits	6.5	5.2	14.4	0.9	74.0	428	1807	2.1	1.2	41.0	33.0	6.1	2.1	19.4	5.4	<0.1	<0.1	N/A	6.75	5.25	0.04	1.62	1.66	0.01	5
10	Fig rolls	13.7	4.2	10.6	1.6	66.8	358	1532	3.3	3.9	23.0	43.8	11.5	8.4	15.8	8.1	<0.1	<0.1	N/A	4.76	3.72	0.23	1.30	1.53	0.01	1
11	Short or sweet biscuits, half coated in chocolate	2.2	6.0	24.2	1.4	70.3	506	2124	1.9	1.4	34.9	35.5	<0.1	<0.1	32.5	<0.1	3.0	<0.1	N/A	12.50	8.19	0.27	1.89	2.16	0.08	16
12	Digestives, half coated in chocolate	1.8	6.3	25.7	1.7	61.8	488	2047	3.1	2.1	37.5	24.3	<0.1	<0.1	24.3	<0.1	<0.1	<0.1	N/A	12.68	8.83	0.08	2.27	2.35	0.04	6

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Composite sample number	Sample description	Water g/100g	Protein g/100g	Total fat g/100g	Ash g/100g	Carbohydrate g/100g	Energy (kcal)/100g	Energy (kJ)/100g	Englyst fibre g/100g	AOAC fibre g/100g	Starch g/100g	Total sugars g/100g	Glucose g/100g	Fructose g/100g	Sucrose g/100g	Maltose g/100g	Lactose g/100g	Galactose g/100g	Oligosaccharides g/100g	Saturated fatty acids g/100g	Cis-monounsaturated fatty acids g/100g	Cis-n3 fatty acids g/100g	Cis-n6 fatty acids g/100g	Cis-polyunsaturated fatty acids g/100g	Trans fatty acids g/100g	Cholesterol milligrams/100g
13	Iced biscuits	2.8	4.8	10.8	1.0	77.1	406	1715	1.6	0.6	32.5	44.6	<0.1	<0.1	44.6	<0.1	<0.1	<0.1	N/A	4.98	3.89	0.05	1.35	1.39	0.01	7
14	Short or sweet biscuits, fully chocolate coated	1.9	6.4	27.2	1.7	62.8	506	2120	2.2	1.7	23.5	39.3	<0.1	<0.1	33.3	<0.1	5.9	<0.1	N/A	15.06	8.74	0.09	1.74	1.83	0.09	17
15	Cream biscuits, fully chocolate coated	1.6	5.2	28.2	1.4	59.0	496	2075	1.9	3.1	21.6	37.4	<0.1	<0.1	34.1	<0.1	3.3	<0.1	N/A	15.81	8.90	0.07	1.89	1.96	0.07	18
16	Chocolate coated biscuits with marshmallow	9.8	4.5	19.0	1.0	59.9	413	1737	1.6	2.7	18.5	41.4	6.0	<0.1	28.7	6.7	<0.1	<0.1	N/A	10.64	6.09	0.13	1.16	1.28	0.04	6
17	Chocolate wafer biscuits, fully coated	2.6	5.5	28.6	1.3	61.1	509	2130	1.4	2.7	16.1	45.1	<0.1	<0.1	38.2	<0.1	6.9	<0.1	N/A	17.50	7.25	0.10	1.12	1.22	0.55	16
18	Cream sandwich biscuits	2.3	5.0	23.3	1.2	65.8	477	2001	2.3	3.1	36.0	29.9	1.6	<0.1	27.2	<0.1	1.1	<0.1	N/A	13.31	6.75	0.05	2.00	2.06	0.02	3
19	Flapjacks, retail	9.3	5.1	22.8	1.2	55.7	434	1821	2.2	5.2	26.5	29.2	4.3	4.2	20.7	<0.1	<0.1	<0.1	N/A	10.25	7.70	0.42	2.61	3.03	0.22	25
20	Chocolate chip cookies, standard	3.6	5.4	24.9	1.4	60.0	471	1973	2.2	3.0	30.0	30.0	<0.1	<0.1	30.0	<0.1	<0.1	<0.1	N/A	12.15	8.96	0.12	2.35	2.47	0.03	3
21	Chocolate chip cookies, American style	6.9	5.2	21.3	1.7	60.6	440	1845	1.8	2.5	20.0	40.5	<0.1	<0.1	40.5	<0.1	<0.1	<0.1	N/A	9.58	7.90	0.54	2.01	2.55	0.08	36
22	Fruit biscuits	6.4	5.1	16.3	1.4	65.3	412	1735	2.3	3.7	35.8	29.6	6.4	7.0	16.2	<0.1	<0.1	<0.1	N/A	7.51	6.09	0.05	1.85	1.90	0.01	6
23	Cereal bars, with fruit and/or nuts, with chocolate, not fortified	6.6	6.0	18.3	1.4	66.0	436	1835	3.0	5.1	25.3	40.7	6.4	6.5	25.9	<0.1	1.9	<0.1	N/A	8.43	7.17	0.05	1.67	1.72	0.04	11

