2008 Key Foods Program Report

Introduction

The Food Composition Program within FSANZ maintains a custom-made data management system containing information on the nutrient composition of Australian foods. FSANZ uses the data to produce reference and survey databases such as NUTTAB and AUSNUT, and to feed into FSANZ risk assessment processes. These data are also used externally for nutrition labelling, research on diet and disease, education, and to assist consumers make healthy food choices.

To maintain the database with the most current information, FSANZ conducts analytical programs where specific foods and nutrients are targeted for laboratory testing. Unfortunately, analytical programs are often expensive and time-intensive, so FSANZ needs a method for prioritising foods for nutrient analysis.

In 2006, FSANZ developed the pilot Australian Children's Key Foods Program (2006 KFP), based on the United States Department of Agriculture (USDA) Key Foods concept (Haytowitz et al. 2002) to assist in prioritising foods for nutrient analysis for the purpose of providing up-to-date nutrient data for estimating nutrient intakes from the 2007 National Children's Nutrition and Physical Activity survey (*Kids Eat, Kids Play*).

FSANZ commissioned a second KFP, focussing on adult food consumption, in 2008 (2008 KFP). This program anticipated the need to develop a survey database for estimating nutrient intakes of Australian adults as part of a future National Nutrition Survey (NNS).

The Survey

Selection of 'key foods'

Key foods were identified by:

- combining food consumption data for respondents 16 years and over from the 1995 National Nutrition Survey (1995 NNS) with nutrient values reported in AUSNUT 1999 (ANZFA, 1999) to produce a list of food groups that contributed to the intake of each individual nutrient
- determining which food groups contributed the most to intakes across all nutrients
- selecting specific foods from within the food groups for analysis, giving consideration to changes in consumption and composition since 1995, the availability of recent analytical data and market share data

The list was also modified to take advantage of samples already being collected as part of another analytical program being conducted by FSANZ and to focus on modified or nutrient fortified products.

For further information on the approach used for identifying key foods, see Appendix 1.

For a list of key foods selected for analysis as part of the 2008 KFP see Appendix 2.

Sampling

The majority of foods were collected as part of the 23rd Australian Total Diet Study with the cooperation of Australian state and territory government health departments over two seasons, summer (January/February 2008) and winter (June/July 2008).

Foods that are available nationwide from a small number of manufacturers and are not expected to show regional variation (such as baked beans and chocolate), were sampled in two states in each season. Foods that might show regional variation in production (such as meat, fruit and vegetables) were sampled in at least four states in each season. Some regional foods that are staples of the Australian diet, such as milk, white bread and potato, were sampled in five to eight jurisdictions in each season. Using this sampling plan, between 4 and 16 samples were purchased for each key food.

A small number of modified and/or fortified products were also collected from eight Australian capital cities, in May 2008. Between 4 and 8 purchases were made for each key food.

Preparation

Summer and winter season samples were prepared and analysed separately.

Preparation of food to a table-ready state included cooking raw products (e.g. meat, potatoes) using typical cooking methods and separation of inedible portions (e.g. skin on bananas). The exception was modified eggs which were analysed raw.

Individual samples and composite samples of each key food were prepared for nutrient analysis. Individual samples were composed of a single purchase of the food. The composite samples included an equal portion from each of the purchases of that food combined to form a single sample for analysis.

Analysis

Nutrients selected for the 2008 KFP were determined based on whether they were likely to be of interest in future national nutrition surveys and to generate data to fill current data gaps (Table 1).

Table 1: Nutrients analysed in the 2008 KFP.

