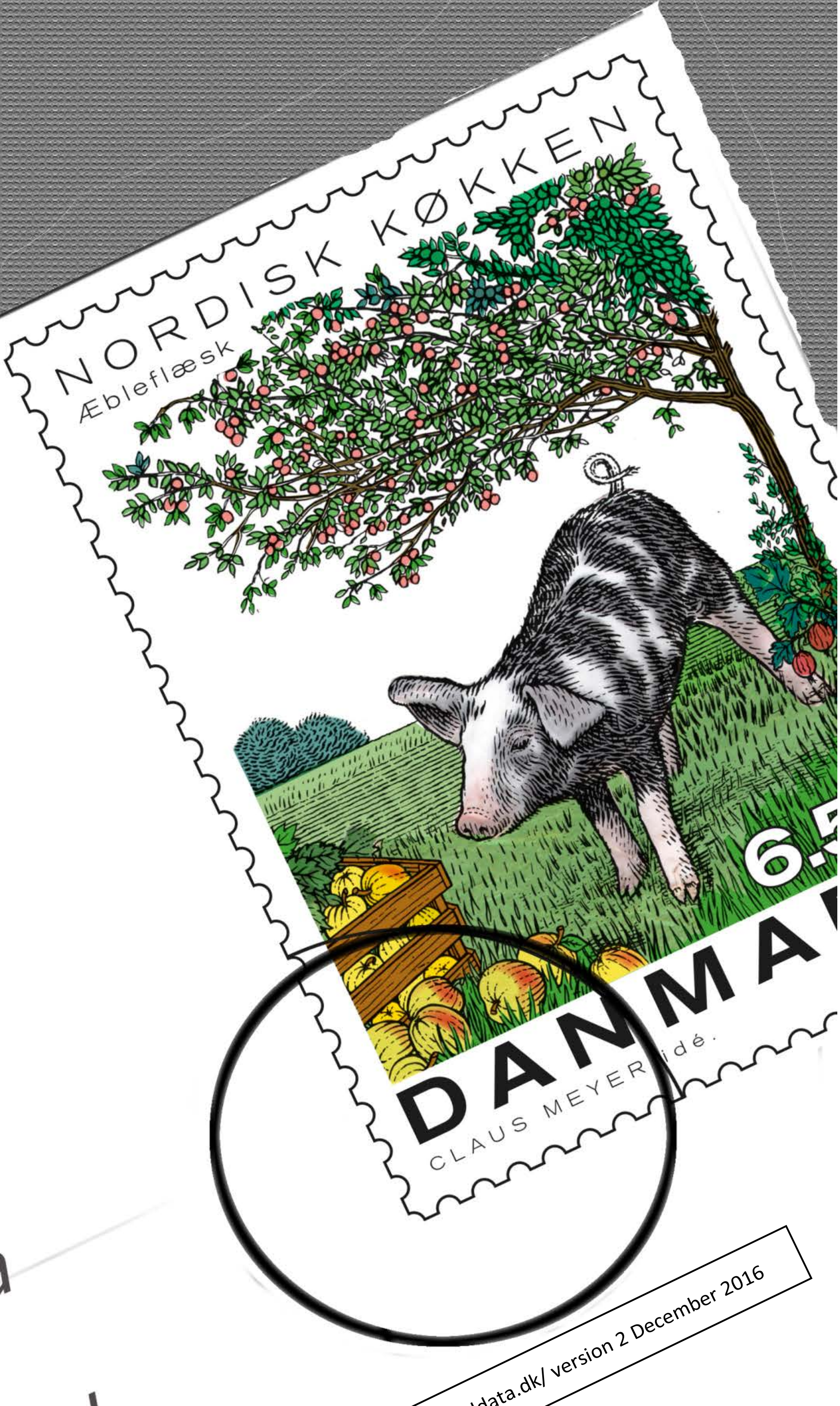

Frida Fooddata
Version 2
2016 DTU Food

Documentation of Food Composition Data http://frida.fooddata.dk/ version 2 December 2016

1. About frida.fooddata.dk

The database Frida Food Data (frida.fooddata.dk) was created and published by the National Food Institute, Technical University of Denmark (DTU) with the intention to facilitate public access to information about substances in the food we eat. Frida Food Data includes data on nutrient content of various foods, and the administrators strive to ensure that the database reflects the food supply in Denmark and that data are as correct and up to date as possible.

The tables show nutrient content per 100 g edible portion of food as average values. Data can be searched by food name or found in alphabetical lists of foods, food groups and food components. The table columns show: Nutrient, content (average) per 100 g, unit per 100 g, median, variation, number of samples and source.

To achieve the best possible quality Frida Food Data is maintained in cooperation with industry associations and retail companies, Nordic and international colleagues, and not least the Danish Veterinary and Food Administration.

1.1 Copyright

The National Food Institute publishes these data on http://frida.fooddata.dk free of charge to users.

All text and graphics in http://frida.fooddata.dk are protected by the Danish Copyright Act and the directive of the European Parliament and of the Council on copyright in the information society (Directive 2001/29/EC of 22 May 2001).

Data and texts from http://frida.fooddata.dk may not be copied or otherwise reproduced without clear acknowledgement of source.

