NEVO-online 2016: background information

Dutch Food Composition Database 2016
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Introduction

The Dutch Food Composition Database (NEVO) contains data on the composition of foods eaten frequently by a large part of the Dutch population. These foods contribute significantly to the intake of energy and nutrients. Foods of importance for specific groups of the Dutch population are also included.

NEVO is owned by the Dutch Ministry of Health, Welfare and Sports, and is maintained at the Netherlands Institute for Public Health and the Environment (RIVM). Data published in NEVO online are freely available for users engaged in scientific research (food research in particular), the food industry, dietetics and nutrition counselling and/or public health education.

The food composition data are collected in collaboration with the Netherlands Nutrition Centre.

1 The 2016 edition of NEVO online

Data for NEVO online are taken from the Dutch Food Composition Database (NEVO).

NEVO online 2016 contains data on 2389 food items. Since the previous version of NEVO online (2013), information in the database on a large number of foods has been completed and/or revised. The changes and additions appertain to the addition or removal of foods and the update of nutrient data:

- Cholecalciferol (vitamin D3) is a new component in NEVO online 2016. Total vitamin D is calculated as the sum of cholecalciferol and 25-hydroxy-vitamin D. Values for all three components are published in NEVO online 2016.
- Special attention is given to updating values for sodium, vitamin K and iodine. New sodium values, as measured in 2015 by the Dutch Food Safety Authority, in a range of foods, have been included in the NEVO database. Furthermore, sodium values in bread, as measured by the Dutch Bakery Centre (2015) are added. Some new vitamin K values from analyses commissioned by RIVM are available, other vitamin K values are compiled from foreign food composition tables from. The iodine content of milk and dairy foods including cheese is updated using new analytical values from the Dutch Dairy Association (NZO) and the FrieslandCampina company.
- Individual mono and disaccharides and individual polyols are no longer published in NEVO online 2016. See the appendix for the list of components removed from NEVO online.
- 18 foods are sampled and analysed to update NEVO online data.
- Special attention is given to the food group fish. Food composition data on fish are updated, using foreign food composition tables and international literature.

- Manufacturers provided data on the composition of their foods, through the web application of NethFIR at the Dutch Nutrition Centre.
- The composition of margarine, low fat margarine and cooking fat has been updated based on the supply in 2015/2016.
- Detailed fatty acid composition of margarines, low fat margarines and cooking fats is no longer published in NEVO online 2016, due to lack of reliable and up to date information. This also accounts for recipes using the same ingredients.
- Based on food intake data from the Dutch National Food Consumption Survey several foods that are frequently eaten, are added to NEVO online 2016.
- In NEVO online 2016, 255 new foods are added and 60 foods are removed since NEVO online 2013.

2 NEVO

2.1 Organisation

The Dutch Food Composition Database (NEVO) is part of the Netherlands Food Information Resource (NethFIR), owned by the Ministry of Health, Welfare and Sports and maintained by RIVM.

NethFIR is a database for food composition data in both generic and brand foods (nutrients, allergens and characteristics such as sustainability and portion sizes). NethFIR is a shared activity of the Netherlands Nutrition Centre and RIVM. RIVM focuses on professional users and use of the data in food research whilst the Netherlands Nutrition Centre targets the public and use of the data in education.
In parallel with NEVO, also the National Supplement Database (NES) is maintained at RIVM as part of NethFIR.

RIVM took responsibility for the maintenance of the NEVO database in 2007. Previously, between 1985 and 2007, Stichting Nederlands Voedingsstoffenbestand (NEVO Foundation) was responsible for the database. This Foundation arose from the committee Uniforme Codering van Voedingsenquêtes (Uniform Coding of Food Consumption Surveys, UCV), which started in 1972 to build a computerized databank with food composition data. In 1988, a merge with the Dutch Food Composition Table resulted in one central database. The NEVO foundation is disbanded on December 31st 2010.

An advisory board with scientific experts, data providers and users of NEVO data advises RIVM. Next to managing and maintaining NEVO, an important goal is promoting the use of the food composition data.

2.2 International developments

In the past decades, several European projects (e.g., INFOODS, COST99 and EuroFIR)

have worked to improve the quality and exchange of data from national food composition databases. Standardisation of European food databases affects not only these databases, but also impacts for the users. Increased comparability of food composition data is expected to improve comparison of food consumption data between countries.