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Composite sample number	Sample description	Water g/100g	Protein g/100g	Total fat g/100g	Ash g/100g	Carbohydrate g/100g	Energy (kcal)/100g	Energy (kJ)/100g	Englyst fibre g/100g	AOAC fibre g/100g	Starch g/100g	Total sugars g/100g	Glucose g/100g	Fructose g/100g	Sucrose g/100g	Maltose g/100g	Lactose g/100g	Galactose g/100g	Oligosaccharides g/100g	Saturated fatty acids g/100g	Cis-monounsaturated fatty acids g/100g	Cis-n3 fatty acids g/100g	Cis-n6 fatty acids g/100g	Cis-polyunsaturated fatty acids g/100g	Trans fatty acids g/100g	Cholesterol milligrams/100g
24	Cereal bars, with fruit and/or nuts, no chocolate, not fortified	8.9	5.6	10.7	1.0	62.9	354	1497	3.7	6.2	28.6	34.3	9.9	9.0	9.5	4.8	1.2	<0.1	N/A	3.85	4.44	0.24	1.63	1.87	0.01	6
25	Cream crackers	4.9	8.9	16.4	1.5	69.7	445	1874	3.3	3.9	68.2	1.5	<0.1	<0.1	<0.1	1.5	<0.1	<0.1	N/A	7.38	5.94	0.07	2.10	2.17	0.01	5
26	Biscuits, cheese flavoured	3.1	10.5	28.1	3.1	53.2	494	2069	2.4	4.5	50.5	2.7	<0.1	<0.1	2.7	<0.1	<0.1	<0.1	N/A	11.67	12.09	0.10	2.53	2.62	0.11	18
27	Rye crisp bread	7.7	8.6	1.4	2.1	63.4	284	1210	14.2	20.0	60.0	3.4	<0.1	<0.1	2.8	0.6	<0.1	<0.1	N/A	0.16	0.17	0.07	0.53	0.60	<0.01	N/A
28	Oatcakes	4.1	9.3	20.0	3.0	62.8	453	1904	8.8	9.4	59.6	3.2	<0.1	<0.1	1.0	2.2	<0.1	<0.1	N/A	5.67	9.31	0.23	3.64	3.87	0.01	5
29	Cheese straws/twists	4.7	14.1	30.3	3.2	48.3	510	2133	2.4	2.5	46.6	1.6	<0.1	<0.1	<0.1	1.6	<0.1	<0.1	N/A	17.54	6.89	0.31	1.40	1.71	0.78	71
30	Toasted minibreads	3.0	10.5	13.6	2.6	68.9	423	1784	2.9	4.2	65.6	3.3	<0.1	<0.1	<0.1	3.3	<0.1	<0.1	N/A	3.22	7.79	0.09	1.77	1.86	0.02	N/A
31	Breadsticks	4.2	10.9	8.1	2.5	72.9	389	1650	2.1	3.7	69.6	3.3	<0.1	<0.1	<0.1	3.3	<0.1	<0.1	N/A	6.01	0.81	0.03	0.71	0.75	<0.01	6
32	Plain scones	23.2	7.2	12.3	2.6	55.2	346	1459	2.3	2.2	42.5	12.7	0.9	<0.1	10.4	<0.1	1.5	<0.1	N/A	6.37	3.33	0.21	0.98	1.19	0.21	35
33	Iced buns	24.4	6.0	7.8	1.5	60.8	322	1364	3.2	2.5	35.0	25.8	6.4	7.0	11.4	1.0	<0.1	<0.1	N/A	3.62	2.49	0.26	1.03	1.30	<0.01	5
34	Fruit cake	21.8	4.5	12.1	1.3	55.2	334	1407	2.4	3.0	15.6	39.6	10.5	11.9	14.0	3.2	<0.1	<0.1	N/A	4.64	4.61	0.44	1.45	1.88	0.11	43
35	Chocolate cake with filling and icing	18.4	4.5	23.7	1.7	48.6	413	1730	1.8	2.9	12.0	36.6	1.4	<0.1	33.2	<0.1	2.0	<0.1	N/A	9.46	9.29	0.88	2.35	3.23	0.20	55
36	Cake with jam and butter cream	22.2	3.7	14.8	1.2	55.1	355	1493	1.4	1.2	17.5	37.6	3.5	1.0	28.2	4.9	<0.1	<0.1	N/A	6.96	4.54	0.36	1.16	1.52	0.31	76
37	Soft iced cake	21.6	4.8	15.8	1.1	55.0	368	1544	1.9	1.3	16.0	39.0	<0.1	<0.1	35.5	3.5	<0.1	<0.1	N/A	6.21	5.54	0.50	2.57	3.07	0.06	36