Proposed source reference:

Long mention:

Frida Food Data (http://frida.fooddata.dk), version 1, 2015, National Food Institute, Technical University of Denmark

Brief mention:

© Frida Food Data (http://frida.fooddata.dk), version 1, 2015.

Version number and date will change as new versions of Frida Food Data are published.

Much of the graphic work is subject to copyright to third party and may therefore not be copied or otherwise reproduced without written permission.

1.2 Disclaimer

The National Food Institute maintains this website to facilitate public access to information on the substances in the food we eat. Efforts are made to ensure that the information is as accurate and up to date as possible. The correction of errors is an ongoing process.

It is clear that a food database is not created solely by Danish efforts. The financial costs alone for food analysis are too high, even seen over a longer period. Therefore, we use data from other countries' food databases to a certain extent. Consequently, the National Food Institute cannot give guarantees about the accuracy, sequence, timeliness or completeness of the data.

I, the National Food Institute accepts no responsibility with regard to the data presented and the subsequent use of such data, including the use of software and links from other databases.

The information on this site is intended for general information only.

2. News and changes

Frida Food Data (frida.fooddata.dk) version 2 replaces version 1 of Frida Food Data (frida.fooddata.dk). The most significant changes are described below.

2.1 New data

There are new data for the following food groups:

- Bread and breakfast cereals (iodine and salt).
- Bread
- Chicken
- Pork
- Dairy products
- Rice-, oats-, almond- and soya drink

An inventory of the products and ingredients covered by the update can be found here.

2.1.1 Displaying data

A new system of presenting data is used in Frida Food Data compared to the system used in previous versions of the Danish food tables. Thus, only data rows containing data are displayed. Consequently, you see a different number of data rows for the different foods, depending on the number of nutrients for which data exist.

2.1.2 Change of identification numbers

It has been necessary to change the identification numbers of product types, nutrients and sources (literature references) when switching from the Food Databank version 7.01 to Frida Food Data version 1.

Click here to see the correlation between old and new identification numbers.

3. Table structure

3.1 Foods

Frida Food Data must reflect the range of Danish food on offer, and the database is continuously optimised. Food names are shown in Danish and English, and, where possible, also the scientific name is given. In addition, synonyms and different spellings are indicated, where relevant.

3.2 Data rows

Data are tabulated with nutrients divided into:

- macronutrients
- factors etc.
  - waste
  - protein conversion factor
  - fatty acid conversion factor
- vitamins
  - fat-soluble
  - water-soluble
- minerals and trace elements
- organic acids
- carbohydrate fractions
- fatty acids
  - saturated
  - monounsaturated
  - polyunsaturated
  - fatty acid, total sums
- amino acids
- sterols
- biogenic amines

In Frida Food Data only data rows containing data are displayed. Consequently, you see a different number of data rows for the different foods, depending on the number of nutrients for which data exists.

In the data rows for the different ingredients there are columns for:

- substances
- unit per 100 g edible food
- content (average value for the samples analysed)
- median (for samples analysed)
- variation (minimum and maximum values for samples analysed)
- number of samples analysed
- source reference
- waste (if applicable)

3.3 Units

The following units are used to indicate the content of the individual substances per 100 g edible food:

Substance	Unit	Integer	1 decimal	3 digits
Energy	kJ (kcal)	X		
Protein	g		X	
Carbohydrate, total	g		X	
Fat	g		X	
Alcohol	g		X	
Ash	g		X	
Dry matter (water)	g		X	
Vitamin A	RAE			X
Vitamin D	µg			X
Vitamin E	mg			X
Vitamin K1	µg			X
Vitamin B1	mg			X
Vitamin B2	mg			X
Niacin	mg			X
Vitamin B6	mg			X
Pantothenic acid	mg			X
Biotin	µg			X
Folate	µg			X
Vitamin B12	µg			X
Vitamin C	mg			X
Sodium	mg			X
Potassium	mg			X
Calcium	mg			X
Magnesium	mg			X
Phosphorous	mg			X
Iron	mg			X
Copper	mg			X
Zinc	mg			X
Manganese	mg			X
Iodine	µg			X
Chromium	µg			X
Selenium	µg			X
Nickel	µg			X
Organic acids	g			X
Sugars	g			X
Sugar alcohols	g			X
Starch	g			X
Fatty acids	g (per 100 g of food) / % (of the sum of fatty acids)			X
Cholesterole	mg			X
Amino acids	mg			X

waste is expressed in per cent as integer.

3.4 Food composition values

All food composition values are expressed per 100 g edible portion of food. Such values will usually be based on an annual average, unless otherwise indicated in the description of the food.

The values in Frida Food Data are presented with a varying number of digits, depending on the nutrient and the food concerned.

Frida Food Data must reflect the range of Danish food on offer as well as possible. The database must be continuously updated to maintain its quality, and this is done in cooperation with the food industry, the food retailers, Nordic and international colleagues who work with food product tables and the Danish Veterinary and Food Administration.

