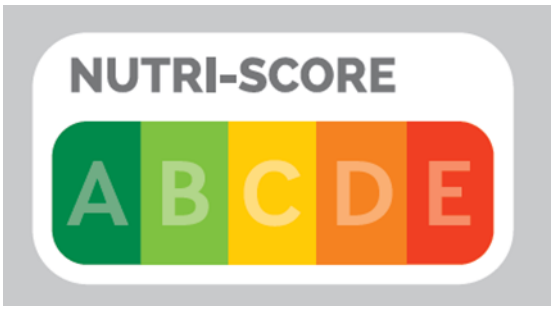

Update of the Nutri-Score algorithm for beverages

Second update report from the Scientific Committee of the Nutri-Score V2 – 2023

The second update report from the Scientific Committee of the Nutri-Score was voted on February 1st, 2023 and accepted with a majority of votes. No minority opinions were expressed.

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Executive summary

The Scientific Committee (ScC) of the Nutri-Score published a report in June 2022 on the update of the algorithm, including 'general foods' and 'fats, oils, nuts and seeds' categories.

This present document provides the proposed update by the ScC for beverages, which recommends that all beverages be included in the category, including milk, milk-based beverages, fermented milk-based beverages and plant-based beverages. Categories included have been adapted from the current Codex Alimentarius food category system described in the general standard for food additives' classification of food products and from categories listed in other front-of-pack labelling systems in use in the EU.

The ScC performed an analysis of the various food-based dietary guidelines (FBDG) to investigate the relative position of various types of beverages in the COEN guidelines. Additionally, the group reviewed the scientific literature on the relationship between the various categories of beverages and health outcomes, as well as on the relationship between non-nutritive sweeteners (NNS) consumption as a whole and relevant health outcomes.

Following these analyses, the group identified areas of improvement and target classifications for the various categories of beverages. Overall, the group considered that the current classification of beverages was adequate within the Nutri-Score algorithm, in particular for high-sugar beverages, but that some improvement in the classification could be reached for low-sugar beverages, milk-based beverages containing high levels of sugars and beverages with NNS. An additional consideration was to provide incentives to the industry for further reformulation towards a reduction of sugar content in beverages without increasing the use of NNS.

Considering the absence of reference values set specifically for beverages, the ScC opted to adopt a pragmatic *a posteriori* approach to the modification of the components within the algorithm, with modified component scenarios based on the distribution of the various nutrients within the beverages categories. Additionally, the ScC considered the alignment of the point allocation thresholds with the Provision of Food Information to Consumers (FIC) regulation for minimal thresholds definition.

Modified components were proposed for energy, sugars, proteins and 'fruit, vegetable, and legumes'[1] components, as they correspond to the nutrients for which a wider variability is shown within beverages.

Following the literature review and the analysis of the specific position of artificially sweetened beverages within FBDG in the COEN, the ScC elected to introduce a new component for the use of NNS for beverages within the algorithm, to align the classification of the Nutri-Score with the contention that the use of NNS should not be promoted.

The final combination scenario was tested in multiple databases of branded food composition, as well as 'generic' food composition of various types of beverages and validated against the initial objectives of the group pertaining to priority areas of improvement of the algorithm.

A majority of the members of the ScC approved the modified scenario for beverages and no minority opinions were expressed.

The ScC recommends the following for the updated algorithm of the Nutri-Score for beverages:

- Include milk-based beverages, fermented milk-based beverages and plant-based beverages within the category of beverages

[1] The current algorithm uses the component « fruit, vegetables, legumes, nuts and plant-based oils ». In its first update report (2022), the Scientific committee proposed to remove nuts and plant-based oil other than olive oil from the component.

- Algorithm component modifications
  - A modified Energy component, using a non-linear point allocation scale, starting at 30 kJ/point, followed by a point allocation scale of 60 kJ/point up to 3 points, then 30 kJ/point up to 10 points (per 100 mL or g beverage)
  - A modified Sugars component, using a non-linear point allocation scale, starting at 0.5 g sugar/point, followed by a point allocation scale of 1.5 g/point up to 3 points, then 1 g sugar/point up to 10 points (per 100 mL or g beverage)
  - A modified Proteins component, using a linear point allocation scale, starting at 1.2 g/100 mL, followed by a point allocation scale of 0.3 g proteins/point up to 7 points (per 100 mL or g beverage);
  - A modified 'Fruit and Vegetables' component, with a modification in the maximal number of points to a maximum of 6 points
  - For salt and fibres, the components are maintained equal to the updated algorithm for 'general foods'
  - An additional NNS component, with 4 A-points allocated to the presence of NNS in the beverage (i.e. as an 'unfavourable component')
- Final thresholds modifications
  - A modified B/C threshold at 2/3 points
  - A modified C/D threshold at 6/7 points

Overall, these modifications lead to:

- A better discrimination of beverages according to their sugar content, in particular for beverages with low contents in sugar
- A better discrimination of milk, milk-based beverages and fermented milk-based beverages in particular for those with high levels of sugar
- An alignment of the classification for NNS-sweetened beverages with current recommendations not to promote the consumption of NNS
- A similar classification for fruit juices was retained

Foreword

In the current version of the algorithm, milk, milk-based beverages and fermented milk-based beverages (with >80% milk as the main ingredient) and plant-based beverages are included in the 'general foods' category. However, given their liquid consistency, that determines their consumption as beverages and their associated composition, the ScC agreed that the algorithm for 'general' foods would not be appropriate for these foods and that they would therefore be more adequately classified under the 'beverages' category (see below for further detail).

