Plant & Food™ Research
Rangahau Ahumāra Kai

PFR SPTS No. 22163

New Zealand FOODfiles™ 2021 Manual

The New Zealand Food Composition Database

March 2021

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Updated Manual for:

New Zealand Ministry of Health
488230/343641/03

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PUBLICATION DATA

Sivakumaran S. March 2021.The New Zealand FOODfiles™ 2021. A Plant & Food Research manual updated for: The New Zealand Ministry of Health. Job code: P/253111/05. Milestone No. 94097. Contract No. 28493 Var 3. PFR SPTS No. 22163.

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CATALOGUING IN PUBLICATION

New Zealand Food Composition Database

New Zealand Food Composition Database. 2022. New Zealand FOODfiles™ 2021 Manual. The New Zealand Institute for Plant and Food Research Limited and Ministry of Health.
www.foodcomposition.co.nz/foodfiles

ISBN 978-0-473-60858-3

The New Zealand FOODfiles™ 2021 was prepared by the following staff members of The New Zealand Institute for Plant and Food Research Limited, Palmerston North, New Zealand: Subathira Sivakumaran, Siva Sivakumaran, Kris Tham and Carolyn Lister.

Acknowledgements

We would like to acknowledge Susanne Middlemiss-Kraak for assistance with sample preparation for the food composition analysis. Thanks to Allan Main as Business Manager for The New Zealand Food Composition Database (NZFCD).

The authors acknowledge Plant & Food Research's Information & Knowledge Services team members Zane Gilmore, Jack McKenzie and Warren Howe for their outstanding work during the replacement of the previous Food Information Management System (FIMS), and for ongoing management of the current NZFCD Management System, FoodCASE. This system replacement was expedited by the strong support from Matthew Laurenson, Lynne Scanlen, and TC Chadderton.

We acknowledge the team led by Dr Karl Presser at Premotec (Switzerland) for FoodCASE feature enhancements, data migration from FIMS to FoodCASE, and for providing software training. FoodCASE now underpins the New Zealand FOODfiles 2021, the Concise Tables 14th Edition, and the associated web access tools.

The authors gratefully acknowledge Dr Sally MacKay, Senior Lecturer (Public Health Nutrition) at the University of Auckland for reviewing the FOODfiles 2021 dataset and associated documents, and for providing valuable feedback for improvements. In addition, Dr Alison Wallace, Plant & Food Research Scientist, reviewed all the documents for the 2021 release.

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The New Zealand Institute for Plant and Food Research Limited and the New Zealand Ministry of Health jointly own the intellectual property in the New Zealand Food Composition Database (NZFCD). The Ministry of Health is the principal funder of the database, with Plant & Food Research investing in the database management system and related infrastructure, and hosting the database. The Ministry of Health contracts Plant & Food Research to maintain and develop the NZFCD and to disseminate data, via updated releases of the New Zealand FOODfiles and The Concise New Zealand Food Composition Tables.

Purpose of this manual

This reference manual has been produced by Plant & Food Research to facilitate the use of the New Zealand FOODfiles™ 2021, The Concise New Zealand Food Composition Tables, 14th Edition 2021 and Online Search. The manual provides technical information for users, and information for computing personnel involved in setting up database management systems for users of food composition data in the form of the New Zealand FOODfiles. It also provides information regarding programmers' application software. Readers should note that this version of the manual provides details of changes made as a result of a change in the data management software used. It also provides a summary of the updates made compared with the previous version of FOODfiles (2018).

Preface

The New Zealand FOODfiles were first released in 1988 by the Biotechnology Division, Department of Scientific and Industrial Research (DSIR), with the majority of the data coming from overseas sources. Since then 22 upgrades have been released, with the latest being this current edition – New Zealand FOODfiles 2021. The data have been regularly disseminated from the New Zealand Food Composition Database (NZFCD) by producing updated, freely accessible versions of FOODfiles and associated products on the website www.foodcomposition.co.nz since 2011. In June 2018 the website was refreshed to incorporate new online search functions, making data more accessible and user-friendly. Downloads of the New Zealand FOODfiles 2021 and The Concise New Zealand Food Composition Tables 14th Edition 2021 remain freely accessible through the website www.foodcomposition.co.nz for all users. In addition, the website provides a 'Search' facility with a number of report options, including a Nutrition Information Panel (NIP) and claimable nutrients, in addition to the full datasets. Previous versions of New Zealand FOODfiles (2010 onwards) and the Concise Tables (8th–13th editions) are archived on the same website.

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1 Introduction

The New Zealand FOODfiles 2021 is the major source of verified food composition data available in New Zealand. It replaces the New Zealand FOODfiles 2018, released in June 2019 (New Zealand Food Composition Database 2019b).

There are two versions of the data files in the New Zealand FOODfiles 2021:

1. A standard version that contains information for 85 components in more than 2700 foods. Some foods do not have data for all 85 components because the number of core components has changed over time.

2. An unabridged version that contains information of up to 360 food components of the same (over 2700) foods listed in the standard version. Most foods do not have data for all 360 components, for a variety of reasons.

The NZFCD data files are intended to be used in database or spreadsheet applications and, depending on their intended use, may require additional computer programming input to be used fully and effectively.

1.1 Data sources

Most of the data found in FOODfiles 2021 were derived from analytical laboratory results from appropriately accredited laboratories. Some of the data have been obtained from overseas food composition databases/tables, Nutrition Information Panels on packaged foods, or from the New Zealand Manufactured Food Database; and some data have been imputed from related foods or derived from recipe calculations by applying the nutrition retention factor. The following sources are acknowledged for contribution of food compositional data:

- Food Composition Table for Use in Africa (Wu Leung 1968)
- Pacific Islands Food Composition Tables (Dignan et al. 2004)
- UK/National Nutrient Databank/McCance and Widdowson's The Composition of Foods Integrated Dataset (CoFID) (Finglas et al. 2015a, b)
- Canadian Nutrient File (Health Canada 2015)
- Fineli-Finnish Food Composition Database (National Institute for Health and Welfare 2010)
- FoodData Central (U.S. Department of Agriculture 2019)
- Australian Food Composition Database (Food Standards Australia New Zealand 2019).

1.2 Updates from 2018 to 2021

FOODfiles 2021 V01 contains the updates detailed below. Further details can be found in the FOODfiles 2021 Update files (available via www.foodcomposition.co.nz). See Section 3 for more details.

- A total of 380 Food Records (individual food or beverage allocated a unique identifier and Food Name) have been updated (Table 1). The list of updated Food Records can be found in the update files on the website: 'New Food Records replacing the old Food Records in the latest version of FOODfiles.xlsx'.
- In contrast, 384 Food Records reported in FOODfiles 2018 V01 have been archived (this list of food is provided in 'Food Records archived from latest version of FOODfiles.xlsx' on the website). If there is a need to access data for these foods, this can be done by downloading FOODfiles 2018 from the archives on the website.
- Over 22,000 food composition data points have been updated. The majority of updates are minor data changes. This is mostly a result of the replacement of the previous NZFCD management system Food Information Management System (FIMS) with the current management system, FoodCASE (Food Composition And System Environment). Food Records from FOODfiles 2018 were migrated from FIMS to FoodCASE and adapted to conform to the FoodCASE-standardised rules (Presser et al. 2018; Premotec GmbH 2021); for example: rounding rules (Appendix 1), Yield Factor (YF) application in recipes, and actions for missing component values in the ingredients. Only the major changes of values for 2018 vs. 2021 (233 foods with ~2600 data points for core components) are listed in 'Data added to or updated in the Food Records in the latest version of FOODfiles.xlsx' available on the website.
- Carbohydrate exchange is no longer included in the unabridged DATA.file.
- Edible portion (EP) no longer appears in the DATA files (as it did for standard and unabridged versions of FOODfiles 2018 and previous publications). It is included in the NAME.FT file.
- Conversion factors: fat to fatty acid (XFA) and nitrogen to protein (XN) factors have been removed from the unabridged DATA files (previously appeared in FOODfiles 2018 and earlier versions). These are now included in a new separate file: CONVERSION FACTOR.FT.
- A new component, sorbitol, has been added to the unabridged DATA file.
- Erratum: the component identifier for 'Fatty acid cis, trans 18:2 omega-9, 11' is corrected from F18D2CN9T11 to F18D2CN9TN11.

As raw ingredients can vary slightly within and between seasons, users should note that the data contained in FOODfiles 2021 do not represent absolute values. Rather, the data provided reflect the typical composition of foods as available and/or consumed in New Zealand, and thus actual values may differ at times.

For additional information on how we have prioritised foods for analysing or derived values from recipe methods, or information on images, sampling, analytical and nutrient plans, please contact staff at Plant & Food Research: foodcomp@plantandfood.co.nz. Some of this information can also be found in the publication Sivakumaran et al. (2018).

Table 1. Summary of the updated Food Records in FOODfiles™ 2021 V01[a].

FOODfiles 2021	Derivation	# Food Records	Type of Foods
New Foods	By analysis[b]	58	**Bakery products**: buns [hot cross buns: plain and chocolate], breads [rye, gluten-free & sprouted seeds, sourdough, sprouted wheat and banana], wraps [white, wholemeal and multigrain], muffin split [cheese, wholemeal, dry fruits and plain] and bread crumbs [Panko and wholegrain]; **Beverages, non-alcoholic:** Tea fermented [kombucha sweetened with sugar, fruit juices and intense sweetener], apple juice [sweetened with sugar and intense sweetener]; **Cereals and pseudo-cereals:** flours [gluten-free, spelt (plain and wholemeal), quinoa and hemp]; **Dairy:** milks [lactose-free (UHT), trim (fortified), A2: (standard and lite)]; **Fats and oils:** hemp seed; **Fin fishes:** kahawai (*Arripis trutta*) fillet smoked; **Fruits:** fresh [gold-fleshed organic kiwifruit, red-fleshed kiwifruit and kiwiberry], frozen fruits [pineapple, mango, cranberry, Boysenberry, cherry and strawberry]; **Meat:** chicken [skin smoked and wings deli cooked]; **Nuts and seeds:** hemp [seed and protein powder] and peanut blanched; **Sugars, confectionaries and sweet spreads:** Marmalade sweetened with fruit juices and dark chocolate with >85% cocoa; **Vegetable and pulses:** purple kumara (raw), sauerkraut [canned and refrigerated], lettuce [iceberg and red], baby leaves [spinach and kale]; and red onion.
	Partial analysis & recipe calculation[c]	24	**Cereals and pseudo-cereals:** self-raising flours [gluten-free and plain]; **Eggs:** yolk boiled and scrambled; **Fin fish:** tāmure/snapper [poached or simmered, crumbed: deep-fried and pan-fried, and battered]; tarakihi (*Nemadactylus macropterus*) [poached or simmered]; gurnard [poached or simmered]; shark [battered], kahawai [poached or simmered, crumbed: deep-fried and pan-fried]; groper [pan-fried] and kingfish [pan-fried]; **Meat:** liver [pan-fried)], purple kumara [cooked], cabbage red and savoy [steamed and stir-fried], onion [sautéed] and watercress [sautéed]
	Recipe[d]	31	**Bakery products**: bread toasted or baked [wheatmeal, multigrain (dense and light)], soy & linseed, multigrain & seeds [dense and light], rye, gluten-free & sprouted seeds, sourdough, sprouted wheat, banana, garlic-filled [vegetable oil and butter]; wrap toasted [white, wholemeal and multigrain], croissant toasted and muffin splits toasted [cheese and plain]; **Meat**: chicken [lean meat stewed or boiled (breast, wing, drumstick and thigh)]; **Nuts and seeds:** roasted with and/or without salt [pine, pecan, macadamia and blanched peanut]
	Aggregation[e]	8	**Meats**: chicken [light meat and dark meat: skin on and skin off (raw and baked)]
Replacing old foods	By analysis[b]	87	**Bakery products**: bun [hot cross bun: fruits], breads [white, wholemeal, wheatmeal, multigrain: dense and light, soy & linseed, multigrain & seeds: dense and light and garlic-filled (vegetable oil and butter)], croissant, muffin split [plain], bread crumbs [regular]; **Beverages, non-alcoholic:** apple juice unsweetened; **Cereals and pseudo-cereals:** flours [plain, high grade and wholemeal]; **Dairy**: milk [UHT: standard, lite and trim; fresh (standard, lite, and trim)]; **Eggs:** raw [whole, yolk and white]; **Fats and oils:** olive oil and rice bran oil; **Fin fishes:** raw fillets [tāmure/snapper, tarakihi, gurnard, shark, hoki, kahawai, blue cod, groper and kingfish] and hoki smoked; **Fruits**: kiwifruits [organic green-fleshed, green-fleshed and gold-fleshed], rhubarb [raw], frozen fruits [blackcurrant, blackberry, raspberry and blueberry]; **Meat:** chicken [separable fat, skin (raw and deli cooked)], breast [lean raw, skin off, deli cooked and smoked], drumstick [lean raw, skin off and deli cooked], thigh [lean raw, skin off and deli cooked] wing [lean raw, skin off and deli cooked] and liver [raw]; **Nuts and seeds:** pine, pecan, macadamia, pistachio, cashew nut, peanut and coconut [fresh and desiccated]; **Sugars, confectionaries and sweet spreads:** marmalade [sweetened with sugar and intense sweetener], dark chocolate [cocoa solids: 45–69% and 70–84%]; white chocolate and milk chocolate; **Vegetable and pulses:** cabbage [red and savoy]; lettuce [green], radish [raw], watercress [raw], cassava root [raw], buttercup [raw] and sprout [alfalfa and mung bean]
	Partial analysis & recipe calculation[c]	36	**Eggs:** whole [boiled, pan-fried and poached]; **Fin fishes:** salmon [pan-fried], tāmure/snapper [pan-fried, baked and steamed], tarakihi [pan-fried], gurnard [pan-fried], hoki [pan-fried], kahawai [baked and steamed], blue cod [pan-fried]; **Meat:** chicken [lean baked (breast, wing, drumstick and

FOODfiles 2021	Derivation	# Food Records	Type of Foods
			thigh)]; **Vegetable and pulses**: capsicum [pan-fried], onion [pan-fried]; eggplant [baked], mushroom [baked, pan-fried]; mashed potato [with milk and butter or margarine], snow pea [stir-fried], taro [baked], buttercup [steamed] and cassava [boiled].
	Recipe[d]	92	**Bakery products**: breads toasted or baked [white and wholemeal]; muffin split [plain and dried fruits], **Beverages, non-alcoholic:** instant coffee beverage [caffeinated and decaffeinated], café verity coffee beverage [flat white, latte, cappuccino and mochaccino], KoKo Samoa drink; **Breakfast cereals:** porridges [oat]; **Cereals and pseudo-cereals** Pasta & sauce [prepared]; **Eggs:** white [boiled]; **Fast food and ready to eat meals:** hash brown [pan-fried]; **Fruits:** rhubarb [cooked]; **Meat:** chicken separable fat [baked], skin [baked]; **Nuts and seeds**: dry roasted with and/or without salt added [pistachio, cashew and peanut]; **Recipe:** pastry raw and cooked [short, flaky and cheese]**,** tarts [jam and treacle], lemon curd, Welsh cheese cake, custard square, cake [chocolate, banana with and without icing, gingerbread, sponge] quiche, pie, pikelet, pancake, pudding [custard, milk, sponge with and without fruit], meringue, ratatouille, omelette, scone, jelly, kedgeree, pavlova, guacamole and dressing [French].
	Aggregation[e]	26	**Meats**: chicken [raw skin on and skin off (breast, wing, drumstick and thigh), baked skin off and skin on (breast, wing and drumstick thigh)], light and dark meat [lean raw, lean baked and lean stewed], whole raw and cooked [lean, skin on and skin off] and whole deli cooked.
	Borrowed[f]	1	**Miscellaneous:** black pepper
	Change of food chapter[g]	17	**Fast foods and ready to eat meals**: Frozen meals
Total		380	

[a] More details can be found in the Update files 'New Food Records replacing the old Food Records in the latest version of FOODfiles.xlsx'.
[b] By analysis – the majority of the core components values were derived by analysis.
[c] Partial analysis & recipe calculation – some of the core component values were derived by analytical means, and the rest from recipe calculation.
[d] Recipe – the majority of the core components values were derived by recipe calculation
[e] Aggregation – derived by simple aggregation of two or more food records' components values with different weights or percentage ratios
[f] Borrowed – core component values derived from one or more published sources
[g] Some frozen meal food records in FOODfiles 2018 have been migrated from chapter N (13) and chapter E (4) to Chapter H in FOODfiles 2021 with new FoodIDs, data and names.
UHT = ultra-heat treated.

2 Notes for users

2.1 Limitations in the dataset

FOODfiles 2021 V01 contains a listing of 2763 Food Records from the New Zealand Food Composition Database (NZFCD). Although there are 360 individual food components (nutrients and non-nutrients) in the NZFCD, only 85 of these ("core components", the most commonly referenced food components) are included in the standard version of FOODfiles 2021. Some foods do not have data for all 85 components because the set of core components has changed over time.

The unabridged version of FOODfiles 2021 includes data for up to 360 components. The total data points are approximately 480,000. Where the data are unavailable for particular components, they are recorded as missing values.

The Concise New Zealand Food Composition Tables, 14th Edition 2021 (Concise Table 14th Edition) provides a subset, or abridged version, of FOODfiles 2021, containing 1281 foods with 38 food components. It should be noted that in the Concise Table 14th Edition food component data are expressed in weight (g) of food using the Common Standard Measure (CSM) or as commonly purchased or eaten, whereas for FOODfiles, food component data are expressed as per 100 g edible portion of food or as specified.

2.2 FoodID

Each food is identified by a unique alpha-numeric FoodID: a single letter denoting a food chapter (see Table 2) followed by one to five digits. As new Food Records are added to the NZFCD, they are given a unique FoodID. When Food Records are archived in the previous versions of FOODfiles, their FoodIDs are also archived i.e. never used again. The FoodID is the record key that links data between NAME.FT, DATA.FT, DATA.AP, CSM.FT and INGREDIENT.FT files (these files are described in Section 3).

Table 2. Descriptions of food chapters in FOODfiles 2021.

Chapter	Food chapter	Types of products included
A	Bakery products	Bagels, biscuits, breads, buns, cakes, crackers, crumpets, doughnuts, muffins, scones, wraps
B	Beverages, alcoholic	Beers, ciders, liqueurs, mixed drinks (RTD), ports, sake, sherries, sprits, vermouths, wines
C	Beverages, non-alcoholic	Beverage bases (e.g. cocoa powder); coffee beverages, energy drinks, energy food drinks, flavoured drinks, juice concentrates, fruit drinks and juices, plant-based milks (e.g. soy almond, coconut), soft drinks, sports drinks, smoothies, teas (including kombucha), water
D	Breakfast cereals	Extruded cereals, mixed grain cereals, mueslis, porridge
E	Cereals and pseudo-cereals	Cereal constituents, flours, noodles, pasta, rice, tempeh
F	Dairy	Butters, cheeses, creams, milks, ice creams, protein powder, yoghurt
G	Eggs	Chicken eggs (raw and cooked)
H	Fast foods and ready to eat meals	Takeaways, including burgers, pizzas, savoury items and frozen meals
J	Fats and oils	Cooking and salad oils, margarines, shortening
K	Fin fishes	Raw, cooked, smoked and canned fishes
L	Fruits	Raw, dried, canned and cooked fruits
M	Meats	Raw and cooked varieties of meat cuts including beef, chicken, lamb, pork, venison and offal items
N	Meat products	Cured meats include bacon, sausages, salami
P	Miscellaneous	Salts, stocks, yeast and yeast spreads, spices, herbs
Q	Nuts and seeds	Nuts, seeds and their products
R	Recipes	Multiple-ingredient recipes, derived from recipe calculations using Weight Yield Factor (WYF) and Nutrient Retention Factors (NRF)
S	Sauces	Dressings, dips, sauces including tomato, simmer and soy
T	Shellfishes	Cockles, crab, mussels, prawns, scallops, squid
U	Snack foods	Chips including potato, soy and corn, and bars including muesli, nuts and fruits
V	Soups	Dry mixes, prepared and canned
W	Sugars, confectionaries and sweet spreads	Chocolates, jams, lollies, marmalade, syrups, sugars, honeys
X	Vegetables and pulses	Raw and cooked vegetables and pulses, tomato puree, tofu, potato fries

2.3 Value derivation description

Derivation codes are used to explain how the data are sourced for all the component values in the NZFCD. In the FOODfiles 2021, two types of value derivation descriptions are used. For the first time, a new derivation description for values called ‘Data provenance’ is used for the new and updated foods (380). The remaining foods carried over from FOODfiles 2018 still use the old description ‘source code’. The list of ‘Data provenance’ including source codes can be found FOODfiles 2021 downloadable files (see Section 3).