The nutrient values in Frida Food Data are derived from:

- Analysis of foods from Denmark, analysed at accredited laboratories
- Values borrowed from other countries' databases, industry and trade figures.
- Estimated values: Where there is no analytical data, data can, in some cases, be transferred from foods similar to the particular food, or data can be calculated on the basis of various analytical data.

A 0 (zero) in the column showing food composition values means either that the value of the naturally occurring substance in question is zero or that there are only insignificant traces of the substance. For a particular food, the theoretical value of the sum of macronutrients (protein, available carbohydrate, dietary fibre, fat, alcohol, ash and water) will always make up 100 g/100 g of food. This will also apply where the carbohydrate is calculated by difference from analysed values. For some foods, this may in some cases result in a negative carbohydrate value. To avoid a negative carbohydrate value, the protein value is adjusted so that the calculated sum is precisely 100. This particularly applies to fish and meat products.

3.5 Median and variation range

Where each sample collected was analysed, the variation range is indicated by the minimum and maximum values found.

In those cases where the source indicates the standard deviation of the variation of the analysis results, the variation range is shown as the mean +/- 2 standard deviations.

3.6 Number of samples

As far as possible, data are used for which the number of samples is indicated. For data derived from the U.S. Department of Agriculture (USDA) the number of samples may be set to 0. This indicates that the USDA value was calculated.

3.7 Source of information

For each entry the source is indicated by a number in the column “Source”. This number refers to the references on which Frida Food Data is based. By clicking on the number the source of the information in the particular data row is displayed. In case there are several sources, all sources will be shown.

Source references starting with a T (e.g. T 115) indicate that the data are taken from a food with the identification number shown (in this case, No. 115: Tea, ready to drink).

Source value 1655 indicates that the value of the substance is either zero or that there are only insignificant traces of the substance.

Source value 1003 indicates that the value was calculated.

3.8 Food waste

Information about how much of a food is wasted is given next to the text box "Factors" as a percentage of the original product. The source value is indicated, if available. The waste percentages are indicative only.

Waste is the parts of a food that you normally do not eat, e.g. bones, heads, tails, fish fins and guts as well as the stalk and bad parts of an apple.
If there is a source value to the right of the text box “Waste”, the waste was calculated with a well-described method and documented in the reference material.

Foods in brine or sauce: As regards products like herring in curry sauce and mackerel in tomato sauce you can typically eat the sauce, thus the sauce is included in the edible part of the product. Pickled herring and mackerel in brine are examples of products where the brine is not eaten, and therefore the products are drained before analysis.

4. Basic information

4.1 Energy

Energy values are expressed in kilojoules (kJ) and kilocalories (kcal). They are calculated from the alcohol, carbohydrate (available), fat, fibre, organic acid, protein and sugar alcohol content with the factors listed in Table 2.

Table 2 Factors for calculating energy values

Nutrient	Energy, kJ/g
Alcohol	29
Carbohydrate (available) (except sugar alcohols)	17
Dietary fibre	8
Fat	37
Organic acid	13
Protein	17
Sugar alcohol	10

The calculation method is taken from the Nordic Nutrition Recommendations (NNR) [source 2040] and from the ordinance on nutrition labelling, etc. for pre-packaged foodstuffs [source 2041]. These energy values are indicative only. See more in Chapter 8.

4.2 Carbohydrates

In Frida Food Data a distinction is made between three different groups of carbohydrates, ref. NNR’s energy calculation method
[Source 2040]:

- carbohydrate determined by difference, includes dietary fibre
- available carbohydrate
- carbohydrate for nutrition labelling

Available carbohydrate and carbohydrate for nutrition labelling may have different values. This results from using a fixed factor for converting nitrogen to protein of 6.25 for nutrition labelling purposes, while using different factors for different foods for scientific purposes.

Carbohydrate is calculated as

carbohydrate, by difference	=	solids - $protein_{scientific}$ - fat - ash
carbohydrate, available	=	solids - $protein_{scientific}$ - fat - ash - dietary fibre
carbohydrate, nutrition labelling	=	solids - $protein_{declaration}$ - fat - ash - dietary fibre

For negative values of carbohydrate determined by difference, the protein content is adjusted down so that carbohydrate determined by difference becomes zero (0). This is common for fish and meat.

The tables also provide information on the following carbohydrate fractions:

Starch	includes starch, dextrins and glycogen.
Sugars, total	sum of all known mono- and di-saccharides.
Added sugar	is refined or industrially produced sugar, perhaps in the form of an ingredient in another food. The value may, for example, originate from a label, not from chemical analysis. There may, therefore, be instances where information on added sugar is not consistent with other carbohydrate information.
Sugar alcohols	like sorbitol, mannitol, inositol, maltitol and isomalt are energising carbohydrates. They occur naturally or are in the form of added sweeteners.
Dietary fibre	There is no clear definition of dietary fibres. The definition originally accepted is physiologically based and states that dietary fibres are plant polysaccharides and lignin, which are not degraded by human digestive enzymes.

Danish dietary fibre values are based on the AOAC (Association of Official Analytical Chemists) method AOAC 15th Ed, 1990, 985.29. Most of the dietary fibre values are new Danish values determined by the AOAC method.

