

# Strengthening our evidence base – Food analytical program for the development of a nutrient database for estimating food consumption and nutrient intakes, July 2012

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## Introduction

The FSANZ Food Composition Program developed and maintains a national food composition reference database known as NUTTAB. To maintain the currency of NUTTAB, it is important to update existing nutrient data as well as generate nationally representative nutrient data for priority foods for which we currently have limited data.

Nutrient data are used for a variety of reasons such as:

- supporting FSANZ risk assessments
- providing data for manufacturers' nutrition labelling of products
- informing university research on diet and disease
- developing educational material
- assisting consumers make good food choices.

Nutrient data are also incorporated into survey databases to help estimate the nutrient intakes of Australians, such as in the current 2011-13 Australian Health Survey (AHS). The data are also used in releases of the FSANZ online Nutrition Panel Calculator (NPC).

As part of FSANZ's program to develop and maintain up-to-date food composition data representative of foods eaten in Australia, we surveyed various foods for a range of nutrients and other chemicals. During 2012 we undertook a food analysis program to support our food composition work for the AHS.

In this paper we present the main findings of this analytical program and provide information on the samples selected for analysis. The methodology for identifying the foods and nutrients for analysis is presented as well as information on the number of samples of each food, sampling process, transport, photography, preparation of samples and storage.

## Background to the Australian Health Survey (AHS)

The Australian Bureau of Statistics (ABS), in consultation with the Department of Health and Ageing, is conducting the AHS<sup>1</sup>, which will collect information on a range of topics, including nutrition, from about 50,000 adults and children across Australia. Around 13,000 people will participate in the National Nutrition and Physical Activity Survey (NNPAS) component of the AHS. FSANZ is preparing a nutrient database of the foods reported to be consumed that will assist in analysing nutrient intakes in the NNPAS. To assist us with preparing this database, we developed a food analysis program to survey 28 foods (Gluten free pasta was analysed raw and cooked and appears as two foods in the results) that either make important contributions to nutrient intake, or for which little or no nutrient data were available. The analytical program also included some bread types that were collected as part of a separate survey on fortification monitoring. The fortification monitoring survey results report is expected to be published on the FSANZ website at a later date.

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<sup>1</sup> For further information on the Australian Health Survey, visit the [ABS website](#) or contact the Department of Health and Ageing at [aushealthsurvey@health.gov.au](mailto:aushealthsurvey@health.gov.au)

# The FSANZ Food Analytical Program

## How FSANZ selects foods and nutrients for inclusion

The food supply in Australia is constantly changing and nutrient data for some foods can become outdated due to changes in product formulation, production practices or advances in analytical methods. Whilst the consumption amounts of staple foods, such as bread and milk may not change dramatically, a slight change to the nutrient profile may have a dramatic affect across a population. Similarly, it is important that we have data for foods that have not been analysed by FSANZ before (e.g. gluten free pasta, broccolini, spelt flour, nori).

There are a number of ways FSANZ identifies food for inclusion in analytical programs. However, for this program, we primarily used food consumption data from the 1995 National Nutrition Survey (NNS) for respondents aged 16 years and over and nutrient values for foods reported in Ausnut 1999<sup>2</sup> to produce a list of foods that contributed to the intake of each nutrient<sup>3</sup>. We then assessed which food groups contributed the most to the intake of specific nutrients and selected specific foods from within a food group for analysis. Further information on the selection of foods and nutrients is available from two summary reports, which are available from the FSANZ website at [www.foodstandards.gov.au](http://www.foodstandards.gov.au) or by following this link to the [Key Foods Program 2006 or the Key Foods Program 2008](#).

Consideration was also given to whether the entire nutrient profile for specific foods, or only part of the profile, had to be updated, as well as whether the foods had been analysed using an outdated method (e.g. vitamin levels in mushrooms), may have changed in composition since previously analysed (e.g. breakfast cereals), or if we were uncertain of the exact origin of the data (e.g. couscous data borrowed from US food composition tables).

The list of foods and the reason for their inclusion in this program is provided in Table 1. For ease, the number of samples and the nutrients analysed are provided in Table 2 and Table 3 and named Part A and Part B. Further information on the approach used to identify foods for inclusion in FSANZ analytical programs is provided in Attachment 1.

Nutrients selected for analyses included those that will be reported as part of the AHS and included nutrients such as selenium, *trans* fatty acids, vitamin B6, and vitamin B12 that had not previously been reported in national nutrition surveys. The range of nutrients differed from food to food depending on what data were available, the quality of the data, whether the nutrient was likely to be present in the food and the impact the consumption of the food may have on population intake of that nutrient.

## Sample collection

Sampling was carried out over a 6 month period in 2010 by the National Measurement Institute (NMI) laboratory and Australian State and Territory government food agencies<sup>4</sup>. All food purchases were made within capital city metropolitan areas, at a retail outlet representing the buying habits of the majority of the community unless otherwise specified. To assist officers, FSANZ provided a guide that included information on the brands or varieties and styles of foods that could be purchased. A list of the types of foods to be excluded from within each food group was also provided. For example, for the collection of mushroom samples, officers were asked to purchase whole flat, cup or button mushrooms only and not to purchase dried mushrooms or other varieties such as portabella or oyster mushrooms.