In 2009, the non-profit association EuroFIR AISBL was founded in Brussels. RIVM is a member of this association as are other organisations responsible for national food composition data globally. The vision of EuroFIR AISBL is the delivery of high quality, validated food composition information, which might be used to address food quality, nutrition and public health challenges in Europe, and increased awareness and understanding of the value of food composition data and its importance for consumers to make healthier dietary choices. Its mission is to be the best and only independent broker of validated food composition information in Europe, facilitate improved data quality, storage and access, and encourage better application of food composition data/ information through harmonisation and training.
Thus, EuroFIR AISBL is an important source of knowledge for individual food database compilers. Issues of primary importance include definition and classification of food components and food items, analytical methods, recipe calculations, exchange of data with the food industry, quality assurance, education, and delivery of data to users (www.eurofir.org). Data from NEVO are provided to EuroFIR AISBL for FoodEXplorer, a tool that allows users to search information from most EU Member States as well as Australia, Canada and USA, simultaneously. In 2012, NEVO online 2011 dataset was shared with the European Food and Safety Authority (EFSA) supporting EFSA in the development of a comprehensive European food composition data collection (1).

3 Use of NEVO online

In NEVO online the composition of foods can be found. It is possible to search on NEVO food code, name of the food item (both Dutch and English) or food group. Synonyms are added to the food names (in Dutch only), to improve search results. Results can be retained to compare them with new search results.

Results are shown per component group (e.g., macronutrients, minerals or fat-soluble vitamins).

By clicking on the button ‘product details’, (*the button with ‘i’*) data on all available components per food are shown. For each value, a detailed reference is shown. This selection of data can be exported to Excel. More information on how to search NEVO online can be found at the website.

In chapter 5 and 6 of this document more details are given on foods and components in NEVO online. Background information such as food group classification, recipes, foods

removed or added, explanation of the references as well as the 'List of abbreviations and symbols' and a 'List of food groups and table headings' can be found at the website.

4 Explanation to NEVO online data

4.1 Data sources for the NEVO food composition database

NEVO food composition data are collected from several sources. All data are evaluated following a standard procedure to check if the data are fit-for-purpose (2). Preferably, food composition data should come from chemical analyses by accredited laboratories. This can be commissioned by research institutes or the food industry. Quality criteria apply for food identification, sampling, and methods of analysis. Supplementary information is collected from foreign food composition tables, scientific literature and food labels .

Information on missing nutrients can, in some instances, be obtained from similar foods, calculated from the ingredients (recipe calculation) or by (logical) deduction (e.g., vitamin D in plant foods is always zero; if total carbohydrates is zero, the mono-, di- and polysaccharide content must also be zero).

The source of every value in NEVO online is known. More information about the references used can be found in Chapter 7.

4.2 Food industry

Because of the large, and rapidly changing, number of industrial foods it is important for NEVO online to be as up to date as possible. We verify, as accurately as possible, whether foods are still on sale or if their name or composition has changed, necessitating a revision of the data. If it is known that a food is no longer available in the market it is no longer included in NEVO online. Because of the generic character of most foods in NEVO, we aim to aggregate comparable foods to a more or less generic (branded) food. For those foods where this is not possible (e.g., fortified foods and foods with no alternatives), data are published under the brand name.

Since 2009, the Netherlands Nutrition Centre collects manufacturers' food data. Manufacturers can upload and update information using the web application of NethFIR at any time. All relevant data collected by the Netherlands Nutrition Centre is provided to RIVM for evaluation and inclusion in NEVO. These data are checked thoroughly, a selection of the foods is exported to the NEVO database, and data about similar food items are merged into generic (branded) foods. Later changes in NethFIR by manufacturers are not shown automatically in NEVO online.

In general for food composition data provided by manufacturers or taken from food

labels, the measurement or calculation method is unknown. Usually, the number of components on food labels is limited to a maximum of eight. In NEVO online, missing components (vitamins and minerals) are added as much as possible, using additional data from manufacturers or other sources (e.g., calculations from ingredients or expert estimations).

4.3 Procedures and quality assurance

New data are scrutinised for relevance (foods and nutrients) and quality (analytical method, sampling procedure et cetera). After careful consideration, decisions are taken with respect to food names, allocation of food code numbers including the merging of several tastes and brands et cetera. Selected data are entered into the NEVO database.

Information on missing nutrients is added from similar foods, recipe calculations and logical deduction. If needed, scientific experts are consulted. Often two or more component values are available for a particular food, including results of several analytical protocols. A mean value or one of the single values is selected for publication. Foods that do not differ substantially from one another are combined within one food code.

In the NEVO quality manual, all procedures to maintain and compile data are documented (2). The food data compilation process adheres to internationally accepted standards, as described in the EuroFIR Quality Management System, and the EuroFIR generic flow chart for food data compilation (3-5) is followed. This way, the work is standardised as far as possible and data are quality assured.