2.3.1 Data provenance

'Data provenance' is a value derivation description that includes six mandatory properties (Table 3) based on the EuroFIR thesauri (Machackova et al. 2021). The full list of the Data provenance descriptions can be found in the FOODfiles 2021 downloadable files. The 'Data provenance' descriptions applied to each component value can be found in the DATA.FT, only for new and updated foods (380).

Table 3. Mandatory value properties used in FOODfiles 2021 for 'Data provenance'.

Value properties	Description
Acquisition Type	Description of the origin of the value reported, e.g. independent laboratory and value created within host system
Value Type	Description of the value, e.g. best estimate, logical zero, below limit of detection, weighted
Method Type	A general indication of the type of method used to obtain the associate value, e.g. analytical, estimated as logical reduction, calculated from a recipe, summation from constituent components
Method Indicator	Details of the method used to obtain a value, including analytical methods, e.g. high performance liquid chromatography, microbiological assay, calculation by formula or recipe method, imputation
Unit	A measure of the amount of the component, e.g. gram (g), microgram (µg), milligram (mg)
Matrix Unit	Amount of matrix material that has its quantity reported, usually expressed using the preposition "per" e.g. per 100 g edible portion (W), per 100 g fatty acid (F) and per g Nitrogen (N)

Source: Machackova et al. (2021).

2.3.2 Source code

All of the component values for the foods in FOODfiles 2018 (2383) are assigned with source code(s). The lower-case letter code indicates the source of the data, such as analysis, calculation or borrowing from another source. The full list of the source code and description can be found in the 'Data provenance' downloadable files from the website. The common source codes used are listed in Table 4.

Table 4. Common source codes and descriptions used in FOODfiles 2021.

Code	Description
z	New Zealand analytical data – the majority of the values were derived by analysis.
c	Calculated by the system (FoodCASE) after data entry – component value can be calculated using the recipe calculation method and calculation formula, e.g. energy. The calculated value can have various combinations of source codes, e.g. the source code " cdz" for 'Protein, total; calculated from total nitrogen' represent by calculation (c) applying a conversion factor from published source (d) to New Zealand analytical value (z) for nitrogen, total.
p	Presumed or logical zero – if the food is not a source of the particular food component, e.g. for cows' milk and beef meat, the dietary fibre value is presumed zero, as milk and meat are not source of dietary fibres.
r	Value imputed from a related food – value source from similar or related foods.
a	Australian Food Composition Database (AFCD, previously called NUTTAB) sourced value – borrowed value expected to be representative of the New Zealand food.
d	Derived from published sources.

2.4 Food components

Each food component is uniquely identified by an INFOODS (International Network of Food Data Systems) tagname. Tagnames are compiled by an expert committee under the auspices of INFOODS and allocated to unique food components (Klensin et al. 1989; FAO/INFOODS 2012c). The INFOODS tagnames incorporate the component entity; the method of analysis where this is specific to the result (e.g. dietary fibre methodologies); and the default unit of measure. As INFOODS tagnames are not available for some of the food components recorded in the NZFCD, the NZFCD uses 'Component Identifiers'. The 'Component Identifier' includes the available INFOODS tagname or, if there is no tagname, it is generated following a similar naming convention to that used for the INFOODS tagnames. A list of the food components, their 'Component Identifiers' INFOODS tagnames and units of measure is given in Appendix 2. Also included is additional information for each component: available in NZFCD product; the number of foods having the value; and the percentage, calculated as the number of the foods having the value and divided by the total number of foods (2763); and which of the components are analysed (A) and which are calculated (C). The chemical methods used for the analyses of the components are summarised in Appendix 3. The components that are calculated from analytical data are described in the following sections.

2.5 Proximate, total

The proximate total is calculated by summing the following components: Ash (ASH), protein (PROT); fat, total (FAT); water (WATER); dietary fibre (FIBTG); alcohol (ALC); and available carbohydrate by weight (CHOAVL). The sum of proximates should fall within a range of 95–105 g per 100 g edible portion. A margin of plus or minus 5% is considered acceptable (FAO/INFOODS 2012c) because many of the food components are determined independently on different samples in different laboratories. In FOODfiles 2021, we accept that ~7% of the Food Records have a sum outside this

acceptable range. Explanations for this include the presence of constituents other than the major proximates listed above, and other miscellaneous organic compounds (e.g. resistant starch, oligosaccharides and polydextrose), which are not measured independently but which may contribute to the values. Where proximate values of entries are outside the ± 5% allowance, the typical food component values are still reliable.

2.6 Energy

The energy values are calculated in four different ways according to the FAO/INFOODS guidelines (FAO/INFOODS 2012b) and Standard 1.2.8 (Food Standards Australia New Zealand 2021a). In addition, they are expressed both in kilocalories (kcal) and kilojoules (kJ), thus providing eight calculated energy values for each food:

1. Energy, total metabolisable (kJ, ENERC)
2. Energy, total metabolisable (kcal, ENERC_KCAL)
3. Energy, total metabolisable (kJ, including dietary fibre, ENERC1)
4. Energy, total metabolisable (kcal, including dietary fibre, ENERC1_KCAL)
5. Energy, total metabolisable, carbohydrate by difference, FSANZ (kJ, ENERC_FSANZ1)
6. Energy, total metabolisable, carbohydrate by difference, FSANZ (kcal, ENERC_FSANZ1_KCAL)
7. Energy, total metabolisable, available carbohydrates, FSANZ (kJ, ENERC_FSANZ2)
8. Energy, total metabolisable, available carbohydrates, FSANZ (kcal, ENERC_FSANZ2_KCAL.

The values are calculated from the energy-producing food components (carbohydrate, protein, fat, total and alcohol), with and without dietary fibre and other energy-producing food components, using the appropriate energy conversion factors (Table 5) as described below.

Table 5. Conversion factors used in FOODfiles 2021 for calculation of energy.

Component identifier for conversion factor	Component (Component Identifier)	kJ/g	kcal/g
XPROT	Protein, total (PROT)	17	
XPROT_KCAL			4
XFAT	Fat, total (FAT)	37	
XFAT_KCAL			9
XCHOAVL	Available carbohydrate [by the weight, difference (CHOAVL)][a]	17	
XCHOAVL_KCAL			4
XCHOCDF	Total carbohydrate by difference (CHOCHDF)	17	
XCHOCDF_KCAL			4
XALC	Alcohol (ALC)	29	
XALC_KCAL			7
XFIBTG	Dietary fibre (FIBTG)	8	
XFIBTG_KCAL			2
XOA XOA_KCAL	Organic acid (OA_G)	13	
XOA_KCAL			3

[a]The conversion factors for available carbohydrates by weight (XCHOAVL and XCHOAVL_KCAL) are used as conversion factors for all other carbohydrates when converting to energy.
Source: Food and Agriculture Organisation of the United Nations and the World Health Organisation (2003); (Food Standards Australia New Zealand 2021a).

2.6.1 FAO/INFOODS

This set of energy calculations meets international conventions as given in FAO/INFOODS (2012b).

1. **Energy, total metabolisable (kJ, ENERC)** is calculated from the values of energy-producing food components and appropriate conversion factors listed in Table 5. The energy-producing food components taken into account are protein (PROT), available carbohydrates by weight (CHOAVL), fat, total (FAT), and alcohol (ALC),

   Equation 1:

   $$\begin{aligned}\mathrm{ENERC\ (kJ/100\ g)} &= [\mathrm{PROT\ (g/100\ g)} \times \mathrm{XPROT(kJ/g)}] + [\mathrm{CHOAVL(g/100\ g)} \times \mathrm{XCHOAVL(kJ/g)}] \\ &+ [\mathrm{FAT(g/100\ g)} \times \mathrm{XFAT(kJ/g)}] + [\mathrm{ALC(g/100\ g)} \times \mathrm{XALC\ (kJ/g)}]\end{aligned}$$

   where the 'Component Identifier' XPROT, XCHOAVL, XFAT and XALC are the energy conversion factors expressed in kJ/g for protein (PROT), available carbohydrates by weight (CHOAVL), fat, total (FAT), and alcohol (ALC) as listed in Table 5.

2. **Energy, total metabolisable (kcal, ENERC_KCAL)** is calculated from the energy-producing food components: protein (PROT), available carbohydrates by weight (CHOAVL), fat, total (FAT), and alcohol (ALC),

   Equation 2:

   $$\begin{aligned}\mathrm{ENERC\ (kcal/100\ g)} &= [\mathrm{PROT\ (g/100\ g)} \times \mathrm{XPROT\_KCAL\ (kcal/g)}] + [\mathrm{CHOAVL(g/100\ g)} \\ &\times \mathrm{XCHOAVL\_KCAL\ (kcal/g)}] + [\mathrm{FAT(g/100\ g)} \times \mathrm{XFAT\_KCAL\ (kcal/g)}] \\ &+ [\mathrm{ALC(g/100\ g)} \times \mathrm{XALC\_KCAL\ (kcal/g)}]\end{aligned}$$

   where XPROT_KCAL, XCHOAVL_KCAL, XFAT_KCAL and XALC_KCAL are the energy conversion factors expressed in kcal/g for protein (PROT), available carbohydrates by weight (CHOAVL), fat, total (FAT), and alcohol (ALC) as listed in Table 5.

3. **Energy, total metabolisable (kJ, including dietary fibre, ENERC1)** is calculated from the energy-producing food components: protein (PROT), available carbohydrates by weight (CHOAVL), fat, total (FAT), alcohol (ALC) and fibre, total dietary (FIBTG),

   Equation 3:

   $$\begin{aligned}\mathrm{ENERC1\ (kJ/100\ g)} &= [\mathrm{PROT\ (g/100\ g)} \times \mathrm{XPROT(kJ/g)}] + [\mathrm{CHOAVL(g/100\ g)} \times \mathrm{XCHOAVL(kJ/g)}] \\ &+ [\mathrm{FAT(g/100\ g)} \times \mathrm{XFAT(kJ/g)}] + [\mathrm{ALC(g/100\ g)} \times \mathrm{XALC\ (kJ/g)}] \\ &+ [\mathrm{FIBTG(g/100\ g)} \times \mathrm{XFIBTG(kJ/g)}]\end{aligned}$$

   where the 'Component Identifier' XFIBTG is the energy conversion factor expressed in kJ/g for fibre. Total dietary and other energy conversion factors are explained above in Equation 1.

4. **Energy, total metabolisable (kcal, including dietary fibre, ENERC1_KCAL)** is calculated from the energy-producing food components: protein (PROT), available carbohydrates by weight (CHOAVL), fat, total (FAT), alcohol (ALC) and dietary fibre (FIBTG),

   Equation 4:

$$\begin{aligned}\text{ENERC1 (kcal/100 g)} &= [\text{PROT (g/100 g)} \times \text{XPROT\_KCAL (kcal/g)}] + [\text{CHOAVL(g/100 g)} \\ &\times \text{XCHOAVL\_KCAL} + \text{(kcal/g)}] + [\text{FAT(g/100 g)} \times \text{XFAT\_KCAL (kcal/g)}] \\ &+ [\text{ALC(g/100 g)} \times \text{XALC\_KCAL (kcal/g} + [\text{FIBTG(g/100 g)} \\ &\times \text{XFIBTG\_KCAL (kcal/g)}]\end{aligned}$$

   where the 'Component Identifier' XFIBTG_KCAL is the energy conversion factor expressed in kcal/g for fibre. Total dietary and other energy conversion factors are explained above in Equation 2.

2.6.2 FSANZ Standard 1.2.8

This set of energy calculations follows the FSANZ guidelines (Food Standards Australia New Zealand 2021a) and is used for food labelling in New Zealand.

5. **Energy, total metabolisable, carbohydrate by difference, FSANZ (kJ, ENERC_FSANZ1)** is calculated according to Standard 1.2.8. The energy-producing food components accounted for are protein (PROT), carbohydrates by difference (CHOAVDF_FSANZ), fat, total (FAT), alcohol (ALC), dietary fibre (FIBTG) and organic acids (OA_G). The calculation of carbohydrate by difference (CHOAVDF_FSANZ) value is explained below in Section 2.9.2.

   Equation 5:

$$\begin{aligned}\text{ENERC\_FSANZ1 (kJ/100 g)} &= [\text{PROT (g/100 g)} \times \text{XPROT(kJ/g)}] + [\text{CHOAVDF\_FSANZ (g/100 g)} \\ &\times \text{XCHOAVL(kJ/g)}] + [\text{FAT(g/100 g)} \times \text{XFAT(kJ/g)}] + [\text{ALC(g/100 g)} \\ &\times \text{XALC (kJ/g]} + [\text{FIBTG(g/100 g)} \times \text{XFIBTG(kJ/g)}] + [\text{OA\_G(g/100 g)} \\ &\times \text{XOA(kJ/g)}]\end{aligned}$$

   Note: Food components 'unavailable carbohydrates', 'polyols' and 'polydextrose' are not recorded in FOODfiles 2021. Therefore, they are not included when calculating ENERC_FSANZ1.

6. **Energy, total metabolisable, carbohydrate by difference, FSANZ (kcal, ENERC_FSANZ1_KCAL)** is converted from ENERC_FSANZ1 by using the unit conversion factor 4.18.

   Equation 6:

$$\text{ENERC\_FSANZ1\_KCAL(kcal/100 g)} = \text{ENERC\_FSANZ1 (kJ/100 g)}/4.18$$

7. **Energy, total metabolisable, available carbohydrates, FSANZ (kJ, ENERC_FSANZ2)** is calculated according to Standard 1.2.8. The energy-producing food components accounted are protein (PROT), available carbohydrates (CHOAVL_FSANZ), fat, total (FAT), alcohol

(ALC), dietary fibre (FIBTG) and organic acids (OA_G). The calculation of available carbohydrates (CHOAV_FSANZ) value is explained in Section 2.9.2.

Equation 7:

$$\begin{aligned}\text{ENERC\_FSANZ2 (kJ/100 g)} &= [\text{PROT (g/100 g)} \times \text{XPROT(kJ/g)}] + [\text{CHOAVL\_FSANZ (the g/100 g)} \\ &\times \text{XCHOAVL(kJ/g)}] + [\text{FAT(g/100 g)} \times \text{XFAT(kJ/g)}] + [\text{ALC(g/100 g)} \\ &\times \text{XALC (kJ/g]} + [\text{FIBTG(g/100 g)} \times \text{XFIBTG(kJ/g)}] + [\text{OA\_G(g/100 g)} \\ &\times \text{XOA(kJ/g)}]\end{aligned}$$

Note: Food components ‘unavailable carbohydrates’, ‘polyols’ and ‘polydextrose’ are not recorded in FOODfiles 2018. Therefore, they are not included when calculating ENERC_FSANZ2.

8. **Energy, total metabolisable, available carbohydrates, FSANZ (kcal, ENERC_FSANZ2_KCAL)** is converted from ENERC_FSANZ2 by using the unit conversion factor 4.18.

   Equation 8:

$$\text{ENERC\_FSANZ2\_KCAL (kcal/100 g)} = \text{ENERC\_FSANZ2 (kJ/100 g)}/4.18$$

   Note: Examples showing calculations using the different methods of determining energy can be found in Appendix 4.

2.7 Protein, total

For all foods, protein, total; calculated from total nitrogen (PROT) is calculated from the measured total nitrogen multiplied by a specific nitrogen-to-protein conversion factor (XN) (Jones 1941; Greenfield & Southgate 2003). The conversion factor that is used for the calculation of the PROT for each food is tabulated in FOODfiles 2021, CONVERSION FACTOR.FT (see Section 3).

Equation 9:

$$\text{PROT (g / 100 g food)} = \text{NT (g / 100 g food)} \times \text{XN (g / g Nitrogen)}$$

2.8 Sugars

Sugars total (SUGAR) is the sum of the free individual monosaccharides, glucose (GLUS) and fructose (FRUS), and the disaccharides lactose (LACS), maltose (MALS) and sucrose (SUCS).

Equation 10:

SUGAR (g/100 g food) =GLUS (g/100 g) + FRUS (g/100 g) + LACS (g/100 g) + MALS (g/100 g) + SUCS (g/100 g)

Glycogen (GLYC), lactose (LACS), maltose (MALS), sucrose (SUCS), starch, total (STARCH), and oligosaccharides, total available (OLSAC) are expressed as monosaccharide equivalents (GLYCM,

LACSM, MALSM, SUCSM, STARCHM and OLSACM respectively) calculated using the conversion factors shown in Table 6.

Table 6. Conversion factors are used in FOODfiles 2021 for the calculation of monosaccharide equivalents.

Food component	Conversion to monosaccharide equivalents (g/g)
Glycogen (GLYC)	x 1.10
Lactose (LACS)	x 1.05
Maltose (MALS)	x 1.05
Sucrose (SUCR)	x 1.05
Starch, total (STARCH)	x 1.10

Source: Finglas et al. (2015b).

Disaccharide, total; **expressed in monosaccharide equivalents (DISACM)** is calculated by summation of lactose, maltose and sucrose expressed in monosaccharide equivalents (LACSM, MALSM and SUCSM respectively).

Equation 11:

$$\mathrm{DISACM\ (g/100\ g)} = \mathrm{LACSM\ (g/100\ g)} + \mathrm{MALSM(g/100\ g)} + \mathrm{SUCSM\ (g/100\ g)}$$

Sugar, total; expressed in monosaccharide equivalents (SUGARM) is calculated by summation of the free monosaccharide (GLUS and FRUS) and disaccharides expressed in monosaccharide equivalents (DISACM).

Equation 12:

$$\mathrm{SUGARM\ (g/100\ g)} = \mathrm{GLUSM\ (g/100\ g)} + \mathrm{FRUSM(g/100\ g)} + \mathrm{DISCM\ (g/100\ g)}$$

Added sugars (SUGAD) are defined according to the United States Food and Drug Administration (US FDA) as: “sugars that are either added during the processing of foods, or are packaged as such, and include sugars (free, mono- and disaccharides), sugars from syrups and honey, and sugars from concentrated fruit or vegetable juices that are in excess of what would be expected from the same volume of 100 percent fruit or vegetable juices of the same type. The definition excludes fruit or vegetable juice concentrated from 100 percent fruit juice that is sold to consumers (e.g. frozen 100 percent fruit juice concentrate) as well as some sugars found in fruit and vegetable juices, jellies, jams, preserves, and fruit spreads” (Erickson & Slavin 2015).

Free sugars (SUGFR) are defined according to the World Health Organisation (WHO) as: “free sugars include monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices, and fruit juice concentrates” (World Health Organisation 2015).

Added and free sugars are estimated using the 10-step method described by Louie et al. (2015) and Louie et al. (2016). Free sugars are estimated adapting the method of Louie et al. (2015), with some modifications (e.g. to include fruit juice) as described by Kibblewhite et al. (2017). Appendix 5 describes the 10-step process, steps 1–6 being objective and steps 7–10 being subjective.

2.9 Carbohydrates

Carbohydrate values are expressed in different ways in FOODfiles 2021 to meet the definitions for INFOODS (FAO/INFOODS 2012a) and for FSANZ Standard 1.2.8 (Food Standards Australia New Zealand 2021a).

2.9.1 INFOODS

The carbohydrate contents in foods are expressed in FOODfiles 2021 in five different ways based on the FAO/INFOODS (2012b) guidelines. Total carbohydrates value includes fibre, total dietary (FIBTG) and Available carbohydrates value 'by weight' or as 'monosaccharide equivalent', not including the FIBTG value. Carbohydrate values are calculated either as the sum of the analytically analysed carbohydrate components or as the difference of 100 minus the sum of the other proximate components.

1. **Available carbohydrates by weight (CHOAVL)** is the sum of the analytical values of sugar, total (SUGAR); starch (STARCH) and glycogen (GLYC).

   Equation 13:

   $$\mathrm{CHOAVL\ (g/100\ g)} = \mathrm{SUGAR\ (g/100\ g)} + \mathrm{STARCH\ (g/100\ g)} + \mathrm{GLYC\ (g/100\ g)}$$

2. **Available carbohydrates in monosaccharide equivalent (CHOAVLM)** is the sum of the analytical values of sugar, total (SUGAR), starch (STARCH) and glycogen (GLYC). It includes the residual water from hydrolysis around each monosaccharide (monosaccharide equivalents SUGARM, STARCHM and GLYCM).

   Equation 14:

   $$\mathrm{CHOAVLM\ (g/100\ g)} = \mathrm{SUGARM\ (g/100\ g)} + \mathrm{STARCHM\ (g/100\ g)} + \mathrm{GLYCM\ (g/100\ g)}$$

3. **Available carbohydrate by difference (CHOAVDF)** is calculated by deducting the sum of the percentage of water (WATER), protein, total (PROT), fat, total (FAT), alcohol (ALC), ash (ASH) and fibre, total dietary (FIBTG) from 100.