Old British dietary fibre values are traditionally based on the Southgate method, which usually gives somewhat higher values than the AOAC method, while newer values are based on the Englyst and AOAC methods. British dietary fibre numbers are linked to the sources [1344, 1354, 1541]. Older American values are based on the 'crude fibre' method (1342 and 1346), which gives lower values than AOAC numbers, while newer American numbers are based on the AOAC method [Source 1938 and 2055].

4.3 Protein

Protein content is calculated from the analysed values for total nitrogen. Protein for scientific purposes is calculated by multiplying the nitrogen content by a conversion factor (NCF, Nitrogen Conversion Factor) that is dependent on protein composition and, thus, the composition of each food. This method tends to overestimate the protein content of product categories such as fish and meat. Protein for nutrition labelling purposes is calculated by a fixed factor of 6.25. The conversion factors in Table 3 are used unless another factor is indicated for a specific food.

Table 3. Nitrogen-to-protein conversion factors *

Protein source	Factor	Protein source	Factor	Protein source	Factor
Animal origin:		Endosperm	5.70	Hazelnuts	5.30
Egg	6.25	***Legumes:***		Hickory nuts	5.30
Gelatin	5.55	Adzuki	6.25	Pecans	5.30
Meat	6.25	Castor	5.30	Pine nuts	5.30
Milk	6.38	Jack	6.25	Pistachio nuts	5.30
Vegetable origin:		Lima	6.25	Walnuts	5.30
Grains and cereals:		Mung	6.25	***Grains/seeds:***	
Barley	5.83	Navy	6.25	Melon seeds	5.30
Maize	6.25	Soya	5.71	Cottonseeds	5.30
Millet	5.83	Velvet	6.25	Linseeds	5.30
Oat	5.83	Peanuts	5.46	Hempseeds	5.30
Rice	5.95	***Nuts:***		Pumpkin seeds	5.30
Rye	5.83	Almonds	5.18	Sesame seeds	5.30
Sorghum	6.25	Brazil nuts	5.46	Sunflower seeds	5.30
Wheat:		Butternuts	5.30	***All other foods, general factor***	***6.25***
Whole grains	5.83	Cashews	5.30		
Bran	6.31	Chestnuts	5.30		
Embryo	5.80	Coconuts	5.30		

*) Jones, D.B.: Factors for converting percentages of nitrogen in foods and feeds into percentages of protein. United States Department of Agriculture, Circular No. 183. Slightly revised edition 1941.

In Frida Food Data, the factor used for a particular food is listed as supplementary information after protein (e.g. 'NCF: 6.25').

4.4 Amino acids

The content of 18 amino acids is listed in the tables for each food. The following amino acids are listed: *Isoleucine, leucine, lysine, methionine, cystine, phenylalanine, tyrosine, threonine, tryptophan, valine, arginine, histidine, alanine, aspartic acid, glutamic acid, glycine, proline and serine*.

4.5 Fat and fatty acids

The total fat content, which is equal to the total content of lipids, is indicated along with a fatty acid conversion factor (FCF). This factor is experimentally determined from the analysed fat and fatty acid content. Table 4 shows the theoretical maximum fatty acid conversion factors for a number of foods. These conversion factors may be used for conversion of total fat to total fatty acid content. As a rule, the factors indicated in Table 4 may be used.

Table 4. Fatty acid conversion factors *

Food	Conversion factor
Wheat, barley and rye	
- Whole grains	0.720
- Flour	0.670
- Bran	0.820
Oats, whole grains	0.940
Rice, polished	0.850
Milk and dairy products	0.945
Eggs	0.830
Fats and oils	
- All except coconut oil	0.956
- Coconut oil	0.942
Beef and lamb	
- lean	0.916
- fat	0.953
Pork	
- lean	0.910
- fat	0.953
Poultry	0.945
Guts	
- Hearts	0.789
- Kidneys	0.747
- Liver	0.741
Fish	
- lean	0.700
- fat	0.900
Vegetables and fruits	0.800
- Avocado	0.956
- Nuts	0.956

* (Paul, A.A. & Southgate, D.A.T. 1978. McCance and Widdowson's The composition of foods. 4th edition. London, Her Majesty's Stationery Office.)

These conversion factors should be considered as indicative values.

The fatty acids are listed as g/100 g edible portion of food as well as as a percentage of the total fatty acid amount (g fatty acid/100 g total fatty acid).

See also Appendix A - Fatty acids, their common and systematic names.

4.6 Sterols

Data for cholesterol are shown in Frida Food Data.

4.7 Alcohol

The values for alcohol (ethanol) are shown as g/100 g. Note that this unit is different from volume percent (vol.%), which is normally used on food packaging, and the value in vol.% is typically somewhat higher than in the unit g/100 g.

As pure alcohol has a specific gravity of 0.789 t/cubic metre, vol.% can be converted into wt % by the following formula:

vol. % × 0.789/(product density) = wt %

Example: If a lager contains 4.6 vol.% alcohol and the density is 0.98 the lager contains 3.7 grams of alcohol per 100 grams (4.6 × 0.789 / 0.98 = 3.7).