During compilation, a number of controls are performed. All data are checked for accuracy, completeness and consistency (e.g., ensuring total macronutrients per 100 g of food add up to 100 g and mono- di- and polysaccharides do not exceed total carbohydrates). Composition of similar types of food is compared to identify errors. Members of the NEVO/NES Advisory Board perform an audit shortly before the release of a new version of NEVO.

Besides assuring the compilation process as a whole, attention is given to the quality of individual values. Therefore, additional information (meta-data) such as origin of foods or numbers of samples, sample description, status of the laboratory (NEN-ISO 17025 accreditation) and analytical methods (validated/accredited), date of analysis, calculation method, reference et cetera are documented. Using the EuroFIR criteria, documentation of values are further standardized leading to better comparability and easier exchange of data between countries, and easier quality evaluation of data (6, 7).

4.4 Bioavailability and biological activity

Biological availability (bioavailability), which is the proportion of a component that is absorbed in the gastrointestinal tract and can be utilised by the body, is influenced by many factors including the chemical form of the nutrient, other substances present

affecting the nutrient and endogenous factors (e.g., nutritional status) associated with the individual factors. Biological activity is the effect the component has in the body and is related to bioavailability.

Data for nutrients given in NEVO are gross values not corrected for bioavailability. For some nutrients, however, biological activity is considered, e.g., retinol and carotenoids (RAE), total vitamin E and folate equivalents.

4.5 Variability of data

Information in NEVO should be seen as the closest approximation of actual values. Foods are subject to variation in composition for various reasons. Natural variation amongst comparable foods may arise from differences in breed or variety, cultivation or breeding method, soil conditions, season, harvest time, and storage conditions.
Differences in composition may also arise in production although these processes are subject to stringent quality requirements. The use of different ingredients by the industry or at home is another potential source of variation.

For dishes based on recipes, NEVO uses standard recipes described in Nieuwe Kookboek 38th edition (8) as a starting point. In daily practice, however, deviations will be the rule rather than the exception.

4.6 Potential pitfalls in the use of food composition tables

Data in food composition tables are intended to reflect reality as closely as possible. These data are frequently used in software for nutritional calculation, and for retrieving and comparing the composition of food items. However, whilst compilers must demonstrate adequate quality control and timely revision of data, users should be aware of the limitations of these tables (9).

Missing values
NEVO online does not include all foods on the Dutch market. Equally, not all components are available for every food item included. Macronutrients (i.e. protein, carbohydrates, fat and water) are complete for the majority, but some individual fatty acids, dietary fibre, mineral and vitamin values are missing. Interpretation of missing foods or values (i.e. are missing foods considered as ‘not eaten’?; are missing values considered to be zero?) must be taken into account when interpreting the results of any nutritional calculation.

Precision
The number of decimal places gives an indication of precision. However, applying a large number of decimal places might introduce a false sense of accuracy.

Comparison with other food composition tables
It is often necessary to consult several food composition tables. These can be former

editions of the national food composition table, foreign food composition tables or food composition tables with a specific scope (e.g., branded data). An important aspect of these comparisons is the identification of the food. Detailed descriptions are needed to be sure the food composition data refer to the same food. Difficulties in translating the name and the fact some foods are country-specific make comparisons between countries difficult. For example in some countries iodized salt in used in bread, but not in other countries. And sometimes foods that look alike, can in different countries be produced by using varying recipes, resulting in different food composition even within one brand. Another important issue is the definition used for components that can easily vary between data sources. For example in some databases, vitamin A is expressed as retinol equivalents and as retinol activity equivalents in other databases. Another example is carbohydrates which might be presented including or excluding dietary fibre. Furthermore, several analytical methods may have been used, making a direct comparison difficult; see Chapter 6.2 and 6.13 on energy calculation and folate.

Differences between NEVO and food labels

Packaged foods declare their nutritional values on the labels. Such information can also be found on the manufacturers' or retailers' websites. Comparison of label information with information in NEVO online might reveal differences. These may be attributable to the values in NEVO being average values based on data from several references and therefore not exactly representing a specific brand food item. In addition, changes in the recipes used, can be introduced by the producer between publication of NEVO online and at the point of sale. Some examples where label information might differ from NEVO online include:

- Producers may describe saturated, mono- and poly-unsaturated fat on the label whilst NEVO shows fatty acids instead of fats;
- Differences in carbohydrate values can arise from in or excluding dietary fibre;
- Energy may be different if different algorithms are used for calculation.

5 Foods

5.1 Description of foods

Names of foods are chosen to describe the food items as appropriately as possible. Sometimes, long descriptions are needed to identify a food and abbreviations may be used in the name. A '[list with abbreviations and symbols]' used (English and Dutch) is available. In NEVO online 2016 synonyms are added to the search options, to get better search results (in Dutch only). Proprietary brands are mentioned only when needed to identify the food item and if the information appertains exclusively to that specific brand.