   Equation 15:

   $$\mathrm{CHOAVDF\ (g/100\ g)} = 100 - [\mathrm{WATER(g/100\ g)} + \mathrm{PROT(g/100\ g)} + \mathrm{FAT(g/100\ g)} + \mathrm{ALC(g/100\ g)} + \mathrm{ASH(g/100\ g)} + \mathrm{FIBTG(g/100\ g)}]$$

4. **Total carbohydrate by difference (CHOCDF)** is calculated by deducting the sum of the percentage of water (WATER), protein, total (PROT), fat (FAT), alcohol (ALC) and ash (ASH) from 100.

   Equation 16:

   $$\mathrm{CHOCDF\ (g/100\ g)} = 100 - [\mathrm{WATER(g/100\ g)} + \mathrm{PROT(g/100\ g)} + \mathrm{FAT(g/100\ g)} + \mathrm{ALC(g/100\ g)} + \mathrm{ASH(g/100\ g)}]$$

5. **Total carbohydrate by summation (CHOCSM)** is the sum of analytical values of sugar, total (SUGAR), starch (STARCH) oligosaccharides (OLSAC) and fibre, total dietary (FIBTG).

Equation 17:

$$\text{CHOCSM (g/100 g)} = \text{SUGAR (g/100 g)} + \text{STARCH (g/100 g)} + \text{OLSAC (g/100 g)} + \text{FIBTG (g/100 g)}$$

2.9.2 FSANZ Standard 1.2.8

For nutrient labelling, two definitions of carbohydrate are found in Standard 1.2.8 of the FSANZ Food Standards Code (Food Standards Australia New Zealand 2021a), either Carbohydrate by difference or Available carbohydrate. Neither definition includes dietary fibre (fibre, total dietary (FIBTG)).

Carbohydrate by difference, FSANZ (CHOAVDF_FSANZ) is calculated by deducting the sum of the percentage of water (WATER), protein (protein, total; PROT), fat (fat, total; FAT), dietary fibre (fibre, total dietary (FIBTG)), ash (ASH), alcohol (ALC) and, if qualified or added to the food (any amount as additive or ingredients to the final food), any other unavailable carbohydrates and substances: sugar alcohols [erythritol (ERYTHL_G), glycerol (GLYRL_G), isomalt (ISOMAL_G), lactitol (LACTL_G), maltitol (MALTL_G), mannitol (MANTL_G), sorbitol (SORTL_G), xylitol (XYLTL_G)], D-tagatose, polydextrose and/or organic acids, total (OA_G) from 100.

Equation 18:

$$\begin{aligned}\text{CHOAVDF\_FSANZ1 (g/100 g)} &= 100 - [\text{WATER (g/100 g)} + \text{PROT (g/100 g)} + \text{FAT (g/100 g)} + \text{FIBTG (g/100 g)} \\ &+ \text{ASH (g/100 g)} + \text{ALC (g/100 g)} + \text{OA\_G (g/100 g)}\end{aligned}$$

Note: **Carbohydrate by difference (CHOAVDF_FSANZ)** is equal to the **Available carbohydrate; by difference (CHOAVDF)** value if other additives or ingredients and unavailable carbohydrates and substances are not present or accounted for. The food components: erythritol, glycerol, isomalt, lactitol, maltitol, mannitol, sorbitol, xylitol, D-tagatose, and polydextrose are not recorded or recorded for only few foods (sorbitol) in FOODfiles 2021 and therefore are not included in this equation. A few foods do have values for organic acids, total (OA_G).

6. **Available carbohydrate (CHOAVL_FSANZ)** is the sum of analytical values of total available sugars (sugar, total; SUGAR) and starch (STARCH) and, if qualified or added to the food (any amount as additive or ingredients to the final food), any available oligosaccharides (oligosaccharides, total available, OLSAC), glycogen (GLYC) and/or maltodextrin (MALTDEX).

   Equation 19:

$$\begin{aligned}\text{CHOAVL\_FSANZ (g/100 g)} &= \text{SUGAR (g/100 g)} + \text{STARCH (g/100 g)} + \text{GLYC (g/100 g)} + \text{MALTDEX (g/100 g)}\end{aligned}$$

   Note: **Available carbohydrate (CHOAVL_FSANZ)** is equal to the **Available carbohydrates by weight (CHOAVL)** value if values for oligosaccharides and maltodextrin are not present or accounted for. The food components oligosaccharides, total available (OLSAC) are not recorded in FOODfiles 2021. A few foods do have values for glycogen (GLYC) and maltodextrin (MALTDEX).

2.10 Fatty acids

2.10.1 Fatty acid, total (FACID) [1]

Fatty acid, total (FACID) is determined in two different ways for FOODfiles 2021:

1. It is calculated by multiplying the fat, total (FAT) with fat-to-fatty-acid conversion factor (XFA),

Equation 20:

$$\text{FACID (g/100 g food)} = \text{FAT (g/100 g food)} \times \text{XFA (g/g)}$$

where XFA values are recorded in the literature (Atwater & Woods 1896; Weihrauch et al. 1977; Greenfield & Southgate 2003). The conversion factors used for each food are found in the unabridged data files of FOODfiles 2021.

2. It is determined from the analytical chromatography method by Sukhija & Palmquist (1988), so a conversion factor is not required.

Note: The method for determining the fatty acid, total value is not overtly specified in FOODfiles 2021; either method can be used and they are all tabulated under the **Fatty acid, total (FACID)**. However, if XFA is listed for a food, the FACID has been calculated using Equation 20 above, and if the XFA value is not listed (left as blank) then the FACID has been determined analytically.

2.10.2 Individual fatty acids

Fatty acids data are expressed as both g/100 g of food and as a percentage of the total fatty acid content. Individual fatty acid (g/100 g food) values in food are derived from the value of each individual fatty acid (g/100 g TFA[2]) using the following equation.

Equation 21:

$$\text{Individual fatty acid (g / 100 g food)} = (\text{Individual fatty acid (g/100 g TFA)} \times \text{FACID (g / 100 g food)}/100$$

The individual fatty acids in FOODfiles 2021 are listed in Tables 7−9 with the ‘Component Identifier’, component names systematic names, and trivial names (Klensin et al. 1989; Beare-Rogers et al. 2001; AOCS Lipid Library 2018).

[1] FACID is the INFOOD tagname for Fatty acid, total; determined by calculation using Equation 21.
[2] TFA is a commonly used abbreviation for the total fatty acid, which is equivalent to the ‘Component Identifier’ fatty acid, total (FACID); Note, TFA is not an INFOODS tagname or ‘Component Identifier. This abbreviation TFA is used for expressing the fatty acid content (g) as per 100 g of total fatty acid (g/100 g TFA).

2.10.3 Fatty acids, total saturated (FASAT)

The **Fatty acids, total saturated (FASAT)** is the sum of all the individual saturated fatty acids listed in Table 7.

Table 7. Details of the saturated fatty acids included in FOODfiles 2021.

Component Identifier	Fatty acid name	Systematic name	Trivial name
F4D0	Fatty acid 4:0	butanoic	butyric
F6D0	Fatty acid 6:0	hexanoic	caproic
F8D0	Fatty acid 8:0	octanoic	caprylic
F10D0	Fatty acid 10:0	decanoic	capric
F12D0	Fatty acid 12:0	dodecanoic	lauric
F13D0	Fatty acid 13:0	tridecanoic	tridecyclic
F14D0	Fatty acid 14:0	tetradecanoic	myristic
F15D0	Fatty acid 15:0	pentadecanoic	pentadecylic acid
F16 D0	Fatty acid 16:0	hexadecanoic	palmitic
F17D0	Fatty acid 17:0	heptadecanoic	margaric
F18D0	Fatty acid 18:0	octadecanoic	stearic
F19D0	Fatty acid 19:0	nonadecanoic	nonadecylic
F20D0	Fatty acid 20:0	eicosanoic	arachidic
F21D0	Fatty acid 21:0	heneicosanoic	heneicosylic
F22D0	Fatty acid 22:0	docosanoic	behenic
F23D0	Fatty acid 23:0	tricosanoic	tricosylic
F24D0	Fatty acid 24:0	tetracosanoic	lignoceric

2.10.4 Fatty acids, total monounsaturated (FAMU)

Fatty acids, total monounsaturated (FAMU) is the sum of undifferentiated individual fatty acids listed in Table 8. The undifferentiated fatty acid, e.g. fatty acid 18:1 omega-9 (F18D1N9), is calculated from the sum of its differentiated isomers, i.e. *cis* (F18D1CN9) and *trans* (F18D1TN9).

Table 8. Details of the monounsaturated fatty acids included in FOODfiles 2021.

Component Identifier	Fatty acid name	Systematic name	Trivial/common name
F10D1	Fatty acid 10:1	decenoic	
F12D1	Fatty acid 12:1	dodecenoic	
F14D1	Fatty acid 14:1	tetradecenoic	myristoleic
F14D1N5	Fatty acid 14:1 omega-5	tetradec-9-enoic	myristoleic
F15D1	Fatty acid 15:1	pentadecenoic	oncobic
F16D1	Fatty acid 16:1 undifferentiated	hexadecenoic	palmitoleic
F16D1C	Fatty acid cis 16:1	cis-hexadecenoic	cis-palmitoleic
F16D1T	Fatty acid trans 16:1	trans-hexadecenoic	trans-palmitoleic
F17D1	Fatty acid 17:1	heptadecenoic	civetic
F18D1	Fatty acid 18:1 undifferentiated	octadecenoic	
F18D1C	Fatty acid cis 18:1	cis-octadecenoic	
F18D1T	Fatty acid trans 18:1	trans-octadecenoic	
F18D1N7	Fatty acid 18:1 omega-7 undifferentiated	octadec-11-enoic	vaccenic
F18D1CN7	Fatty acid cis.18:1 omega-7	cis-octadec-11-enoic	cis-vaccenic
F18D1TN7	Fatty acid trans 18:1 omega-7	trans-octadec-11-enoic	trans-vaccenic
F18D1N9	Fatty acid 18:1 omega-9 undifferentiated	octadec-9-enoic	
F18D1CN9	Fatty acid cis 18:1 omega-9	cis-octadec-9-enoic	elaidoic, (cis-)oleic
F18D1TN9	Fatty acid trans 18:1 omega-9	trans-octadec-9-enoic	elaidic, trans-oleic
F20D1	Fatty acid 20:1 undifferentiated	eicosenoic	
F20D1N11	Fatty acid 20:1 omega-11	eicos-9-enoic	gadoleic
F20D1N9	Fatty acid 20:1 omega-9	eicos-11-enoic	gondoic
F22D1	Fatty acid 22:1 undifferentiated	docosenoic	
F22D1N9	Fatty acid 22:1 omega-9	docos-13-enoic	erucic
F22D1N11	Fatty acid 22:1 omega-11	docos-11-enoic	catelaidic
F24D1	Fatty acid 24:1	tetracosenoic	nervonic

2.10.5 Fatty acids, total polyunsaturated (FAPU)

Fatty acids, total polyunsaturated (FAPU) is the sum of undifferentiated individual fatty acids listed in Table 9.

Table 9. Details of the polyunsaturated fatty acids included in FOODfiles 2021.

Component Identifier	Fatty acid name	Systematic name	Trivial/common name	Abbreviation
F18D2	Fatty acid 18:2 undifferentiated	octadecadienoic		
F18D2C	Fatty acid cis 18:2	cis-octadecadienoic		
F18D2T	Fatty acid trans 18:2	trans-octadecadienoic		
F18D2N6	Fatty acid 18:2 omega-6 undifferentiated			
F18D2CN6	Fatty acid cis,cis 18:2 omega-6	cis,cis-octadeca-9,12-dienoic	linoleic	
F18D2TN6	Fatty acid trans 18:2 omega-6			
F18D2CN9TN11	Fatty acids cis,trans 18:2 omega-9, 11	cis,trans-octadeca-9,11-dienoic	rumenic	CLA
F18D3	Fatty acid 18:3 undifferentiated	octadecatrienoic	linolenic	
F18D3N3	Fatty acid 18:3 omega-3	all-cis-octadeca-9,12,15-trienoic	α-linolenic	ALA
F18D3TN3	Fatty acid trans 18:3 omega-3	octadeca-9,12,15-trienoic		
F18D3N6	Fatty acid 18:3 omega-6	all-*cis*-octadeca-6,9,12-trienoic	γ-linolenic	GLA
F18D4	Fatty acid 18:4	octadecatetraenoic	parinaric	
F18D4N3	Fatty acid 18:4 omega-3	all-*cis*-octadeca-6,9,12,15-tetraenoic	stearidonic	
F20D2	Fatty acid 20:2	eicosadienoic		
F20D2N6	Fatty acid 20:2 omega-6	all-*cis*-eicosa-11,14-dienoic	eicosadienoic	
F20D3	Fatty acid 20:3 undifferentiated	eicosatrienoic		
F20D3N3	Fatty acid 20:3 omega-3	all-*cis*-eicosa-11,14,17-trienoic	eicosatrienoic	ETE
F20D3N6	Fatty acid 20:3 omega-6	all-*cis*-eicosa-8,11,14-trienoic	dihomo-γ-linolenic	DHLA
F20D4	Fatty acid 20:4 undifferentiated	eicosatetraenoic		
F20D4N3	Fatty acid 20:4 omega-3	all-*cis*-eicosa-8.11,14.17-tetraenoic	eicosatetraenoic	ETA
F20D4N6	Fatty acid 20:4 omega-6	all-*cis*-eicosa-5,8,11,14-tetraenoic	arachidonic	AA
F20D5	Fatty acid 20:5	eicosapentaenoic		
F20D5N3	Fatty acid 20:5 omega-3	all-*cis*-eicosa-5,8,11,14,17-pentaenoic	timnodonic	EPA
F22D2	Fatty acid 22:2	docosadienoic		
F22D2N6	Fatty acid 22:2 omega-6	all-*cis*-docosa-13,22-dienoic	docosadienoic	
F22D4	Fatty acid 22:4	docosatetraenoic		
F22D4N6	Fatty acid 22:4 omega-6	all-*cis*-docosa-7,10,13,22-tetraenoic	adrenic	
F22D5	Fatty acid 22:5 undifferentiated	docosapentaenoic		
F22D5N3	Fatty acid 22:5 omega-3	all-*cis*-docosa-7,10,13,22,19-pentaenoic	clupanodonic	DPA
F22D5N6	Fatty acid 22:5 omega-6	all-*cis*-docosa-4,7,10,13,22-pentaenoic	clupanodonic	
F22D6	Fatty acid 22:6	docosahexaenoic		
F22D6N3	Fatty acid 22:6 omega-3	all-*cis*-docosa-4,7,10,13,22,19-hexaenoic	cervonic	DHA

Fatty acids, total omega-3 polyunsaturated (FAPUN3) and Fatty acids, total omega-6 polyunsaturated (FAPUN6) are the sums of the undifferentiated omega-3 fatty acid and undifferentiated omega-6 fatty acid in Table 9, respectively.

2.10.6 Fatty acids, total *trans* (FATRN)

Fatty acids, total *trans* (FATRN) is the sum of the percentage of individual *trans* fatty acids in Tables 8 and 9.

The list of the fatty acids that contribute to the FATRN is summarised in Appendix 6.

2.11 Vitamins

The following vitamin data are expressed in equivalents in FOODfiles 2021 and were calculated using the appropriate conversion factors given in Table 10.

Table 10. Conversion factors used in FOODfiles 2021 to determine the equivalents of selected vitamins.

Compound Identifier	Description	Conversion factor (g/g)[a]
	Vitamin A-related	
XBCARTA	Conversion factor for beta-carotene equivalent of alpha-carotene	0.5
XRECARTB XRECARTBEQ	Conversion factor for retinol equivalent of beta-carotene or beta-carotene equivalent	0.167 (1/6)
XRAECARTB XRAECARTBEQ	Conversion factor for retinol activity equivalent of beta-carotene or beta-carotene equivalent	0.083 (1/12)
	Vitamin B3-related	
XTRYP	Conversion factor for niacin equivalents of tryptophan	0.017
	Vitamin E-related	
XTOCOPHA	Alpha-tocopherol	1
XTOCOPHB	Conversion factor for alpha-tocopherol equivalent of beta tocopherol	0.4
XTOCOPHD	Delta-tocopherol	0.01
XTOCOPHG	tocopherol	0.1
	Dietary folate-related	
XFOLAC	Conversion factor for dietary folate equivalents of folic acid	1.67

[a] Sources: NHMRC (2006); Finglas et al. (2015b).

2.11.1 Beta-carotene equivalents (CARTBEQ)

Beta-carotene equivalents (CARTBEQ) are calculated by multiplying alpha-carotene (CARTA) by the conversion factor for beta-carotene equivalent of alpha-carotene (XCARTA) and adding beta-carotene (CARTB).

Equation 22:

$$CARTBEQ\ (\mu g/100\ g\ food) = CARTB\ (\mu g/100\ g) + [CARTA(\mu g/100\ g\ food) \times XBCARTA\ (g/g)]$$

Note: Other provitamin A carotenoids are not reported in FOODfiles 2021, and therefore are not included in beta-carotene equivalents calculation. However, for a few foods where data are “borrowed” from other sources, the food component cryptoxanthins might be reported as half the activity of beta-carotene, where that is the standard practice of the original source.

2.11.2 Vitamin A, total: expressed as retinol equivalents (VITA)

Vitamin A, expressed as retinol equivalents (VITA), is calculated by multiplying beta-carotene equivalents (CARTBEQ) by the conversion factor (1/6, i.e. 0.167) and adding retinol (RETOL).

Equation 23:

$$VITA\ (\mu g/100\ g\ food) = RETOL(\mu g/100\ g\ food) + \left[\frac{CARTBEQ(\mu g/100\ g\ food)}{6}\right]$$

2.11.3 Vitamin A, total: expressed as retinol activity equivalents (VITA_RAE)

Vitamin A, expressed as retinol activity equivalents (VITA_RAE), is calculated by multiplying beta-carotene equivalents (CARTBEQ) by the conversion factor (1/12, i.e. 0.083) and adding retinol (RETOL).

Equation 24:

$$VITA\ (\mu g/100\ g\ food) = RETOL(\mu g/100\ g\ food) + \left[\frac{CARTBEQ(\mu g/100\ g\ food)}{12}\right]$$

2.11.4 Niacin equivalent from tryptophan (NIATRP)

Niacin equivalents, from tryptophan (NIATRP), are calculated by multiplying tryptophan (TRYP) by the conversion factor for niacin equivalents of tryptophan (XTRYP),

Equation 25:

$$NIATRP\ (mg/100\ gfood) = TRYP(mg/100\ g\ food) \times XTRYP(g/g)$$

where the tryptophan value was not available, it has been imputed as 1.1% of total protein (Health Canada 2015).

2.11.5 Niacin equivalents total (NIAEQ)

Niacin equivalents total (NIAEQ) is the sum of the percentage of niacin, preformed (NIA) and niacin equivalent from tryptophan (NIATRP).

Equation 26:

$$NIAEQ\ (mg/100\ g) = NIA\ (mg/100\ g) + NIATRP\ (mg/100\ g)$$

2.11.6 Vitamin E, expressed as alpha-tocopherol equivalents (VITE)

Vitamin E, expressed as alpha-tocopherol equivalents (VITE), is calculated by multiplying alpha-beta-, gamma- and delta-tocopherols (TOCPHA, TOCPHB, TOCHPG, and TOCHPD) by their corresponding conversion factors for alpha-tocopherol equivalents of XTOCPHA, XTOCPHB, XTOCHPG, and XTOCHPD respectively and summing them.

Equation 27:

$$\begin{aligned} VITE\ (mg/100\ gfood) &= [TOCPHA\ (mg/100\ gfood) \times XTOCPHA] + [TOCPHB\ (mg/100\ g\ food) \\ &\times XTOCPHB] + [TOCPHG\ (mg/100\ g\ food) \times XTOCPHG] \\ &+ [TOCPHD\ (mg/100\ g\ food) \times XTOCPHD] \end{aligned}$$

Note: Where the tocopherol profile is incomplete, it has been assumed all activity is alpha-tocopherol. There is an exception for seeds and seed oils where the gamma-tocopherol and other forms may be present in significant amounts and part of the tocopherol calculation for VITE. Tocotrienols are not recorded in FOODfiles 2021; therefore, they are not included in the VITE calculation.

2.11.7 Dietary folate equivalents (FOLDFE)

Dietary folate equivalents (FOLDFE) are calculated by multiplying folic acid (FOLAC) by the conversion factor for dietary folate equivalents of folic acid (XFOLAC) and adding food folate, naturally occurring folates (FOLFD).

Equation 28:

$$FOLDFE\ (mg/(100\ g\ food)) = [FOLAC\ (mg/100\ g\ food) \times XFOLAC] + FOLFD$$

Folate food, naturally occurring food folate (FOLFD) is calculated by subtracting folic acid (FOLAC) from folate, total (FOL).

Equation 29:

$$FOLFD\ (mg/100\ g\ food) = FOL\ (mg/100\ g\ food) - FOLAC\ (mg/100\ g\ food)$$

2.11.8 Vitamin D

Vitamin D (VITD) is the sum of cholecalciferol or vitamin D3 (CHOCAL) and ergocalciferol or vitamin D2 (ERGCAL).