Where a brand or type was not specified the purchasing officers were instructed to purchase the item with the most shelf space, avoiding fortified, boutique or exotic lines unless specifically

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<sup>2</sup> AUSNUT99 is the nutrient dataset that is based on the technical support files for the 1995 NNS

<sup>3</sup> Although these data are over ten years old, they still provide us with the best quantitative estimates of food consumption and nutrient intakes available across a nationally representative sample and take into account all foods consumed

<sup>4</sup> Sample collection was carried out by NMI in NSW, Victoria and WA. FSANZ staff conducted sampling in the ACT and staff from the Tasmanian Department of Health and Human Services conducted sampling in Tasmania.

requested. Purchasing information including store name, location, use-by dates, type of packaging, and transport conditions to the laboratory (for example, whether the samples were packed in eskies with ice bricks) were recorded and provided to FSANZ. Between one and five purchases of each food were made to provide a final sample weight of approximately 500 grams.

Officers that were involved in the purchase of samples were briefed prior to purchasing to ensure consistency in the handling methods such as packing, storage and transport. Purchasing and delivery of samples to the laboratory was staggered to minimise any nutrient losses that might occur prior to analysis if samples had to be stored longer than necessary and to assist the laboratory manage their work schedule.

The samples were delivered by hand or sent by courier to the analytical laboratory. Samples were packed in eskies with ice, if required, and transported in their original packaging. If a sample was spoilt or lost, the analytical laboratory advised the relevant purchasing officer and an additional purchase was undertaken to replace the samples. All samples were photographed by the analytical laboratory using instructions provided by FSANZ. Photographs were requested prior to the commencement of the analysis of each food to help ensure that the correct type of product had been purchased for the specific category. For example, we were able to identify and exclude, from the low fat varieties, a full-fat soy yoghurt sample that had been incorrectly purchased.

## Sample preparation and analyses

The NMI laboratory was selected to provide analytical services. Samples that had use-by-dates were within these dates by the time they got to the analytical laboratory for preparation and analysis. Any perishable foods were delivered and prepared within 48 hours of purchasing. The preparation of shelf-stable foods was able to be delayed, but where possible, were analysed within a week of purchase.

NMI laboratory staff prepared samples to a ready-to-eat state before being analysed. For some products, FSANZ provided NMI with specific instructions for their preparation prior to the analysis, including the equipment to be used for handling and preparing samples and any specific cooking, weighing or trimming instructions.

For example, for mushrooms, the instructions provided were:

1. Brush off excess dirt and trim the inedible lower stalk to retain the edible portion.
2. Record the trimmed weight and describe inedible portion for each sample.
3. Homogenise.
4. Select aliquots for preparation of composite samples as required.

A glossary of definitions for terms such as blend, mix, wash was also provided to ensure consistency and minimise interference with analytical results.

Analyses were undertaken using agreed analytical methods and to agreed limits of reporting<sup>5</sup> (LOR). The NMI laboratory is accredited by the National Association of Testing Authorities (NATA<sup>6</sup>), Australia, and where possible, all samples were analysed using NATA accredited methods. The methods and LORs for each nutrient analysed are provided in Attachment 2. The results and a report on quality control information and the analytical methods used were provided electronically to FSANZ.

Individual samples were analysed for nutrients for which the food was determined to be a key contributor to dietary intake or for foods that may have been fortified with a specific nutrient.

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<sup>5</sup> **Limit of Reporting (LOR)** – The LOR is the lowest concentration level that the laboratory reports analytical results.

<sup>6</sup> The National Association of Testing Authorities (NATA), Australia is an Australian authority that provides independent assurance of technical competence. Further information can be found at <http://www.nata.asn.au/>

Composite samples were analysed for nutrients for which the food was not a major contributor to dietary intake.

Individual samples were composed of only a single purchase of the food. Aliquots of individual foods were not combined prior to analysis. Composite samples included an equal aliquot from each purchase for that food from each jurisdiction, combined to form a single sample for analysis. A single composite sample provides a representation of the mean nutrient level in that food but does not provide information on variation in nutrient levels within a food.

## Data scrutiny

To ensure the data generated from this analytical program were of high quality, a number of validation processes and checks were implemented prior to the results being accepted.

The following checks were made before and/or after the analytical results were sent to FSANZ:

- sample images were cross-referenced with the purchase instructions and specifications
- the specified LOR was used
- the samples had been transported, stored, prepared and analysed using the methods specified
- sample reference numbers were matched against the values provided for each analyte.

In addition, all nutrient data provided underwent an extensive data checking process, which included:

- calculating the sum of moisture, fat, protein, ash, sugars, starch, dietary fibre and organic acids to ensure it is in the range 97-103 g/100 g. Values outside this range may reflect poor sample preparation, analytical problems or the presence of components in the food that cannot be measured with the tests used
- ensuring no single nutrient value was greater than 101 g/100 g
- calculating the sum of individual fatty acids
- ensuring that a nitrogen value had been provided
- ensuring that plant foods have zero cholesterol, retinol and vitamin D
- calculating the sum of mineral components compared to ash content
- analysing datasets for outliers e.g. checking for values that look inconsistent with other samples of the same food (random error)
- analysing data for unusual trends e.g. are all the B1 data from a particular analytical program consistently lower than would be expected (systematic error)
- consulting with external experts as appropriate.

In some cases, we also compared the nutrition information panel label values and product ingredient lists with similar analysed food items to look for broad consistency of data and then investigated reasons for inconsistencies.