Thus, the update of the algorithm for beverages aimed in particular for milk, milk-based beverages, fermented milk-based beverages and plant-based beverages to be included in the category along with other types of beverages.

Considering the expansion of the scope of the category, the group considered in depth the relative position that the various types of beverages would be required to achieve in comparison with the current algorithm to maintain a high consistency with FBDG in the COEN. Also, updates of the algorithm considered recent scientific literature regarding the association between health outcomes and different categories of beverages, as well as relationships with ingredients used in beverages.

The group maintained the principles highlighted in the 2021 annual report of the ScC and in particular the consideration that the information currently given through the FIC regulation [(1)] (nutrient declaration and list of ingredients) should remain the reference for the algorithm development and update.

1. Categories considered as beverages

In general, a beverage is a liquid that is intended to be drunk by humans as part of their nutrition. Given their similarities in terms of physiological and composition aspects, the ScC considered that all beverages intended to be drunk should be consistently classified in the beverages category. Besides beverages such as water, fruit or vegetable juices and soft drinks, this basic definition also includes milk, milk-based beverages, fermented milk-based beverages and plant-based beverages and would be easily understood by consumers given their similar mode of consumption.

1.1. Inclusion of milk, milk-based beverages, fermented milk-based beverages and plant-based beverages in the beverages category

The current definition of milk and milk-based beverages to be included in the 'general foods' algorithm is based on a threshold of milk as an ingredient (with products >80% of milk being classified within the general algorithm). This definition could be challenged and also could lead to confusion for consumers as similar products in composition and way of consumption would be classified by the general food algorithm for some and others by the beverage algorithm, in particular considering the number of beverages containing a mixture of ingredients including milk, fruit juices, or water in various amounts, that would not be classified with uniform criteria.

Plant-based beverages refer to beverages based on soy, almond, oat, rice, coconut and cashew-nuts. They are sold as plant-based substitutes for milk, milk-alternatives, or (plant-based) milk-replacement beverages, and include primarily dairy-free alternatives in particular for vegetarians/vegans or those with lactose intolerance or dairy allergies. For the purpose of the Nutri-Score classification, the term 'plant-based beverages' is applied to these products with the exclusion of fruit and vegetable juices. Detailed information on the categories of beverages considered can be found in Appendix table 1.

The viscosity [2; 3; 4; 5] and thus assumed gastric emptying time and gastro-intestinal passage of milk and associated milk-based beverages is rather similar to other beverages such as fruit juices, placing them physiologically rather in the beverage category. In general, shorter gastric emptying time for liquid than for iso-caloric solid foods have been reported [6], possibly related to aspects of fullness and satiety in conjunction with hormones such as ghrelin and insulin [7]. In general, milk-based products, if low in simple sugars other than lactose, have been reported to have a higher satiety value when compared to e.g. fruit-based and sugar-sweetened beverages [8; 9]. Also, two similar cross-over studies suggest that solid yogurt affects satiety more beneficially than yogurt drinks [10], since yogurt was more satiating than milk in one study and milk and yogurt drinks affected satiety similarly in a second study[10]. Again, this argues for an inclusion of milk-based beverages (including fermented milk-based beverages) into the beverages category.

Contrary to common belief, the glycaemic index (GI) of beverages is not generally higher than that of solid foods [11]. In general, dairy products – unless further modified by the addition of other simple sugars such as glucose, fructose or saccharose or fruits rich in those –only contain lactose as a simple sugar. This results in a rather low GI – below 40 for most yogurts , yogurt drinks and milks [11] – and therefore it is not appropriate to use the GI as a parameter to differentiate between, for instance, solid and liquid dairy products. Many plant-based beverages prepared from soy also have a rather low GI (below 40), despite not containing lactose, while rice-based beverages have a rather high GI. Whilst the GI may per se not be the primary argument for including milk in the beverage category, it should be taken into account that many of the milk beverages contain free sugar (i.e. added to the drink), which can at present not be distinguished numerically from the sugar naturally present in dairy. Recent observational analyses suggest that consumption of free sugar in milk-based drinks may be detrimental (see section 4.6.3 Associations with health outcomes, page 39), supporting the consideration of milk-based drinks in the category of beverages. In line with this, the current draft of the WHO Guideline on fiscal policies on sugar-sweetened beverages

[12] includes flavoured milks, milk-based drinks, and plant-based milk substitutes in their definition of sugar-sweetened beverages (SSB).

From a composition perspective, milk-based beverages, fermented milk-based beverages and plant-based beverages share relatively low energy contents per 100ml (on average <300 kJ), saturates (at most 2.5g/100ml in the case of whole milk) and protein (on average 3 g/100 ml), with limited variation compared to solid foods. The most variable attribute in composition for these beverages is sugars, from an average of 5g/100ml for plain milk and up to a median of 10.8 g/100 ml for fermented milk-based beverages in France. As such, their composition distribution is close to that of other beverages.

In addition, the nutritional composition of fermented milk-based beverages intended to be drunk was compared with the ones of flavoured milk-based beverages and their solid equivalents. French data are presented, and results were confirmed with data from Germany and the Netherlands (see Appendix table 2, Appendix table 3 and Appendix table 4).