4.8 Dry matter and water

Water is calculated from the analytical value of solids: Water = 100 - solid, with the unit g/100 g edible food.
Water does not contribute with energy but is nevertheless an important nutrient. It is also noted that a change in water content, e.g. as a result of evaporation, can lead to substantial changes in the content of other nutrients expressed per 100 g of food.

4.9 Ash

Ash is the part of the food that is left after ashing. Essentially, ash consists of various minerals. Ash is part of the calculation of total carbohydrate by difference.

5. Vitamins

Generally, data are shown in the same manner as in the Nordic Nutrition Recommendations from 2012 [2040]. When this is not possible, the source used is indicated.

5.1 Vitamin A

For vitamin A values for retinol and beta-carotene are shown. The total vitamin A activity is calculated in the unit retinol equivalent (RE):

1 RE = 1 µg retinol
= 12 µg β-carotene

When converting from international units (IU) the following conversion factor is used

1 IU retinol = 0,3 µg retinol.

5.2 Vitamin D

For vitamin D the values for vitamin D3, vitamin D2, 25-hydroxy vitamin D3 and 25-hydroxy vitamin D2 are shown, where available. There is no consensus on how the total vitamin D activity is calculated from the single active vitamin D components. In this version we use the same conversion factors as in FoodComp 7.01

1 µg vitamin D = 1 µg vitamin D3
= 1 µg vitamin D2
= 0.2 µg 25-hydroxy vitamin D3
= 0.2 µg 25-hydroxy vitamin D2 [1]

When converting from international units (IU) the following conversion factor is used

1 IU vitamin D = 0.025 micrograms of vitamin D.

[1] These factors are found on the basis of the following articles

Blunt JW et al (1968): Biological activity of 25-hydroxycholecalciferol, a metabolite of vitamin D3. Proceeding of the National Academy of Sciences of the United States of America 61(4), 1503-1516.

Jakobsen J (2007): Bioavailability and bioactivity of vitamin D3 active compounds - Which potency should be used for 25-hydroxy vitamin D3? Int. Congress Series 1297, 133-142.

Cashman KD et al (2012): Relative effectiveness of oral 25-hydroxyvitamin D3 and vitamin D3 in raising winter time serum 25-hydroxy vitamin D in older adults. Am J Clin Nutr 2012; 95: 1350-6.

Jette A et al (2014): Pharmacokinetics of oral vitamin D3 and calcifediol. Bone 59, 14-19.

5.3 Vitamin E

For vitamin E only the value for α-tocopherol, which reflects the total vitamin E activity, is used.

5.4 Vitamin K_1

For Vitamin K only the value for phylloquinone, vitamin K1, is indicated. Please note that menaquinones (vitamin K2) also have vitamin K activity.

5.5 Vitamin B1

Vitamin B1 activity (thiamin and 2- (1-hydroxyethyl) thiamin and phosphate esters thereof) is indicated as for thiamin. Vitamin B1 is expressed as thiamin chloride hydrochloride (MW 337.28).

5.6 Riboflavin

The activity of vitamin B2 (riboflavin and its phosphate esters) is expressed as riboflavin (MW 376.36).

5.7 Niacin

The niacin activity includes nicotinic acid, nicotinamide and tryptophan. The content of niacin is the sum of nicotinamide and nicotinic acid and is expressed as nicotinic acid (molecular weight 123.11). Niacin activity is expressed in niacin equivalents (NE):

1 NE = 1 mg niacin
= 60 mg tryptophan

In calculating niacin activity in cereals and cereal products only tryptophan contributes to niacin activity as niacin is probably not available in these products

5.8 Vitamin B_6

The vitamin B6 activity, i.e. pyridoxine, pyridoxal and pyridoxamine and phosphate esters thereof, is expressed as pyridoxine, calculated as pyridoxine hydrochloride (MW 205.64).

5.9 Pantothenic acid

Expressed as pantothenic acid (MW 219.23).

5.10 Biotin

Expressed as biotin (MW 244.31).

5.11 Folate

Content of folate active substances is expressed as folic acid (MW 441.40).

5.12 Vitamin B_{12}

Vitamin B12 activity is expressed as cyanocobalamin (MW 1355.37).

5.13 Vitamin C

Vitamin C is expressed as the sum of ascorbic acid and dehydroascorbic acid. Based on earlier studies it is estimated that the content of dehydroascorbic is often of minor importance. In some foods, the amount of dehydroascorbic acid is 10-30% of the ascorbic acid. This may be the case in processed (e.g. cut) fruits and vegetables. Vitamin C is specified as ascorbic acid (MW 176.12), with the unit mg/100 g edible portion.

6. Minerals and trace elements

The content of chloride, sodium, potassium, calcium, magnesium, phosphorus, iron, copper, zinc and manganese is expressed as mg/100 g of edible portion, while the content of iodine, chromium, selenium, and nickel is expressed as µg/100 g of edible portion. Values for minerals and trace elements indicate total content.

7. Other components

7.1 Biogenic amines

/GB>The compounds histamine, tyramine, phenylethylamine, putrescine, cadaverine, spermine, spermidine and serotonin are all biogenic amines. They are natural substances which are not nutrients but may, nevertheless, be of interest in some cases. They can cause unpleasant reactions in certain susceptible individuals. In rare cases, where there are hygienic problems with a food product, the content of biogenic amines may become so high that they will cause reactions in virtually all individuals. Read more about biogenic amines here: http://frida.fooddata.dk/bv/userfiles/downloads/BiogeneAminer.pdf. Biogenic amines are expressed in the unit mg/100 g edible portion.