Nutrient analysis survey of biscuits, buns, cakes and pastries

Composite sample number	Sample description	Water g/100g	Protein g/100g	Total fat g/100g	Ash g/100g	Carbohydrate g/100g	Energy (kcal)/100g	Energy (kJ)/100g	Englyst fibre g/100g	AOAC fibre g/100g	Starch g/100g	Total sugars g/100g	Glucose g/100g	Fructose g/100g	Sucrose g/100g	Maltose g/100g	Lactose g/100g	Galactose g/100g	Oligosaccharides g/100g	Saturated fatty acids g/100g	Cis-monounsaturated fatty acids g/100g	Cis-n3 fatty acids g/100g	Cis-n6 fatty acids g/100g	Cis-polyunsaturated fatty acids g/100g	Trans fatty acids g/100g	Cholesterol milligrams/100g
38	Loaf cake	21.7	3.3	11.0	1.2	56.2	323	1362	1.5	1.4	22.7	33.5	10.2	6.8	13.6	2.9	<0.1	<0.1	N/A	3.16	5.05	0.41	1.65	2.05	0.02	8
39	Chocolate covered and filled Swiss rolls	13.4	4.5	22.7	1.5	51.0	414	1733	1.7	3.1	9.8	41.2	4.1	<0.1	33.8	3.4	<0.1	<0.1	N/A	11.68	7.34	0.35	1.45	1.79	0.19	44
40	Battenberg cake	16.7	4.4	9.9	1.0	65.9	354	1495	1.1	1.5	9.1	56.8	5.1	0.3	46.7	4.7	<0.1	<0.1	N/A	3.08	4.06	0.44	1.73	2.17	0.02	6
41	Carrot cake, iced	20.4	4.2	20.2	1.3	46.8	374	1569	1.1	1.9	12.3	34.5	<0.1	0.8	31.8	1.9	<0.1	<0.1	N/A	5.14	8.03	1.03	4.55	5.58	0.16	53
42	Caramel shortcake	8.5	4.7	27.3	1.4	53.6	466	1948	1.3	2.3	17.4	36.2	1.8	2.0	27.8	3.1	1.6	<0.1	N/A	15.18	8.15	0.26	1.74	2.00	0.24	23
43	Eccles cakes	17.6	4.4	18.3	1.6	48.8	365	1532	2.0	3.6	14.7	34.0	10.8	15.4	3.3	4.5	<0.1	<0.1	N/A	9.40	5.79	0.28	1.46	1.74	0.17	23
44	Fancy iced cakes, individual	18.4	3.3	16.8	1.2	57.6	381	1600	0.9	1.1	13.5	44.1	1.5	<0.1	40.5	2.1	<0.1	<0.1	N/A	5.86	6.65	0.76	2.55	3.31	0.04	31
45	Cakes from 'healthy eating' ranges	24.0	3.3	2.5	1.3	58.8	256	1090	1.7	2.6	11.4	47.4	2.8	1.7	41.9	1.0	<0.1	<0.1	N/A	1.22	0.71	0.06	0.38	0.45	<0.01	19
46	Danish pastries	20.0	4.9	29.2	0.9	43.6	446	1861	1.5	2.1	26.3	17.3	3.3	2.7	9.6	1.7	<0.1	<0.1	N/A	11.83	11.39	0.67	3.72	4.39	0.06	19
47	Greek pastries	10.8	6.7	25.1	1.0	54.1	456	1909	1.6	2.0	25.1	29.0	9.7	8.6	9.0	1.7	<0.1	<0.1	N/A	9.65	9.91	0.20	3.57	3.77	0.21	20
48	Cream filled pastries	29.8	3.3	27.4	0.9	41.4	415	1731	0.9	2.9	14.1	27.3	2.7	1.0	20.8	1.6	1.2	<0.1	N/A	16.05	6.98	0.25	1.37	1.62	0.42	52
49	Cream filled chocolate pastries	34.5	6.1	28.5	0.9	28.2	387	1609	1.0	1.4	4.2	24.0	2.7	<0.1	18.4	<0.1	2.9	<0.1	N/A	13.59	9.30	0.74	2.06	2.80	0.42	136
50	Bakewell tarts, iced	14.9	3.1	16.8	0.7	65.9	411	1729	1.1	1.1	20.7	45.2	3.5	1.1	35.5	5.2	<0.1	<0.1	N/A	6.94	6.41	0.54	2.03	2.58	0.02	4
51	Jam tarts	16.9	3.2	13.5	0.4	58.2	353	1485	1.3	1.4	26.2	32.1	9.4	3.7	10.9	8.2	<0.1	<0.1	N/A	5.54	5.42	0.25	1.60	1.85	0.01	3

Nutrient analysis survey of biscuits, buns, cakes and pastries

Composite sample number	Sample description	Water g/100g	Protein g/100g	Total fat g/100g	Ash g/100g	Carbohydrate g/100g	Energy (kcal)/100g	Energy (kJ)/100g	Englyst fibre g/100g	AOAC fibre g/100g	Starch g/100g	Total sugars g/100g	Glucose g/100g	Fructose g/100g	Sucrose g/100g	Maltose g/100g	Lactose g/100g	Galactose g/100g	Oligosaccharides g/100g	Saturated fatty acids g/100g	Cis-monounsaturated fatty acids g/100g	Cis-n3 fatty acids g/100g	Cis-n6 fatty acids g/100g	Cis-polyunsaturated fatty acids g/100g	Trans fatty acids g/100g	Cholesterol milligrams/100g
52	Custard tarts, Individual	49.5	6.7	14.3	0.8	28.7	263	1102	1.0	1.1	14.5	14.2	0.9	<0.1	11.2	2.0	<0.1	<0.1	N/A	5.87	5.58	0.35	1.66	2.01	0.06	91
53	Small fruit pies	23.5	3.1	13.7	0.6	60.0	361	1520	1.6	4.3	28.9	31.0	8.3	2.4	17.1	2.6	0.7	<0.1	N/A	4.87	5.86	0.46	1.84	2.30	0.01	<0.5
54	Mince pies	18.5	3.8	14.9	0.8	60.7	377	1588	1.7	2.6	25.2	35.5	16.6	11.9	3.4	2.7	0.4	0.5	N/A	5.97	5.70	0.44	1.79	2.23	0.08	12
55	Doughnuts, with jam	28.9	5.4	13.1	1.5	48.4	321	1352	1.4	1.7	28.2	20.3	11.4	5.5	<0.1	3.4	<0.1	<0.1	N/A	4.96	5.01	0.22	2.01	2.23	0.11	7
56	Doughnuts ring, iced	21.3	5.8	25.7	1.4	42.3	413	1728	1.4	2.7	26.2	16.2	1.7	0.8	13.7	<0.1	<0.1	<0.1	N/A	14.14	7.83	0.12	2.15	2.26	0.11	9
57	Short crust pastry, uncooked	21.8	5.7	31.4	0.9	39.4	453	1889	1.8	3.4	38.5	0.9	0.3	<0.1	<0.1	0.5	<0.1	<0.1	N/A	11.68	13.24	1.04	3.80	4.84	0.02	2
58	Pastry flaky/puff pastry, uncooked	31.7	5.3	26.2	1.2	33.7	384	1600	0.9	2.8	32.2	1.5	<0.1	<0.1	<0.1	1.5	<0.1	<0.1	N/A	12.56	9.43	0.37	2.47	2.84	0.02	2
59	Short crust pastry, cooked	5.6	6.9	37.9	1.1	47.5	547	2281	2.2	4.1	46.5	1.0	0.4	<0.1	<0.1	0.6	<0.1	<0.1	N/A	14.10	15.99	1.25	4.59	5.84	0.03	2
60	Pastry flaky/puff pastry, cooked	13.4	6.7	33.2	1.5	42.8	486	2027	1.1	3.5	40.8	1.9	<0.1	<0.1	<0.1	1.9	<0.1	<0.1	N/A	15.92	11.95	0.46	3.14	3.60	0.03	3
61	Filo pastry, uncooked	26.6	7.6	2.9	1.6	58.9	278	1180	1.7	3.4	56.5	2.4	0.2	0.1	<0.1	2.1	<0.1	<0.1	N/A	0.32	1.22	0.15	1.06	1.21	<0.01	2
62	Filo pastry, cooked	3.9	10.0	3.8	2.1	77.1	363	1544	2.2	4.5	74.0	3.1	0.2	0.1	<0.1	2.7	<0.1	<0.1	N/A	0.42	1.60	0.20	1.38	1.58	<0.01	2