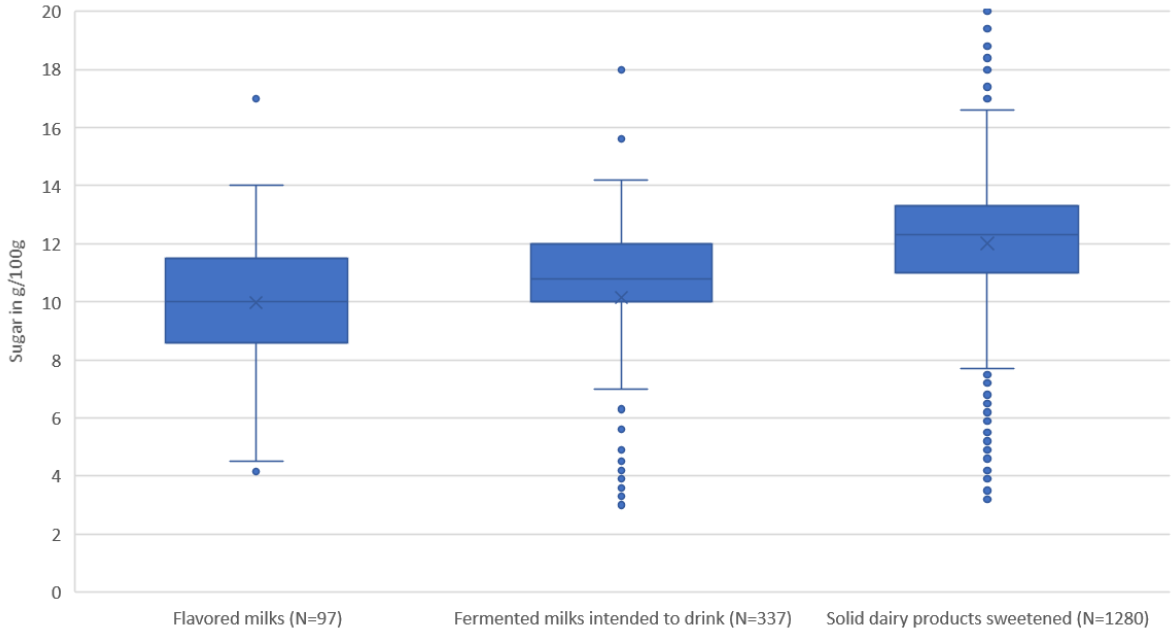

Figure 1 Distribution of sugar (g/100ml) content in flavoured milks, fermented milks intended to drink and solid sweetened dairy products – FR (OQALI and OFF databases)

On average, sugar contents of flavoured milks and fermented milk-based beverages appear similar to those of sweetened solid dairy products in France, highlighting the fact that the products currently on the market usually contain added sugars. Of note, given that fermented milk-based beverages generally contain lower amounts of lactose than milk-based beverages, it follows that even with similar contents in total sugars, fermented milk-based beverages on average contain higher levels of added/free sugars.

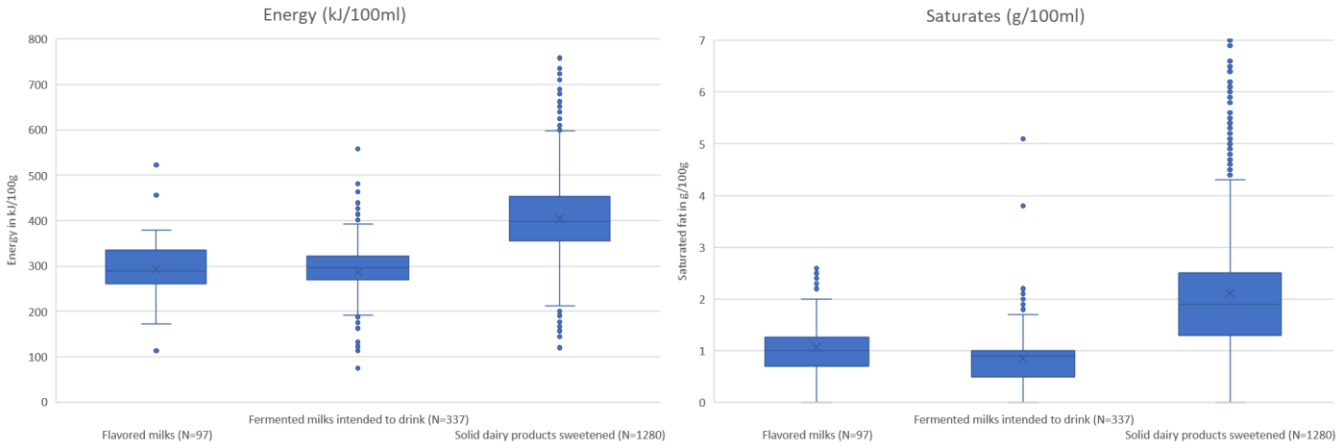

Figure 2 Energy (kJ/100ml) and saturates (g/100ml) content of flavoured milks, fermented milks intended to drink and solid sweetened products (FR – OQALI and OFF databases)

However, in terms of energy or saturates content, fermented milk-based beverages have distributions much more similar to flavored milks and other milk-based beverages than sweetened solid dairy products (on average 100 kJ differences in energy content and half the content in saturates, see Appendix table 176), in terms of both average values and width of distribution.