Proximates	Vitamins	Minerals	Other
Moisture	Carotenes (α and β)	Aluminum	Fatty acid profile
Protein	Cryptoxanthin	Arsenic	Cholesterol
Total fat	Retinol	Cadmium	Tryptophan
Starch	Lutein	Calcium	
Sugar profile	Lycopene	Chromium	
Dietary fibre	Thiamin	Copper	
Ash	Riboflavin	Iodine	
Organic acids	Niacin	Iron	
	Vitamin B6	Lead	
	Vitamin B12	Manganese	
	Pantothenate	Mercury	
	Total folates	Molybdenum	
	Free folates	Potassium	
	Vitamin C	Selenium	
	Vitamin D (D2, D3 and hydroxy derivatives)	Sodium	
	Tocopherols (α, β, γ and δ)	Zinc	

In general, individual samples were analysed for nutrients for which the food is a key contributor to dietary intake. Individual samples were also analysed for nutrients where the food was fortified with the nutrient and/or the nutrient was a priority for FSANZ standards development work.

Composite samples were analysed for nutrients for which the food is not considered to be a key contributor to dietary intake. Based on existing data and the nature of the food, some nutrients were not analysed in some foods not expected to contain the nutrient.

Results

Average, minimum and maximum results for each food are outlined in Appendix 3.

Key findings

- Potatoes and potato products (including fried potato dishes and potatoes cooked by various other methods) was the food group that achieved the highest overall score as they contribute a wide range of nutrients (including fats when fried) and are a staple food for many people. However milk (full fat and reduced fat) was the single food that was the most important contributor to overall nutrient intake of Australian adults aged 16 years and over.
- Foods analysed for this program showed little variation in nutrient levels between states and territories. There were also no major differences noted between the analytical results from samples purchased in summer compared to winter samples.

- A few unexpected results were found, such as measurable levels of fructose in lamb and cheese, and notable differences in the sugar profile of fresh carrots and frozen peas between seasons. Any values that seem unusual have been highlighted on the results spreadsheet and should not be relied upon as being accurate. Nutrient analyses sometimes yield unexpected results, and some analytical methods are not as reliable as other methods.
- A measure of whether the overall analyses have been acceptable is to add the amount of moisture, protein, fat, carbohydrates, ash and organic acids. Typically this sum should fall in the range 97 – 103 g/100 g. Values outside this range may reflect factors such as poor sample mixing, analytical difficulties or the presence of components in the food that can't be measured with the tests used. There were a few foods where this was found, such as Vegemite (where there are likely to be unusual carbohydrates present that are not measured) and breakfast cereals (possibly due to the difficulties of mixing samples that contain dried fruits).
- The analytical methodology for folate and folic acid in food has developed substantially in recent years. The 2008 KFP used the most up-to-date method available. Some folate values received from the laboratory were very different to existing FSANZ values and were internally inconsistent. There were numerous instances across multiple food groups (including bread, milk, eggs and cereal) where the quantity of reported free folate exceeded total folates. This indicates some degree of uncertainty and thus the results for folate and folic acids from this program should be used with caution.
- Preparation methods play a significant role in the final nutrient composition of foods. Some foods which were prepared to a ready-to-eat state in the laboratory (such as rice, potatoes, and meat), had quite different levels of moisture when analysed individually, which affected other nutrients proportionally. This highlights how individual cooking practices in the kitchen can alter the nutrient profile of foods consumed.
- The results of the 2006 KFP showed levels of iodine in some foods such as milk and bread seem to be higher than those seen in previous analytical surveys such as the 2005 Australian Iodine Program and the 22nd Australian Total Diet Study. Because of this, FSANZ undertook additional milk analyses six months after the initial sampling for the 2006 KFP, and again as part of the 2008 KFP. The results were still higher than previous analyses from 2005. This variation is possibly due to drought conditions resulting in changes to animal feed; the method of analysis for iodine did not change over these surveys. FSANZ will continue to monitor levels of iodine in milk.
- Conversely, levels of calcium in milk were again found to be lower than in surveys conducted before 2005, confirming a finding of the 2006 KFP. There was little variation across seasons and programs. The method of analysis for calcium changed between surveys before and after 2006. Levels of calcium in milk will also be investigated in future surveys.
- Vitamin D results for some foods were low compared to international data. Methods for the accurate analysis of the low levels of vitamin D found in unfortified foods are still being developed internationally, and FSANZ will continue to gather data on the vitamin D content in food as the methodology is refined.