Incorrectly purchased samples were easily identifiable because at least one nutrient value was markedly different to other values or the product description was not consistent with the sampling instructions. For example, preliminary checking identified that four out of the five soy-yoghurts had a fat content of <0.9 g/100 g and one sample had a value of 3.7 g/100 g. This higher fat soy yoghurt was excluded from the data set for low-fat soy yoghurts analyses and a replacement sample purchased for inclusion. A canned smoked tuna product was also identified as not fitting in the 'Tuna, canned in brine, drained' category and excluded prior to analysis. A suitable replacement tuna sample was purchased and included in the analysis.

## Results

The results on individual foods are provided in the Excel file available on the [report's web page](#). A summary table of some key nutrients is provided at Table 4. Where individual analyses were undertaken, the mean value of the results is provided. Where analytical data were not provided in the raw data for a specific nutrient, such as total grams of polyunsaturated fatty acids, the value has been calculated from the raw analytical percentages of the relevant fatty acids.

The majority of results obtained were consistent with previous findings. Although there was a range seen across some products for some nutrients, this would be expected as there is often variation between different brands. The ranges for some key nutrients from individually analysed foods are shown in Table 5 and Table 6. Where individual samples were analysed for some nutrients, variation between individual samples was considerable. Vitamin C ranged from 13 - 35 mg/100 g in apple juice, calcium ranged from 570 - 860 mg/100 g in mozzarella cheese, beta carotene levels ranged from 170 – 510 µg/100 g in broccolini. Other considerable variations included the total fat content in drained canned red salmon ranging from 3.3 - 6.4 g/100 g and from 0.7 – 3.7 g/100 g in soy based yoghurt.

A number of unexpected results were observed in the initial assessment of the data. The most notable ones were in relation to fatty acid results for mushrooms, seaweed and spelt flour. Low levels of long chain omega 3 fatty acids were found in raw, fresh mushrooms and spelt which was unexpected as these fatty acids are not typically found in plant foods other than some algae. All results were reviewed and the presence of eicosapentaenoic acid (C20:5w3) in spelt was verified using mass spectrometry. The data will be used with caution pending further investigation of the results.

The beta carotene value of 94 µg/100 g for couscous (generally made from coarsely ground wheat) was higher than expected but was confirmed by analysis of the reserve sample. This result suggests that at least one sample may have been coloured with carotene, which is a permitted<sup>7</sup> colour in this type of food.

In goats' cheese, calcium values ranged from 57 – 770 mg/100 g. The wide range is due to the different styles of goats' cheese analysed (i.e. soft and creamy compared to hard cheese).

Raw mushrooms also provided some challenges with the analysis of vitamin D. Mushrooms were not able to be analysed for low level vitamin D due to the presence of naturally occurring ergosterol, which when exposed to UV radiation converts to Vitamin D2.

Whilst some results for specific nutrients were higher or lower than expected, the majority were within an expected range, with only a few samples having to be reanalysed.

## Conclusion

FSANZ's scrutiny and validation processes have ensured high quality data. FSANZ has incorporated the data from this analytical survey into its food composition database [NUTTAB](#). The new data generated in this survey provide us with robust data for use in the Australian Health Survey, other dietary intake assessments and our on-line databases.

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<sup>7</sup> The *Australia New Zealand Food Standards Code* (the Code) lists carotene in Schedule 3 (Colours permitted at a level that is in accordance with GMP). Schedule 1 of the Code permits additives listed in Schedules 2, 3 and 4, at the level specified, in processed cereals and meals. This includes couscous.

**Table 1: Foods included in the survey and the reason for their inclusion**

<b>PRIORITY</b>	<b>FOOD</b>	<b>REASON FOR INCLUSION</b>
<b>1. BEVERAGES – NON-ALCOHOLIC</b>		
<i>Essential</i>	Juice, apple and blackcurrant	No analytical data available. Popular fruit juice consumed in ANCNPAS <sup>8</sup> . Current nutrient data was derived using a recipe approach. Likely to be consumed during AHS.
<i>Essential</i>	Juice, orange and mango	Limited, outdated data. Popular fruit juice consumed in ANCNPAS. Current nutrient data was derived from nutrient analysis undertaken in 1990. Change in fruit varieties and processing methods since 1990. Likely to be consumed during AHS.
<b>2. CEREAL AND CEREAL PRODUCTS</b>		
<i>Essential</i>	Couscous	No analytical data available. Current nutrient data borrowed from the US food composition database. Likely good source of protein, Fe, B1 and B3. Likely to be consumed during AHS.
<i>Essential</i>	Flour, spelt	No analytical data available. Increase in consumption of specialty grains. Will be needed as an ingredient for multiple recipes during AHS.
<i>Essential</i>	Pasta, gluten free	No analytical data available. Increase in consumption of gluten free products. Likely to be consumed during AHS.
<i>Desirable</i>	Breakfast cereal, Special K, original	Major type of fortified breakfast cereal, Likely to be consumed during AHS. Current data are old.
<i>Desirable</i>	Breakfast cereal, Coco Pops, original	Major type of fortified breakfast cereal, Likely to be consumed during AHS. Current data are old.
<i>Desirable</i>	Breakfast cereal, Muesli, raw (untoasted)	Current data are old. Likely to be consumed in the AHS, particularly by adults.
<b>3. DAIRY</b>		
<i>Essential</i>	Milk, regular fat (approx. 3.5% fat)	Staple food. Good source of protein, fat, sugars, vitamin A, B2, Ca, I, Zn, Mg, P and K. Need to monitor calcium and iodine levels which have varied substantially over previous analyses. Likely to be consumed during AHS.
<i>Essential</i>	Milk, reduced fat (approx. 1-2% fat)	Staple food. Good source of protein, sugars, B2, Ca, Mg, P, K and I. Need to monitor calcium and iodine levels which have varied substantially over previous analyses. Likely to be consumed during AHS.
<i>Essential</i>	Cheese, mozzarella	Limited, outdated data. Current nutrient data derived from nutrient data provided by the dairy industry in 1989, and limited data from nutrient analysis undertaken in 2005. Fatty acid data was imputed from regular hard cheese. Mozzarella commonly consumed in ANCNPAS. Likely to be consumed during AHS.
<i>Desirable</i>	Milk, Anlene	Fortified food. Contains added Ca, Mg, Zn, protein and vitamin D. Not previously analysed by FSANZ.
<i>Desirable</i>	Cheese, goat	Newer food for which we hold no Australian data
<i>Desirable</i>	Cream, regular, 35% fat	Little current analytical data. Widely consumed including as an ingredient in many mixed dishes.
<i>Desirable</i>	Sour cream, regular	Little current analytical data. Widely consumed including as an ingredient in many mixed dishes.
<i>Desirable</i>	Cream cheese, regular	Little current analytical data. Widely consumed including as an ingredient in many mixed dishes.