N/A = Not Analysed

< = Result was below the analytical limit of quantification (LOQ) or limit of detection (LOD). There is no distinction between '<' and 'not detected'

Annex D: Analytical data – micronutrients

Composite sample number	Sample description	Vitamin A micrograms /100g*	Vitamin D micrograms /100g	Thiamin milligrams /100g	Riboflavin milligrams /100g	Niacin milligrams /100g	Tryptophan/60 milligrams/100g	Vitamin C milligrams /100g	Vitamin E milligrams /100g	Vitamin B6 milligrams /100g	Vitamin B12 micrograms /100g	Folate micrograms /100g	Pantothenic acid milligrams /100g	Biotin micrograms /100g	Sodium milligrams /100g	Potassium milligrams /100g	Calcium milligrams /100g	Magnesium milligrams /100g	Phosphorous milligrams /100g	Iron milligrams /100g	Copper milligrams /100g	Zinc milligrams /100g	Chloride milligrams /100g	Iodine micrograms /100g	Manganese milligrams /100g	Selenium micrograms /100g
1	Short, sweet biscuits	N/A	N/A	0.17	0.02	1.3	1.1	N/A	2.68	0.05	N/A	9	0.37	2	403	155	95	20	106	1.6	0.12	0.7	380	<1	0.64	3
2	Semi-sweet biscuits	N/A	N/A	0.12	0.01	1.4	1.3	N/A	2.85	0.06	N/A	12	N/A	N/A	358	168	157	23	99	2.0	0.09	1.0	290	N/A	0.77	3
3	Ginger nut biscuits	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.10	N/A	N/A	N/A	N/A	N/A	429	154	43	18	68	1.5	0.10	0.5	360	N/A	0.68	2
4	Digestives, plain	N/A	N/A	0.12	0.02	1.9	1.2	N/A	5.32	0.07	N/A	11	0.48	4	561	215	95	31	119	1.8	0.21	0.9	360	<1	0.91	4
5	Wafer, plain ice cream wafer, not filled	N/A	N/A	0.08	0.02	1.6	2.0	N/A	0.42	0.04	N/A	14	0.53	9	192	195	89	28	129	2.3	0.12	1.2	160	N/A	0.92	7
6	Reduced-fat plain biscuits	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	471	193	102	30	124	2.0	0.18	0.8	N/A	N/A	0.91	N/A
7	Shortbread	297	<0.5	N/A	N/A	N/A	N/A	N/A	1.30	N/A	N/A	N/A	N/A	N/A	321	133	138	15	77	1.5	0.08	0.5	N/A	3	0.61	6
8	Digestives with oats, plain	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	328	248	34	60	214	2.2	0.28	1.4	N/A	N/A	2.15	N/A
9	Jam filled biscuits	N/A	N/A	0.09	0.01	0.9	0.9	N/A	2.12	0.05	N/A	<5	N/A	N/A	164	135	121	14	94	1.1	0.12	0.4	190	<1	0.44	2
10	Fig rolls	<10	N/A	0.15	0.02	0.8	0.7	N/A	1.59	0.08	N/A	6	0.40	4	273	299	125	30	64	2.0	0.17	0.4	330	N/A	0.47	8
11	Short or sweet biscuits, half coated in chocolate	<10	N/A	0.10	0.08	0.9	1.2	N/A	1.84	N/A	N/A	8	0.37	3	249	260	123	35	123	2.4	0.27	0.7	190	N/A	0.56	4
12	Digestives, half coated in chocolate	<21	N/A	0.11	0.07	2.2	1.3	N/A	2.35	0.07	0.07	7	0.59	5	351	258	100	37	124	2.1	0.32	0.8	280	8	0.66	3