Via the button 'Productdetails' (*this is the button with 'i'*) additional information about the food item is given. This information may appertain to the brands on which the average value is based, the use of specific cooking fats, a recipe or a fortified food item. Nutrients added by the manufacturer to fortify foods are included here.

5.2 Units

The composition of foods is expressed per 100 g of the edible part (i.e. meat without bones, vegetables without waste, canned foods without brine of sweetened liquid). This also accounts for foods such as oil and ice cream, which have a density different from water. Label information for these foods is often presented per 100 ml. Users should be aware of this difference when comparing label information with NEVO online data. In certain cases, the composition of liquid foods for specific dietary use may be displayed per 100 ml, if the manufacturer has provided such data. When the food composition is not per 100 g of food, this is indicated in the food name.

5.3 Recipes and average foods

For several foods, information on a number of components is missing. When possible these foods are included in the database as a 'recipe'. The composition is calculated based on the known composition of the ingredients. However, recipes vary widely between regions and may change over time. Standard recipes from a general cook book are used (8).Several recipes are derived from ingredients on the label, because the label in general only provides macronutrients and salt.

In the 'List of recipes NEVO online 2016' the makeup of the recipes is listed to allow the user to assess the nutritional value in relation to the ingredients.

Averaged foods are included in the same document. Such foods include, for example, 'boiled vegetables averaged', 'sausages without liver products averaged', 'raw beef with <5 g fat averaged', et cetera. If possible, the selection of ingredients for these averaged foods was derived from the Dutch National Food Consumption Surveys (DNFCS) to account for the number of users and quantities consumed. For some averaged foods data on market shares (based on marketing research data or data from manufactures and trade organisations) is used.

Organic and halal foods

Organic and halal foods are not included separately in NEVO online. Users need to use the equivalent values for established commercial varieties. Only very limited information about organic or halal foods is available.

5.4 Fortified foods

Many fortified varieties of food items are available nowadays. Fortified and non-fortified foods cannot be merged in averaged foods, because of the differing amounts of micronutrients. Furthermore, several brands of the same type of fortified foods cannot be averaged due to fortification with different nutrients and/or with different amounts. This has resulted into more foods published under specific brand names.

The quantities given in NEVO online are total amounts including both naturally occurring and added micronutrients. In some foods, the micronutrients are additives (e.g., β-carotene as colouring agent). The manufacturer does not need to label the use of such

additives as fortification, although the content can be elevated compared with foods without such ingredient.
The content of some components decreases over time. Manufacturers take this into account by adding a larger amount and indicating on the label the amount that will remain at the expiration date.
For fortified foods a * behind the value indicates the food is fortified with this component. Under the 'productdetails' button (*this is the button with 'i'*), the fortified components are reported per food item. This does not apply to the food group 'Clinical formulas', as all vitamins and minerals have been added to these foods.

Fortified foods are also marked with * for derived components (e.g., RAE, RE and folate equivalents) if any of the contributing components is fortified; e.g., when folic acid is added, * occurs for folic acid and folate equivalents.

5.5 Margarine and other edible fats

The average composition of several of types of margarine, low fat margarine, cooking and frying fat is included in NEVO. The average composition is calculated from 2015/2016 data on individual brands. The 'List of margarines, low-fat margarines and cooking fats NEVO online 2016' includes NEVO codes applying to the specific brands. The names 'margarine product', 'low-fat margarine product' and 'butter product' are used for foods that strongly resemble margarine, low-fat margarine or butter, but do not meet the requirements of the Netherlands Food and Commodities Act.
Detailed fatty acid composition of margarines, low fat margarines and cooking fats is no longer published in NEVO online 2016, due to lack of reliable and up to date information. This also accounts for recipes using the same ingredients.

5.6 Sweeteners

The amount of high-intensity sweeteners (e.g., aspartame, acesulfam, cyclamate et cetera) in foods is not included in NEVO. The content of sugar alcohols (polyols), however, is included in NEVO; see Chapter 6.9.

6 Energy and nutrients

6.1 Introduction

Definitions of nutrients in NEVO are, whenever relevant, described in short. The 'List of components NEVO online 2016' shows components published in NEVO online 2016.

Units
Nutrient content is expressed in units used by the Dutch Health Council's Committee on Dietary Reference Values for recommended daily intake (10-12). For macronutrients, the unit is gram (g) whilst for vitamins and minerals it is milligram (mg) or microgram (μg).