<sup>8</sup> FSANZ's most recent survey specific nutrient database developed for estimating nutrient intakes from foods, beverages and dietary supplements consumed as part of the 2007 Australian National Children's Nutrition and Physical Activity Survey (ANCNPAS, commonly referred to as Kids Eat Kids Play). For further information on the Survey methodology and outcomes please refer to [www.health.gov.au](http://www.health.gov.au)

<b>PRIORITY</b>	<b>FOOD</b>	<b>REASON FOR INCLUSION</b>
<b>4. FATS AND OILS</b>		
<i>Desirable</i>	Butter, salted	Staple food. Widely used as an ingredient in other foods.
<b>5. SEAFOOD</b>		
<i>Essential</i>	Fish finger, crumbed	Seafood is a major source of omega 3s and should be considered a key group for analysis. Limited outdated data. Current nutrient data was derived from nutrient analysis undertaken in 1986. Fibre and folate values borrowed from UK food composition tables. Commonly consumed fish product in ANCNPAS. Likely to be consumed during AHS.
<i>Desirable</i>	Salmon, canned, flavoured	No analytical data available. Current nutrient data based on regular canned salmon and adjusted using label information. Increase in canned flavoured salmon products available for consumption. Likely to be consumed during AHS.
<i>Desirable</i>	Tuna, canned, flavoured	No analytical data available. Current nutrient data based on regular canned tuna and adjusted using label information. Increase in canned flavoured tuna products available for consumption. Likely to be consumed during AHS.
<i>Desirable</i>	Salmon, red, canned, drained,	Likely to be consumed during AHS. Fatty acid data need updating.
<i>Desirable</i>	Tuna, canned in brine, drained	Likely to be consumed during AHS. Fatty acid data need updating.
<b>6. SPREADS AND SAUCES</b>		
<i>Essential</i>	Vegemite	Fortified food. Popular spread consumed in ANCNPAS. Good source of folic acid. Likely to be consumed during AHS.
<b>7. VEGETABLES</b>		
<i>Essential</i>	Broccolini	No Australian nutrient data available. Likely to be consumed during AHS.
<i>Essential</i>	Nori	No Australian nutrient data available except for iodine. Current nutrient data borrowed from the US food composition tables. Important to collect data on foods generally consumed by migrant groups. Likely to be consumed during AHS.
<i>Desirable</i>	Mushrooms	Limited, outdated data. Current nutrient data derived from nutrient analysis in 1983/84, with limited analytical data from 2000. Popular vegetable consumed. Likely to be consumed during AHS.
<b>8. VEGETARIAN PRODUCTS</b>		
<i>Essential</i>	Soy-based yoghurt	Limited, outdated data. Current nutrient data derived from nutrient analysis undertaken in 1995. Fatty acid content imputed from tofu. Increase in products available for consumption. Likely to be consumed during AHS.
<b>9. EGG and EGG PRODUCTS</b>		
<i>Essential</i>	Egg, chicken, whole, raw	Staple food. Likely to be widely consumed during AHS including through its use as an ingredient in mixed foods.