Nutrient analysis survey of biscuits, buns, cakes and pastries

Composite sample number	Sample description	Vitamin A micrograms /100g*	Vitamin D micrograms /100g	Thiamin milligrams /100g	Riboflavin milligrams /100g	Niacin milligrams /100g	Tryptophan/60 milligrams/100g	Vitamin C milligrams /100g	Vitamin E milligrams /100g	Vitamin B6 milligrams /100g	Vitamin B12 micrograms /100g	Folate micrograms /100g	Pantothenic acid milligrams /100g	Biotin micrograms /100g	Sodium milligrams /100g	Potassium milligrams /100g	Calcium milligrams /100g	Magnesium milligrams /100g	Phosphorous milligrams /100g	Iron milligrams /100g	Copper milligrams /100g	Zinc milligrams /100g	Chloride milligrams /100g	Iodine micrograms /100g	Manganese milligrams /100g	Selenium micrograms /100g
13	Iced biscuits	25	N/A	0.12	<0.01	1.3	0.8	N/A	1.21	0.03	N/A	7	N/A	N/A	274	112	74	13	90	1.2	<0.06	0.4	230	N/A	0.40	5
14	Short or sweet biscuits, fully chocolate coated	28	N/A	0.14	0.19	1.2	1.3	N/A	1.57	N/A	N/A	14	N/A	N/A	229	344	163	46	204	2.0	0.28	1.0	180	N/A	0.68	3
15	Cream biscuits, fully chocolate coated	2	N/A	0.11	0.13	1.3	1.0	N/A	1.78	0.06	0.10	9	0.67	5	174	337	146	42	156	3.0	0.35	0.8	160	14	0.53	7
16	Chocolate coated biscuits with marshmallow	N/A	N/A	0.06	0.13	0.6	0.8	N/A	0.83	0.04	0.15	8	N/A	N/A	132	259	102	28	103	1.7	0.26	0.6	N/A	N/A	0.36	3
17	Chocolate wafer biscuits, fully coated	N/A	N/A	0.07	0.20	0.8	1.2	N/A	0.83	0.05	N/A	11	0.83	14	90	340	167	41	151	2.4	0.27	0.8	N/A	22	0.35	4
18	Cream sandwich biscuits	2	N/A	0.16	0.05	1.6	1.0	N/A	2.25	0.06	N/A	11	0.56	3	188	253	118	29	102	2.2	0.20	0.6	190	8	0.72	2
19	Flapjacks, retail	86	<0.5	0.15	0.03	0.5	1.2	N/A	2.18	0.04	N/A	8	0.42	8	194	207	52	47	177	1.9	0.17	1.1	300	<1	1.79	3
20	Chocolate chip cookies, standard	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.19	N/A	N/A	N/A	N/A	N/A	298	217	117	34	132	2.3	0.22	0.7	N/A	N/A	0.57	N/A
21	Chocolate chip cookies, American style	N/A	N/A	0.07	0.08	0.8	1.1	N/A	2.39	0.05	0.27	12	0.49	5	422	252	108	36	155	2.5	0.17	0.7	280	N/A	0.44	12
22	Fruit biscuits	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	279	295	74	21	122	1.3	0.27	0.5	N/A	N/A	0.62	8
23	Cereal bars, with fruit and/or nuts, with chocolate, not fortified	<2	N/A	0.18	0.08	1.5	1.3	<1	2.24	0.07	0.11	10	0.76	6	221	309	73	58	182	1.9	0.32	1.2	300	N/A	0.14	2

Nutrient analysis survey of biscuits, buns, cakes and pastries

Composite sample number	Sample description	Vitamin A micrograms /100g*	Vitamin D micrograms /100g	Thiamin milligrams /100g	Riboflavin milligrams /100g	Niacin milligrams /100g	Tryptophan/60 milligrams/100g	Vitamin C milligrams /100g	Vitamin E milligrams /100g	Vitamin B6 milligrams /100g	Vitamin B12 micrograms /100g	Folate micrograms /100g	Pantothenic acid milligrams /100g	Biotin micrograms /100g	Sodium milligrams /100g	Potassium milligrams /100g	Calcium milligrams /100g	Magnesium milligrams /100g	Phosphorous milligrams /100g	Iron milligrams /100g	Copper milligrams /100g	Zinc milligrams /100g	Chloride milligrams /100g	Iodine micrograms /100g	Manganese milligrams /100g	Selenium micrograms /100g
24	Cereal bars, with fruit and/or nuts, no chocolate, not fortified	N/A	N/A	N/A	N/A	N/A	N/A	1.5	1.74	N/A	N/A	N/A	N/A	N/A	65	308	51	50	177	1.8	0.24	1.0	N/A	N/A	0.17	N/A
25	Cream crackers	N/A	N/A	0.14	0.02	1.5	1.7	N/A	1.68	0.06	N/A	19	0.78	4	384	215	93	22	103	2.0	0.17	0.7	430	<1	0.65	3
26	Biscuits, cheese flavoured	49	<0.5	0.25	0.10	2.1	2.1	N/A	8.71	0.07	0.19	35	0.81	6	882	247	263	34	249	2.1	0.16	1.4	650	<1	0.84	5
27	Rye crisp bread	N/A	N/A	0.26	0.04	0.9	1.7	N/A	0.40	0.10	N/A	29	0.59	8	264	511	38	89	292	2.5	0.32	2.2	350	<1	0.20	5
28	Oatcakes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	796	359	57	101	383	3.8	0.35	2.0	N/A	N/A	3.84	9
29	Cheese straws/twists	184	<0.5	N/A	0.10	N/A	N/A	N/A	1.28	N/A	0.24	N/A	N/A	N/A	974	153	233	24	215	1.2	0.14	1.4	N/A	9	0.45	11
30	Toasted minibreeds	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.93	N/A	N/A	N/A	N/A	N/A	865	221	39	26	114	1.4	0.18	0.7	N/A	N/A	0.59	N/A
31	Breadsticks	N/A	N/A	0.09	0.02	1.5	2.1	N/A	0.18	N/A	N/A	21	N/A	N/A	817	202	31	30	120	2.0	0.21	0.9	1140	N/A	0.57	6
32	Plain scones	88	<0.5	0.11	0.05	1.9	1.5	N/A	0.92	0.06	0.14	6	0.54	5	592	270	131	20	476	1.3	0.12	0.6	130	7	0.35	4
33	Iced buns	N/A	N/A	0.14	0.03	1.3	1.2	N/A	0.77	0.05	N/A	22	N/A	N/A	228	130	294	18	96	1.6	0.12	0.6	N/A	N/A	0.39	5
34	Fruit cake	39	<0.5	0.09	0.06	1.0	0.9	N/A	1.50	0.08	0.14	<5	0.56	5	193	385	74	20	113	1.6	0.21	0.4	200	N/A	0.34	4
35	Chocolate cake with filling and icing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	259	340	144	39	212	3.1	0.35	0.7	N/A	N/A	0.36	N/A
36	Cake with jam and butter cream	116	<0.5	0.05	0.06	0.5	0.8	<1	1.19	0.04	0.40	<5	0.52	4	344	132	72	8	162	0.7	0.08	0.3	160	7	0.15	4
37	Soft iced cake	45	<0.5	0.06	0.08	0.9	1.1	N/A	1.80	0.08	0.17	<5	0.76	5	251	197	81	14	144	0.9	0.11	0.4	270	<1	0.27	4