7.2 Sugar alcohols

Sugar alcohols like *sorbitol, mannitol, inositol, maltitol and isomalt* and others are energising carbohydrates (see the section on energy). They can occur both naturally and as added sweeteners. Especially sweets and confectionery products may have high quantities of sugar alcohols. Sugar alcohols are expressed in the unit g/100 g edible portion.

8. Assumptions and calculations

For certain food groups, comments onassumptions and calculations of nutrient content have been added. For some food products there is direct correlation between the content of two or more substances. The work to uncover these correlations is an ongoing process and is refined as more and improved food analysis are undertaken. The correlation between fat content and fat-soluble vitamins in milk products is used to calculate the content of the fat-soluble vitamins (see Table 9). Similar correlations are used to calculate the cholesterol content in dairy and meat products.

These correlations are described in the following sections.

8.1 Energy calculation

Energy (kJ/100 grams) is calculated as:

$$\text{Energy} = \text{alcohol} \times 29 + \text{fat} \times 37 + \text{dietary fibre} \times 8 + \text{carbohydrate (available)} \times 17 + \text{organic acids} \times 13 + \text{protein} \times 17 + \text{sugar alcohols} \times 10$$

or expressed from the originally analysed values as:

$$\text{Energy} = \text{protein} \times 17 + \text{fat} \times 37 + \text{alcohol} \times 29 + \text{carbohydrate, for., energy} \times 17 + \text{sugar alcohols} \times 10 + \text{organic acids} \times 13 + \text{dietary fibre} \times 8$$

$$= \text{NCF} \times \text{N} \times 17 + \text{fat} \times 37 \times \text{alcohol} \times 29 + (\text{solid - alcohol - ash - fat - (NCF} \times \text{N) - dietary fibre - sugar alcohols, total - organic acids, total}) \times 17 + \text{sugar alcohols} \times 10 + \text{organic acids} \times 13 + \text{dietary fibres} \times 8$$

(where NCF is the nitrogen conversion factor and N is the nitrogen content)

$$= (\text{solid - ash}) \times 17 + \text{fat} \times 20 + \text{alcohol} \times 12 - \text{dietary fibre} \times 9 - \text{sugar alcohols} \times 7 - \text{organic acids} \times 4$$ <GB />

Conversion from kJ to kcal:
1 kJ = 0.239 kcal

8.2 Milk and milk products

8.2.1 Values for fat-soluble vitamins in dairy products

The content of fat-soluble vitamins (retinol, β-carotene, vitamin D and vitamin E) in dairy products is calculated on the basis of the products' content of milk fat since the content of fat-soluble vitamins follows the products' content of milk fat, and the reprocessing of each product does not cause any detectable loss of these vitamins.

It should be noted that the content of fat-soluble vitamins in milk fat exhibits a significant seasonal variation. However, only annual averages are shown in the tables. For the calculation of fat-soluble vitamins in milk products the values in Table 9 are used.

Table 9. Calculation of fat-soluble vitamins

Vitamin	Unit	Calculated as
Retinol	µg/100g	total fat (g/100 g) × 8.5 (µg retinol/g fat)
β-carotene	µg/100g	total fat (g/100 g) × 4.4 (µg β-carotene/g fat)
Vitamin D	µg/100g	total fat (g/100 g) × 0.0086 (µg D vitamin/g fat) + water (g/100 g) × 0.0008 (µg D vitamin/g water)
Vitamin E	α-TE	total fat (g/100 g) × 0.0255 (mg α-tokopherol/g fat)

8.2.2 The content of fatty acids in dairy products

The fatty acid content is calculated in a similar manner for those milk products where specific results of analysis are missing. The fatty acid content is assumed to exhibit a constant and equal distribution.

This assumption of constant fatty acid distribution is not entirely correct as the fatty acid content shows a clear seasonal variation depending on the feed and the cattle breed.

Table 10 shows the average values used to calculate the fatty acid content in dairy products (values derived from source number [1227].

Table 10. Average distribution of fatty acids in milk fat

Fatty acid	g fatty acid per 100 g milk fat
C 4:0	3.4
C 6:0	2.2
C 8:0	1.4
C 10:0	3.1
C 12:0	3.9
C 14:0	11.0
C 16:0	29.6
C 18:0	10.1
C 14:1	1.4
C 16:1	2.2
C 18:1	22.2
C 18:2	2.1
C 18:3	0.8
C 20:1	1.2

8.2.3 The content of cholesterol in dairy products

The content of cholesterol in milk products also follows the content of milk fat, taking, however, into account the manufacturing method. Products that have undergone separation (skimmed milk) contain a proportionately greater amount of cholesterol than 'unseparated' products. On the basis of studies conducted in the US [source 1342] the following correlation between milk fat content and cholesterol in dairy products has been observed:

Cholesterol = 3.24 × fat + 2

,the unit of cholesterol being mg/100 g and that of fat g/100 g

8.3 Cereals and cereal products

8.3.1 Niacin in cereals and cereal products

For cereals the niacin equivalent value is calculated from the tryptophan content alone, since niacin is considered inaccessible in this food group due to binding of niacin.