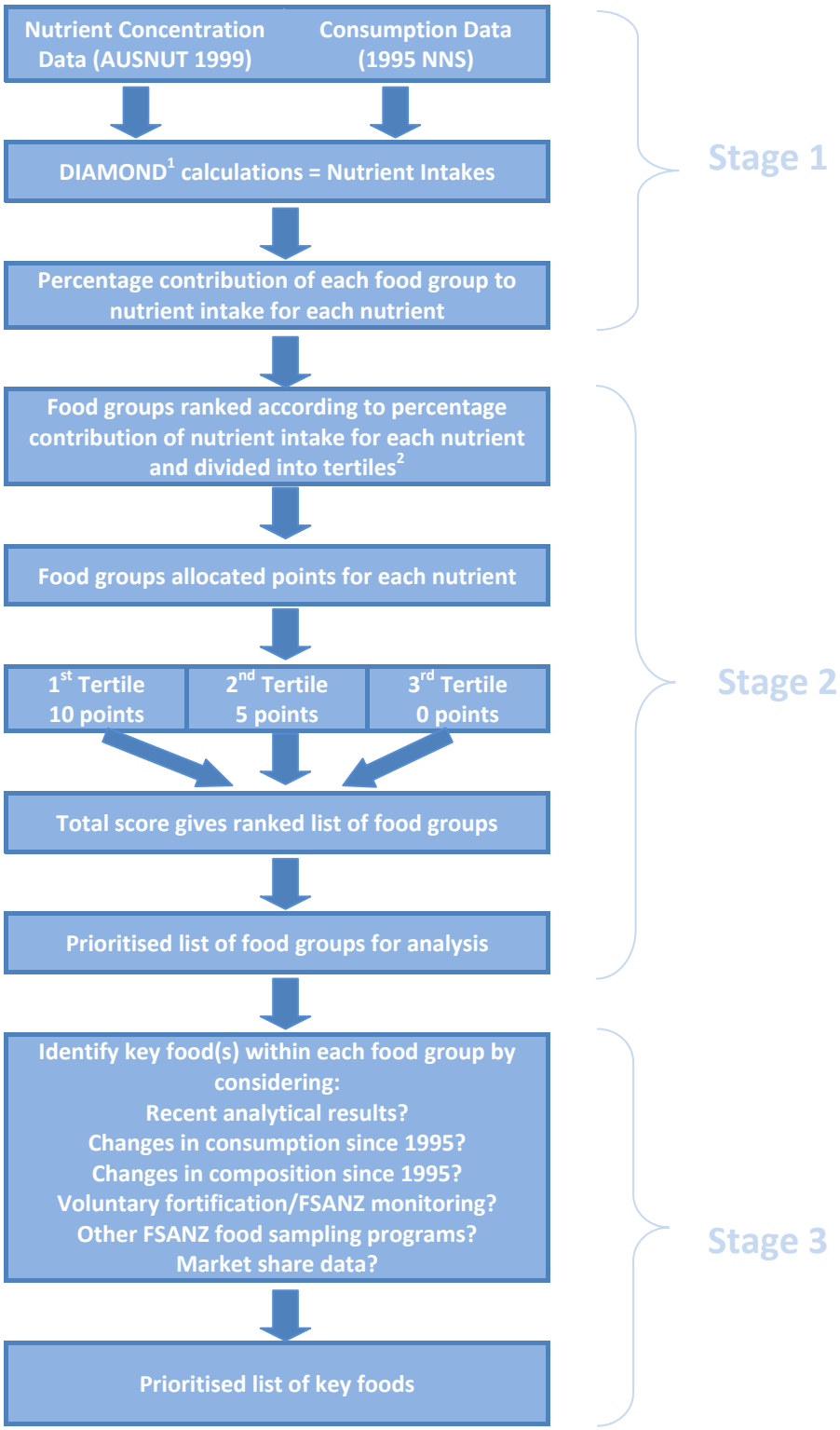
- For foods where a direct link between the analytical sample and a particular brand could be made, the nutrition information panel values were generally in close agreement with the analytical result.