Nutrient analysis survey of biscuits, buns, cakes and pastries

Composite sample number	Sample description	Vitamin A micrograms /100g*	Vitamin D micrograms /100g	Thiamin milligrams /100g	Riboflavin milligrams /100g	Niacin milligrams /100g	Tryptophan/60 milligrams/100g	Vitamin C milligrams /100g	Vitamin E milligrams /100g	Vitamin B6 milligrams /100g	Vitamin B12 micrograms /100g	Folate micrograms /100g	Pantothenic acid milligrams /100g	Biotin micrograms /100g	Sodium milligrams /100g	Potassium milligrams /100g	Calcium milligrams /100g	Magnesium milligrams /100g	Phosphorous milligrams /100g	Iron milligrams /100g	Copper milligrams /100g	Zinc milligrams /100g	Chloride milligrams /100g	Iodine micrograms /100g	Manganese milligrams /100g	Selenium micrograms /100g
38	Loaf cake	N/A	N/A	0.06	0.07	0.4	0.6	N/A	1.69	0.04	N/A	6	0.26	2	366	154	34	8	46	0.5	<0.06	0.4	N/A	N/A	0.17	4
39	Chocolate covered and filled Swiss rolls	49	<0.5	0.05	0.12	0.6	1.1	N/A	1.14	0.05	0.22	13	0.56	5	259	331	85	44	186	2.7	0.34	0.8	210	14	0.37	3
40	Battenberg cake	N/A	N/A	0.03	0.06	0.4	0.9	N/A	1.14	0.04	0.11	8	0.21	4	137	174	107	18	134	0.6	0.13	0.4	270	N/A	0.21	3
41	Carrot cake, iced	162	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	319	140	101	14	169	0.9	0.16	0.5	N/A	N/A	0.45	4
42	Caramel shortcake	82	<0.5	0.08	0.14	1.0	1.0	N/A	2.25	0.05	0.15	9	0.48	3	258	254	137	26	125	1.5	0.13	0.7	280	N/A	0.36	2
43	Eccles cakes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	221	428	75	22	77	1.5	0.22	0.4	N/A	N/A	0.37	N/A
44	Fancy iced cakes, individual	<20	N/A	0.06	0.07	0.5	0.7	N/A	2.61	0.03	0.18	7	0.24	3	275	147	72	10	148	0.9	0.06	0.3	180	<1	0.13	3
45	Cakes from 'healthy eating' ranges	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	304	115	103	9	186	0.9	0.17	0.4	N/A	N/A	0.18	N/A
46	Danish pastries	205	<0.5	0.08	0.03	0.8	0.9	N/A	3.98	0.04	0.12	21	0.32	4	233	136	52	17	74	0.8	0.12	0.7	310	<1	0.44	4
47	Greek pastries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3.03	N/A	N/A	9	0.20	6	163	180	48	49	119	1.6	0.35	1.0	N/A	N/A	0.60	5
48	Cream filled pastries	206	<0.5	0.05	0.05	0.4	0.7	N/A	1.66	0.03	0.15	6	0.20	2	205	94	68	10	86	0.5	<0.06	0.3	250	10	0.20	3
49	Cream filled chocolate pastries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	125	161	83	22	120	1.8	0.10	0.6	N/A	N/A	0.21	6
50	Bakewell tarts, iced	<20	<0.5	0.06	0.04	0.6	0.7	N/A	2.03	0.03	0.12	6	0.25	3	132	117	69	12	73	0.6	0.12	0.3	180	<1	0.24	2
51	Jam tarts	14	N/A	0.06	0.01	0.6	0.6	<1	2.32	0.03	N/A	N/A	N/A	N/A	26	68	22	6	27	0.3	<0.06	<0.2	100	<1	0.25	2

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Composite sample number	Sample description	Vitamin A micrograms /100g*	Vitamin D micrograms /100g	Thiamin milligrams /100g	Riboflavin milligrams /100g	Niacin milligrams /100g	Tryptophan/60 milligrams/100g	Vitamin C milligrams /100g	Vitamin E milligrams /100g	Vitamin B6 milligrams /100g	Vitamin B12 micrograms /100g	Folate micrograms /100g	Pantothenic acid milligrams /100g	Biotin micrograms /100g	Sodium milligrams /100g	Potassium milligrams /100g	Calcium milligrams /100g	Magnesium milligrams /100g	Phosphorous milligrams /100g	Iron milligrams /100g	Copper milligrams /100g	Zinc milligrams /100g	Chloride milligrams /100g	Iodine micrograms /100g	Manganese milligrams /100g	Selenium micrograms /100g
52	Custard tarts, Individual	72	<0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.49	6	114	138	92	14	101	0.7	0.09	0.5	N/A	N/A	0.19	8
53	Small fruit pies	<20	N/A	0.08	0.01	0.7	0.6	8	2.17	0.03	N/A	6	0.23	2	115	117	33	11	53	0.6	0.07	0.2	180	N/A	0.27	2
54	Mince pies	28	N/A	0.11	0.01	1.0	0.7	<1	2.06	0.04	N/A	14	0.20	2	101	211	66	16	65	1.2	<0.06	0.3	140	N/A	0.36	2
55	Doughnuts, with jam	<20	N/A	0.08	0.03	1.3	1.1	N/A	1.75	0.04	0.08	21	0.26	5	404	121	990 ^s	15	135	1.2	<0.06	0.6	320	N/A	0.39	3
56	Doughnuts ring, iced	<20	N/A	0.08	0.06	0.9	1.1	N/A	2.43	0.03	N/A	17	0.35	4	326	202	55	22	154	6.2 [^]	<0.06	0.6	260	N/A	0.38	6
57	Short crust pastry, uncooked	N/A	N/A	0.09	0.01	0.8	1.1	N/A	3.26	0.04	N/A	6	0.39	2	224	97	80	10	51	1.0	<0.06	0.3	330	N/A	0.29	3
58	Pastry flaky/puff pastry, uncooked	N/A	N/A	0.07	0.01	0.7	1.0	N/A	1.99	0.04	N/A	<5	0.22	2	337	89	77	10	49	1.1	<0.06	0.3	450	N/A	0.29	2
59	Short crust pastry, cooked	N/A	N/A	0.10	0.01	1.0	1.3	N/A	3.94	0.05	N/A	8	0.47	2	271	118	97	12	61	1.2	<0.06	0.4	399	N/A	0.36	4
60	Pastry flaky/puff pastry, cooked	N/A	N/A	0.09	0.01	0.9	1.3	N/A	2.52	0.05	N/A	<5	0.27	2	427	112	98	13	61	1.4	<0.06	0.4	570	N/A	0.37	3
61	Filo pastry, uncooked	N/A	N/A	0.20	0.02	1.0	1.4	N/A	0.30	0.06	N/A	11	0.40	2	436	119	108	17	78	1.5	<0.06	0.5	N/A	N/A	0.50	5
62	Filo pastry, cooked	N/A	N/A	0.26	0.03	1.2	1.8	N/A	0.39	0.08	N/A	15	0.52	3	571	156	141	23	102	1.9	<0.06	0.6	N/A	N/A	0.65	6