8.4 Meat and meat products

8.4.1 General comments

For the raw meat cuts, there is a direct correlation between macronutrients and the content of vitamins and minerals/trace elements. The following describes how these values can be calculated.

8.4.2 Cholesterol content in meat and meat products

For meat cuts, there is a direct correlation between the content of protein, fat and cholesterol. The cholesterol content in meat cuts can therefore be calculated from the content of fat and protein.

Where there are no specific analytical values, the cholesterol content is calculated using the following calculation formula [Source 1342]:

cholesterol = protein × x + fat × y

where x is 2.6 for pork, 2.65 for beef and 3.25 for lamb and sheep and y is 1 for all types of meat. The content of cholesterol and fat is expressed as mg/100 g and g/100g, respectively.

8.4.3 Vitamin D content in meat and meat products

For cuts of meat, we have calculated the content of vitamin D from the content of fat. Vitamin D is calculated where there are no specific analytical values. The calculation method was developed from analysed results of similar meat samples of beef and pork (derived from source [1300]):

- Beef: Vitamin D [µg/100 g] = fat [g/100g] × 0.0207 + 0.3108
- Pork: D3 cholecalciferol [µg/100 g] = fat [g/100g] × 0.0056 + 0.0541
- Pork: 25-hydroxycholecalciferol [µg/100 g] = fat [g/100g] × 0.0013 + 0.0812

8.4.4 Information on meat cuts

The type of meat cuts on the market vary over time depending on market trends (consumer demands, trade, tradition, etc.). This can cause changes in the content of nutrients, especially fat and protein.

For pork, there have been changes for some cuts and their names. Pork meat has generally become more lean. This development has progressed over the past 25 years.

The cuts of beef have only been exposed to insignificant changes over the same period.

When using data for meat cuts you should check whether the fat content of the particular product is equal to the fat content declared in Frida Food Data. For example, if a specific product is estimated to be more lean than specified in Frida Food Data, one can use the data available for a similar meat product with lower fat content, corresponding to the actual cut of meat, for nutrient calculations.

9. Source references

[2040] Nordic Nutrition Recommendations NNR 2012 - integrating nutrition and physical activity. Nord 2004: 002nd ISBN ISBN 978-92-893-2670-4.https://www.norden.org/en/theme/nordic-nutrition-recommendation/nordic-nutrition-recommendations-2012< GB/>

[2048] National Academy of Science, Food and Nutrition Board: Dietary reference intakes of Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, molybdenum denum, Nickel, Silicon, Vanadium , and Zinc (2001). URL: http://www.nap.edu/openbook.php?isbn=0309072794

[2049] National Academy of Science, Food and Nutrition Board: Dietary reference intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride (1999). URL: http://www.nap.edu/openbook.php?record_id=5776

[2053] National Academy of Science, Food and Nutrition Board: Dietary reference intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids (2000). URL: http://www.nap.edu/openbook.php?record_id=9810&page=1

[2056] National Academy of Science, Food and Nutrition Board: Recommended Dietary Allowances. 10th ed.)

Appendix A - fatty acids, their common and systematic names

Table name	Common name	Chemical name
C4:0	Butyric acid	Butanoic acid
C6:0	Capronic acid	Hexanoic acid
C8:0	Caprylic acid	Octanoic acid
C10:0	Capric acid	Decanoic acid
C12:0	Lauric acid	Dodecanoic acid
C14:0	Myristic acid	Tetradecanoic acid
C15:0		Pentadecanoic acid
C16:0	Palmitic acid	Hexadecanoic acid
C17:0	Margaric acid	Heptadecanoic acid
C18:0	Stearic acid	Octadecanoic acid
C20:0	Arachidic acid	Eicosanoic acid
C22:0	Behenic acid	Docosanoic acid
C24:0	Lignoceric acid	Tetracosanoic acid
C14:1,n-5	Myristoleic acid	(Z)-tetradec-9-enoic acid
C15:1		Pentadecensyre; (Z)-pentadec-10-enoic acid
C16:1,n-7	Palmitoleic acid	(Z)-hexadec-9-enoic acid
C16:1,trans	Palmitelaidic acid	(E)-hexadec-9-enoic acid; 9-trans-hexadecenoic acid
C17:1,n-7		cis-10-heptadecensyre; (Z)-heptadec-10-enoic acid
C18:1,n-7	cis-vaccenic acid	(Z)-octadec-11-enoic acid
C18:1,n-9	Oleic acid	(Z)-octadec-9-enoic acid
C18:1,t n-9	Elaidic acid	(E)-octadec-9-enoic acid
C20:1,n-9	Gondoic acid	(Z)-eicos-11-enoic acid
C20:1,n-11	Gadoleic acid	(9Z)-9-eicosenoic acid
C20:1,trans		trans-11-eicosenoic acid
C22:1,n-9	Erucic acid	(Z)-docos-13-enoic acid
C22:1,n-11	Cetoleic acid	(Z)-docos-11-enoic acid
C22:1,n-9,trans	Brassidic acid	(E)-13-docosenoic acid
C24:1,n-9	Nervonic acid	(Z)-tetracos-15-enoic acid
C18:2,n-6	Linoleic acid	(9Z,12Z)-9,12- octadecadienoic acid
C18:2,conj-A	Conjugated linoleic acids (CLA), undifferentiated	Conjugated linoleic acids (CLA); 9,t11-CLA (1)
C18:2,trans		(2)
C18:3,n-3	α-linolenic acid	(9Z,12Z,15Z)-9,12,15-octadecatrienoic acid
C18:3,n-6	γ-linolenic acid	6Z,9Z,12Z-octadecatrienoic acid
C18:4,n-3	Steridonic acid	(6Z,9Z,12Z,15Z)-6,9,12,15-octadecatetraenoic acid
C20:2,n-6		11Z,14Z-eicosadienoic acid
C20:3,n-3	Eicosatrienoic acid; ETE	*all-cis*-11,14,17-eicosatrienoic acid; 11Z,14Z,17Z-eicosatrienoic acid