Use of survey results and future work

FSANZ has incorporated these nutrient data into the reference database NUTTAB 2009. The data will also be used in the development of a survey database for use in the upcoming National Health Survey. Some of the fatty acid values were used to assist in estimating dietary intake of trans fatty acids. You can find FSANZ's report on this at http://www.foodstandards.gov.au/scienceandeducation/publications/transfattyacidsrepor4560.cfm.

APPENDICIES

Appendix 1: Overview of FSANZ's process for building a key foods list



[1] DIAMOND is FSANZ's custom-built computer system for estimating chemical exposure and nutrient intakes.
[2] A tertile is a group of foods that together constitute one-third of the nutrient intake.

Appendix 2: Complete 2008 Adult's Key Foods list

Food Group Category	Reason for Inclusion	Key Foods
Potatoes (includes cooked potatoes such as baked, boiled, mashed, hot chips and wedges)	1st tertile contributor to 14 nutrients (protein, carbohydrate, dietary fibre, saturated fat, monounsaturated fat, polyunsaturated fat, vitamin C, thiamin, niacin, iron, magnesium, phosphorus, potassium, zinc) and 2nd tertile contributor to 7 nutrients, analysed in 2006; staple food rated high in overall consumption; on the 23rd ATDS sampling plan	1. Potato, peeled, boiled
Milk, fluid, regular whole, full fat	1st tertile contributor to 13 nutrients (protein, sugars, cholesterol, saturated fat, monounsaturated fat, retinol, riboflavin, calcium, magnesium, phosphorus, potassium, zinc, iodine) and 2nd tertile contributor to 7 nutrients; analysed in 2006; staple food rated high in overall consumption; on the 23rd ATDS sampling plan	2. Milk, fluid, full fat (~4%), unfortified
Bread and rolls, white	1st tertile contributor to 11 nutrients (protein, carbohydrate, dietary fibre, polyunsaturated fat, thiamin, folate, iron, magnesium, phosphorus, zinc, sodium) and 2nd tertile contributor to 7 nutrients; staple food; fortified and unfortified varieties analysed in 2006, fortified variety selected for this program	3. Bread, white, folic acid fortified
Beef	1st tertile contributor to 9 nutrients (protein, cholesterol, saturated fat, monounsaturated fat, riboflavin, niacin, iron, phosphorus, zinc) and 2nd tertile contributor to 5 nutrients; analysed in 2006 (rump steak and regular fat mince); on the 23rd ATDS sampling plan; increased sales of lean mince since 1995	4. Beef mince, lean (low fat/lean/heart smart), dry fried
Bread and rolls, wholemeal	1st tertile contributor to 7 nutrients (carbohydrate, dietary fibre, thiamin, iron, magnesium, phosphorus, sodium) and 2nd tertile contributor to 7 nutrients, unfortified variety analysed in 2006, fortified variety selected for this program	5. Bread, wholemeal, folic acid fortified
Chicken	1st tertile contributor to 6 nutrients (protein, cholesterol, monounsaturated fat, polyunsaturated fat, niacin, phosphorus) and 2nd tertile contributor to 8 nutrients; different cooking method (stir fried) analysed in 2006; on the 23rd ATDS sampling plan	6. Chicken, breast fillets, grilled
Savoury pastry products, double crust, pies, rolls and envelopes	1st tertile contributor to 3 nutrients (saturated fat, monounsaturated fat, sodium) and 2nd tertile contributor to 13 nutrients; frozen meat pies	7. Pie, meat, plain, individual size, ready to eat