N/A = Not analysed

< = Result was below the analytical limit of quantification (LOQ) or limit of detection (LOD). There is no distinction between '<' and 'not detected'

* = Total vitamin A is calculated as retinol equivalents and is equal to all *trans* retinol + (beta-carotene/6)

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§ = Composite was analysed, and re-analysed to confirm data. The calcium value does not reflect that expected for doughnuts with jam. One sub-sample in particular contained various calcium salts, which had the effect of skewing the calcium value for the composite. The data is published here for completeness, but will not be incorporated into the Department of Health's nutrient databanks which support the National Diet and Nutrition Survey and other national dietary surveys

^ = Composite was analysed, and re-analysed to confirm data. The iron value does not reflect that expected for iced, ring doughnuts. One sub-sample in particular contained added iron, which had the effect of skewing the iron value for the composite. The data is published here for completeness, but will not be incorporated into the Department of Health's nutrient databanks which support the National Diet and Nutrition Survey and other national dietary surveys

Annex E: Analytical methods used

Moisture:

A homogenised portion of the sample was mixed with sand and heated to 102°C and the moisture loss determined gravimetrically. Analysis by EuroFins. Based on: BS4401-3 1997-UKAS accredited.

Suitable for oil and samples with high sugar content. A homogenised portion of the sample was mixed with sand and heated to 70°C in a vacuum oven and the moisture loss determined gravimetrically. Analysis by EuroFins. In house method H/007.

Protein:

Samples were analysed by a Leco instrumentation following Dumas procedure: samples were combusted in an oxygen atmosphere, the gaseous product was cleaned and nitrogen compounds converted to nitrogen which was measured by a thermal conductivity cell. The crude protein was calculated by multiplying by the appropriate conversion factor. Analysis by EuroFins. In house method Z/001 - UKAS accredited.

Fat:

Samples were acid hydrolysed with hydrochloric acid, cooled, filtered and dried. The fat was extracted from the residue with petroleum ether and the dried fat determined gravimetrically. Analysis by EuroFins. In house method Q/002 – UKAS accredited.

Ash:

The homogenised samples were ashed in a muffle furnace by heating at 550°C and the residue (ash) determined gravimetrically. Analysis by EuroFins. In house method Q/001 – UKAS accredited.

Fatty Acids:

Lipid fractions of the sample were solvent extracted. The isolated fat was transesterified with methanolic sodium methoxide to form fatty acid methyl esters (FAMES). The FAME profile was determined using capillary gas chromatography (GC). Quantification and identification of individual FAMES in the test material was achieved with reference to calibration standards. Analysis by EuroFins. In house method CHROM/215 – UKAS accredited.

Cholesterol:

Lipid in sample was saponified at high temperature with ethanolic KOH solution. Unsaponifiable fraction containing cholesterol and other sterols was extracted with toluene. Sterols are derivatized to trimethylsilyl (TMS) ethers and then quantified by GC. Analysis by EuroFins, method A7335.

Total and Individual Sugars:

Sugars were extracted with water, clarified and chromatographically separated on an amine column with an acetonitrile/water mobile phase. The sugars were detected using an evaporative light scattering detector and quantified with reference to calibration standards. Analysis by EuroFins. In house method CHROM/104 – UKAS accredited.

Starch:

Determination of starch and high molecular weight degradation products of starch in feeding stuffs and milk powders. The method consists of two separate determinations. The sample was treated with warm diluted hydrochloric acid, clarified and filtered; the optical rotation of the resulting solution was determined. In the second determination, the sample was extracted with 40% ethanol and filtered. The filtrate was acidified with hydrochloric acid, clarified and filtered again; the optical rotation of the resulting solution was determined at $20 \pm 2^\circ\text{C}$. Analysis by EuroFins. In house method H/050 – UKAS accredited.

Total Non-Starch Polysaccharide:

Total non-starch polysaccharide was determined using the Englyst and Cummings KIT instructions. Analysis by EuroFins.

AOAC Fibre:

The sample was weighed and de-fatted if necessary. It was then gelatinised and treated with α -amylase and further digested enzymatically with protease and amyloglucosidase to remove the starch and protein. The dietary fibre was precipitated with IMS, filtered, washed, dried and weighed. Total dietary fibre was then determined gravimetrically and corrected for protein and ash. Analysis by EuroFins. In house method H/085 – UKAS accredited.