Missing nutrient values
If no information is available about a nutrient, the space for the value remains empty. In cases where the level is too low to be adequately quantified, the indication ‘sp’ (‘spoor’ = trace) is used. Zero is assigned only if the nutrient is not present at all. When nutrient values are missing for one of more ingredients of a calculated recipe, this results in underestimation of the content of that component in the recipe. As far as possible, missing data have been imputed based on values derived from comparable foods (using NEVO data or other food composition tables), or estimated by recipe calculation using the ingredients.

6.2 Energy

Energy available to the body for metabolism, heat production and labour (metabolisable energy) is expressed both in kilojoules (kJ) and in kilocalories (kcal).

The amount of energy for each food in NEVO is calculated on the base of energy providing nutrients, using the following factors:

17 kJ (4 kcal)	/gram for protein
17 kJ (4 kcal)	/gram for carbohydrates (excluding dietary fibre and polyols)
8 kJ (2 kcal)	/gram for dietary fibre
37 kJ (9 kcal)	/gram for fat
29 kJ (7 kcal)	/gram for alcohol
10 kJ (2,4 kcal)	/gram for polyols
13 kJ (3 kcal)	/gram for organic acid

This energy calculation complies with EU regulation 1169/2011 on the provision of food information to consumers, for nutritional value labelling of food items (13) . In this way, a standardised algorithm for energy calculation is used to yield comparable data.
For NEVO online, energy derived from dietary fibre and organic acids is taken into account during the calculation since 2011. Previously, it was assumed that no energy was derived from dietary fibre, as it is not digested. However, research has shown that approximately 70% of dietary fibre is fermented in the colon, yielding some energy. The EU regulation indicates that the amount of energy derived from dietary fibre is, on average, 8 kJ (2 kcal) per gram of fibre. Similarly, according to EU guidelines, an average of 13 kJ (3 kcal) is provided per gram of organic acid, regardless of the type (13).

The adapted energy calculation has resulted in higher energy content for foods containing dietary fibre and organic acids in NEVO online 2011 and subsequent versions compared with earlier versions.

6.3 Protein

For analytical values, the protein content is calculated from the amount of nitrogen (gram) * 6.25. For dairy foods, a factor of 6.38 is used.

In addition to total protein, the amount of vegetable and animal protein is published. For composite foods, the distribution of animal and vegetable protein is estimated based on the ingredients. If known, also the nitrogen content is given.

6.4 Carbohydrates

The meaning of 'carbohydrate' and 'dietary fibre' in food composition tables depends on the definitions used. Sometimes total carbohydrate content (including dietary fibre and polyols) is given whilst, in other cases, carbohydrate contents excludes dietary fibre. In NEVO online, total carbohydrate content represents carbohydrates excluding dietary fibre and polyols, which both are specified separately.

Carbohydrates consist of:

Monosaccharides:	glucose, fructose and galactose
Disaccharides (2 monosaccharide molecules):	sucrose, lactose and maltose
Oligosaccharides (>2 - <10 monosaccharide molecules):	e.g., malto oligosaccharides, raffinose, fructo oligosaccharides
Polysaccharides (> 10 monosaccharide molecules):	starch, dextrin, glycogen

Oligosaccharides are found in minute quantities in foods and, hence, are not included in NEVO. Available oligosaccharides should be taken into account in total available carbohydrates, although from the data provided for NEVO online it is not always clear if this was done correctly.

NEVO online lists the total amount of available carbohydrates, and the total amounts of mono-, di- and polysaccharides. When analytical values on individual mono-, di- and polysaccharides are available, the total amount of available carbohydrates is calculated from these values. Available carbohydrates can also be calculated by subtracting the content of water, protein, fat, dietary fibre, polyols, alcohol, organic acids and ash from 100 gram using the 'by difference' method.
In NEVO online 2016 individual mono- and disaccharides are no longer published due to lacking information for many foods and because no up to date information from the food industry was received on these components.

6.5 Dietary fibre

Dietary fibre consists of those constituents of plant cells that cannot be decomposed by enzymes in the human stomach and small intestine, e.g., lignin, cellulose, hemi cellulose and pectin. Dietary fibre content depends strongly on the method of analysis used. As

far as possible, NEVO contains values for dietary fibre that have been analysed using AOAC985.29 or AOAC991.43 methods, which are currently common in food composition databases. These methods, however, do not take into account the presence of low molecular dietary fibre (e.g., inulin and oligosaccharides) or resistant starch, which are included in the latest definition of dietary fibre (13, 14). The newer AOAC2009.01 method (or modifications) measures a large part of the low molecular dietary fibre and resistant starch present. Dietary fibre values derived from AOAC2009.01 are not yet available in NEVO or other food composition datasets, as far as is known.