Equation 30:

$$VITD\ (\mu g/100\ g) = CHOCAL\ (\mu g/100\ g) + ERGCAL\ (\mu g/100\ g)$$

2.12 Amino acids

Amino acid profiles are expressed in three ways: mg/g of total nitrogen (mg/g N), mg/100 g of food, and g/100 g of food. The amino acids have been determined by analysis as mg/100 g of food. The values can be expressed as mg/g N using the total nitrogen (NT) value of the food as follows:

Equation 31:

$$Amino\ \text{acid}\ (\text{mg/g N}) = \text{Amino acid}\ (\text{mg}/100\ \text{g food})/\text{Nitrogen total}\ (\text{g}/100\ \text{g food})$$

The amino acid (mg/g N) values can be used to calculate the amounts of amino acids in 100 g food by using the total nitrogen values for foods containing proteins with the same amino acid profiles (Orr & Watt 1957; Paul & Southgate 1978).

2.13 Organic acids, total

Organic acids, total (grams, OA_G) are the sum of the gram per 100 g of acetic acid (ACEAC_G), citric acid (CITAC_G), lactic acid (LACAC_G), malic acid (MALAC_G), oxalic acid (OXALAC_G) and quinic acid (QUINAC_G).

Equation 32:

$$\begin{aligned} OA\_G\ (g/100\ g) \\ &= ACEAC\_G\ (g/100\ g)\ + CITAC\_G\ (g/100\ g)\ +\ LACAC\_G\ (g/100\ g) \\ &+\ MALAC\_G\ (g/100\ g) +\ OXALAC\_G\ (g/100\ g) + QUINAC\ (g/100\ g) \end{aligned}$$

Note: Only a few foods have values for organic acids.

2.14 Recipes

Recipe Food Records are generated by calculation following a method known as the ‘Mixed method’ (FAO/INFOODS 2012c) using the food composition data management system, FoodCASE. In this recipe method, nutrient gains or losses during recipe preparation are estimated by applying Nutrient Retention Factors (NRFs) at the individual ingredient level and Weight Yield Factor (WYF) at the recipe level for total weight gain or loss.

For previous FOODfiles a different approach was followed, the application of Yield Factors (YF), where Water and Fat YFs were used instead of direct use of WYF at the recipe level. They were explained in FOODfiles Manual 2018 (New Zealand Food Composition Database 2019a).

2.14.1 Nutrient Retention Factor (NRF)

Nutrient retention is defined as the measure of the proportion of the nutrient remaining in the cooked dish in relation to the nutrient originally present in the raw ingredient.

The equation used for calculation of NRF (%) is:

Equation 33:

$$NRF\ (\%) = \frac{Nutrient\ content\ in\ cooked\ dish\ (g/100\ g)}{Nutrient\ content\ in\ raw\ ingredients\ (g/100\ g)} \times WYF$$

The NRFs have been derived largely from the U.S. Department of Agriculture (2007) document for vitamins and minerals. Iodine retention factors have been derived from (Food Standards Australia New Zealand 2021b). A list of NRFs linked to specific NRF classification and preparation methods can be downloaded from the NUTRIENT RETENTION FACTOR.FT file. NRF classification and preparation method linked to each recipe Food Record can be found in the INGREDIENTS.FT file (Section 3).

The equation used for estimating the nutrient content of a recipe (cooked dish) is:

Equation 34:

$$Nutrient\ content\ of\ cooked\ dish\ (per\ 100\ g) = (Nutrient\ content\ of\ cooked\ dish\ (sum\ of\ nutrient\ content\ of\ each\ raw\ ingredient\ x\ NRF)(g)) /(Weight\ of\ cooked\ dish\ (g)) \times 100$$

Note: Where the analytical values were available for vitamins and minerals in the cooked food, these were used instead of values derived (recipe calculation) using NRFs.

2.14.2 Weight Yield Factor (WYF)

The WYFs have been obtained largely during preparation of recipes by measuring the weight of the ingredients before and after cooking, using the formula below. Where the measure of weight change was not available, the WYF values were obtained from published sources (Matthews et al. 1975; Finglas et al. 2015b; Food Standards Australia New Zealand 2021c). WYFs that are used for each recipe can be downloaded from the WEIGHT YIELD FACTOR.FT (Section 3).

Equation 35:

$$WYF = \frac{Weight\ of\ the\ cooked\ dish\ (g)}{Weight\ of\ the\ ingredents\ before\ cook*\ (g)} \times 100$$

*All ingredient weights are based on edible portions.

2.14.3 Calculation of component values in recipes

The food component values for each recipe can be derived by the mixture of methods: recipe calculation (using WYF and NRFs) and direct chemical analysis. The values derived by these methods (calculation and analysis) are identified with codes in the DATA.FT file for each component.

If an analytical value was unavailable for water, the value was calculated by difference (subtracting other proximate components from 100). The proximate total (sum of the macro-nutrient set of ash, protein, fat (total), water, dietary fibre, alcohol and available carbohydrate by weight) per ingredient was also checked that it was ~100 g before performing the calculation.

An example of calculation of the values of the selected components for a recipe can be found in Appendix 7.

2.14.4 Recipe Food Records

Thirteen percent (349) of the Food Records in FOODfiles 2021 are derived by recipe calculation. Of these, 44 are complex recipes derived from multiple ingredients and are listed only in Chapter R (Recipes). The rest of the 305 recipe Food Records are listed in the associated food chapters (Table 2). They were derived from a single ingredient (179, e.g. N1021 – Sausage, beef, pan fried, with no added fat, composite); simple recipes (106), with another ingredient such as water; or aggregations (20) of ingredients (already as recipes) by the percentage of weight ratio. All recipe Food Records are listed in the INGREDIENT.FT.

3 Downloadable files

FOODfiles 2021 contains six principal data files and six supporting files. Four of these are update files, which include foods that have been archived, replaced and new; and component values updated since the release of FOODfiles 2018 are also available.

The 11 principal and supporting files listed below are available in two formats: as DSV (tilde delimited UTF8 encoded) and as Microsoft® Excel® files. These files occupy approximately 25 MB and 36 MB, respectively. The Excel files are in .xlsx format.

Principal files

- DATA.AP (Standard and unabridged data files) – contains data in a table format
- DATA.FT (Standard and unabridged data files) – contains data in a list format along with Data provenance (source code)
- CSM.FT – contains common standard measures along with density
- INGREDIENT.FT – contains data on ingredients used to create a recipe Food Record and where relevant the NRF Classification and preparation method.

Supporting files

- NAME.FT – provides full food details including more edible portion, detailed description and sampling details.
- CODE.FT – provides a list of the components included in the standard and unabridged dataset, their identifier, Unit Code and Matrix Unit Code.
- NUTRIENT RETENTION FACTOR.FT – contains the value for NRF used where foods have been prepared (e.g. boiled).
- WEIGHT YIELD FACTOR.FT – gives the value for WYF for foods that have been cooked.
- CONVERSION FACTOR.FT – gives the general conversion factors from the published sources for nitrogen to protein (Jones 1941; Greenfield & Southgate 2003) and fat to fatty acid (Exler & Weihrauch 1977; Greenfield & Southgate 2003).
- Data Provenance Description.xlsx – lists data derivation and other details: Unit Code, Matrix Unit Code, Data Source Code, Value Type Code, Acquisition Type Code, Method Type Code and Method Indicator based on Machackova et al. (2021). The short descriptions are listed in Table 3.

Update files

These four files provide the added, changed, or deleted foods, nutrient values and major changes made to the database since the last release of FOODfiles, in 2018 (New Zealand Food Composition Database 2019b).

- New Food Records replacing the old Food Records in latest version of FOODfiles.xlsx
- Food Records archived from latest version of FOODfiles.xlsx
- Data added to or updated in the Food Records in the latest version of FOODfiles.xlsx

- List of components updated in current version of FOODfiles.xlsx.

3.1 Instructions

All files can be found at www.foodcomposition.co.nz and are provided as a Microsoft Windows® installer file (.msi). Use “This PC” or “Windows Explorer” to browse to the folder (where you saved the installation program when downloading it) and double click on the installer FOODfilesSetup.msi (foodfiles-2021-v1.msi normally in your “Downloads” directory) to begin the installation. (NOTE: you may not be able to see the .msi extension, depending on your computer settings). You will need local administrative rights on your computer to complete this. If you do not specify otherwise during the installation, the New Zealand FOODfiles will be installed in the folder **New Zealand FOODfiles 2021** on your C: drive. If you wish to remove the New Zealand FOODfiles from your computer, you can do so through the Control Panel | Programs and Features. |Uninstall or change a program.

3.2 ASCII text files

ASCII text files are delimited and text fields are separated by tildes (~). The tilde characters can be replaced with other field separators. To open these files in Microsoft Excel, go to the “Open file” of the programme and find the folder. Make sure you select “Files of Type”. Choose the appropriate file and open it. The “Text Import Wizard” will be activated. In the first screen choose “Delimited” and in the “File Origin” drop-down box, ensure that the entry “Unicode (UTF8) is selected and press “Next”. In the second screen choose “Other” and type “~” in the text box and select “[none]” for “Text Qualifier”. Press “Finish” button.

Note that all text fields are separated by a tilde (“~”) character. When a field is null or blank, two tilde characters will be adjacent to each other. The first line of all text files contains “© Copyright The New Zealand Institute for Plant and Food Research Limited and the Ministry of Health (New Zealand) 2022 All rights reserved”. The field structure starts from the second line in all the text files.

3.3 NAME.FT file

The NAME.FT file contains the FoodID, Food Name, Short Food Name, and descriptions of the foods in FOODfiles 2021. The Food Name includes the multi-faceted descriptors according to the INFOODS Food Description System (Truswell et al. 1991). The faceted descriptions are also reported in separate fields. The Short Food Name is used in The Concise New Zealand Food Composition Tables, 14th Edition 2021. Each Short Food Name is unique, represents more common words for general public use, and does not typically follow the multi-faceted descriptors from INFOODS. The details of the fields included in the NAME.FT file can be found in Table 11.

Table 11. Details of the fields used in the NAME.FT file of FOODfiles 2021.

Field	Name	Field type alphanumeric	Notes (Required (R) or Optional (O))
1	FoodID	Identifier	(R) The unique code; first character alphabetic, representing food group (Table 2); remaining characters sequential numbers.
2	Food Name	Text	(R) Includes the multi-faceted descriptors according to the INFOODS Food Description System (Truswell et al. 1991). Use this field as the 'name' of the food in printed tables and computer packages. Each Food Name is unique.
3	Short Food Name	Text	(R) The Short Food Name has fewer words than the 'Food Name'. The Short Food Name is used in The Concise New Zealand Food Composition Tables. Each Short Food Name is unique, represents more common words for general public use, and does not typically follow the multi-faceted descriptors from INFOODS.
4	Alternative Name	Text	(O) Other common names to be used for cross-referencing indices.
5	Food Description	Text	(O) Detailed information of the food, including ingredients, fortification, appearance, production, preparation and whether the Food Records generated by borrowing from other databases or recipe calculated.
6	Edible portion	Numeric	(R) Percentage of the edible part of the food and all data refer to the denominator 100% of edible portion unless specified with a different denominator.
7	Generic Name	Text	(R) Food descriptor facet, the most general of food descriptors.
8	Kind	Text	(O) More specific descriptor.
9	Part	Text	(O) Portion of the food represented by the data.
10	State	Text	(O) State, condition, treatment, cooking etc.
11	Grade	Text	(O) Usually defined by food standards.
12	Maturity	Text	(O) Age or stage of development.
13	Scientific Name	Text	(O) Latin name; binary nomenclature; the first part of the name identifies the genus and second part identifies the species within the genus, followed by variety (cultivar or sub-species name); for animals and plants.
14	Sampling details	Text	(O) Detailed information on samples such as numbers of samples, product names including brands and flavours, place of purchase, date of purchase and analysis. If the Food Records are "borrowed" from other databases, the source of the Food Records information is included.
15	Component message	Text	(O) Includes the additional information on Food Composition Data derivation.

Each food is uniquely described using the following naming structure in the second line of the text file and in tabular form (Table 12):

Format:

> FoodID~Food Name~Short Food Name~Alternative Names~Food Description~Edible portion (%)~Generic Name~Kind~Part~State~Grade~Maturity~Scientific Name~Sampling Details~Component Message

Example:

> Q1042~Seed, hemp, hulled, dried, composite~Hemp seed, hulled, dried~Hemp hearts~Hulled hemp seed commercially made by removing crunchy outer shell of the whole hemp seed. Product of New Zealand and imported.~100~SEED~HEMP ~Seed~Dried, Hulled~~~Cannabis sativa~A composite sample of the brands: Hemp Farm (x 2), new hemisphere (x 1), Good Pantry (x 1), Bin Inn (x 1), Organic buzz (x 1), Love Organics (x 1), Floating leaf (x 1), Organic buzz (x 1) and Organic Mechanic (x 1) were sampled from retail outlets in April 2019.~Majority of food components data were derived by analysis. Alcohol, caffeine, cholesterol, retinol, folic acid and vitamins (B12 and D) data were presumed zero.

Table 12. Example of the naming structure used in the NAME.FT file of FOODfiles 2021 in tabular form.

Field	Name	Entry
1	FoodID	Q1042
2	Food Name	Seed, hemp, hulled, dried, composite
3	Short Food Name	Hemp seed, hulled, dried
4	Alternative Names	Hemp hearts
5	Food Description	Hulled hemp seed commercially made by removing crunchy outer shell of the whole hemp seed. Product of New Zealand and imported.
6	Edible portion (%)	100
7	Generic Name	SEED
8	Kind	HEMP
9	Part	Seed
10	State	Dried, Hulled
11	Grade	
12	Maturity	
13	Scientific Name	*Cannabis sativa*
14	Sampling Details	A composite sample of the brands: Hemp Farm (x 2), new hemisphere (x 1), Good Pantry (x 1), Bin Inn (x 1), Organic buzz (x 1), Love Organics (x 1), Floating leaf (x 1), Organic buzz (x 1) and Organic Mechanic (x 1) were sampled from retail outlets in April 2019.
15	Component Message	Majority of food components data were derived by analysis. Alcohol, caffeine, cholesterol, retinol, folic acid and vitamins (B12 and D) data were presumed zero.

3.4 CODE.FT file

The CODE.FT file contains the nutritional component name, with its Component Identifier being used in the data files to define the component. Each line is one record and holds information on one component. The unit is a measure of the amount of the component values followed by a code for Matrix unit,

Format:

Code~Description~Unit Code~Matrix Unit Code
Example: RETOL~Retinol~µg~W

where:

- RETOL is the 'Component Identifier'
- Retinol is the component name of the 'Component Identifier'
- Unit of measure is µg
- W is the code for the Matrix Unit Code, 'per 100 grams edible portion'.

Appendix 2 contains a full list of 'Component Identifier' and food component names. The details of the fields that are included in the CODE.FT file can be found in Table 13.

Table 13. Details of the fields used in the CODE.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	Component Identifier	Identifier	(Klensin et al. 1989; FAO/INFOODS 2012c)
2	Component	Text	The component name
3	Unit	Identifier	The measure of the amount of the component values, a dimensionless number
4	Matrix Unit Code	Identifier	The amount of matrix material that has a quantity reported, usually expressed using the preposition "per". Codes: W – per 100 g of edible portion; N – per g of nitrogen; F- per 100 g Total fatty acids.

3.5 DATA.FT file

The DATA.FT file contains the data for each component for all foods. Each component forms a record for each food. The format as defined on the second line of the file contains the header:

FoodID~Component Identifier~Value~Unit Code~Matrix Unit Code~Source Code~Value Type Code~Acquisition Type Code~Method Type Code~Method Indicator Code

Each record in the file is composed of a FoodID followed by a field for each of the Component Identifier, the component, value, unit code, matrix unit code and data provenance descriptions, Example:

K1034~WATER~78.5~g~W~~BE~D~A~MI1212

where:

- K1034 is the FoodID for Snapper, fillet, flesh, fresh, raw, related in the file NAME.FT
- WATER is the 'Component Identifier' for WATER, related in the file CODE.FT file
- 78.5 is the value of water in this food
- 'g' is the measurement unit code for 'gram'
- 'W' is the Matrix Unit Code "per 100 g edible portion".

The rest of the field's description codes are related to data derivation (refer to Data provenance.xslx): 'BE' is the Value Type Code "Best Estimation"; D is the Acquisition Type Code data derived from "Independent laboratory"; A is the Method Type Code "Analytical" and MI1212 is the Method Indicator Code for "Vacuum drying".

The details of the fields that are included in the DATA.FT file can be found in Table 14.

Table 14. Details of the fields used in the DATA.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	FoodID	Identifier	NAME.FT
2	Component Identifier	Identifier	CODE.FT
2	Value	Numeric	Value
3	Unit Code	Identifier	
4	Matrix Unit Code	Identifier	
5	Source Code	Identifier	
6	Value Type Code	Identifier	Data provenance, .xslx (see Tables 3 and 4)
7	Acquisition Type Code	Identifier	
8	Method Type Code	Identifier	
9	Method Indicator Code	Identifier	

3.6 DATA.AP file

The DATA.AP file contains some of the information already present in DATA.FT but in an alternative format. It features only the values of the components in each food within rows and columns like a spreadsheet. The second line of the file contains the name of each of the components, and the third line contains the units of measure. The subsequent lines contain a field for each component. These fields are filled by values:

Second line:

FoodID~Food Name~Alcohol~Alpha-carotene~Alpha-tocopherol~Ash~Available carbohydrate by difference~Available carbohydrate, FSANZ~Available carbohydrates by weight~Available carbohydrates in monosaccharide equivalent~Beta-carotene~Beta-carotene equivalents~Beta-tocopherol~Caffeine~Calcium~Carbohydrate by difference, FSANZ~Cholesterol~Copper~etc.

Third line:

FoodID~Food Name~g/100 g~µg/100 g~mg/100 g~g/100 g~g/100 g~g/100 g~g/100 g~g/100 g~µg/100 g~µg/100 g~mg/100 g~mg/100 g~mg/100 g~g/100 g~mg/100 g~mg/100 g~etc.

Subsequent lines, an example (37th line):

A1119~Crumpet, white, as purchased, commercial~0~0~0.07~2.4~36.8~31.6~31.6~34.7~0~0~0.02~0~71~36.8~0~0.104~etc,

Table 15 provides an example of the DATA.AP data in tabular form.

Table 15. Example of the details in the DATA.AP for Food Record A1119 of FOODfiles 2021 provided in tabular form (note only the first 19 lines are shown here).

Field	Second line	Third line	37th line (example)
1	FoodID	FoodID	A1119
3	Food Name	Food name	Crumpet, white, as purchased, commercial
4	Alcohol	g/100 g	0
5	Alpha-carotene	µg/100 g	0
6	Alpha-tocopherol	mg/100 g	0.07
7	Ash	g/100 g	2.4
8	Available carbohydrate by difference	g/100 g	36.8
9	Available carbohydrate, FSANZ	g/100 g	31.6
10	Available carbohydrates by weight	g/100 g	31.6
11	Available carbohydrates in monosaccharide equivalent	g/100 g	34.7
12	Beta-carotene	µg/100 g	0
13	Beta-carotene equivalents	µg/100 g	0
14	Beta-tocopherol	mg/100 g	0.02
15	Caffeine	mg/100 g	0
16	Calcium	mg/100 g	71
17	Carbohydrate by difference, FSANZ	g/100 g	36.8
18	Cholesterol	mg/100 g	0.00
19	Copper	mg/100 g	0.104
etc.			

3.7 CSM.FT file

The CSM.FT file contains the data for the common standard measures (CSM) and density data for most foods. The details of the fields included in the CSM.FT file can be found in Table 16. The CSM is either expressed as New Zealand metric standards (Appendix 8) or as the amount commonly purchased or eaten. All these description measures are listed under the CSM column, noting that there may be more than one CSM for any particular food. All the measures (g) were made on an edible portion, so no adjustments are necessary to account for the inedible portion. For the alcoholic beverages in New Zealand, one standard drink containing 10 g of pure alcohol is used (Health Promotion Agency. April 2016).

Density is measured as specific gravity, mass density, bulk density and/or use mass and volume by water or rapeseed displacement method. The Mass density of a food is its mass per unit volume. The term Specific gravity is used for liquid foods (e.g. milk, fruit juices), whereas the term Mass density is typically used for semi-solids and solids with regular shapes (e.g. bread, biscuits). Bulk density is the term typically used measurement for powders, grains, or other particulate solids that contain occluded air. The bulk density total volume includes particle volume, inter-particle void volume and internal pore volume (e.g. almonds ground and slivered). Water displacement method is used for foods with irregular shapes (e.g. eggplant, meat cuts) to establish the volume that relates to an item of known mass/weight to allow density to be calculated. Similarly, a baked product can be measured using rapeseed instead of water.