Table 3 : Analytes and number of samples for each food in Part B

Program 1 Part B - Australian Health Survey																																	
No.	Food	Moisture	Protein	Total Fat	Fatty Acid Profile	Sugar profile	Starch	Ash	Dietary fibre	Trace Element scan *	Selenium	Iodine	Retinol	Carotenes	Cryptoxanthin	lutein	Vitamin C	Vitamin D (D2, D3 & 25-OH)	Thiamin	Riboflavin	Niacin	Vitamin B6	Vitamin B12	Tocopherols	Total Folate	Folic Acid	Pantothenate	Organic Acids	Tryptophan	Cholesterol			
1	Pasta, gluten free, cooked	●	●	●	●	●	●	●	●	●	●	●	●	●					●	●	●	●		●	●	●	●	●	●	●	●		
2	Pasta, gluten free, dry	●																															
3	Milk, regular fat (approx. 3.5% fat)	●	●	●	●	●		●		✓	●	✓	●	●				●	●	✓	●	●	●	●	●	●		●		●	●		
4	Milk, reduced fat (approx. 1-2% fat)	●	●	●	●	●		●		✓	●	✓	●	●				●	●	✓	●	●	●	●	●	●		●		●	●		
5	Fish finger, frozen, crumbed, raw	●	●	●	●	●	●	●	●	●	●	●	●	●				●	●	●	●	●	●	●	●	●		●		●	●		
6	Salmon, red, canned, drained	●	●	✓	✓			●		●	●	●	●					●	●	●	●	●	●	●	●	●		●		●	●		
7	Tuna, canned in brine, drained	●	●	✓	✓			●		●	●	●	●					●	●	●	●	●	●	●	●	●		●		●	●		
8	Broccolini, fresh, raw	●	●	●		●	●	●	●	●	●	●		✓	✓	✓	✓		●	●	●	●	●		●	✓		●	●		●	●	
9	Soy based yoghurt, vanilla or fruit flavoured	●	●	●	●	●	●	●	●	●	●	●		●			●		●	●	●	●	●	●	●	●		●	●		●	●	
10	Breakfast cereal, Special K, original	●	●	●	●	●	●	●	●	✓	●	●		●					✓	✓	✓	✓		●	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	Breakfast cereal, Coco Pops, original	●	●	●	●	●	●	●	●	✓	●	●		●			●		✓	✓	✓	✓		●	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Breakfast cereal, Muesli, raw (untoasted)	●	●	●	●	●	●	●	●	●	●	●		●					●	●	●	●	●	●	●	●		●		●	●	●	
13	Cream, regular, 35% fat	●	●	●	●	●		●		●	●	●	●	●					●	●	●	●	●	●	●	●		●		●	●	●	
14	Sour cream, regular	●	●	●	●	●		●		●	●	●	●	●					●	●	●	●	●	●	●	●		●	●	●	●	●	
15	Cream cheese, regular	●	●	●	●	●		●		●	●	●	●	●					●	●	●	●	●	●	●	●		●	●	●	●	●	●
	<b>No. of samples (individual analyses)</b>			10	10		0		0	20	0	10	0	5	5	5	5	0	10	20	10	5	0	0	15	10	0	0	0	0	0		
	<b>No. of samples (composite analyses)</b>	15	14	12	11	12	7	14	7	10	14	12	8	11	0	0	2	5	12	10	12	13	9	14	11	0	14	5	12	4			
	<b>Total no. of samples</b>	15	14	22	21	12	7	14	7	30	14	22	8	16	5	5	7	5	22	30	22	18	9	14	26	10	14	5	12	4			
<b>Key: Program 1 Part B</b>																																	
✓	Individual analysis of 5 samples																																
●	One composite analysis of 5 samples																																
*	Includes (per 100 g): aluminium, µg; cadmium, ug; calcium, mg; chromium, µg; copper, mg; iron, mg; magnesium, mg; manganese, mg; molybdenum, µg; phosphorus, mg; potassium, mg; sodium, mg; sulfur, mg; and zinc, mg.																																