6.6 Fat and fatty acids

In NEVO online the total fat content is given as well as the fatty acid clusters saturated (SFA), trans (TFA), monounsaturated (cis) (MUFA), polyunsaturated (PUFA), n-3 and n-6 fatty acids and the individual fatty acids: linoleic acid, α-linolenic acid (ALA), eicosapentanoic acid (EPA) and docosahexanoic acid (DHA). n-3 (ALA, EPA and DHA) and n-6 fatty acid clusters are incorporated in polyunsaturated fatty acids and hence should not be added to the other fatty acid clusters to calculate total fatty acid content. Linoleic acid is part of the n-6 fatty acids cluster.

The polyunsaturated fatty acid cluster might contain minute quantities of trans fatty acids, as some cis-trans configurations are included, whilst the trans fatty acid cluster contains only trans-trans configurations. The individual fatty acids used to calculate the fatty acid clusters can be found in '[Composition of fatty acid clusters NEVO online 2016]'.

Sum of fatty acid clusters does not equal total fat

A conversion factor is used to calculate fatty acid content from total fat content, because fat contains compounds other than fatty acids, such as glycerol, sterols and phospholipids (15). For most foods, this conversion factor (FACF) is between 0.80 and 0.96. Foods with a high content of phospholipids and sterols (e.g., egg and offal) have a low(er) FACF and contain less fatty acids. For this reason, and because foods may contain unidentified fatty acids, the sum of the fatty acid clusters (SFA, MUFA, PUFA and TFA) often does not add up to total fat content.

In addition to thes fatty acid clusters and individual fatty acids mentioned above, NEVO online also includes individual fatty acids as a percentage (%) of total fatty acids. The absolute amount of each of individual fatty acids in g/ 100 g of food can be calculated using the total fat content and the fatty acid conversion factor.

For example:

Data from NEVO database:				
Total fat in gram/100 g	Total fatty acids in gram/100 g	Individual fatty acids as % of total fatty acids		
		C 16:0	C18:1 cis	Other fatty acids
10 g	9.4 g	15%	20%	65%

Calculation: % fatty acid * total fatty acids = g fatty acid g/100 g food

Result:	Individual fatty acids in g/100 g food		
	C16:0	C18:1 cis	Other fatty acids
	1.41 g	1.88 g	6.11 g

NB: This is an example, 'other fatty acids' represents the sum of several individual fatty acids not specified here. The fatty acid conversion factor in this example is 0.94.

Because analytical data from several research projects and different periods may be used, the fatty acids reported may vary. New and more advanced analytical methods allow for the quantification of more individual fatty acids. For some foods, older and more recent data are combined to calculate mean values, which is why the sum of calculated fatty acid clusters does not always equal total fatty acids.

6.7 Sterols

Cholesterol

The fatty substance cholesterol is found in foods of animal origin. By definition, vegetable foods have a cholesterol content of zero mg per 100 g of food.

Plant sterols

In some foods plant sterols are added for their cholesterol-lowering effect. Their presence and, if known, the amount added is mentioned under 'Opmerking', which can be found after clicking on 'Productdetails' (*this is the button with 'i')*.

6.8 Alcohol

Values for alcohol are expressed in grams per 100 g of the food. On labels, alcohol content is often described per 100 ml, which can cause discrepancies.

6.9 Polyols

Polyols include sugar alcohols such as sorbitol, xylitol, mannitol, maltitol, isomalt and lactitol. These compounds are added to sweeten a limited number of foods. In NEVO online 2016 individual polyols are no longer published. Only the total amount of polyols is given, due to lack of up to date information on individual polyols in foods. Total polyols are listed in the window with the 'Carbohydrates'.

6.10 Organic acids

Organic acids include compounds such as lactic, oxalic, citric, malic and tartaric acids. These compounds are naturally occurring in a limited number of foods. The total amount of organic acids is shown in the window together with 'Energy and macronutrients'.

6.11 Water

Water is an important compound to establish the nature of a food item and to compare foods. However, many analytical data and most label information do not include water. Where the water content was not known, it has been calculated by subtracting the sum of all other nutrients from 100 gram ('by difference method').

6.12 Minerals and trace elements

Sodium

All home cooked foods such as boiled vegetables, potatoes, legumes, cereals (rice, pasta, et cetera), prepared meat and fish are reported without added salt unless otherwise stated. The indication 'prepared without salt' is not used in the food names. The abbreviation 'Na-' in the name of a food is used to indicate it is a low-sodium or sodium-restricted food. For a limited number of foods, both the variety with and without added salt is included when both types are available (e.g., salted and unsalted nuts).

Recipes are calculated without added salt where possible. If salt is indispensable for the dish (such as soup) or a food is usually bought ready-to-eat, salt is taken into account. Recipes for cookies and pastries are calculated with iodine-fortified salt (not bakers' salt).