Hence, the classification of both flavoured milks and fermented milk-based beverages as beverages is also justified from a nutritional composition perspective.

Of note, fermented milk-based beverages contain a highly variable set of products, with differences in terms of viscosity, composition and intentional use for consumers. Some have a firmer consistency with overlaps with other fermented products not intended as drinks. From a consumer perspective, fermented products intended as drinks can be sold and used both as substitutes for beverages or substitutes for more firmer consistency products (such as yogurts). Depending on the country, fermented milk-based beverages may be sold in supermarkets alongside beverages or alongside other dairy products. However, no data allows to draw definite conclusions as to the intent and mode of consumption of these products as either susbstitutes for beverages or for other dairy products of firmer consistency.

In the current version of the algorithm, milk, fermented milk-based beverages and milk-based beverages (with >80% milk as the main ingredient) and plant-based beverages are included in the ‘general foods’ category. However, given their liquid nature and the associated distribution of nutrient content, the classification of these products under the ‘general foods’ algorithm does not allow for an adequate discrimination between products, in particular with regards to their sugar content.

The distribution of milk-, fermented milk- and plant-based beverages in the current algorithm for the Nutri-Score, as well as the updated algorithm for general foods is detailed below. The distributions of solid dairy products (from the report on the update of the algorithm for general foods published in 2022) have been added for comparison.

		Nutri-Score (%) Current algorithm					Nutri-Score (%) Modified algorithm for general food				
	N	A	B	C	D	E	A	B	C	D	E
France											
Skimmed milk	160	39	61	0	0	0	98	2	0	0	0
Partially skimmed milk	1041	28	72	0	0	0	86	14	0	0	0
Whole milk	323	4	94	2	0	0	7	86	7	0	0
Milk-based beverages	97	6	88	6	0	0	5	57	38	0	0
Fermented milk-based beverages	337	13	74	12	1	0	13	59	27	0	1
Plant-based beverages	972	30	69	1	0	0	45	51	4	0	0
Solid products (from the 2022 update report)											
Dairy products	1153	15	21	46	16	2	11	12	52	17	8
Dairy products sweetened	493	18	36	44	2	0	13	16	67	1	3
Dairy products unsweetened	142	54	30	16	0	0	43	29	28	0	0
Dairy desserts	518	2	4	54	35	5	0	2	45	38	15
Germany											
Skimmed milk	14	100	0	0	0	0	100	0	0	0	0
Partially-skimmed milk not sweetened	60	68	28	3	0	0	72	25	3	0	0
Whole milk	87	0	98	2	0	0	0	99	1	0	0
Other dairy beverages	668	7	31	10	3	48	9	67	24	0	0
Milk-based beverages	327	7	35	19	4	35	8	65	27	0	0
Fermented milk-based beverages	341	7	24	3	3	58	11	69	20	0	0
Plant-based beverages	**392**	**24**	**74**	**2**	**0**	**0**	41	58	1	0	0
Plant-based beverages not sweetened	244	18	81	1	0	0	35	65	0	0	0
Plant-based beverages sweetened	148	33	63	4	0	0	52	46	2	0	0
Coffee drinks	**287**	**1**	**2**	**2**	**13**	**82**	13	79	8	0	0
Coffee drinks not sweetened	59	0	3	5	27	64	37	59	3	0	0
Coffee drinks sweetened	228	1	2	2	9	86	7	84	9	0	0
Solid products (from the 2022 update report)	1937										
Dairy products sweetened	1379	13	47	39	1	0	11	24	64	1	0
Dairy products unsweetened	558	28	67	4	0	0	37	56	6	0	0
The Netherlands											
Skimmed milk	30	100	0	0	0	0	100	0	0	0	0
Partially-skimmed milk	120	64	36	0	0	0	75	24	1	0	0
Whole milk	71	3	97	0	0	0	3	97	0	0	0
Milk-based beverages	23	35	65	0	0	0	13	52	35	0	0

			Nutri-Score (%) Current algorithm					Nutri-Score (%) Modified algorithm for general food				
		N	A	B	C	D	E	A	B	C	D	E
Fermented milk-based beverages		74	49	50	1	0	0	39	46	15	0	0
Plant-based beverages		78	38	62	0	0	0	67	32	1	0	0
Solid products (from the 2022 update report)												
	Dairy products sweetened	219	16	43	41	0	0	6	31	60	3	0
	Dairy products unsweetened	38	92	8	0	0	0	92	8	0	0	0
	Dairy desserts	132	1	5	18	58	18	1	0	19	39	42

Detailed description of all food groups is given in Appendix table 1

For Germany, le detailed list of ingredients was used to determine whether milk-based beverages reached the 80% milk threshold to rate them according to the general foods or the beverage algorithms (according to the Nutri-Score FAQ). In databases in France and the Netherlands, the hypothesis was made than all milk-based beverages contained >80% milk and were rated according to the general foods algorithm.

For plain milk, in the algorithm for general foods, whether the current algorithm or the updated algorithm, there appears to be thresholds effects in the classification of partially skimmed milk. Indeed, the category is distributed between A and B in all countries, and the variation in composition in these products is highly limited. While the update of the algorithm for general foods appears to have increased the homogeneity of the classification, it hasn't entirely rectified this threshold effect.