**Table 4: Summary of key nutrients**

	Moisture		Protein (N X N factor)	Total Sugars	Starch	Total Dietary Fibre	Fat (method not specified)	Fatty acid conversion factor	Total Saturated	Total Saturated	Total Mono-unsaturated	Total Mono-unsaturated	Total Poly-unsaturated	Total Poly-unsaturated	Long Chain PUFA*	Long Chain PUFA	Ascorbic Acid	Iodine (I)	Calcium	Potassium	Selenium	Zinc	Sodium	Iron	Dietary Folate Equivalents (DFE)	
Limit of reporting (LOR)	0.2	0.2		Equation	0.1	0.05			Equation	Equation	Equation	Equation	Equation	Equation	Equation	Equation	1	1	0.5	1	1	0.001	1	0.2	Equation	
Food description	g/100g	g/100g		g/100g	g/100g	g/100g	g/100g		%	g/100g	%	g/100g	%	g/100g	%	mg/100g	ug/100	mg/100g	mg/100g	ug/100	mg/100g	mg/100g	mg/100g	ug/100g	ug/100g	
Juice, apple and blackcurrant	89.2	0.2	6.25	9.88	<0.1	<0.1	<0.2	0.956								26.8	<LOR	4.8	94.0	<LOR	0.01	6.4	<LOR	<LOR		
Juice, orange and mango	90.3	0.6	6.25	7.72	<0.1	0.2	<0.1	0.956								82.0	<LOR	8.6	160.0	<LOR	0.05	3.6	<LOR	26.0		
Flour, spelt	10.3	18.7	5.83	6.70	58.2	7.4	2.4	0.720	18.3	0.32	25.2	0.44	55.8	0.96	0.3	5.18		1.3	29.0	330.0	26.0	3.0	2.0	4.8	75.0	
Couscous, uncooked	10.1	12.6	5.70	3.40	70.2	4.2	0.2	0.670	22.6	0.03	25.2	0.03	46.9	0.06	0.0	0.00	<LOR	27.0	250.0	11.0	1.1	2.3	1.9	28.0		
Egg, chicken, whole, raw	76.1	13.4	6.25					8.5	0.830	34.2	2.41	51.9	3.66	13.4	0.95	1.2	84.66	170.0	47.0	140.0	23.0	0.9	150.0	1.9	110.0	
Salmon, canned, flavoured, drained	74.6	15.5	6.25	4.10	1.4		5.0	0.920	15.0	0.69	30.3	1.39	51.3	2.36	7.3	335.80	17.0	12.0	240.0	15.0	0.3	420.0	1.0			
Tuna, canned, flavoured, drained	72.3	18.0	6.25	2.50	0.8		5.8	0.940	20.7	1.13	37.6	2.05	40.3	2.20	3.9	212.63	12.0	13.0	250.0	48.0	0.5	430.0	1.2			
Cheese, mozzarella	47.5	22.2	6.38	<1			22.1	0.945	69.0	14.41	25.0	5.22	2.8	0.58	0.2	41.77	28.8	685.0	79.3	8.5	3.1	522.5	0.2	48.0		
Cheese, goat	47.0	19.5	6.38	<1			28.1	0.945	70.2	18.64	24.4	6.48	3.1	0.82	0.0	0.00	61.2	333.8	115.6	9.8	1.3	538.0	0.2	51.0		
Milk, Anlene, fresh, low fat	87.6	4.5	6.38	5.90	<0.1		1.4	0.945									23.0	208.0	168.0	<LOR	1.0	45.4	<LOR			
Butter, salted	14.8						80.8	0.945	68.8	52.53	24.8	18.94	2.5	1.91	0.1	76.36		15.0		<LOR				<LOR		
Vegete	40.9	24.4	5.70					0.800										14.0	80.0	2300.0	22.0	4.8	3300.0	4.0	3977	
Mushrooms, common, fresh, raw	93.0	2.5	4.38	<1	<0.1	1.4	0.4	0.800	24.6	0.08	3.5	0.01	70.9	0.23	0.5	1.60	<LOR	<LOR	3.0	360.0	16.0	0.6	8.6	4.5	22.0	
Seaweed, nori, dried	3.9	46.7	6.25	<1	2.0	34.3	4.3	0.800	25.8	0.89	9.2	0.32	64.6	2.22	51.7	1778.48	290.0	2200.0	310.0	2900.0	13.0	3.0	470.0	19.0	1400.0	
Pasta, gluten free, cooked	62.2	3.1	6.10	<1	32.4	1.2	0.7	0.820	47.9	0.27	14.3	0.08	35.2	0.20	0.0	0.00	<LOR	15.0	39.0	<LOR	0.3	1.1	0.9	120.0		
Pasta, gluten free, dry	11.0																									
Milk, regular fat (Approx:3.5% fat)	88.0	3.2	6.38	3.90			3.5	0.945	67.3	2.23	26.2	0.87	2.8	0.09	0.2	6.62	18.8	104.4	142.0	<LOR	0.4	33.6	<LOR	34.4		
Milk, reduced fat (Approx:1-2% fat)	89.5	3.5	6.38	4.20			1.3	0.945	67.4	0.83	26.6	0.33	2.6	0.03	0.0	0.00	29.4	120.0	162.0	<LOR	0.4	36.4	<LOR	23.0		
Fish finger, frozen, crumbed, raw	57.3	12.1	6.25	1.50	16.4	1.1	11.6	0.950	14.3	1.58	55.5	6.12	28.9	3.18	6.0	661.20	4.4	13.0	190.0	24.0	0.4	300.0	0.5	69.0		
Salmon, red, canned, drained	69.6	24.4	6.25				5.5	0.900	23.4	1.16	41.9	2.07	34.1	1.69	24.2	1197.90	13.0	130.0	270.0	32.0	0.6	350.0	0.5	95.0		
Tuna, canned in brine, drained	74.6	26.1	6.25				0.2	0.900	35.8	0.06	14.3	0.03	49.9	0.09	44.0	79.20	9.4	4.6	200.0	58.0	0.6	200.0	1.6	51.0		
Broccolini, fresh, raw	92.0	3.2	6.25	1.30	0.7	2.5	0.4	0.800									12.2	1.2	39.0	250.0	1.7	0.5	16.0	0.8	122.8	
Soy based yoghurt, vanilla or fruit flavoured	80.8	4.0	6.25	8.40	4.2	0.2	1.5	0.920	14.2	0.20	44.7	0.62	41.0	0.57	0.0	0.00	<LOR	2.3	120.0	55.0	<LOR	0.2	55.0	0.6	75.0	
Breakfast cereal, Special K, original	3.9	19.5	6.25	13.00	57.3	2.7	4.1	0.790	22.4	0.73	18.6	0.60	59.1	1.91	0.3	9.72	<LOR	936.0	116.0	13.0	3.3	474.0	13.8	1532		
Breakfast cereal, Coco Pops, original	3.1	5.3	6.25	30.00	52.9	1.9	2.9	0.850	46.3	1.14	36.1	0.89	17.6	0.43	0.0	0.00	55.0	<LOR	388.0	208.0	1.1	7.8	496.0	13.8	1784	
Breakfast cereal, Muesli raw (untoasted)	9.6	10.8	6.25	19.00	40.5	9.4	10.8	0.940	27.2	2.76	38.1	3.87	34.6	3.51	0.0	0.00	<LOR	57.0	440.0	9.4	1.8	41.0	4.2	130.0		
Cream, regular 35% fat	57.4	2.0	6.38	2.40			36.1	0.945	69.9	23.85	24.5	8.36	2.2	0.75	0.0	0.00	15.0	60.0	84.0	<LOR	0.2	27.0	<LOR	64.0		
Sour cream, regular	61.6	1.9	6.38	2.00			36.3	0.945	68.3	23.43	25.4	8.71	2.3	0.79	0.0	0.00	15.0	50.0	74.0	<LOR	0.2	19.0	<LOR	57.0		
Cream cheese, regular	53.3	8.5	6.38	2.00			34.2	0.945	68.4	22.11	24.7	7.98	2.3	0.74	0.0	0.00	13.0	69.0	80.0	3.2	0.6	320.0	<LOR	64.0		