Food Group Category	Reason for Inclusion	Key Foods
	analysed in 2006; ready to eat variety on the 23rd ATDS sampling plan	
Milk, fluid, reduced fat, < 2%	1st tertile contributor to 6 nutrients (riboflavin, calcium, magnesium, phosphorus, potassium, iodine) and 2nd tertile contributor to 7 nutrients; unfortified variety analysed in 2006, fortified varieties have the potential to contribute significantly to overall nutrient intake	8. Milk, fluid, reduced fat, folic acid fortified 9. Milk, fluid, reduced fat, omega 3 fortified
Cheese, natural, traditional	1st tertile contributor to 7 nutrients (saturated fat, monounsaturated fat, retinol, calcium, phosphorus, zinc, sodium) and 2nd tertile contributor to 4 nutrients, analysed in 2006, on the 23rd ATDS sampling plan	10. Cheese, cheddar, full fat
Bread, rolls, mixed grain	1st tertile contributor to 2 nutrients (magnesium, sodium) and 2nd tertile contributor to 12 nutrients; fortified variety selected for this program	11. Bread, multigrain, folic acid fortified
Cakes, cake mixes	1st tertile contributor to 2 nutrients (carbohydrate, polyunsaturated fat) and 2nd tertile contributor to 10 nutrients, ranked 7 but not selected for analysis in 2006; on the 23rd ATDS sampling plan	12. Cake, chocolate, iced
Cabbage, cauliflower and similar brassica vegetables	1st tertile contributor to 1 nutrient (dietary fibre) and 2nd tertile contributor to 12 nutrients; on the 23rd ATDS sampling plan	13. Broccoli, fresh, microwaved
Filled rolls and hamburgers	2nd tertile contributor to 13 nutrients; on the 23rd ATDS sampling plan	14. Beef burger, plain, takeaway shop
Pizza	2nd tertile contributor to 12 nutrients; takeaway variety analysed in 2006, frozen variety on the 23rd ATDS sampling plan	15. Pizza, frozen, ham & pineapple, baked
Lamb	1st tertile contributor to 2 nutrients (protein, zinc) and 2nd tertile contributor to 8 nutrients; on the 23rd ATDS sampling plan	16. Lamb, loin chop, grilled, trimmed
Rice	1st tertile contributor to 1 nutrient (carbohydrate) and 2nd tertile contributor to 9 nutrients; on the 23rd ATDS sampling plan	17. Rice, white (long grain or jasmine), boiled without salt
Eggs, chicken	1st tertile contributor to 1 nutrient (cholesterol) and 2nd tertile contributor to 9 nutrients; boiled egg on the 23rd ATDS sampling plan, modified variety also selected for this program	18. Egg, chicken, boiled 19. Egg, modified (e.g. vegetarian, omega 3), raw
Peas and edible-podded peas	1st tertile contributor to 2 nutrients (dietary fibre, iron) and 2nd tertile contributor to 7 nutrients; on the 23rd ATDS sampling plan	20. Peas, frozen, green, plain/minted, boiled without salt
Breakfast cereal, grain and fruit/nut mixtures	1st tertile contributor to 2 nutrients (folate, iron) and 2nd tertile contributor to 6 nutrients; Kelloggs varieties on the 23rd ATDS sampling plan	21. Breakfast cereal, Just Right (Kelloggs) 22. Breakfast cereal, Sultana Bran (Kelloggs) 23. Breakfast cereal, Uncle Toby's Fibre Plus Cereal