More importantly, for fermented milk-based beverages and other milk-based beverages, both categories of products that are mainly flavoured and sweetened, there appears to be limited discrimination with plain versions. Flavoured milks and flavoured fermented milk-based beverages (such as yogurts to drink, kefir, buttermilk) appear to be mainly classified in the B category, whether in the current or the updated algorithm for general foods, and no product reaches beyond the C category.

As such, milk-based beverages (often flavoured and sweetened) made from partially skimmed milk have a similar classification as plain whole milk. Additionally, when compared to sweetened 'solid' yogurts (from the 2022 update report for general foods), fermented milk-based beverages (such as yogurts to drinks that are mostly sweetened and flavoured) appear on average better classified: while the distribution for sweetened 'solid' yogurts is centered on the "C" category of the Nutri-Score, fermented milk-based beverages are centered in the "B" category.

Overall, these limitations to the algorithm have not been adequately rectified with the updated algorithm for general foods, which would further justify the inclusion of milk-, fermented milk- and plant-based beverages in the beverages category.

1.2. Definition of beverages included

The ScC identified the food categories that would fall under the 'beverages' group algorithm based on existing acknowledged categorizations with use for regulatory purposes. The ScC agrees the use of Codex standards as reference for categorization as a starting point, though the exact classification used could depend on implementation efficacy considerations outside of the mandate of the ScC. Additionally, the ScC investigated how various types of beverages were classified under other front-of-pack labelling systems, in particular those currently in use in the EU, in order to further define some products to be considered as beverages.

This proposal is adapted from the Codex Alimentarius food category system described in the CODEX STAN 192-1995 (first version 1995, revised in 2019 [13]) because it includes as an annex a detailed definition of each of the products.

After reviewing the Codex information https://www.maff.go.jp/j/shokusan/export/shokuhin-kikaku/attach/pdf/index-14.pdf(annex B), Table 1 lists the codes (underlined text) of the products and their related liquid versionsthat would correspond to 'beverages', when thoses are intended to be drunk.

Table 1 List of categories of beverages adapted from the CODEX ALIMENTARIUS food category system

01.1 Fluid Milk and Milk Products			
	01.1.1 Fluid Milk (plain)		
	01.1.2 Other Fluid Milk (plain)		
	01.1.3 Fluid Buttermilk (plain)		
	01.1.4 Flavoured Fluid Milk Drinks *		
01.2 Fermented and renneted milk products (plain). Only the liquid versions intended to be drunk of the following products:			
	01.2.1 Fermented milks (plain)		
		01.2.1.1 Fermented milks (plain), not heat-treated after fermentation	
		01.2.1.2 Fermented milks (plain), heat-treated after fermentation	
	01.2.2 Renneted milk (plain)		
01.7 Dairy-based desserts : **only the liquid versions intended to be drunk**			
01.8 Whey and whey products, excluding whey cheeses. **Only the liquid versions intended to be drunk of the following products:**			
	01.8.1 Liquid whey and whey products, excluding whey cheeses		
06.8 Soybean products (excluding soybean-based seasonings and condiments of food category 12.9)			
	06.8.1 Soybean-based beverages**		
14.1 Non-alcoholic ("soft") beverages			
	14.1.1 Waters		
		14.1.1.1 Natural mineral waters and source waters	
		14.1.1.2 Table waters and soda waters	
	14.1.2 Fruit and vegetable juices		
		14.1.2.1 Fruit juice	
		14.1.2.2 Vegetable juice	
		14.1.2.3 Concentrates for fruit juice	
		14.1.2.4 Concentrates for vegetable juice	
	14.1.3 Fruit and vegetable nectars		
		14.1.3.1 Fruit nectar	
		14.1.3.2 Vegetable nectar	
		14.1.3.3 Concentrates for fruit nectar	
		14.1.3.4 Concentrates for vegetable nectar	
	14.1.4 Water-based flavoured drinks, including "sport," "energy," or "electrolyte" drinks and particulated drinks		
		14.1.4.1 Carbonated water-based flavoured drinks	
		14.1.4.2 Non-carbonated water-based flavoured drinks, including punches and ades***	
		14.1.4.3 Concentrates (liquid or solid) for water-based flavoured drinks	

	14.1.5 Coffee, coffee substitutes, tea, herbal infusions, and other hot cereal and grain beverages, excluding cocoa

Notes: *(continued on next page)*

*This category includes **sweetened dairy beverages** (with both sugar and NNS). The definition of the category 0.1.1.4 is: *"Includes all mixes and ready-to-drink fermented or not fermented milk-based drinks with flavourings and/or food ingredients that intentionally impart flavour, excluding mixes for cocoa (cocoa-sugar mixtures, category 05.1.1). Examples, include but are not limited to, chocolate milk, chocolate malt drinks, strawberry-flavoured yogurt drink, lactic acid bacteria drinks, whey-based drinks, and lassi (liquid obtained by whipping curd from the lactic acid fermentation of milk, and mixing with sugar or intense sweetener)."*

This category includes **soybean beverages. The definition of the category 06.8.1 is: *"Soybean-based beverages. Products prepared from dried soybeans that are soaked in water, pureed, boiled and strained, or prepared from soybean flour, soybean concentrate, or soybean isolate. In a number of countries this category includes products referred to as soybean milk."*