To estimate the sodium content of foods prepared with salt, reference is made to Dutch Nutrition Council advice 'reduce the use of table salt' (16). To include sodium intake from added salt (during cooking or eating), the following quantities of salt per 100 g can be applied. These figures exclude the sodium naturally present as indicated in NEVO online.

Per 100 g of food prepared with salt	estimated amount of added salt in g/100g food *
potatoes, rice and pasta	0.375
mashed potatoes	0.625
vegetables	0.625
meat, fish, game, poultry, egg, tofu, tempeh	1.250
composite dishes	1.000
gravy	0.750

*1 gram of salt contains 0.4 g of sodium

Due to the ongoing achievements of the food industry to reformulate sodium content in foods, updating sodium received special attention for NEVO online 2016. Up to date

values were included whenever possible. New values are produced by the laboratory of the Dutch Food Safety Authority for a variety of foods, by the Dutch Bakery Centre for bread and by the food industry.

Foods contain naturally occurring sodium, sodium from added salt, and sodium bound to other compounds (several additives). Analytical values in NEVO are determined by measuring total sodium. For label data it is not always clear if sodium values are produced by chemical analyses or recipe calculation and if sources other than salt (NaCl) are included (such as food additives). Sodium content of foods could also be calculated based on the analysis of chloride, assuming all chloride occurs as sodium chloride. However, in NEVO, values derived in this way are only used where no values based on the analyses of total sodium content are available.

Potassium, Calcium, Phosphorus and Magnesium
The food industry uses additives that may contain potassium, calcium, phosphorus and magnesium. Using additives will vary per brand and type of food. It is likely that the amount of minerals from these additives is not included in the total amount as presented in NEVO online, due to missing information from the manufacturers. This may result in some underestimation of the mineral content in NEVO online.

Iron
The iron in foods is present as haem and non-haem iron. Plant foods contain exclusively non-haem iron whilst animal foods contain both haem and non-haem iron. In NEVO, the percentage of haem iron was estimated from available literature for all raw and cooked meat species. These percentages are used to calculate haem and non-haem iron contents for foods in NEVO (17). For composite foods with animal and plant ingredients, the ratio between haem and non-haem iron was estimated as accurately as possible.

Copper
The content of minerals and trace elements in tap water is updated using national representative analytical values. Copper content in tap water is higher than measured in the previous analyses, which is likely to be due to a changed sampling procedure (18).

Iodine
In the Netherlands, bread is supplemented with iodine by using bakers' salt. Iodine content was measured by analysing a limited number of frequently eaten types of bread. For most types of bread in NEVO online, the iodine content is calculated based on the sodium contents measured in 2012. This means that sodium reduction levels achieved in 2012 are taken into account, but not from the period thereafter.

Dutch legislation states that the maximum iodine content allowed is 65 mg/kg bakers' salt. In daily practice, this varies between 50 and 65 mg/kg. For modelling studies and for recipe calculations in NEVO, RIVM applies the iodine content of bakers' salt as defined at 58 mg/kg of salt (previously, it was 55 mg/kg salt in NEVO online 2011)(19). This iodine level was defined in collaboration with salt producing industry and the Nederlands

Bakkerij Centrum (Dutch Bakery Centre) (20).

Where food composition of cookies and pastry is calculated as a NEVO recipe, the iodine content was calculated from retail salt with iodine (21 mg iodine/kg). The iodine content of this salt is in between the content of non-iodised salt (0.44 mg iodine/kg) and baker's salt. For other industrial foods, it is assumed non-iodised salt was used, unless otherwise specified by the manufacturer.

In NEVO online 2016 the iodine content of the food groups milk and milk products and cheese was updated, based on new analysis in raw milk and several types of cheese.

6.13 Vitamins

Fat soluble vitamins

Vitamin A

In NEVO online, Vitamin A in foods is expressed as retinol activity equivalents (RAE), (21). This value is made up of:

µg retinol + µg β-carotene/12 + µg α-carotene/24 + µg β-cryptoxanthin/24.

Lycopene, lutein and zeaxanthin have no vitamin A activity.

Previously vitamin A was only expressed as retinol equivalents (RE). RE values are made up of:

µg retinol + µg β-carotene/6 + µg α-carotene/12 + µg β-cryptoxanthin/12.

Both RAE and RE are published in NEVO online.

If available the contributing components, retinol and individual carotenoids are also shown in NEVO online.