Food Group Category	Reason for Inclusion	Key Foods
Ham	1st tertile contributor to 1 nutrient (sodium) and 2nd tertile contributor to 8 nutrients; on the 23rd ATDS sampling plan	24. Ham, sliced, delicatessen style
Bananas	1st tertile contributor to 2 nutrients (sugars, potassium) and 2nd tertile contributor to 5 nutrients, analysed in 2006, reanalysed due to atypical supply in 2006 where storms damaged Australian crops in primary production areas in northern Queensland; on the 23rd ATDS sampling plan	25. Banana, cavendish, peeled
Carrot and similar root vegetables	1st tertile contributor to 2 nutrients (dietary fibre, carotenes) and 2nd tertile contributor to 5 nutrients; on the 23rd ATDS sampling plan	26. Carrot, fresh, mature, boiled without salt
Yeast, vegetable and meat extracts	1st tertile contributor to 4 nutrients (thiamin, riboflavin, niacin, folate) and 2nd tertile contributor to 1 nutrient, ranked 24 but not selected for analysis in 2006; iconic Australian food	27. Vegemite
Tomato	2nd tertile contributor to 8 nutrients; on the 23rd ATDS sampling plan	28. Tomato, fresh, raw
Tea	1st tertile contributor to 2 nutrients (folate, iodine - both nutrients are of interest to FSANZ standards work) and 2nd tertile contributor to 3 nutrients; on the 23rd ATDS sampling plan	29. Tea, prepared, no added milk
Chocolate-based confectionery	2nd tertile contributor to 7 nutrients; on the 23rd ATDS sampling plan	30. Chocolate, milk, plain
Pasta and egg noodles	2nd tertile contributor to 6 nutrients, ranked 33 in 2006 but not selected for analysis; on the 23rd ATDS sampling plan	31. Pasta, white, dry, boiled without salt
Other fruit	2nd tertile contributor to 7 nutrients; on the 23rd ATDS sampling plan for the summer season	32. Strawberries, fresh, without leaves
Butter	1st tertile contributor to 1 nutrient (saturated fat) and 2nd tertile contributor to 3 nutrients; on the 23rd ATDS sampling plan	33. Butter, salted
Peanuts and peanut products	1st tertile contributor to 1 nutrient (polyunsaturated fat) and 2nd tertile contributor to 3 nutrients, ranked 28 in 2006 but not selected for analysis; on the 23rd ATDS sampling plan	34. Peanut butter
Sweet biscuits, plain or flavoured	2nd tertile contributor to 3 nutrients, ranked 33 in 2006 but not selected for analysis; on the 23rd ATDS sampling plan	35. Biscuit, sweet, plain
Monounsaturated margarine, and spreads (approximately 70% fat)	2nd tertile contributor to 3 nutrients; on the 23rd ATDS sampling plan	36. Margarine spread, monounsaturated, ~70% fat
Dishes where mature legumes are the major component	2nd tertile contributor to 3 nutrients; on the 23rd ATDS sampling plan	37. Baked beans, canned, in tomato sauce

Food Group Category	Reason for Inclusion	Key Foods
Potato crisps	2nd tertile contributor to 3 nutrients; on the 23rd ATDS sampling plan	38. Potato crisps
Cheese, processed	2nd tertile contributor to 2 nutrients, rated high for overall consumption, fortified variety selected to fit in with FSANZ monitoring activities	39. Cheese, processed cheddar slices, reduced fat, vitamin D fortified
Soy-based beverage	2nd tertile contributor to 1 nutrient; likely increase in consumption since 1995	40. Beverage, soy, calcium fortified, reduced fat (Sanitarium So Good Lite)
Savoury biscuits, flavoured	Likely compositional change since last analysis; on the 23rd ATDS sampling plan	41. Biscuit, savoury, cheese flavoured 42. Biscuit, savoury, non-cheese flavoured
Savoury biscuits, plain, high fat	Likely compositional change since last analysis; on the 23rd ATDS sampling plan	43. Biscuit, savoury, plain
Fortified dry beverage flavourings	Likely compositional change since last analysis; iconic Australian food	44. Milo powder
Monounsaturated oils, canola	On the 23rd ATDS sampling plan	45. Oil, canola
Unspecified vegetable oils	On the 23rd ATDS sampling plan	46. Oil, olive
Breakfast drink	New product since 1995, no FSANZ data	47. Breakfast drink
Energy drink	New product since 1995, no FSANZ data	48. Energy drink, sugar sweetened

Appendix 3: 2008 Adult's Key Foods Program results [average (minimum-maximum)]