*** This category includes most "**plant-based beverages**" and "**energy drinks**". The definition of the category 14.1.4.2 is: *"Include water-based flavoured drinks without added carbon dioxide, fruit and vegetable juice-based drinks (e.g. almond, aniseed, coconut-based drinks, and ginseng drink), fruit flavoured ades (e.g. lemonade, orangeade), squashes (citrus-based soft drinks), capile groselha, lactic acid beverage, ready-to-drink coffee and tea drinks with or without milk or milk solids, and herbal-based drinks (e.g. iced tea, fruit-flavoured iced tea, chilled canned cappuccino drinks) and "sports" drinks containing electrolytes. These beverages may be clear or contain particulated matter (e.g. fruit pieces), and may be unsweetened or sweetened with sugar or a non-nutritive high-intensity sweetener. Includes so-called "energy" drinks that are non-carbonated and contain high levels of nutrients and other ingredients (e.g. caffeine, taurine, carnitine)."*

Additional clarification regarding fermented milk-based beverages:

The Codex standard for fermented milks CXS 243-2003 defines, among others:

- **Fermented Milk**, as a milk product obtained by fermentation of milk, which milk may have been manufactured from products obtained from milk with or without compositional modification as limited by the provision of the standard, by the action of suitable microorganisms and resulting in reduction of pH with or without coagulation (iso-electric precipitation).
- **Flavoured Fermented Milks** are composite milk products, as defined in Section 2.3 of the General Standard for the Use of Dairy Terms (CXS 206-1999) which contain a maximum of 50% (m/m) of non-dairy ingredients (such as nutritive and non nutritive sweeteners, fruits and vegetables as well as juices, purees, pulps, preparations and preserves derived there from, cereals, honey, chocolate, nuts, coffee, spices and other harmless natural flavouring foods) and/or flavours. The non-dairy ingredients can be mixed in prior to/or after fermentation.
- **Drinks based on Fermented Milk** are composite milk products, as defined in Section 2.3 of the General Standard for the Use of Dairy Terms (CXS 206-1999), obtained by mixing Fermented Milk as described in standard with potable water with or without the addition of other ingredients such as whey, other non-dairy ingredients, and flavourings. Drinks Based on Fermented Milk contain a minimum of 40% (m/m) fermented milk.

Of note, the Codex Alimentarius standard for fermented milks CXS 243-2003 and the food category system described in the CODEX STAN 192-1995 used above don't distinguish the liquid and solid variants of fermented milks and flavoured fermented milks.

Therefore, in the absence of a Codex technical description or a regulatory definition of the liquid and solid variants of fermented milks and flavoured fermented milks, other sources relevant from a nutritional perspective were explored to support the definition of fermented milk-based beverages.

Other front-of-pack nutrition labels in use in the EU differentiate between liquid and solid versions of fermented milk-based products:

- The Nordic Keyhole system includes two different groups for milk-based products (groups 11a and 12a), as follows:
  - 11a) Milk and equivalent fermented milk products intended as a drink.
  - 11b) Vegetable products intended for the sale uses as products in food group 11a)
  - 12a) Fermented milk products not intended to be drunk

Additional information on group 11a) and 11b) indicates that *'groups 11a and 11b) include drinkable products only. They therefore differ from the other milk groups, as groups 12 and 13 include products of a firmer consistency that are not intended for drinking'* [(14)].

- The Finnish Heart symbol includes a category for 'drinkable yogurts and similar seasoned products' [(15)].

For both systems, the use of different criteria for liquid vs. solid products is linked to their differing physiological effects (liquid transit-time from stomach to intestine is lower for liquid products, and liquid energy contributes to weight gain more than similar amounts of energy from solid foods).

For the purpose of the Nutri-Score algorithm, therefore, the definitions used for the Nordic Keyhole and the Finnish Heart Symbol were considered by the ScC the most consistent to further specify the products to be considered as fermented milk-based beverages.

As a conclusion, are considered as fermented milk-based beverages, all products falling under the Codex definition of fermented milks, flavoured fermented milks and drinks based on fermented milk, provided they are intented to be drunk or if their presentation suggests such mode of consumption (e.g. in a bottle, with a straw). The list of categories proposed by the CODEX STAN 192-1995 was specified accordingly with the following annotation "**Only the liquid versions intended to be drunk**".

Therefore, the ScC recommends that the fermented milks and flavoured fermented milks intended to be drunk should be considered as beverages for the purpose of the Nutri-Score.

The ScC agrees that the following categories should be included as beverages for the purpose of the Nutri-Score classification:

- **Non-alcoholic beverages**
  - Water
  - Water-based beverages
    - Sugar-sweetened beverages (SSB)
    - Beverages with NNS (also called 'artificially sweetened beverages') or flavourings
  - Fruit and vegetable juices and nectars

        - Fruit juices and nectars
        - Vegetable juices and nectars

Including coconut drinks. Of note, coconut milks for culinary purposes are excluded from the beverages category.

        - Smoothies
    - Coffee, coffee substitutes, tea, herbal infusion and other hot cereal and grain-based beverages
- **Milk, milk-based beverages, fermented milk-based beverages**
    - Plain milk
    - Milk-based beverages (incl. flavored, sweetened, with NNS)
    - Fermented milk products intended to be drunk (incl. plain, flavored, sweetened, with NNS), termed fermented milk-based beverages

Of note, while powder cocoa, coffee or chicory mixes are not classified in the Codex as beverages, they should be included as beverages for Nutri-Score classification if their nutritional declaration (for 100g/mL) is reported 'as consumed' (i.e. after reconstitution with milk or water) rather than 'as sold'.