The format, as defined on the second line of the CSM.FT file is:

FoodID~Food Name~CSM~Measure~Density (g/cm^3)

For example:

A1169~Bread, from white wheat flour with multigrain, light, sliced, prepacked, as purchased, commercial, composite~1 slice sandwich (11.4 x 10.3 x 1.1 cm)~29.8~0.25

In the example above:

A1069 is the FoodID for a Food Name, Bread, from white wheat flour with multigrain, light, sliced, prepacked, as purchased, commercial, composite

1 slice sandwich (11.4 x 10.3 x 1.1 cm) weights 29.8 g and has a density of 0.25 g/cm^3

NOTE: The weight specified in the Measure (g) field can be used as a percentage scaling factor to convert the component mean values in the DATA.FT and DATA.AP data files to component values per CSM (New Zealand Food Composition Database 2022), as all values in DATA.FT and DATA.AP are expressed per 100 g.

Table 16. Details of the fields used in the CSM.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	Food ID	Identifier	NAME.FT file
2	Food Name	Text	NAME.FT file
3	CSM	Text	The description of the Common Standard Measure (CSM) or amount commonly purchased or eaten
4	Measure (g)	Numeric	The weight of the CSM amount commonly purchased or eaten in grams
5	Density	Numeric	g/cm^3; Food Records may have multiple densities based on the physical state e.g. 1 cup (250 mL) almond: ground, slivered and whole

3.8 INGREDIENT.FT file

The INGREDIENT.FT file contains the FoodID of a recipe, FoodIDs of the ingredients and their Food Names, Weight Fractions used in that particular recipe, Nutrition Retention Factor ID and USDA Retention Factor description. The Nutrition Retention Factor ID is specific to the cooking method (USDA Retention Factor description). The details of the fields included in the INGREDIENT.FT file can be found in Table 17.

Table 17. Details of the fields used in the INGREDIENT.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	Recipe FoodID	Identifier	NAME.FT file
2	Ingredient FoodID	Identifier	NAME.FT file
3	Ingredient Name	Text	NAME.FT file
4	Weight Fraction (%)	Numeric	The weight fraction of the food ingredient in the recipe
5	Nutrient Retention Factor Classification	Text	U.S. Department of Agriculture (2007)
6	Preparation Method	Text	

The naming structure for each record in this file is:

Recipe FoodID~Ingredient Food Name~Weight Fraction(%)~Nutrient Retention Factor Classification~Preparation Method

For example, the recipe “Cake, sponge, fat added, baked” (R10034) contains the following:

- R10034~F1046~Butter, salted, composite~25.0~~
- R10034~G1016~Egg, chicken, white & yolk (whole), raw, fresh, composite~24.4~EGGS~BAKED
- R10034~W20~Sugar, caster~25.0~~
- R10034~E1088~Flour, wheat, white, standard, plain, composite~25.0~FLOUR/MEAL~BAKED
- R10034~P62~Baking soda~0.6~~

The tabulated form of the above example R10028 can be found in Table 18.

Table 18. Example of the details in the INGREDIENT.FT file for Food Record R5442 of FOODfiles 2021 provided in tabular form.

Recipe FoodID	Ingredient FoodID	Ingredient name	Weight fraction (g)[a]	Nutrient Retention Factor Classification	Preparation Method[b]
R10034	F1046	Butter, salted, composite	25.0		
R10034	G1016	Egg, chicken, white & yolk (whole), raw, fresh, composite	24.4	EGGS	BAKED
R10034	W20	Sugar, caster	25.0		
R10034	E1088	Flour, wheat, white, standard, plain, composite	25.0	FLOUR/MEAL	BAKED
R10034	P62	Baking soda	0.6		

[a] Weight fraction is the percentage of each ingredient used in the recipe; [b] U.S. Department of Agriculture (2007).

3.9 NUTRIENT RETENTION FACTOR.FT file

The NUTRIENT RETENTION FACTOR.FT contains the NRF for selected nutrients and ID. The details of the fields included in the NUTRIENT RETENTION FACTOR.FT file can be found in Table 19.

The naming structure in this file is,

Nutrient Retention Factor Classification ~ Preparation Method ~Component Identifier~Nutrient Retention Factor

Example: CHICKEN~ROASTED~FOL~0.6

where:

- CHICKEN is the 'Nutrient Retention Factor Classification' and 'ROASTED is the Preparation Method from U.S. Department of Agriculture (2007) related to the INGREDIENT.FT
- FOL is the 'Component Identifier' for 'Folate, total', related in the file CODE.FT file'
- 0.6 is 'Nutrient Retention Factor'.

Table 19. Details of the fields used in the NUTRIENT FACTOR.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	Nutrient Retention Factor Classification	Text	Related to the INGREDIENT.FT
2	Preparation Method	Text	U.S. Department of Agriculture (2007)
3	Component Identifier	Identifier	CODE.FT file
3	Nutrient Retention Factor	Numeric	Ratio of the nutrient retention between cooked and raw ingredients (g/g) U.S. Department of Agriculture (2007); (Food Standards Australia New Zealand 2008)

3.10 WEIGHT YIELD FACTOR.FT file

The WEIGHT YIELD FACTOR.FT contains the Weight YF for each recipe food. The details of the fields included in the WEIGHT YIELD FACTOR.FT file can be found in Table 20.

The naming structure in this file is:

Recipe Food ID~Recipe Food Name~Weight Yield Factor

The details of the fields included in the WEIGHT YIELD.FACTOR.FT file can be found in Table 20.

Table 20. Details of the fields used in the WEIGHT YIELD FACTOR.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	Recipe Food ID	Identifier	INGREDIENT.FT file (NAME.FT)
2	Recipe Food Name	Text	INGREDIENT.FT file (NAME.FT)
3	Weight Yield Factor	Numeric	Measure of the percentage of the weight of the cooked dish in relation to the weight of the raw ingredient/s (Equation 35)

3.11 CONVERSION FACTOR.FT file

The CONVERSION FACTOR.FT contains the general factor conversions for fat to fatty acids for some of the Food Records, and for nitrogen to protein for all the Food Records from the published sources. The details of the fields included in the CONVERSION FACTOR.FT file can be found in Table 21.

The naming structure in this file is:

FoodID~XFA~XN

Table 21. Details of the fields used in the CONVERSION.FACTOR.FT file of FOODfiles 2021.

Field	Name	Field type	Notes
1	FoodID	Identifier	INGREDIENT.FT file (NAME.FT)
2	XFA	Identifier	INFOODS tagname for fat to fatty acids conversion factor (Exler & Weihrauch 1977; Greenfield & Southgate 2003)
3	XN	Identifier	INFOODS tagname for nitrogen to protein conversion factor (Jones 1941; Greenfield & Southgate 2003)

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Appendices

Appendix 1. Rules applied for significant numbers, decimal places and rounding

This table describes the application of a fixed significant place for each component value, followed by a rounding rule to maximise the decimal place.

Component	Unit	Number of places		Rounding rules	
		Significant digits	Maximum decimal	Range	Scale (limit)
Energy	kJ/kcal	3	0	0–100	1
Macronutrients					
Fat, water, dry matter, dietary fibre and alcohol	g	3	1	0–10	0.1
Ash, carbohydrates, protein, nitrogen total, sugars and starch	g	3	2	0–1	0.01
Inorganic compounds (minerals)					
Calcium, potassium, magnesium, sodium and phosphorus	mg	3	0	0–100	1
Iron and zinc	mg	3	2	0–1	0.01
Selenium and iodine	µg	2	2	0–1	0.01
Copper	mg	3	3	0–1	0.001
Manganese	µg	2	0	0–10	1
Aluminium, arsenic, boron, cadmium, cobalt, chromium, caesium, lithium, lead, molybdenum, nickel, rubidium, sulphur, lead, silicon (acid soluble), tin, mercury, molybdenum, vanadium	µg	2	2	0–1	0.01
Vitamins					
Vitamin A, carotene (alpha- and beta-), beta-carotene equivalents, retinol, lutein, lycopene and zeaxanthin	µg	3	0	0–100	1
Thiamin, riboflavin, niacin (niacin from tryptophan, niacin equivalent), vitamin B6, pantothenic acid	mg	2	3	0–1	0.001
Vitamins B12, D (D3 and D2) and K	µg	2	2	0–1	0.01
Folates	µg	2	0	0–10	1
Vitamin C	mg	3	2	0–1	0.01
Vitamin E (tocopherol)	mg	2	2	0–1	0.01
Others					
Caffeine	mg	3	0	0–100	1
Cholesterol	mg	3	2	0–1	0.01
Fatty acids total (saturated, mono-, poly- etc.)	g	3	2	0–1	0.01
Fatty acid individual	g	3	3	0–1	0.001
Amino acids	mg	3	0	0–100	1

Sources: Greenfield & Southgate (2003) and (FAO/INFOODS 2012c).

Appendix 2. List of components with supporting details

This table provides details of the components included in the database, including which publications they are included in.

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
ACEAC_G	Acetic acid (g)	ACEAC_G	g/100 g	A				72	2.61
AL	Aluminium	AL	µg/100 g	A			✓	480	17.4
ALA	Alanine	ALA	mg/100 g	A			✓	484	17.5
ALA_G	Alanine (g)	ALA_G	g/100 g	A			✓	483	17.4
ALAN	Alanine (/g N)	ALAN	mg/g N	C			✓	482	17.4
ALC	Alcohol	ALC	g/100 g	A	✓	✓	✓	2763	100
ARG	Arginine	ARG	mg/100 g	A			✓	486	17.6
ARG_G	Arginine (g)	ARG_G	g/100 g	A			✓	486	17.6
ARGN	Arginine (/g N)	ARGN	mg/g N	C			✓	484	17.5
AS	Arsenic	AS	µg/100 g	A			✓	532	19.3
ASH	Ash	ASH	g/100 g	A		✓	✓	2763	100
ASN	Asparagine	ASN	mg/100 g	A			✓	178	6.44
ASN_G	Asparagine (g)	ASN_G	g/100 g	A			✓	178	6.44
ASNN	Asparagine (/g N)	ASNN	mg/g N	C			✓	178	6.44
ASP	Aspartic acid	ASP	mg/100 g	A			✓	306	11.1
ASP_G	Aspartic acid	ASP_G	g/100 g	A			✓	305	11.0
ASPN	Aspartic acid	ASPN	mg/g N	C			✓	304	11.0
B	Boron	B	µg/100 g	A			✓	485	17.6
BIOT	Biotin	BIOT	µg/100 g	A			✓	1119	40.5
CA	Calcium	CA	mg/100 g	A	✓	✓	✓	2763	100
CAFFN	Caffeine	CAFFN	mg/100 g	A	✓	✓	✓	2763	100
CARTA	Alpha-carotene	CARTA	µg/100 g	A		✓	✓	2266	82.0
CARTB	Beta-carotene	CARTB	µg/100 g	A		✓	✓	2418	87.5
CARTBEQ	Beta-carotene equivalents	CARTBEQ	µg/100 g	C	✓	✓	✓	2763	100
CD	Cadmium	CD	µg/100 g	A			✓	591	21.4
CHOAVL	Available carbohydrates by weight	CHOAVL	g/100 g	C		✓	✓	2763	100
CHOAVL_FSANZ	Available carbohydrate		g/100 g	C	✓	✓	✓	2763	100

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
CHOAVLDF	Available carbohydrate by difference	CHOAVLDF	g/100 g	C		✓	✓	2763	100
CHOAVLDF_FSANZ	Carbohydrate by difference		g/100 g	C		✓	✓	2763	100
CHOAVLM	Available carbohydrates in monosaccharide equivalent	CHOAVLM	g/100 g	C		✓	✓	2763	100
CHOCAL	Cholecalciferol (Vitamin D3)	CHOCAL	µg/100 g	A			✓	2763	100
CHOCALOH	25-hydroxyvitamin D3	CHOCALOH	µg/100 g	A			✓	190	6.88
CHOCDF	Total carbohydrate by difference	CHOCDF	g/100 g	C		✓	✓	2763	100
CHOCSM	Total carbohydrates by summation	CHOCSM	g/100 g	C		✓	✓	2763	100
CHOLE	Cholesterol	CHOLE	mg/100 g	A	✓	✓	✓	2763	100
CITAC_G	Citric acid (g)	CITAC_G	g/100 g	A			✓	49	1.77
CLD	Chloride	CLD	mg/100 g	A			✓	963	34.9
CO	Cobalt	CO	µg/100 g	A			✓	428	15.5
CR	Chromium	CR	µg/100 g	A			✓	518	18.7
CS	Caesium	CS	µg/100 g	A			✓	312	11.3
CU	Copper	CU	mg/100 g	A		✓	✓	2763	100
CYS	Cystine	CYS	mg/100 g	A			✓	469	17.0
CYS_G	Cystine (g)	CYS_G	g/100 g	A			✓	468	16.9
CYSN	Cystine (/g N)	CYSN	mg/g N	C			✓	467	16.9
DISAC	Disaccharides, total	DISAC	g/100 g	C			✓	2763	100
DISACM	Disaccharides, total (monosaccharide equivalents)	DISACM	g/100 g	C			✓	2763	100
DM	Dry matter	DM	g/100 g	C		✓	✓	2763	100
ENERC	Energy, total metabolisable (kJ)	ENERC	kJ/100 g	C	✓	✓	✓	2763	100
ENERC1	Energy, total metabolisable (kJ, including dietary fibre)		kJ/100 g	C		✓	✓	2763	100
ENERC_KCAL	Energy, total metabolisable (kcal)	ENERC_KCAL	kcal/100 g	C		✓	✓	2763	100
ENERC1_KCAL	Energy, total metabolisable (kcal, including dietary fibre)		kcal/100 g	C		✓	✓	2763	100
ENERC_FSANZ1	Energy, total metabolisable,		kJ/100 g	C		✓	✓	2763	100

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
	carbohydrate by difference, FSANZ (kJ)								
ENERC_FSANZ2	Energy, total metabolisable, available carbohydrate, FSANZ (kJ)		kJ/100 g	C	✓	✓	✓	2763	100
ENERC_FSANZ1_KCAL	Energy, total metabolisable, carbohydrate by difference, FSANZ (kcal)		kcal/100 g	C		✓	✓	2763	100
ENERC_FSANZ2_KCAL	Energy, total metabolisable, available carbohydrate, FSANZ (kcal)		kcal/100 g	C		✓	✓	2763	100
ERGCAL	Ergocalciferol (Vitamin D2)	ERGCAL	µg/100 g	A			✓	2763	100
F4D0	Fatty acid 4:0	F4D0	g/100 g	C			✓	501	18.1
F4D0F	Fatty acid 4:0 (/100 g TFA)	F4D0F	g/100 g TFA	A			✓	501	18.1
F6D0	Fatty acid 6:0	F6D0	g/100 g	C			✓	1228	44,4
F6D0F	Fatty acid 6:0 (/100 g TFA)	F6D0F	g/100 g TFA	A			✓	1227	44.4
F8D0	Fatty acid 8:0	F8D0	g/100 g	C			✓	1435	51.9
F8D0F	Fatty acid 8:0 (/100 g TFA)	F8D0F	g/100 g TFA	A			✓	1434	51.9
F10D0	Fatty acid 10:0	F10D0	g/100 g	C			✓	1561	56.5
F10D0F	Fatty acid 10:0 (/100 g TFA)	F10D0F	g/100 g TFA	A			✓	1560	56.5
F12D0	Fatty acid 12:0	F12D0	g/100 g	C			✓	1634	59.1
F12D0F	Fatty acid 12:0 (/100 g TFA)	F12D0F	g/100 g TFA	A			✓	1617	58.5
F13D0	Fatty acid 13:0	F13D0	g/100 g	C			✓	1299	47.0
F13D0F	Fatty acid 13:0 (/100 g TFA)	F13D0F	g/100 g TFA	A			✓	1298	47.0
F14D0	Fatty acid 14:0	F14D0	g/100 g	C			✓	1957	70.8
F14D0F	Fatty acid 14:0 (/100 g TFA)	F14D0F	g/100 g TFA	A			✓	1940	70.2
F15D0	Fatty acid 15:0	F15D0	g/100 g	C			✓	813	29.4
F15D0F	Fatty acid 15:0 (/100 g TFA)	F15D0F	g/100 g TFA	A			✓	804	29.1
F16D0	Fatty acid 16:0	F16D0	g/100 g	C			✓	2021	73.1
F16D0F	Fatty acid 16:0 (/100 g TFA)	F16D0F	g/100 g TFA	A			✓	2004	72.5

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
F17D0	Fatty acid 17:0	F17D0	g/100 g	C			✓	1771	64.1
F17D0F	Fatty acid 17:0 (/100 g TFA)	F17D0F	g/100 g TFA	A			✓	1754	63.5
F18D0	Fatty acid 18:0	F18D0	g/100 g	C			✓	2019	73.1
F18D0F	Fatty acid 18:0 (/100 g TFA)	F18D0F	g/100 g TFA	A			✓	2001	72.5
F19D0	Fatty acid 19:0	F19D0	g/100 g	C			✓	32	1.16
F19D0F	Fatty acid 19:0 (/100 g TFA)	F19D0F	g/100 g TFA	A			✓	32	1.16
F20D0	Fatty acid 20:0	F20D0	g/100 g	C			✓	1650	59.7
F20D0F	Fatty acid 20:0 (/100 g TFA)	F20D0F	g/100 g TFA	A			✓	1646	59.6
F21D0	Fatty acid 21:0	F21D0	g/100 g	C			✓	951	34.4
F21D0F	Fatty acid 21:0 (/100 g TFA)	F21D0F	g/100 g TFA	A			✓	951	34.4
F22D0	Fatty acid 22:0	F22D0	g/100 g	C			✓	1434	51.9
F22D0F	Fatty acid 22:0 (/100 g TFA)	F22D0F	g/100 g TFA	A			✓	1433	51.9
F23D0	Fatty acid 23:0	F23D0	g/100 g	C			✓	935	33.8
F23D0F	Fatty acid 23:0 (/100 g TFA)	F23D0F	g/100 g TFA	A			✓	935	33.8
F24D0	Fatty acid 24:0	F24D0	g/100 g	C			✓	1393	50.4
F24D0F	Fatty acid 24:0 (/100 g TFA)	F24D0F	g/100 g TFA	A			✓	1392	50.4
FASAT	Fatty acids, total saturated	FASAT	g/100 g	C	✓	✓	✓	2763	100
FASATF	Fatty acids, total saturated (/100 g TFA)	FASATF	g/100 g TFA	C			✓	2745	99.3
F10D1	Fatty acid 10:1	F10D1	g/100 g	C			✓	382	13.8
F10D1F	Fatty acid 10:1 (/100 g TFA)	F10D1F	g/100 g TFA	A			✓	382	13.8
F12D1	Fatty acid 12:1	F12D1	g/100 g	C			✓	146	5.28
F12D1F	Fatty acid 12:1 (/100 g TFA)	F12D1F	g/100 g TFA	A			✓	146	5.28
F14D1N5	Fatty acid 14:1 omega-5	F14D1N5	g/100 g	C			✓	1096	39.7
F14D1N5F	Fatty acid 14:1 omega-5 (/100 g TFA)	F14D1FN5F	g/100 g TFA	A			✓	1096	39.7
F14D1	Fatty acid 14:1	F14D1	g/100 g	C			✓	1511	54.7
F14D1F	Fatty acid 14:1 (/100 g TFA)	F14D1F	g/100 g TFA	C			✓	1497	54.2
F15D1	Fatty acid 15:1	F15D1	g/100 g	C			✓	1424	51.5