Table name	Common name	Chemical name
C20:3,n-6	Dihomo-γ-linolenic acid; DGLA	8Z,11Z,14Z-eicosatrienoic acid
C20:4,n-3	n-3 arachidonic acid	8Z,11Z,14Z,17Z-eicosatetraenoic acid
C20:4,n-6	arachidonic acid	(5Z,8Z,11Z,14Z)-5,8,11,14-eicosatetraenoic acid
C20:5,n-3	Timnodonic acid; EPA	(5Z,8Z,11Z,14Z,17Z)-eicosapentaenoic acid
C22:5,n-3	Clupanodonic acid; DPA	(7Z,10Z,13Z,16Z,19Z)-7,10,13,16,19-docosapentaenoic acid
C22:6,n-3	Cervonic acid; DHA	cis 4,7,10,13,16,19-docosahexaensyre
Other FA (?)		(3)

(1) conjugated linoleic acid is a mixture of several fatty acids which are not clearly identified. Rumenic acid and t10, c12-CLA may be the most abundant

(2) C18: 2, trans covers various isomeric c, t/t, c/t, t with methylene-interrupted double bonds i.e. 9,12

(3) fatty acids which are not clearly identified in the chemical analysis or found only in very small amounts.

Appendix B - Specific gravity (density) of liquid food

Food	Density kg/l	Source
Milk products		
Skimmed	1.0363	5
Semi-skimmed milk	1.0341	5
Whole milk	1.0314	5
Cream 9%	1.0179	5
Cream 13%	1.0131	5
Cream 38%	0.9835	5
Cocoa milk, skimmed	1.0567	5
Cocoa milk	1.0519	5
Creme fraiche 18%	1.0051	5
Creme fraiche 38%	0.9788	5
Ymer	1.0307	5
Ylette (ymer, low fat)	1.0312	5
A-38 (milk, acidophilus cultured)	1.0103	5
Butter milk	1.0219	5
Plain yogurt	1.0306	5
Yogurt with fruit	1.0451 to 1.0596	5
Cooking oils		
Palm oil	0890	6
Other edible oils	0920	7
Mineral water		
All kinds, sweetened	1035-1040	8
Beer		
Pilsner (lager beer))	1.0072	9
Strong beer	1.0089	9
Elephant b beer	1.0104	9
Påskebryg (easter beer)	1.0123	9
Porter (porter beer)	1.0190	9
Wine and spirits		
Spirits 75%	0873	8
Spirits 70%	0885	8
Whisky 45%	0993	8
Cognac and schnapps 40%	0948	8
Schnapps 37%	0953	8
Liqueur, all sorts	1030-1150	8
Table wines	Around 0990	8
Liqueur	1000-1040	8

Appendix C - Data curation

Data are preserved and documented with all available details, ensuring that it is always possible to study the original data at the most detailed level. Data curation makes it possible to use data also in future on updated IT platforms.

All data collected are archived in full, including full documentation. Data that no longer contribute to the current user tables are retained in full, and old data are not deleted. This ensures that old data can be studied, and any interesting developments in the content of nutrients can be followed.

It is ensured that data collections and the underlying documentation remain accessible and viable in subsequent technological environments.

Data curation is essential for a research institution like DTU because it offers two vital services: 1) data are not only stored but also retained to overcome technical obsolescence inherent in any storage system, and 2) data are documented in such a way that they can be referred to in scientific publications.

The staff at DTU, the Danish Veterinary and Food Administration and other scientific institutions regularly produce significant data about our foods. These data sets must be stored, analysed and preserved as they represent part of the intellectual capital of the university. It must be possible to make them available to future researchers, students, food producers and citizens, who use these data in many different ways.

Today's interdisciplinary research problems can not be solved without the ability to combine data from different disciplines. Researchers must have access to all relevant data and knowledge on how to retrieve them so they can be used and combined in new and old ways, and analysed using the latest tools.

To avoid an unintended and unforeseen loss of data a backup of all the data is regularly done and stored physically and organisationally separated from DTU.