- **Milk analogues – referred to 'plant-based beverages' throughout the document**

Milk analogues are defined in the Codex as 'products in which milk fat has been partially or wholly replaced by vegetable fats or oils'. However, this definition does not fully cover beverages made from plants.

The most common products on the European market include beverages based on soy, almond, oat, rice, coconut and cashew-nuts. They are sold as plant-based substitutes for milk, milk-alternatives, or (plant-based) milk-replacement beverages, and include primarily dairy-free alternatives in particular for vegetarians/vegans or those with lactose intolerance or dairy allergies. For the purpose of the Nutri-Score classification, the term 'plant-based beverages' is applied to these products with the exclusion of fruit and vegetable juices.

The ScC agrees to maintain alcoholic beverages containing more than 1.2% alcohol **outside of the scope** of the Nutri-Score algorithm classification, considering both their specific composition and their harmful effects on health.

2. Methods

2.1. General strategy

The general strategy for the update of the algorithm followed the principles laid in the 2021 annual report from the ScC [16]. In particular, the aim for the modifications was to ensure a high level of consistency between the classification within the Nutri-Score and FBDG.

The general strategy for the update of the algorithm in the beverages category included the following steps:

1. Definition of products considered as beverages for the purpose of the Nutri-Score algorithm and definition of the various beverage sub-types and categories.

2. Analysis of FBDG in the COEN and the relative position of the various types of beverages within FBDG. Additional analyses of trends in the use of certain ingredients in the food supply and specifically in beverages.
3. Literature review on specific categories of beverages and investigation of their association with relevant health outcomes.
4. Considering the results of steps 1-3, the ScC identified priorities for classification of the updated algorithm for the various beverages categories.
5. Defining scenarios for modifications.
6. Testing scenarios for modifications.
7. Selection of combined scenario and thresholds adjustment.

2.2. FBDG analysis

As a starting point for the analysis, the FBDG from COEN were analysed to evaluate the relative position of the various types of beverages.

Particular consideration was paid to the position of milk and milk-based beverages within FBDG, given that one of the aims of the update of the algorithm for beverages was to integrate these beverages within the category, whereas they are considered within the 'general foods' algorithm in the current version of the Nutri-Score. Additional information was gathered to inform whether specific recommendations existed in FBDG regarding plant-based beverages.

2.3. Literature review

Literature reviews were conducted for the update of the algorithm to rely on recent knowledge of the association between various categories of beverages and sweetening ingredients and relevant health outcomes. Considering that FBDG rely on scientific evidence, complementary literature reviews were performed for beverages categories that were not sufficiently detailed in FBDG and to take into account recent research developments.

Literature reviews were specifically conducted for: water and naturally low-calorie beverages, NNS in beverages and NNS in general; fruit juices; plant-based beverages used as substitutes for milk (soy, almond, coconut, oat, rice and similar beverages), and for low-fat versus high-fat milk and dairy.

Literature reviews included primarily meta-analyses and systematic reviews (summarizing all types of studies, i.e., observational or interventional) published after 2013, with additional investigation of original studies, in particular with regards to methodology (i.e., considerations on reverse causation in observational studies). Funding sources were also considered as a potential source of bias. Articles published in languages other than English were excluded from the review. Main outcomes considered were total mortality or morbidity related to cardiovascular disease, type 2 diabetes, or cancer as well as weight gain, overweight and obesity. Outcomes relating to caries, sports injury, urinary tract infections were not included in the analysis. Additional intermediate outcomes were explored, namely blood lipids and glycaemia whenever hard endpoints were not available.

Results from the grey literature were also collected, in particular reviews and meta-analyses from WHO and the World Cancer Research Fund (WCRF). The articles retrieved were analysed separately according to target population under investigation (general adult population, children and adolescents, pregnant women).

Of note, challenges were identified relating to the definition of the exposure measures (i.e., categories of beverages), in particular with definitions used in regulatory documents. For example, while in Europe, by definition of the European Commission, fruit juices must not contain added water (beyond the original amount) or sugar, thus being different from fruit nectars, this distinction may differ in non-EU countries,

and thus meta-analyses were not always clear in whether fruit-juices included fruit-nectars (as by European legislation/definition, i.e., with added sugars). As another example, whilst definition of food groups differs across studies, fermented milk-based beverages are commonly grouped with other milk-based or sweetened dairy beverages rather than with yogurts.

Finally, case studies from countries outside of COEN were collected to inform on potential reformulation impact of front-of-pack labelling initiatives.

2.4. Defining update scenarios

In the first update report of the ScC, published in July 2022, the ScC provided an update of the Nutri-Score algorithm for the 'general foods' and the 'fats, oils, nuts, and seeds' groups.

To develop the modifications in the various components for these categories mostly *a priori* approaches were used, whereby reference values from the FIC or claims regulations were used to define minimal values, thresholds, or reference points from which the allocation scale for points was set.

However, for beverages, the only universally recommended beverage is water, which does not contribute to energy intake at the dietary level. Additionally, reference values for nutrient intakes are defined considering the entire diet, which includes a wide variety of foods. Extracting a reference value that would cover nutrient requirements specifically from beverages within the diet does not have any reference framework on which the ScC could adequately rely upon.

Therefore, in the case of beverages, the ScC considered *a posteriori* approaches to modify the algorithm, using distribution values of the relevant nutrients within the category of beverages – including milk, milk-based beverages, fermented milk-based beverages and plant-based beverages.