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
F15D1F	Fatty acid 15:1 (/100 g TFA)	F15D1F	g/100 g TFA				✓	1423	51.5
F16D1C	Fatty acid *cis* 16:1	F16D1C	g/100 g	C			✓	1396	50.5
F16D1CF	Fatty acid *cis* 16:1 (/100 g TFA)	F16D1CF	g/100 g TFA	A			✓	1380	49.9
F16D1T	Fatty acid *trans* 16:1	F16D1T	g/100 g	C			✓	603	21.8
F16D1TF	Fatty acid *trans* 16:1 (/100 g TFA)	F16D1TF	g/100 g TFA	A			✓	587	21.2
F16D1	Fatty acid 16:1	F16D1	g/100 g	C			✓	1940	70.2
F16D1F	Fatty acid 16:1 (/100 g TFA)	F16D1F	g/100 g TFA	C			✓	1922	69.6
F17D1	Fatty acid 17:1	F17D1	g/100 g	C			✓	1722	62.3
F17D1F	Fatty acid 17:1 (/100 g TFA)	F17D1F	g/100 g TFA	A			✓	1711	61.9
F18D1CN7	Fatty acid *cis* 18:1 omega-7	F18D1CN7	g/100 g	C			✓	1240	44.9
F18D1CN7F	Fatty acid *cis* 18:1 omega-7 (/100 g TFA)	F18D1CN7F	g/100 g TFA	A			✓	1240	44.9
F18D1TN7	Fatty acid *trans* 18:1 omega-7	F18D1CN7	g/100 g	C			✓	951	34.4
F18D1TN7F	Fatty acid *trans* 18:1 omega-7 (/100 g TFA)	F18D1CN7F	g/100 g TFA	A			✓	951	34.4
F18D1N7	Fatty acid 18:1 omega-7	F18D1N7	g/100 g	C			✓	1346	48.7
F18D1N7F	Fatty acid 18:1 omega-7 (/100 g TFA)	F18D1N7F	g/100 g TFA	C			✓	1346	48.7
F18D1CN9	Fatty acid *cis* 18:1 omega-9	F18D1CN9	g/100 g	C			✓	1349	48.8
F18D1CN9F	Fatty acid *cis* 18:1 omega-9 (/100 g TFA)	F18D1CN9F	g/100 g TFA	A			✓	1349	48.8
F18D1TN9	Fatty acid *trans* 18:1 omega-9	F18D1TN9	g/100 g	C			✓	1227	44.4
F18D1TN9F	Fatty acid *trans*18:1 omega-9 (/100 g TFA)	F18D1TN9F	g/100 g TFA	A			✓	1227	44.4
F18D1N9	Fatty acid 18:1 omega-9	F18D1N9	g/100 g	C			✓	1394	50.5
F18D1N9F	Fatty acid 18:1 omega-9 (/100 g TFA)	F18D1N9F	g/100 g TFA	C			✓	1394	50.5
F18D1C	Fatty acid *cis* 18:1	F18D1C	g/100 g	C			✓	1422	51.5
F18D1CF	Fatty acid *cis* 18:1 (/100 g TFA)	F18D1CF	g/100 g TFA	C			✓	1405	50.9
F18D1T	Fatty acid *trans* 18:1	F18D1T	g/100 g	C			✓	1324	47.9
F18D1TF	Fatty acid *trans* 18:1 (/100 g TFA)	F18D1TF	g/100 g TFA	C			✓	1307	47.3

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
F18D1	Fatty acid 18:1	F18D1	g/100 g	C			✓	2065	74.7
F18D1F	Fatty acid 18:1 (/100 g TFA)	F18D1F	g/100 g TFA	C			✓	2047	74.1
F20D1N9	Fatty acid 20:1 omega-9	F20D1N9	g/100 g	C			✓	1308	47.3
F20D1N9F	Fatty acid 20:1 omega-9 (/100 g TFA)	F20D1N9F	g/100 g TFA	A			✓	1308	47.3
F20D1N11	Fatty acid 20:1 omega-11	F20D1N11	g/100 g	C			✓	247	8.94
F20D1N11F	Fatty acid 20:1 omega-11 (/100 g TFA)	F20D1N11F	g/100 g TFA	A			✓	247	8.94
F20D1	Fatty acid 20:1	F20D1	g/100 g	C			✓	1714	62.0
F20D1F	Fatty acid 20:1 (/100 g TFA)	F20D1F	g/100 g TFA	C			✓	1712	62.0
F22D1N9	Fatty acid 22:1 omega-9	F22D1N9	g/100 g	C			✓	1083	39.2
F22D1N9F	Fatty acid 22:1 omega-9 (/100 g TFA)	F22D1N9F	g/100 g TFA	A			✓	1083	39.2
F22D1N11	Fatty acid 22:1 omega-11	F22D1N11	g/100 g	C			✓	321	11.6
F22D1N11F	Fatty acid 22:1 omega-11 (/100 g TFA)	F22D1N11F	g/100 g TFA	A			✓	321	11.6
F22D1	Fatty acid 22:1	F22D1	g/100 g	C			✓	1437	52.0
F22D1F	Fatty acid 22:1 (/100 g TFA)	F22D1F	g/100 g TFA	C			✓	1436	52.0
F24D1	Fatty acid 24:1	F24D1	g/100 g	C			✓	1281	46.4
F24D1F	Fatty acid 24:1 (/100 g TFA)	F24D1F	g/100 g TFA	A			✓	1280	46.3
FAMST	Fatty acids, total monounsaturated *trans*	FAMST	g/100 g	C			✓	1397	50.6
FAMSTF	Fatty acids, total monounsaturated *trans* (/100 g TFA)	FAMSTF	g/100 g TFA	C			✓	1380	49.9
FAMS	Fatty acids, total monounsaturated	FAMS	g/100 g	C	✓	✓	✓	2763	100
FAMSF	Fatty acids, total monounsaturated (/100 g TFA)	FAMSF	g/100 g TFA	C			✓	2745	99.3
F18D2CN6	Fatty acid *cis,cis* 18:2 omega-6	F18D2CN6	g/100 g	C	✓	✓	✓	1585	57.4
F18D2CN6F	Fatty acid *cis,cis* 18:2 omega-6 (/100 g TFA)	F18D2CN6F	g/100 g TFA	A			✓	1569	56.8
F18D2TN6	Fatty acid *trans* 18:2 omega-6	F18D2TN6	g/100 g	C			✓	1151	41.7
F18D2TN6F	Fatty acid *trans* 18:2 omega-6 (/100 g TFA)	F18D2TN6F	g/100 g TFA	A			✓	1135	41.1

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
F18D2N6	Fatty acid 18:2 omega-6	F18D2N6	g/100 g	C			✓	1655	59.9
F18D2N6F	Fatty acid 18:2 omega-6 (/100 g TFA)	F18D2N6F	g/100 g TFA	C			✓	1638	59.3
F18D2CN9TN11	Fatty acid *cis, trans* 18:2 omega-9, 11		g/100 g	C		✓	✓	1198	43.4
F18D2CN9TN11F	Fatty acid *cis, trans* 18:2 omega-9, 11 (/100 g TFA)		g/100 g TFA	A			✓	1198	43.4
F18D2C	Fatty acid *cis* 18:2	F18D2C	g/100 g	C			✓	1585	57.4
F18D2CF	Fatty acid *cis* 18:2 (/100 g TFA)	F18D2NCF	g/100 g TFA	C			✓	1569	56.8
F18D2T	Fatty acid *trans* 18:2	F18D2T	g/100 g	C			✓	1369	49.5
F18D2TF	Fatty acid *trans* 18:2 (/100 g TFA)	F18D2TF	g/100 g TFA	C			✓	1352	48.9
F18D2	Fatty acid 18:2	F18D2	g/100 g	C			✓	2019	73.1
F18D2F	Fatty acid 18:2 (/100 g TFA)	F18D2F	g/100 g TFA	C			✓	2001	72.4
F18D3N3	Fatty acid 18:3 omega-3	F18D3N3	g/100 g	C	✓	✓	✓	1499	54.3
F18D3N3F	Fatty acid 18:3 omega-3 (/100 g TFA)	F18D3N3F	g/100 g TFA	A			✓	1498	54.2
F18D3TN3	Fatty acid *trans*18:3 omega-3	F18D3TN3	g/100 g	C			✓	7	0.25
F18D3TN3F	Fatty acid *trans* 18:3 omega-6 (/100 g TFA)	F18D3TN3F	g/100 g TFA	A			✓	7	0.25
F18D3N6	Fatty acid 18:3 omega-6	F18D3N6	g/100 g	C			✓	1301	47.1
F18D3N6F	Fatty acid 18:3 omega-6 (/100 g TFA)	F18D3N6F	g/100 g TFA	A			✓	1284	46.5
F18D3	Fatty acid 18:3	F18D3	g/100 g	C			✓	1861	67.4
F18D3F	Fatty acid 18:3 (/100 g TFA)	F18D3F	g/100 g TFA	C			✓	1846	66.8
F18D4N3	Fatty acid 18:4 omega-3	F18D4N3	g/100 g	C			✓	237	8.58
F18D4N3F	Fatty acid 18:4 omega-3 (/100 g TFA)	F18D4N3F	g/100 g TFA	A			✓	237	8.58
F18D4	Fatty acid 18:4	F18D4	g/100 g	C			✓	295	10.7
F18D4F	Fatty acid 18:4 (/100 g TFA)	F18D4F	g/100 g TFA	C			✓	295	10.7
F20D2N6	Fatty acid 20:2 omega-6	F20D2N6	g/100 g	C			✓	1187	43.0
F20D2N6F	Fatty acid 20:2 omega-6 (/100 g TFA)	F20D2N6F	g/100 g TFA	A			✓	1186	42.9
F20D2	Fatty acid 20:2	F20D2	g/100 g	C			✓	1360	49.2

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
F20D2F	Fatty acid 20:2 (/100 g TFA)	F20D2F	g/100 g TFA	C			✓	1359	49.2
F20D3N3	Fatty acid 20:3 omega-3	F20D3N3	g/100 g	C			✓	1184	42.9
F20D3N3F	Fatty acid 20:3 omega-3 (/100 g TFA)	F20D3N3F	g/100 g TFA	A			✓	1184	42.9
F20D3N6	Fatty acid 20:3 omega-6	F20D3N6	g/100 g	C			✓	1288	46.6
F20D3N6F	Fatty acid 20:3 omega-6 (/100 g TFA)	F20D3N6F	g/100 g TFA	A			✓	1288	46.6
F20D3	Fatty acid 20:3	F20D3	g/100 g	C			✓	1466	53.1
F20D3F	Fatty acid 20:3 (/100 g TFA)	F20D3F	g/100 g TFA	C			✓	1465	53.0
F20D4N3	Fatty acid 20:4 omega-3	F20D4N3	g/100 g	C			✓	268	9.70
F20D4N3F	Fatty acid 20:4 omega-3 (/100 g TFA)	F20D4N3F	g/100 g TFA	A			✓	268	9.70
F20D4N6	Fatty acid 20:4 omega-6	F20D4N6	g/100 g	C			✓	1272	46.0
F20D4N6F	Fatty acid 20:4 omega-6 (/100 g TFA)	F20D4N6F	g/100 g TFA	A			✓	1272	46.0
F20D4	Fatty acid 20:4	F20D4	g/100 g	C			✓	1541	55.8
F20D4F	Fatty acid 20:4 (/100 g TFA)	F20D4F	g/100 g TFA	C		✓	✓	1540	55.7
F20D5N3	Fatty acid 20:5 omega-3	F20D5N3	g/100 g	C		✓	✓	1329	48.1
F20D5N3F	Fatty acid 20:5 omega-3 (/100 g TFA)	F20D5N3F	g/100 g TFA	A			✓	1328	48.1
F20D5	Fatty acid 20:5	F20D5	g/100 g	C			✓	1512	54.7
F20D5F	Fatty acid 20:5 (/100 g TFA)	F20D5F	g/100 g TFA	C			✓	1511	54.7
F21D5N3	Fatty acid 21:5 omega-3	F21D5N3	g/100 g	C			✓	178	6.44
F21D5N3F	Fatty acid 21:5 omega-3 (/100 g TFA)	F21D5N3F	g/100 g TFA	A			✓	178	6.44
F21D5	Fatty acid 21:5	F21D5	g/100 g	C			✓	248	8.98
F21D5F	Fatty acid 21:5 (/100 g TFA)	F21D5F	g/100 g TFA	C			✓	248	8.98
F22D2N6	Fatty acid 22:2 omega-6	F22D2N6	g/100 g	C			✓	994	36.0
F22D2N6F	Fatty acid 22:2 omega-6 (/100 g TFA)	F22D2N6F	g/100 g TFA	A			✓	994	36.0
F22D2	Fatty acid 22:2	F22D2	g/100 g	C			✓	1031	37.3
F22D2F	Fatty acid 22:2 (/100 g TFA)	F22D2F	g/100 g TFA	C			✓	1031	37.3
F22D4N6	Fatty acid 22:4 omega-6	F22D4N6	g/100 g	C			✓	212	7.67
F22D4N6F	Fatty acid 22:4 omega-6 (/100 g TFA)	F22D4N6F	g/100 g TFA	A			✓	212	7.67

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
F22D4	Fatty acid 22:4	F22D4	g/100 g	C			✓	386	14.0
F22D4F	Fatty acid 22:4 (/100 g TFA)	F22D4F	g/100 g TFA	C			✓	386	14.0
F22D5N3	Fatty acid 22:5 omega-3	F22D5N3	g/100 g	C		✓	✓	1306	47.3
F22D5N3F	Fatty acid 22:5 omega-3 (/100 g TFA)	F22D5N3F	g/100 g TFA	A			✓	1305	47.2
F22D5N6	Fatty acid 22:5 omega-6	F22D5N6	g/100 g	C			✓	270	9.77
F22D5N6F	Fatty acid 22:5 omega-6 (/100 g TFA)	F22D5N6F	g/100 g TFA	A			✓	270	9.77
F22D5	Fatty acid 22:5	F22D5	g/100 g	C			✓	1458	52.8
F22D5F	Fatty acid 22:5 (/100 g TFA)	F22D5F	g/100 g TFA	C			✓	1457	52.7
F22D6N3	Fatty acid 22:6 omega-3	F22D6N3	g/100 g	C		✓	✓	1311	47.4
F22D6N3F	Fatty acid 22:6 omega-3 (/100 g TFA)	F22D6N3F	g/100 g TFA	A			✓	1310	47.4
F22D6	Fatty acid 22:6	F22D6	g/100 g	C			✓	1565	56.6
F22D6F	Fatty acid 22:6 (/100 g TFA)	F22D6F	g/100 g TFA	C			✓	1564	56.6
FAPUN3	Fatty acids, total polyunsaturated omega-3	FAPUN3	g/100 g	C		✓	✓	1555	56.3
FAPUN3F	Fatty acids, total polyunsaturated omega-3 (/100 g TFA)	FAPUN3F	g/100 g TFA	C			✓	1555	56.3
FAPUN6	Fatty acids, total polyunsaturated omega-6	FAPUN6	g/100 g	C		✓	✓	1672	60.5
FAPUN6F	Fatty acids, total polyunsaturated omega-6 (/100 g TFA)	FAPUN6F	g/100 g TFA	C			✓	1656	59.9
FALCPUN3	Fatty acids, total long chain polyunsaturated omega-3		g/100 g	C		✓	✓	1372	49.7
FALCPUN3F	Fatty acids, total long chain polyunsaturated omega-3 (/100 g TFA)		g/100 g TFA	C			✓	1372	49.7
FAPUT	Fatty acids, total polyunsaturated *trans*	FAPUT	g/100 g	C			✓	1409	51.0
FAPUTF	Fatty acids, total polyunsaturated *trans* (/100 g TFA)	FAPUTF	g/100 g TFA	C			✓	1392	50.4
FAPU	Fatty acids, total polyunsaturated	FAPU	g/100 g	C	✓	✓	✓	2763	100

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
FAPUF	Fatty acids, total polyunsaturated (/100 g TFA)	FAPUF	g/100 g TFA	C			✓	2745	99.3
FATRN	Fatty acids, total *trans*	FATRN	g/100 g	C		✓	✓	1409	51.0
FATRNF	Fatty acids, total *trans* (/100 g TFA)	FATRNF	g/100 g TFA	C			✓	1392	50.4
FACID	Fatty acids, total	FACID	g/100 g	A or C			✓	2745	99.3
FAT	Fat, total	FAT	g/100 g	A	✓	✓	✓	2763	100
FD	Fluoride	FD	µg/100 g	A			✓	32	1.16
FE	Iron	FE	mg/100 g	A	✓	✓	✓	2763	100
FIBINS	Fibre, water-insoluble	FIBINS	g/100 g	A		✓	✓	1847	66.8
FIBSOL	Fibre, water-soluble	FIBSOL	g/100 g	A		✓	✓	1855	67.1
FIBTG	Fibre, total dietary	FIBTG	g/100 g	A	√	✓	✓	2763	100
FOL	Folate, total	FOL	µg/100 g	A		✓	✓	2763	100
FOLAC	Folic acid, synthetic folic acid	FOLAC	µg/100 g	A		✓	✓	2763	100
FOLDFE	Dietary folate equivalents	FOLDFE	µg/100 g	C	✓	✓	✓	2763	100
FOLFD	Folate food, naturally occurring food folates	FOLFD	µg/100 g	C		✓	✓	2763	100
FRUS	Fructose	FRUS	g/100 g	A		✓	✓	2763	100
GLU	Glutamic acid	GLU	mg/100 g	A			✓	482	17.4
GLU_G	Glutamic acid (g)	GLU_G	g/100 g	A			✓	481	17.4
GLUN	Glutamic acid (/g N)	GLUN	mg/g N	C			✓	480	17.4
GLUS	Glucose	GLUS	g/100 g	A		✓	✓	2763	100
GLY	Glycine	GLY	mg/100 g	A			✓	484	17.5
GLY_G	Glycine (g)	GLY_G	g/100 g	A			✓	483	17.5
GLYN	Glycine (/g N)	GLYN	mg/g N	C			✓	482	17.4
GLYC	Glycogen	GLYC	g/100 g	A			✓	29	1.05
GLYCM	Glycogen (monosaccharide equivalents)	GLYCM	g/100 g	C			✓	29	1.05
HG	Mercury	HG	µg/100 g	A			✓	418	15.1
HIS	Histidine	HIS	mg/100 g	A			✓	482	17.4
HIS_G	Histidine (g)	HIS_G	g/100 g	C			✓	481	17.4
HISN	Histidine (/g N)	HISN	mg/g N	C			✓	480	17.4
HYP	Hydroxyproline	HYP	mg/100 g	A			✓	38	1.38

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
HYP_G	Hydroxyproline (g)	HYP_G	g/100 g	A			✓	38	1.38
HYPN	Hydroxyproline (/g N)	HYPN	mg/g N	C			✓	38	1.38
ID	Iodide	ID	µg/100 g	A	✓	✓	✓	2763	100
ILE	Isoleucine	ILE	mg/100 g	A			✓	486	17.6
ILE_G	Isoleucine (g)	ILE_G	g/100 g	A			✓	485	17.6
ILEN	Isoleucine (/g N)	ILEN	mg/g N	C			✓	484	17.5
K	Potassium	K	mg/100 g	A	✓	✓	✓	2763	100
LACAC_G	Lactic acid (g)	LACAC_G	g/100 g	A			✓	23	0.83
LACS	Lactose	LACS	g/100 g	A		✓	✓	2763	100
LACSM	Lactose (monosaccharide equivalents)	LACSM	g/100 g	C			✓	2763	100
LEU	Leucine	LEU	mg/100 g	A			✓	486	17.6
LEU_G	Leucine (g)	LEU_G	g/100 g	A			✓	486	17.6
LEUN	Leucine (/g N)	LEUN	mg/g N	C			✓	484	17.5
LI	Lithium	LI	µg/100 g	A			✓	352	12.7
LUTN	Lutein	LUTN	µg/100 g	A			✓	37	1.34
LYCPN	Lycopene	LYCPN	µg/100 g	A			✓	91	3.29
LYS	Lysine	LYS	mg/100 g	A			✓	491	17.8
LYS_G	Lysine (g)	LYS_G	g/100 g	A			✓	490	17.7
LYSN	Lysine (/g N)	LYSN	mg/g N	C			✓	489	17.7
MALAC_G	Malic acid (g)	MALAC_G	g/100 g	A			✓	46	1.66
MALS	Maltose	MALS	g/100 g	A		✓	✓	2763	100
MALSM	Maltose (monosaccharide equivalents)	MALSM	g/100 g	C			✓	2763	100
MALTDEX	Maltodextrin		g/100 g	A			✓	26	0.94
MET	Methionine	MET	mg/100 g	A			✓	486	17.6
MET_G	Methionine (g)	MET_G	g/100 g	A			✓	485	17.6
METN	Methionine (/g N)	METN	mg/g N	C			✓	485	17.6
MG	Magnesium	MG	mg/100 g	A		✓	✓	2763	100
MN	Manganese	MN	µg/100 g	A		✓	✓	2763	100
MNSAC	Monosaccharides, total	MNSAC	g/100 g	C			✓	2763	100
MO	Molybdenum	MO	µg/100 g	A			✓	447	16.2
NA	Sodium	NA	mg/100 g	A	✓	✓	✓	2763	100