Blank = not analysed

Yellow cells contain the average levels of the individual analyses; all other results are from composite samples

Majority of analytical results rounded to one decimal place

\*Long chain Poly-unsaturated Fatty Acid (PUFA) comprises: C20:5w3 Eicosapentaenoic, C22:5w3 Docosapentaenoic and C22:6w3 Docosahexaenoic

Dietary Folate Equivalents (DFE) calculated as: (folic acid x 1.67) + food folate = DFE

Fatty acid grams calculated using published FSANZ fatty acid conversion factors

**Table 5: Ranges for key nutrients from foods analysed individually**

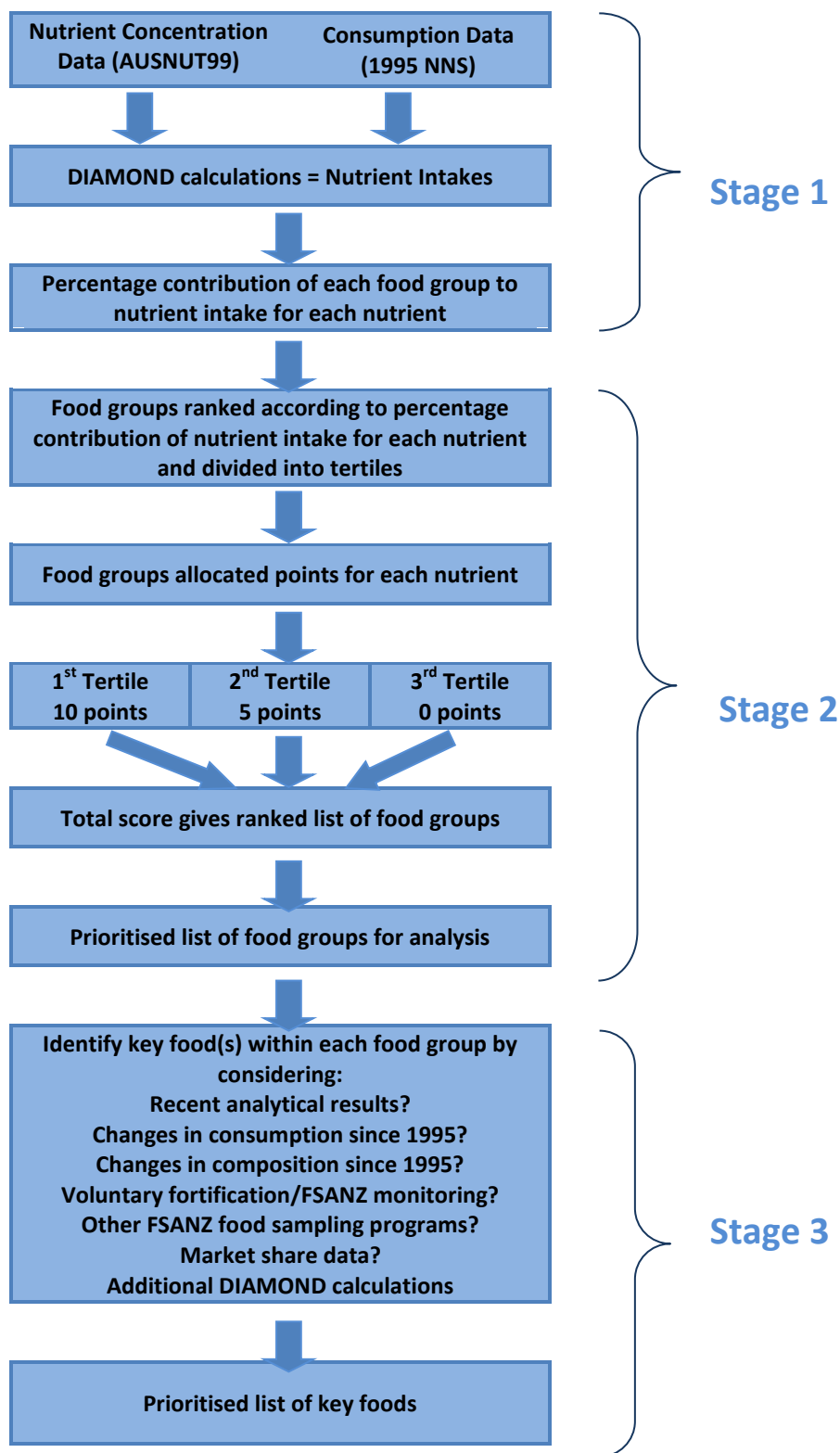
	Total Sugars	Ascorbic Acid	Iodine (I)	Calcium	Potassium	Zinc	Sodium	Iron	Dietary Folate Equivalents (DFE)
Limit of reporting (LOR)	Equation	1	1	0.5	1	0.001	1	0.2	Equation
Food description	g/100g	mg/100g	ug/100	mg/100g	mg/100g	mg/100g	mg/100g	mg/100g	ug/100g
Juice, apple and blackcurrant	9.7 - 10.0	13 - 35							
Juice, orange and mango	7.6 - 7.9	67 - 93							
Cheese, mozzarella			16 - 37	570 - 860	53 - 94	2.8 - 3.7	490 - 570	<LOR - 0.22	
Cheese, goat			23 - 100	57 - 770	88 - 140	0.3 - 2.8	350 - 750	<LOR - 0.23	
Milk, Anlene, fresh, low fat				200 - 210	160 - 170	0.92 - 1.0	45 - 46	all <LOR	
Vegetemite									3673 - 4122
Milk, regular fat (Approx:3.5% fat)			12 - 25	92 - 110	130 - 150	0.3 - 0.38	28 - 39	all <LOR	
Milk, reduced fat (Approx:1-2%% fat)			18 - 40	100 - 150	140 - 190	0.35 - 0.5	32 - 41	all <LOR	
Broccolini, fresh, raw		11 - 14							94 - 140
Breakfast cereal, Special K, original				890 - 1100	110 - 120	3.0 - 3.6	450 - 500	12 - 16	1296 - 1837
Breakfast cereal, Coco Pops, original				350 - 410	200 - 220	7.0 - 8.3	440 - 540	12 - 15	1530 - 2171