Inorganics:

For sodium, potassium, calcium, magnesium, phosphorous, iron, copper, zinc and manganese, approximately 1g of homogenised sample was digested with concentrated nitric acid using microwave assisted accelerated digestion. Determined by ICP-OES (inductively coupled plasma optical emission spectrometry). Analysis by EuroFins. In house documented.

Iodine:

A strong solution of tetra-methyl ammonium hydroxide (TMAH) was used to digest the samples in a closed container at elevated temperatures. This converted iodine into a soluble, stable form. Iodine in the alkaline extract produced was determined by ICP-MS (inductively coupled plasma mass spectrometry). Analysis by EuroFins. In house documented.

NOTE: Results reported for samples 7, 12, 15, 17, 18, 29, 32, 36, 39 and 48 were re-analysed by LGC (samples were digested in TMAH for 3 hours at 90°C before analysis by ICP-MS).

Selenium:

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Approximately 1g of homogenised sample was digested with concentrated nitric acid using microwave assisted accelerated digestion. Selenium was determined in the extract produced by ICP-MS (inductively coupled plasma mass spectrometry). Analysis by EuroFins. In house documented.

Aluminium:

Aluminium was determined by ICP-MS (inductively coupled plasma mass spectrometry). Analysis by EuroFins. In house documented.

Chloride:

Organic matter in the sample was destroyed by wet digestion with a mixture of potassium permanganate and nitric acid. This method used a back titration with potassium thiocyanate to determine the concentration of chloride ions in solution. In the presence of excess silver nitrate, chloride was precipitated as silver chloride. Urea was added to the decomposed nitrites and the excess silver nitrate was titrated with potassium thiocyanate in the presence of acetone, using ferric iron as the indicator. Analysis by EuroFins. In house method Q/012 - UKAS accredited.

Thiamin (Vitamin B₁):

Thiamin was determined by reverse phase HPLC using fluorescence detection. Analysis by EuroFins, method A7273/DJA13/DJ070.

Vitamin B₆:

Vitamin B₆ was determined by reverse phase HPLC using fluorescence detection. Analysis by EuroFins, method A7251/DJA55/DJ072.

Vitamin B₁₂:

The sample was assayed microbiologically. Analysis by EuroFins, method A7289.

Niacin:

The sample was assayed microbiologically. Analysis by EuroFins, method A7276/DJ082.

Tryptophan (to calculate niacin equivalent):

Tryptophan was determined by HPLC. Niacin equivalent is calculated as the sum of tryptophan/60 and niacin. Analysis by EuroFins, method DJ009.

Riboflavin (Vitamin B₂):

Riboflavin was determined by reverse phase HPLC using fluorescence detection. Analysis by EuroFins, method A7274/DJA34/DJ071.

Folate:

Folate was determined microbiologically. Analysis by EuroFins, method A7286/DJA41/ DJ085.

Pantothenic Acid:

Pantothenic acid was determined microbiologically. Analysis by EuroFins, method A7278/DJA48/DJ083.

Biotin:

Biotin was determined microbiologically. Analysis by EuroFins method A7284/DJA39/ DJ084.

Vitamin C:

Vitamin C was determined by reverse phase HPLC using fluorescence detection. Analysis by EuroFins, method A7291.

Vitamin A: retinol fractions (all-trans), carotenoids (alpha and beta-carotene, cryptoxanthins). Non pro-vitamin A carotenoids e.g. lycopene, lutein, zeaxanthin

Vitamin A and carotenoids were determined using reverse phase HPLC with diode array detector. Total vitamin A was expressed as micrograms/100g all-trans retinol equivalents (ATRE) and was calculated as follows:

All *trans*-retinol + (0.749 X 13 *cis*-retinol) + (*trans* beta-carotene ÷ 6) + (other active carotenoids ÷ 12)

Analysis by EuroFins, method A7272/DJA36 determination of *trans* retinol isomers in foods and A7271/DJA57 determination of carotene isomers in foods.

Vitamin D₃:

The vitamin D₃ was assayed by normal phase/reverse phase HPLC with diode array detector/MS. Analysis by EuroFins, method A7252/DJA35.

Vitamin E (α-tocopherol):

α-tocopherol was assayed by reverse phase HPLC using fluorescence detection. Analysis by EuroFins, method A7296/DJA37.

Details of the quality control measures employed are given in the analytical report associated with this project, available at www.dh.gov.uk/publications.

References

¹ Responsibility for nutrition policy in England transferred from the Food Standards Agency to the Department of Health (DH) on 1 October 2010. Management of the rolling programme of nutrient analysis also transferred to DH.

²Food Standards Agency. *Management of the Foods Standards Agency programme of nutrient analysis and associated work*

<http://tna.europarchive.org/20110116113217/http://www.food.gov.uk/science/dietarysurveys/analyticalsurveys/n10039/> (accessed 20 July 2011).

³Food Standards Agency. *McCance and Widdowson's The Composition of Foods integrated dataset*

<http://tna.europarchive.org/20110116113217/http://www.food.gov.uk/science/dietarysurveys/dietsurveys/> (accessed 20 July 2011).

⁴ Based on data from the National Diet and Nutrition Survey.

⁵ The 'Lights' range of McVities digestives, rich teas and Hob Nobs were obtained from the manufacturer (United Biscuits) direct, as they were not available to purchase from retail outlets during the purchasing period. The McVities range had undergone significant reformulation at the time of sampling and to have used the older formulation in the survey would have quickly left the analysis out of date.

⁶ For sample 38 (loaf cakes), the second round of analysis was performed on a new composite sample that was prepared using sub-samples purchased in November 2009 (as stocks of the original had depleted). The sub-samples were the same products (with the same ingredients and nutritional information) as the original composite and were purchased from the same retailers.