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
NI	Nickel	NI	µg/100 g	A			✓	441	16.0
NIA	Niacin, preformed	NIA	mg/100 g	A		✓	✓	2763	100
NIAEQ	Niacin equivalents, total	NIAEQ	mg/100 g	C	✓	✓	✓	2763	100
NIATRP	Niacin equivalents from tryptophan	NIATRP	mg/100 g	C		✓	✓	2763	100
NT	Nitrogen, total	NT	g/100 g	A		✓	✓	2763	100
OXALAC_G	Oxalic acid (g)	OXALAC_G	g/100 g	A			✓	1	0.04
OA_G	Organic acids, total (g)	OA_G	g/100 g	C			✓	107	3.87
P	Phosphorus	P	mg/100 g	A	✓	✓	✓	2763	100
PANTAC	Pantothenic acid	PANTAC	mg/100 g	A			✓	1434	51.9
PB	Lead	PB	µg/100 g	A			✓	497	18.0
PHE	Phenylalanine	PHE	mg/100 g	A			✓	491	17.8
PHE_G	Phenylalanine (g)	PHE_G	g/100 g	A			✓	490	17.7
PHEN	Phenylalanine (/g N)	PHEN	mg/g N	C			✓	491	17.8
PHYSTR	Phytosterols, total	PHYSTR	mg/100 g	A			✓	34	1.23
PRO	Proline	PRO	mg/100 g	A			✓	472	17.1
PRO_G	Proline (g)	PRO_G	g/100 g	A			✓	471	17.0
PRON	Proline (/g N)	PRON	mg/g N	C			✓	470	17.0
PROT	Protein, total; calculated from total nitrogen	PROT	g/100 g	C	✓	✓	✓	2763	100
PROXTOT	Proximate, total			C			✓	2763	100
PSACNS	Polysaccharides, non-starch	PSACNS	g/100 g	A			✓	1789	64.7
PSACNSI	Polysaccharides, non-starch, water-insoluble	PSACNSI	g/100 g	A			✓	1683	60.9
PSACNSS	Polysaccharides, non-starch, water-soluble	PSACNSS	g/100 g	C			✓	1664	60.2
QUINAC_G	Quinic acid (g)	QUINAC_G	g/100 g	A			✓	1	0.04
RB	Rubidium	RB	mg/100 g	A			✓	351	12.7
RETOL	Retinol	RETOL	µg/100 g	A		✓	✓	2763	100
RIBF	Riboflavin	RIBF	mg/100 g	A	✓	✓	✓	2763	100
S	Sulphur	S	mg/100 g	A			✓	1271	46.0
SE	Selenium	SE	µg/100 g	A	✓	✓	✓	2763	100
SER	Serine	SER	mg/100 g	A			✓	485	17.6
SER_G	Serine (g)	SER_G	g/100 g	A			✓	483	17.5
SERN	Serine (/g N)	SERN	mg/g N	C			✓	483	17.5

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
SISOL	Silicon (acid soluble)	SISOL	µg/100 g	A			✓	272	9.8
SN	Tin	SN	µg/100 g	A			✓	459	16.6
SORTL_G	Sorbitol (g)	SORTL_G	g/ 100 g	A			✓	23	0.83
STARCH	Starch, total	STARCH	g/100 g	A	✓	✓	✓	2763	100
STARCHM	Starch, total (monosaccharide equivalents)	STARCHM	g/100 g	C			✓	2763	100
STARES	Starch, resistant	STARES	g/100 g	A			✓	277	10.0
SUCAC_G	Succinic acid (g)	SUCAC_G	g/100 g	A			✓	17	0.62
SUCS	Sucrose	SUCS	g/100 g	A		✓	✓	2763	100
SUCSM	Sucrose (monosaccharide equivalents)	SUCSM	g/100 g	C			✓	2763	100
SUGAR	Sugars, total	SUGAR	g/100 g	C	✓	✓	✓	2763	100
SUGAD	Sugars, added	SUGAD	g/100 g	C	✓	✓	✓	2763	100
SUGFR	Sugars, free		g/100 g	C	✓	✓	✓	2763	100
SUGARM	Sugars, total (monosaccharide equivalents)	SUGARM	g/100 g	C			✓	2763	100
TAU	Taurine	TAU	mg/100 g	A			✓	161	5.83
TAU_G	Taurine (g)	TAU_G	g/100 g	A			✓	160	5.79
TAUN	Taurine (/g N)	TAUN	mg/g N	C			✓	160	5.79
THIA	Thiamin	THIA	mg/100 g	A	✓	✓	✓	2763	100
THR	Threonine	THR	mg/100 g	A			✓	486	17.6
THR_G	Threonine (g)	THR_G	g/100 g	A			✓	485	17.6
THRN	Threonine (/g N)	THRN	mg/g N	C			✓	484	17.5
TOCPHA	Alpha-tocopherol	TOCPHA	mg/100 g	A		✓	✓	1975	71.5
TOCPHB	Beta-tocopherol	TOCPHB	mg/100 g	A		✓	✓	973	35.2
TOCPHBG	Beta-tocopherol + Gamma-tocopherol		mg/100 g	A			✓	4	0.14
TOCPHD	Delta-tocopherol	TOCPHD	mg/100 g	A		✓	✓	1277	46.2
TOCPHG	Gamma-tocopherol	TOCPHG	mg/100 g	A		✓	✓	1305	47.2
TRP	Tryptophan	TRP	mg/100 g	A or C		✓	✓	1596	57.8
TRP_G	Tryptophan (g)	TRP_G	g/100 g	A			✓	547	19.8
TRPN	Tryptophan (/g N)	TRPN	mg/g N	C			✓	545	19.7
TYR	Tyrosine	TYR	mg/100 g	A			✓	491	17.8

Component identifier	Component name	INFOODS Tagname[a]	Unit	Analysed (A) or Calculated (C)	Concise Table 14th Edition 2021	FOODfiles™ 2021 Version 01			
						Standard	Unabridged	Number of foods	Percentage
TYR_G	Tyrosine (g)	TYR_G	g/100 g	A			✓	490	17.7
TYRN	Tyrosine (/g N)	TYRN	mg/g N	C			✓	489	17.7
V	Vanadium	V	µg/100 g	A			✓	349	12.6
VAL	Valine	VAL	mg/100 g	A			✓	486	17.6
VAL_G	Valine (g)	VAL_G	g/100 g	A			✓	485	17.6
VALN	Valine (/g N)	VALN	mg/g N	C			✓	485	17.6
VITA	Vitamin A, retinol equivalents	VITA	µg/100 g	C	✓	✓	✓	2763	100
VITA_RAE	Vitamin A, retinol activity equivalents	VITA_RAE	µg/100 g	C		✓	✓	2763	100
VITB12	Vitamin B12	VITB12	µg/100 g	A	✓	✓	✓	2763	100
VITB6A	Vitamin B6	VITB6A	mg/100 g	A	✓	✓	✓	2763	100
VITC	Vitamin C	VITC	mg/100 g	A	✓	✓	✓	2763	100
VITD	Vitamin D; calculated by summation	VITD	µg/100 g	C	✓	✓	✓	2763	100
VITE	Vitamin E, alpha-tocopherol equivalents	VITE	mg/100 g	C	✓	✓	✓	2763	100
VITK	Vitamin K	VITK	µg/100 g	A			✓	105	3.80
WATER	Water	WATER	g/100 g	A	✓	✓	✓	2763	100
ZEAX	Zeaxanthin	ZEAX	µg/100 g	A			✓	33	1.19
ZN	Zinc	ZN	mg/100 g	A	✓	✓	✓	2763	100

[a]Sources: Klensin et al. (1989) and FAO/INFOODS (2012c)

Appendix 3. Analytical methods

This table provides the analytical methods, including method references used to generate the values for components in the database.

Components	Method technique (primary)	Method identification and references[a]	Lower limit of detection *
Alcohol	Gas chromatography	Palo & Ilkova (1970)	
Ash	Gravimetric – dry ashing	AOAC 900.02: Ash of sugars and syrups AOAC 920.153: Ash of meat AOAC 923.03: Ash of flour AOAC 938.08: Ash of seafood AOAC 940.26: Ash of fruits and fruit products AOAC 942.05: Ash in animal feed In-house method	0.1 g/100 g
Fat, total	Acid hydrolysis – Organic solvent extraction/Soxhlet extraction	AOAC 954.02: Fat (crude) or ether extract in pet food AOAC 948.22: Fat (crude) in nuts and nut products	0.1 g/100 g
	Alkaline hydrolysis – Organic solvent extraction	International Dairy Federation (2004)	
	Alkaline and acid hydrolysis – Organic solvent extraction	'In-house' method	
Nitrogen, total	Titrimetry (Kjeldahl method)	AOAC 988.05: Protein (crude) in animal feed and pet food AOAC 981.10: Crude protein in meat AOAC 991.20: Nitrogen (total) in milk	0.1 g/100 g
	Combustion (Dumas method)	AOAC 968.06: Protein (crude) in animal feed	0.02 g/100 g
Fatty acid profile	Methylated with acid catalyst – Gas chromatography	Bannon et al. (1985) Sukhija & Palmquist (1988)	0.1 g/100 g
Conjugated fatty acids		'In-house' method based on Aldai et al. (2007)	0.1 g/100 g
Fibre, dietary (total, soluble and insoluble)	Enzymatic-gravimetric	AOAC 991.43: Total, soluble and insoluble dietary fibre in foods AOAC 985.29: Total dietary fibre in foods	0.1 g/100 g
Fibre, total dietary	Enzymatic-gravimetric-liquid chromatography	AOAC 2017.16: Rapid integrated total dietary fibre method Megazyme (2020)	0.1 g/100 g
Polysaccharides, non-starch	Enzymatic-gravimetric	Englyst et al. (1988)	0.1 g/100 g
Sugar profile	Gas liquid chromatography	'In-house' method	0.1 g/100 g
Starch	Enzymatic-colormetric	AOAC 996.11: Starch (total) in cereal products; (Lee et al. 1992)	0.1 g/100 g
Starch, resistant	Enzymatic-colormetric	AOAC 2002.2: Resistant starch in starch and plant materials	0.1 g/ 100 g
Water/Total solid	Vacuum oven/forced air-gravimetric	AOAC 950.46: Moisture in meat AOAC 930.15: Loss on drying (moisture) for feeds (at 135°C for 2 hours)/dry matter on oven drying for feeds (at 135°C for 2 hours)	0.1 g/100 g

Components	Method technique (primary)	Method identification and references[a]	Lower limit of detection *
		AOAC 925.10: Solids (total) and loss on drying (moisture) in flour AOAC 925.45: Loss on drying (moisture) in sugars Internatinal Dairy Federation (2010) International Dairy Federation (2004)	
	Titration (Karl Fisher)	AOAC 984.20: Loss on drying (moisture) and volatile matter in oils and fats, Karl Fisher method	0.1 g/100 g
Ca, K, Mg, Na, P, S	Biological materials digestion, ICP-OES	AOAC 984.27: Calcium, copper, iron, magnesium, manganese, phosphorous and zinc in infant formula. Mendham et al. (2000a) Martin et al. (1994)	0.001–0.005 g/100 g
Fe			1–5 mg/kg
Al, As, B, Co, Cr, Cs, Cu, Hg, Li, Mn, Mo, Pb, Ni, Rb, Si, Sn, V, Zn, Cd	Biological materials digestion, ICP-MS	Martin et al. (1994) Mendham et al. (2000b)	Unknown
I, Se, As	TMAH digestion, ICP-MS	Fecher et al. (1998)	0.001–0.004 mg/kg
Cl	Potentiometric	AOAC 971.27: Sodium chloride in canned vegetables	10 mg/kg dry or fresh product, 1 mg/kg liquids
Alpha- and Beta-carotene	HPLC	European Committee for Standardisation (2000b) Hostetler (2019)	1–5 µg/100 g
Lutein and Zeaxanthin	HPLC	McGhie & Ainge (2002) Barba et al. (2006)	5 µg/100 g
Retinol	Colorimetric	AOAC 974.29: Vitamin A in mixed feeds, premixes, and human and pet foods	10 IU/100 g
	HPLC	(European Committee for Standardisation 2000a)	
Folate, total	Microbiological	DeVries et al. (2005)	5 µg/100 g
Folic acid			
Thiamin	HPLC	European Committee for Standardisation (2003)	0.01 mg/100 g
Riboflavin	HPLC	Dunbar & Stevenson (1979)	
Niacin, preformed	HPLC	Woollard (1984)	
Pantothenic acid (Vitamin B_5)	Gas liquid chromatography	Davidek et al. (1985)	1 mg/100 g
Vitamin B_6	HPLC	Bitsch & Moller (1989); Gregory (1993) and Olds et al. (1993)	0.01 mg/100 g
Vitamin B_{12}	Radio isotope dilution	Green et al. (1974)	0.1 µg/100 g
	Microbiological	AOAC Method 952.20: Cobalamin (Vitamin B12 Activity) in vitamin preparations	0.01 µg/100 g
	HPLC	Campos-Gimenez et al. (2008)	Unknown
Vitamin C	LC-fluorometric detection	Dodson et al. (1992) Giménez et al. (2017)	1 mg/ 100 g

Components	Method technique (primary)	Method identification and references[a]	Lower limit of detection *
25-hydroxyvitamin D_3	Acetonitrile extraction followed by Radioimmune assay	Diasorin kit (Stillwater, Minnesota) from Immuno Pty Ltd	Unknown
Cholecalciferol (vitamin D_2) & Ergocalciferol (vitamin D_3)	Reversed phase HPLC with UV detection	AOAC 2002.05: Cholecalciferol (Vitamin D3) in selected foods	0.1 µg/100 g
Vitamin K1	HPLC	Damon et al. (2005) Schimpf et al. (2018) AOAC 999.15: Vitamin K in milk and infant formulas	1 µg/100 g
Alpha-Beta-, Delta- and Gamma-tocopherol	HPLC	Brubacher et al. (1986) AOAC Official Method 971.30: a-tocopherol and a-tocopherol acetate in foods and feeds	0.11 IU/100 g
Biotin	Optical biosensor-based immunoassay	Indyk et al. (2000)	Unknown
Caffeine	HPLC	Woollard (1982)	0.2 mg/g
Cholesterol	Gas chromatography	AOAC 933.08: Residue (unsaponifiable) of oils and fats AOAC 970.50: Fat (vegetable) in butterfat AOAC 970.51: Fats (animal) in vegetable fats and oils (determination of cholesterol)	0.5 mg/100 g
Amino acids	Enzymatic HPLC method	Draher & White (2018)	unknown
	HPLC	AOAC 988.15:Tryptophan in foods and food and feed ingredients AOAC 985.28: Sulphur amino acids in food, feed ingredient, and processed foods AOAC 994.12: Amino acids in feeds Landry et al. (1992)	
Sorbitol	HPLC	National Health and Family Planning Commission of the People Republic of China (2016)	unknown
Maltodextrin		Starch determination kit (Boehringer Mannheim)	0.1 g/100 g

[a] AOAC methods source: Official Methods of Analysis of AOAC International (2019)
* Lower limit of detection varies, based on the food matrix.
Note: The food components were analysed by IANZ (International Accreditation New Zealand) accredited laboratories in New Zealand and NATA (The National Association of Testing Authorities, Australia) accredited laboratory in Australia. Some of the analytical methods were not accredited for some of the food matrices. 'In-house' methods are developed or modified standard test method by the accredited laboratories.
AOAC = Association of Official Analytical Chemists; ICP-OES = Inductivity Coupled Plasma Optical Emission Spectroscopy; ICP-MS = Inductivity Coupled Plasma Optical Mass Spectrometry; HPLC = High Performance Liquid Chromatography; LC = Liquid Chromatography.

Appendix 4. Examples for energy calculation

1. Energy calculated based on FAO/INFOODS (2012b)

Component name: energy, total metabolisable (kJ)	
Components Identifier	ENERC
INFOODS tagname	ENERC
Formula	Energy (kJ/100 g Edible Portion, EP) = (protein, total calculated from nitrogen total x 17) + (fat, total x 37) + (available carbohydrate by weight x 17) + (alcohol x 29)
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains per g 100 g EP: 1.27 g protein, total; calculated from nitrogen total (PROT) + 0.2 g fat, total (FAT) + 12.3 g available carbohydrate by weight (CHOAVL) + 0 g alcohol (ALC)
	Calculation: [(1.27 g PROT x 17) + (0.2 g FAT x 37) + (12.3 g CHOAVL x 17) + (0.00 g ALC x 29)] = ***ENERC = 299 kJ/100 g EP***

Component name: energy, total metabolisable (kcal)	
Components Identifier	ENERC_KCAL
INFOODS tagname	ENERC_KCAL
Formula	Energy (kcal/100 g EP) = (protein, total; calculated from nitrogen total x 4) + (fat, total x 9) + (available carbohydrate by weight) x 4) + (alcohol x 7)
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains per g 100 g EP: 1.27 g protein, total; calculated from nitrogen total (PROT) + 0.2 g fat, total (FAT) + 12.3 g available carbohydrate by weight (CHOAVL) + 0 g alcohol (ALC).
	Calculation: [(1.27 g PROT x 4) + (0.2 g FAT x 9) + (12.3 g CHOAVL x 4) + (0.00 g ALC x 7)] = ***ENERC_KCAL = 56 kcal/100 g EP***

2. Energy calculated according to FAO/INFOODS (2012b) including dietary fibre

Component name: energy, total metabolisable (including dietary fibre, kJ)	
Components Identifier	ENERC1
INFOODS tagname	None
Formula	Energy (kJ/100 g EP) = (protein, total; calculated from nitrogen total x 17) + (fat, total x 37) + available carbohydrate by weight (CHOAVL) x 17) + (alcohol x 29) + (fibre, total dietary x 8)
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains per g 100 g EP: 1.27 g protein, total; calculated from nitrogen total (PROT) + 0.2 g fat, total (FAT) + 12.3 g available carbohydrate by weight (CHOAVL) + 0 g alcohol (ALC) + 2.4 g fibre, total dietary (FIBTG)
	Calculation: [(1.27 g PROT x 17) + (0.2 g FAT x 37) + (12.3 g CHOAVL x 17) + (0 g ALC x 29) + (2.4 g FIBTG x 8)] = ***ENERC1 = 258 kJ/100 g EP***

Component name: energy, total metabolisable (including dietary fibre, kcal)	
Components Identifier	ENERC1_KCAL
INFOODS tagname	None
Formula	Energy (kJ/100 g EP) = (protein, total; calculated from nitrogen total x 4) + (fat, total x 9) + available carbohydrate by weight (CHOAVL) x 4) + (alcohol x 7) + (fibre, total dietary x 2)
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains per g 100 g EP: 1.27 g protein, total; calculated from nitrogen total (PROT) + 0.2 g fat, total (FAT) + 12.3 g available carbohydrate by weight (CHOAVL) + 0 g alcohol (ALC) + 2.4 g fibre, total dietary (FIBTG)
	Calculation: [(1.27 g PROT x 4) + (0.2 g FAT x 9) + (12.3 g CHOAVL x 4) + (0 g ALC x 7) + (2.4 g FIBTG x 2)] = ***ENERC1_KCAL = 61 kcal/100 g EP***

3. Energy calculated according to Food Standards Australia New Zealand (2021a), using carbohydrate by difference

Component name: energy, total metabolisable, carbohydrate by difference, FSANZ (kJ)	
Components Identifier	ENERC_FSANZ1
INFOODS tagname	N/A
Formula	Energy (kJ/100 g EP) = (protein, total; calculated from nitrogen total x 17) + (fat, total x 37) + (carbohydrate by difference x 17) + (alcohol x 29) + (fibre, total dietary x 8) + (organic acids, total x 13)
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains per g 100 g EP: 1.27 g protein, total; calculated from nitrogen total (PROT) + 0.2 g fat, total (FAT) + 12.8 g carbohydrate by difference (CHOAVLDF_FSANZ) + 0.0 g alcohol (ALC) + 2.4 g fibre, total dietary (FIBTG) + 2.4 g organic acid, total (gram) (OA_G)
	Calculation: [(1.27 g PROT x 17) + (0.2 g FAT x 37) + (12.8 g CHOAVLDF_FSANZ x 17) + (0.00 g ALC x 29) + (2.4 g FIBTG x 8) + (2.4 g OA_G x 13)] = ***ENERC_FSANZ1 = 299 kJ/100 g EP***

Component name: energy, total metabolisable, carbohydrate by difference, FSANZ (kcal)	
Components Identifier	ENERC_FSANZ1_KCAL
INFOODS tagname	N/A
Formula	Energy (kcal/100 g EP) = Energy, total metabolisable, carbohydrate by difference FSANZ (kJ/100 g EP)/4.18
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains 299 kJ per 100 g EP of energy, total metabolisable, carbohydrate by difference, FSANZ (kJ) (ENERC_FSANZ1)
	Calculation: [(299 kJ/100 g EP ENERC FSANZ1)/ 4.18] = ***ENERC_FSANZ1_KCAL = 72 kcal/100 g EP***