Blank cells = not analysed individually

**Table 6: Ranges for key nutrients from individual analysis of salmon samples**

	Fat total (method not specified)	Total Saturated	Total Saturated	Total Mono-unsaturated	Total Mono-unsaturated	Total Poly-unsaturated	Total Poly-unsaturated	Long Chain PUFA*	Long Chain PUFA
			Equation		Equation		Equation		Equation
Food description	g/100g	%	g/100g	%	g/100g	%	g/100g	%	mg/100g
Salmon, red, canned, drained	3.3 - 6.4	21.7 - 27.7	0.7 - 1.6	34.2 - 45.1	1.3 - 2.5	32.5 - 36.7	1.0 - 2.1	22.4 - 27.0	683.1 - 1434.2

Attachment 1 : Overview of the FSANZ process for creating a key foods list



**Attachment 2: Limits of reporting and methods of analysis for each nutrient**

<b>Nutrient</b>	<b>LOR</b>	<b>Method</b>	<b>NATA accredited</b>
Free folic acid	0.2 mg/kg	Triple enzyme microbiological assay	yes
Folate		Triple enzyme microbiological assay	yes
Moisture	0.2 g/100g	Oven dried	yes
Ash	0.1 g/100g, 0.1 g/100ml	Muffle furnace	yes
Protein	0.2 g/100g	Kjeldahl nitrogen, converted to protein using factors specific to particular foods	yes
Fat	0.2 g/100g	Mojonnier extraction	yes
Fat	0.2 g/100g	Soxhlet extraction (for meat and fish)	yes
Fatty acid profile	0.1 g/100g	Gas chromatography with Flame ionisation Detector (GC-FID)	yes
Cholesterol	1mg/kg solids, 1mg/L liquids	Gas-Liquid chromatography (GLC)	yes
Thiamin (B1)	0.05 mg/100g	High Performance Liquid Chromatography	yes
Riboflavin (B2)	0.05 mg/100g	High Performance Liquid Chromatography	yes
Niacin (B3)	0.5 mg/100g	High Performance Liquid Chromatography	yes
Vitamin B6	0.02 mg/100g	High Performance Liquid Chromatography	yes
Vitamin B12 (cobalamin)	0.1 ug/100g	Microbiological assay	yes
Retinol	5 ug/100g	High Performance Liquid Chromatography	yes
Alpha and beta carotene	5 ug/100g	High Performance Liquid Chromatography	yes
Tocopherols (α, β, γ and δ isomers)	0.1 mg/100g	High Performance Liquid Chromatography	yes
Vitamin D (D2, D3 and 25-OH)	5 ug/100g*	High Performance Liquid Chromatography	yes
Trace elements	0.01 - 0.5 mg/kg for most metals; 0.2 - 1.0 mg/kg for Na, K, S, P, Fe, Ca and Mg	One of the following methods were used depending on the matrix: Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) or Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES)	yes
Iodine	0.01 mg/kg	Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)	yes
Pantothenic acid (Vitamin B5)	1-10 mg/100g	Gas Liquid Chromatography (GLC)	yes
Cryptoxanthin	5 ug/100g	High Performance Liquid Chromatography	
Lutein	5 ug/100g	High Performance Liquid Chromatography	
Sugars (common)	0.2 g/100g with refractive index detector (RID); 0.05 g/100g with evaporative light scattering detector (ELSD)	High Performance Liquid Chromatography with either RID or ELSD	yes
Ascorbic acid (Vitamin C)	1 mg/100g	High Performance Liquid Chromatography	yes
Organic acids (acetic, butyric, citric, lactic, malic, propionic and quinic)	20 mg/100g	High Performance Liquid Chromatography	yes
Starch		Enzymatic microbiological assay	
Dietary fibre	0.05 g/100g	AOAC 985.29	
Selenium		Inductively Coupled Plasma-Mass Spectrometry (ICP-MS)	
Tryptophan		NaOH Hydrolysis, derivatisation & reverse phase HPLC	