Vitamin D

Vitamin D is present in animal foods, mainly as cholecalciferol (vitamin D3) and 25-hydroxy-vitamin D. In NEVO online 2013 cholecalciferol was published as total vitamin D. In NEVO online 2016 a further distinction is made and cholecalciferol and 25-hydroxy-vitamin D are summed as total vitamin D. This approach is similar to several foreign food composition tables. However, in the United Kingdom and Denmark, 25-hydroxy-vitamin D is multiplied with factor 5, before making the summation with cholecalciferol. From the literature, we did not find convincing evidence that this factor is correct. Therefore, no factor is applied to 25-hydroxy-vitamin D in NEVO online. Cholecalciferol, 25-hydroxy-vitamin D and total vitamin D are published in NEVO online 2016, which allows the users to apply a factor and recalculate total vitamin D if needed.

Vitamin E

Vitamin E consists of several tocopherols and tocotrienols, which vary in activity. Vitamin E is represented in NEVO online based on:

*mg α-tocopherol + mg β-tocopherol*0.40 + mg γ-tocopherol*0.10 + mg δ-tocopherol*0.01.*

Vitamin E is calculated whenever possible from contributing tocopherols. In the absence of such data, derivations or estimations of total vitamin E content have been used. Data on tocotrienols are not available in NEVO.

Vitamin K
Vitamin K is presented in NEVO online as vitamin K total, vitamin K1 (fylochinon) and vitamin K2 (menachinon). Vitamin K total is the sum of vitamin K1 and vitamin K2. Vitamin K2 is the sum of several types of menachinon, ranging from menachinon-4 (MK-4) to menachinon-10 (MK-10).

Water soluble vitamins

Vitamin B1
Analytical values for vitamin B1 (thiamin), produced in Dutch laboratories, are determined as thiamin (chloride) hydrochloride (thiaminCl.HCl). This is also the preferred analytical method when using data from other sources.

Vitamin B12
Vitamin B12 (cyanocobalamin) is found exclusively in animal foods. Kelp (seaweed) is an exception to this rule, but vitamin B12 in kelp is present in a biologically inactive form and hence is 0 µg/100 g in NEVO.

Niacin
Niacin is expressed in mg. Information on niacin equivalents (niacin + tryptophan/60) is not available in NEVO online.

Folate equivalents
NEVO online contains data on folate (present in food by nature), folic acid (added to food items) and total dietary folate equivalents.

Total dietary folate equivalents are calculated as (12, 22):
*µg naturally present folate + µg synthetic folic acid from fortified foods * 1.7 + (µg folic acid from food supplements * 2.0)*
NEVO does not include food supplements. Thus, the part of the formula in parenthesis is not applicable to total dietary folate equivalents given in NEVO online.

Folate values for NEVO online are analysed microbiologically, which is the most frequently used analytical method for laboratories in the Netherlands and abroad. When values are taken from foreign food composition databases, preferably values measured by microbiological method were used, when available.

In NEVO online and printed tables published before 2011, folate values were based on or derived from HPLC methods. The HPLC method in general yields lower results than the microbiological method (23).

Changing to microbiological values resulted in on average higher folate values from NEVO 2011 onwards when compared to older NEVO data. This also accounts for folate equivalents, calculated from natural occurring folate and folic acid added to fortify food items.

Producers usually calculate total folate by summing absolute quantities of naturally present folate and folic acid. In NEVO, calculations of folate activity use * 1.7 for folic acid. Consequently, figures for fortified foods may be higher in NEVO online than values given on food labels.

Vitamin C
Total vitamin C content is the sum of active forms ascorbic acid and dehydro-ascorbic acid.

7 Additional information/metadata

Source codes
For each nutrient value in NEVO online a reference is available. References can be found using the information button 'Productdetails' (*this is the button with 'i'*). On the NEVO website the 'Explanation of different reference types' can be found, as well as the specification of the references.

Next to the reference for each value, the NEVO database contains additional information, in particular for analytical values.. This information is used to assess the quality of data and to determine if older values are to be kept or discarded should new values become available. NEVO online does not report this additional information.

More background information
Using the button 'tables / graphs' on the NEVO website more information can be found on e.g., the NEVO food group classification, components published in NEVO, foods added or removed since 2013, recipes, composition of fatty acid clusters, classification of margarins et cetera and references to the values. An overview of abbreviations and symbols used is also available.

8 Other publications of NEVO data

Since 2013 NEVO data are published online and not as printed tables anymore. A copy of the NEVO online dataset can be requested via the NEVO website. Use of this information is allowed if data are unchanged and with the correct reference, including the version number. The reference to be used is: NEVO online version 2016/5.0, RIVM, Bilthoven.
For more information, visit: Request NEVO online 2016/5.0 dataset

The Netherlands Nutrition Centre produces printed publications and electronic tools incorporating NEVO data. More information can be found at www.voedingscentrum.nl.

9 NEVO team and NEVO/NES Advisory board

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Members of the NEVO/NES Advisory board as per October 2016

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