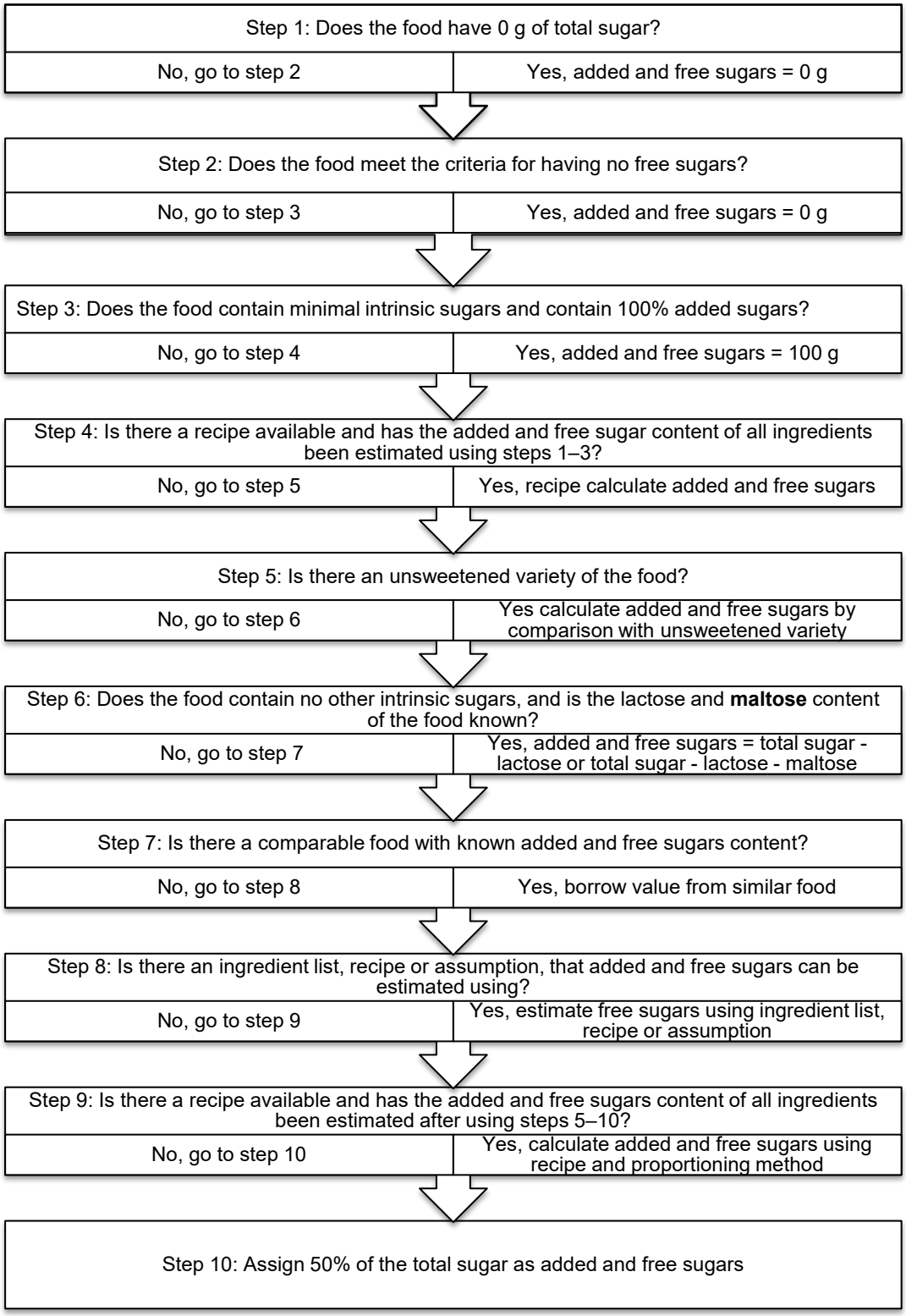
4. Energy calculated according to Food Standards Australia New Zealand (2021a), using available carbohydrate

Component name: energy, total metabolisable, available carbohydrate, FSANZ (kJ)	
Components Identifier	ENERC_FSANZ2
INFOODS tagname	None
Formula	Energy (kJ/100 g EP) = (protein, total; calculated from nitrogen total x 17) + (fat, total x 37)+ (available carbohydrate x 17) + (alcohol x 29) + (fibre, total dietary x 8) + (organic acids, total x 13)
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains: 1.27 g protein, total; calculated from nitrogen total (PROT) + 0.2 g fat, total (FAT) + 12.3 g available carbohydrate (CHOAVL_FSANZ) + 0 g alcohol (ALC) + 2.4 g fibre, total dietary (FIBTG) + 2.4 g organic acids, total (OA_G)
	Calculation: [(1.27 g PROT x 17) + (0.2 g FAT x 37) + (12.3 g CHOAVL_FASNZ x 17) + (0.00 g ALC x 29) + (2.4 g FIBTG x 8) + (2.4 g OA_G x 13)] = ***ENERC_FSANZ2 = 289 kJ/100 g EP***

Component name: energy, total metabolisable, available carbohydrate, FSANZ (kcal)	
Components Identifier	ENERC_FSANZ2_KCAL
INFOODS tagname	None
Formula	Energy (kcal/100 g EP) = Energy, total metabolisable, available carbohydrate, FSANZ (kJ) (kJ/100 g EP)/4.18
Example	L1078, Kiwifruit, green-fleshed, flesh & seed, raw, Zespri™ SweetGreen Kiwifruit contains: 289 kJ/100 g EP of energy, total metabolisable, available carbohydrate, FSANZ (kJ) (ENERC_FSANZ2)
	Calculation: [(289 kJ/100 g EP ENERC_FSANZ2)/ 4.18] = ***ENERC_FSANZ2_KCAL = 69 kcal/100 g EP***

Note: To avoid additional bias, the system rounds the energy value after summation of values from the energy-producing components according to Appendix 1.

Appendix 5. Method for estimating added and free sugars



Detailed 10-step method for estimating added and free sugars in FOODfiles 2021.

Steps	Added sugar	Free sugar
Objective steps		
1	**All foods with the total sugar content of 0 g were assigned 0 g sugar**	
2	**Assigned 0 g added sugar to foods in the following groups**	**Assigned 0 g free sugar to foods in the following groups**
	(a) 100% fruit juice and vegetable juice with no added sugar (include fruit puree)	(a) See below step 3 (l)
	(b) All spices and herbs	(b) All spices and herbs
	(c) All fats and oils	(c) All fats and oils
	(d) Plain cereals including pastas, rice and flours	(d) Plain cereals including pastas, rice and flours
	(e) Eggs and egg products (excluding egg-based desserts)	(e) Eggs and egg products (excluding egg-based desserts)
	(f) Fresh fruits, vegetables (including salads with no dressing), fresh meat, fresh seafood and tofu. Includes cooked vegetables, meat and seafoods with no added sugar.	(f) Fresh fruits, vegetables (including salads with no dressing), fresh meat, fresh seafood and tofu. Includes cooked vegetables, meat and seafoods with no added sugar.
	(g) Fruit canned in 100% fruit juice or liquid sweetened with artificial sweeteners	(g) See below step 3 (l)
	(h) Beverage base (without added sugar) and prepared with water (including flavoured drink)	(h) Beverage base (without added sugar)
	(i) Legumes (fresh, dried and/or processed, except sweetened varieties)	(i) Legumes (fresh, dried and/or processed, except sweetened varieties)
	(j) Mixed dishes with no added sugar (decided on the basis of ingredient information; recipe)	(j) Mixed dishes with no added sugar (decided on the basis of ingredient information; recipe)
	(k) Non-sugar-sweetened alcoholic beverage	(k) Non-sweetened alcohol (excluding liqueurs and mixers)
	(l) Non-sugar-sweetened tea and coffee	(l) Non-sugar-sweetened tea and coffee
	(m) Non-sugar-sweetened milk (including plant-based milk) and buttermilk; breastmilk	(m) Non-sugar-sweetened milk (excluding plant-based milk) and buttermilk; breastmilk
	(n) Non-sweetened dairy products (including those sweetened with artificial sweeteners only)	(n) Non-sweetened dairy products (including those sweetened with artificial sweeteners only)
	(o) All nuts and seeds (does not include sweetened varieties or nut bars)	(o) All nuts and seeds (does not include sweetened varieties or nut bars)
	(p) Oats, including porridge with no added sugar	(p) Oats, including porridge with no added sugar
	(q) Plain pastries without filling (such as chocolate, dried fruits and/or nuts)	(q) Plain pastries without filling (such as chocolate, dried fruits and/or nuts)
	(r) Plain breads (except gluten-free), English muffin, bagels, pizza bases and naan	(r) Plain breads (except gluten-free), English muffin, bagels, pizza bases and naan
	(s) Unsweetened dried fruits	(s) Unsweetened dried fruits

Steps	Added sugar	Free sugar
3	**Assigned 100% of total sugar as added sugar to foods in the following groups**	**Assigned 100% of total sugar as added sugar to foods in the following groups**
	(a) All confectionery except those containing dairy products such as fudge and chocolate. Vegetable chips (including potato, cassava, soy etc.)	(a) All confectionery (excluding chocolate) and vegetable chips (including potato, cassava, soy etc.)
	(b) Breakfast cereals and cereal bars without fruits, chocolate, dairy or milk	(b) All breakfast cereals and cereal bars which do not contain fruit pieces, chocolate, or dairy or milk
	(c) Coffee and beverage bases with no milk solids, dry, or made up with water	(c) Coffee and beverage bases
	(d) Crumbed/battered meat and seafood	(d) Crumbed/battered meat and seafood
	(e) Processed meat including pies, pastries, sausages etc.	(e) Processed meat including pies, pastries, sausages etc.
	(f) Soft drinks, sport drinks, flavoured water and non-fruit-based products that do not contain fruit, chocolate or dairy products	(f) Sugar-sweetened soft drinks, sports drinks, flavoured waters, and energy drinks.
	(g) Savoury biscuits, sweet biscuits, cakes, and buns, donuts and batter-based products that do not contain fruit, chocolate or dairy products	(g) All baked goods such as biscuits, cakes, buns, donuts and crackers that did not contain fruits, chocolate or dairy products. Gluten free breads.
	(h) Soy beverages and soy yoghurt without added fruits	(h) Soy beverages and soy yoghurt without added fruits
	(i) Stock powder	(i) Stock powder
	(j) Sugars and syrups	(j) All sugars and syrups
	(k) Sauces and dressings, excluding pasta sauces and those that are vegetable-based such as pickles	(k) Sauces and dressings, excluding pasta sauces and those that are vegetable-based such as pickles
		(l) All fruit juices, purees, concentrates, fruit canned in fruit juice and jams (both sweetened and unsweetened varieties), including tomato pastes, sauces, and purees
		(m) Alcoholic mixed drinks, non-cream-based liqueurs
4	**Calculation based on standard recipe used in the food composition database, where added sugar or free sugar contents of all ingredients were available from steps 1–3.**	
	(a) Calculation based on standard recipe used in the food composition database (by recipe calculation by FIMS)	
	(b) Added sugar content determined for undrained canned fruits in syrup: Added sugar (g/100 g) = Total sugar (g/100 g) – (total sugar content of raw fruit (g/100 g) * % of raw fruit in the canned fruits.	Free sugar content determined for undrained canned fruits in fruit juice or syrup: Free sugar (g/100 g) = Total sugar (g/100 g) – (total sugar content of raw fruit (g/100 g) * % of raw fruit in the canned fruits.
5	**Calculation based on comparison with values from the unsweetened variety**	
	Added or free sugar per 100 g is given by the formula:	

Steps	Added sugar	Free sugar
		$$Added\ or\ Free\ sugar\ (g/100g) = \frac{100 \times (S_{US} - S_T)}{(S_{US} - 100)}$$
	where S_{US} is the total sugar content per 100 g of the unsweetened variety of the food and S_T is the total sugar for the food item for which free sugars are to be estimated. Example: Added and free sugars calculation for sweetened (L1124) variety from the unsweetened (L1128) counterpart: L1124 – Peach, in light syrup, sugar-sweetened, canned, drained, composite (sugar total 14.2 g/100 g) L1128 – Peach, in water, artificially sweetened, canned, drained, composite (sugar total 6.6 g/100 g) Added or free sugar for L1124 = 100 – (6.6–14.2) / (6.6–100) = 8.14 g/100 g)	
6	**Decision based on analytical data of mono- and disaccharide content**	
	Lactose subtracted from total sugars for all foods Maltose subtracted from total sugars as intrinsic sugar	
7	**Use "borrowed" values from similar products from steps 1–6 or from overseas databases**	
	Example H215 – Spring roll, vegetarian, deep-fried, commercial, added and free sugar estimated based on the recipe in the NZFCD (old archive Food Records, H130 – Spring roll, deep), 90% of the total sugar	
8	**Subjective estimation of added and free sugars based on the best available information regarding ingredients and/or common recipes and/or assumption**	
	Added and free sugars estimated by searching the ingredient list of packed foods and recipes for sources. Example: D1055 – Breakfast cereal, muesli, ready to eat, Toasted Muesli Super Fruity, Sanitarium™, fortified vitamin E Ingredient list states dried fruits = 16% [raisins, cranberries]. Assumed even distribution (8.0% each). Total sugar from 8.0% raisins, 8.0% cranberries were considered as intrinsic sugars and deducted from the total sugars of D1055.	
9	**Calculate based on standard recipe which includes ingredients with values assigned at steps 5–8, using the proportioning method. Step 4 is repeated here where more have their added sugar contents estimated after steps 5–8.**	
	Ingredients ratio in the standard recipe checked (step 8, % dried fruit), exclude lactose value (step 6) Example – A1152 – Cake, assorted fruits, rich or dark, un-iced, ready to eat, commercial	
10	**Assign 50% of total sugars as added or free sugars**	
	Used when it was not possible to determine free sugars using steps 1–9. Example is takeaway foods, H1058 – Salad, coleslaw with dressing, fresh, from deli, composite, assumed 50% of the total is added and free sugars	

Sources: Louie et al. (2015), Louie et al. (2016) and Kibblewhite et al. (2017).

Appendix 6. Individual fatty acids contributing to the total fatty acids

Component identifier[a]										
Individual fatty acids	Undifferentiated fatty acid	FASATF	FAMSF	FAPUF	FAPUN3F	FALCPUN3F	FAPUN6F	FAMSTF	FAPUTF	FATRNF
F4D0F		✓								
F6D0F		✓								
F8D0F		✓								
F10D0F		✓								
F12D0F		✓								
F13D0F		✓								
F14D0F		✓								
F15D0F		✓								
F16D0F		✓								
F17D0F		✓								
F18D0F		✓								
F20D0F		✓								
F21D0F		✓								
F22D0F		✓								
F23D0F		✓								
F24D0F		✓								
F10D1F			✓							
F12D1F			✓							
F14D1N5F	F14D1F		✓							
F15D1F			✓							
F16D1CF	F16D1F		✓							
F16D1TF			✓					✓		✓
F17D1F			✓							
F18D1CN7F	F18D1F		✓							
F18D1TN7F								✓		✓
F18D1CN9F										
F18D1TN9F								✓		✓
F20D1N9F	F20D1F		✓							
F20D1N11F										
F22D1N9F	F22D1		✓							
F22D1N11F										

Component identifier[a]										
Individual fatty acids	Undifferentiated fatty acid	FASATF	FAMSF	FAPUF	FAPUN3F	FALCPUN3F	FAPUN6F	FAMSTF	FAPUTF	FATRNF
F24D1F			✓							
F18D2CN6F	F18D2			✓			✓		✓	
F18D2TN6F									✓	
F18D2TCN9T11F									✓	
F18D3N3F	F18D3F			✓	✓					
F18D3N6F							✓			
F18D4N3F	F18D4			✓	✓					
F20D2N6F	F20D2			✓			✓			
F20D3N3F	F20D3			✓	✓	✓				
F20D3N6F							✓			
F20D4N3F	F20D4			✓	✓	✓				
F20D4N6F							✓			
F20D5N3F	F20D5			✓	✓	✓				
F21D5N3F	F21D5			✓	✓	✓				
F22D2N6F	F22D2			✓			✓			
F22D4N6F	F22D4			✓			✓			
F22D5N3F	F22D5			✓	✓	✓				
F22D5N6F							✓			
F22D6N3F	F22D6F			✓	✓	✓				

[a] Description of the component identifier can be found in Appendix 2.

Appendix 7. Recipe calculation – Mixed method

Examples showing nutrient calculation for a recipe food record to demonstrate the principles of the recipe calculation system 'Mixed method'.

Ingredient	Amount in recipe	Weight ratio (X)	Water	Ash	Fat	Starch	Glucose	Sucrose	Sugar Total	Nitrogen total	Protein total[b]	Fibre	Sodium	Iron	Folate, total
	g		g	g	g	g	g	g	g	g	g	g	mg	mg	µg
C1036 – Baking cocoa, cocoa, powder, Cocoa, Bournville®, Cadbury® (per 100 g)	37.75	0.02		8.6	15.8	10.7	0	1.7		3.956		39.1	102	9.8	65
E1077 – Rice, white, polished, raw (per 100 g) – (A)	206	0.11		0.4	0.9	74.6	0.1	0.2		1.218		0.7	0	0	0
NRF[b] – (B)				1	1	1	1	1		1		1	1	0.95	0.7
E1077 – Rice, white, polished, raw, (per 100 g), nutrient values adjusted with NRF = (A x B)				0.4	0.9	74.6	0.1	0.2		1.218		0.7	0	0	0
P10 – Salt, table, un-iodised (per 100 g)	5.4	0.00		99.9	0	0	0	0		0		0	38100	0.2	0
Q1015 – Coconut, milk, standard, composite (per 100 g)	452.4	0.24		0.4	21.05	0	0	1.1		0.2		0.3	18.7	0.62	0
C40 – Water, tap (per 100 g)	1000	0.52		0.01	0	0	0	0		0		0	1	0	0
W23 – Sugar, raw (per 100 g)	218	0.11		0.05	0	0	0	99.17		0		0	1	0.3	0
Food components in the raw recipe (per 100 g) – (weight sum of nutrient in each ingredient *X)				0.598	5.37	8.22	0.011	11.6		0.256		0.915	114	0.373	1.28
Total weight of the ingredients (Y)	1920														
Weight Yield factor (per g) (z)										0.97					
Food components in the cooked dish (per 100 g, R10011) (X*Z)[a]			70.8[a]	0.62	5.53	8.47	0.01	11.9	11.9[b]	0.26	1.65[b]	0.9	118	0.39	1

[a] To avoid introducing additional bias, all the values were rounded after the calculation (summation, multiplication etc.), Appendix 1.
[b] Water value 70.8 g/100 g is calculated by the difference from 100 minus other proximate components: ash, fat, protein, fibre, starch and sugar.
[c] Calculated using formulas: sugar value 11.9 g/ 100 g is the sum of individual sugars (fructose, lactose and maltose values zero for all the ingredients) and 'protein, total' value is 1.65 g/100 g from nitrogen total (0.26 g/ 100 g) multiplied by nitrogen to protein conversion factor 6.25.

Appendix 8. Units of measurement and New Zealand metric standards

Units	Definition
1 teaspoon	5 mL
1 tablespoon	15 mL
1 cup	250 mL
mL	millilitres
L	litre
cm^3	cubic centimetre
µg	microgram
mg	milligram
g	grams
kg	kilogram
cm	centimetre
kcal	kilocalories
kJ	kilojoules
g/100 g TFA	grams per 100 g of total fatty acids or grams per percentage of total fatty acids
mg/g N	milligrams of amino acid per gram of nitrogen present in food
°C	degrees Celsius
%ABV	Percentage alcohol by volume

Appendix 9. Key to abbreviations

Abbreviation/Acronym	Meaning
ABV	Alcohol By Volume
AP	Applix Presents (file extension)
ASCII	American Standard Code for information changes
AOAC	Association of Official Analytical Chemists
AFCD	Australian Food Composition Database
BRWN	Brown
BLD	Boiled
CKD	Cooked
CoFID	Composition of Foods Integrated Dataset
CNF	Canadian Nutrient Files
CSM	Common Standard Measure
DRIP	Dripping
DRND	Drained
EP	Edible Portion
FAO	Food and Agriculture Organisation (United Nations)
FIMS	Food Information Management System
FT	Full Text index file extension
FSANZ	Food Standard Australia and New Zealand
FoodCASE	Food Composition And System Environment
FoodID	Food Index
FRZN	Frozen
HPLC	High Performance Liquid Chromatography
ICP-MS	Inductivity Coupled Plasma Mass Spectrometry
ICP-OES	Inductivity Coupled Plasma Optical Emission Spectroscopy
IU	International Unit
IUPAC	International Union of Pure and Applied Chemistry
INFOODS	International Network of Food Data Systems
LC	Liquid Chromatography
NIP	Nutrition Information Panel
NRF	Nutrient Retention Factor
NUTTAB	NUTrition TABles
NZFCD	New Zealand Food Composition Database
PFR	The New Zealand Institute for Plant and Food Research Limited
RAE	Retinol Activity Equivalent
RTD	Ready To Drink
RE	Retinol Equivalent
SIMMR	Simmer
TFA	Total Fatty Acid

Abbreviation/Acronym	Meaning
TMAH	Tetramethylammonium hydroxide
UHT	Ultra-heat treated Ultra-high-Temperature
USDA	United States Department of Agriculture
UV	Ultra-Violet
YF	Yield Factor
W/	With
W/O	Without
WHO	World Health Organisation
WTR	Water
WYF	Weight Yield Factor

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