Of note, this methodology was followed during the adaptation of the original Ofcom algorithm for the purpose of labelling in France in 2015 by the French High Council for Public Health (HCSP)[17]. Components that were modified specifically for the beverages category were energy, sugars and the "fruit, vegetables, nuts, legumes, and vegetable oils (canola, olive and nuts)".

Considering the publication of the updated algorithm by the ScC in June 2022, modifications in the beverages category included the published algorithm updates for non-beverage specific components (i.e. saturated fats, salt, fibres).

2.5. Testing of the scenarios

The scenarios for modification of the algorithm were tested in several national databases of nutritional composition available to the ScC and presented in the 2021 annual report and the 2022 update report from the ScC.

For the analysis of beverages, not only the nutrient composition for the calculation of the Nutri-Score was necessary, but additional consideration was given to NNS use within ingredients. As such, the ScC extracted the information from the list of ingredients.

As in the case for the update of the algorithm for general foods, classifications of foods were harmonized between countries (France, Germany, and the Netherlands) as best as possible. Of note, in some cases, harmonization was not possible, as the definition of the food categories varied. For detailed information, please refer to description table in the Appendix (Appendix tables

Appendix table 1 Description of the beverages groups available in the databases of nutritional composition of branded food products – Data from , page 76).

3. Results - Food-based dietary guidelines analysis regarding beverages

3.1. Water and naturally low-calorie beverages

Water is recommended as the beverage of choice in all COEN. Other naturally low-calorie beverages may also be recommended in some COEN (flavoured waters without NNS or sugars, unsweetened infusions, tea, etc), but their inclusion is not consistent across FBDG.

In **Germany**, the dietary guidelines provided by the German Nutrition Society (DGE) recommend the consumption of primarily water followed by unsweetened fruit and herbal teas as ideal beverages to quench thirst. Further beverages that are mentioned as suitable to quench thirst are fruit juice spritzer in a 3:1 water/fruit juices ratio – flavoured waters are not mentioned in this regard.

In **Luxembourg**, the government's initiative "Gesond iessen mei beweegen" recommends the consumption of water from different sources, as well as unsweetened fruit-and herbal teas. Flavoured waters are not mentioned.

In **Spain**, the *Healthy ad Sustainable Dietary Guidelines* issued by the Ministry of Consumer Affairs recommends consumption of tap water as the preferred beverage ("always water to quench thirst"). However, it is also mentioned that there are other beverages that can help maintain hydration, such as coffee, tea, herbal teas and sugar-free carbonated waters. Flavoured waters are not mentioned [18; 19].

In **France**, the dietary guidelines for adults by the High Council for Public Health stipulates as a main recommendation that water is the only recommended beverage (ad libitum). As complementary information, tea, herbal tea and coffee, with no added sugars can contribute to water intakes in adults. However, recommendations for children stipulate that beverages containing caffeine (coffee, tea or energy drinks) are not recommended.

In **Belgium**, dietary guidelines for the Belgian adult population recommend to consume as few drinks with added sugars as possible and choose water instead. Water should be the first choice. To maintain a healthy water balance, adults and young people should consume 1 to 1.5 litres of water daily, spread out over the day, in addition to the fluids absorbed through food [20]. Water and unsweetened beverages are at the base of the Food Pyramid [21]. In the beverage category, water (with low salt content) and water without addition of sugars or additives/NNS, tea, herbal tea, and coffee should be favored. Water is also at the base of the Food Triangle. Tap water should be privilegied for healthy and sustainable reasons. If ever water is not appreciated, alternatives are flavored water (without added sugar or NNS), tea, herbal tea or coffee [22].

In infants and children, ONE (Office de la Naissance et de l'Enfance) recommends to familiarize children very early on with the taste of plain water. Given a natural predisposition for sweet taste, providing flavoured water (including in the form of herbal tea) is believed to strengthen this appeal and would establish detrimental habits [23].

In **Switzerland**, beverages are found at the base of the Swiss Food Pyramid [24] by the Federal Food Safety and Veterinary Office FSVO and the Swiss Society for Nutrition SSN. The corresponding guidelines for adults recommend the consumption of 1-2 litres of fluid, preferably unsweetened beverages such as tap or mineral water and fruit or herbal tea. Caffein-containing beverages such as coffee, black and green tea can also be counted towards the liquid intake. All other beverages (milk, dairy beverages, fruit and vegetable juices, sugar and artificially sweetened soft drinks, alcoholic beverages) are classified elsewhere. Flavoured waters are not mentioned specifically. The flavouring with lemon or orange slices however is mentioned as a tip to add some taste to pure water. For children, the types or recommended fluids are identical [25]. Only the recommended amounts are lower and caffein-containing beverages are to be avoided up to 10 years and later to be consumed only occasionally.

In **the Netherlands,** the Dutch Dietary guidelines have not made specific recommendations about water. However, in the Wheel of Five, which translates the Dutch Dietary Guidelines to practical recommendations, water is recommended as the beverage of choice (together with coffee and tea without added sugar). This is based on the fact that it does not contain calories and can be used to quench thirst. [26].

3.2. Sugar-sweetened beverages

In all COEN, FBDG recommend reducing or limiting the consumption of SSB.

3.3. Beverages with NNS

Of note, while the group refers to 'beverages with NNS', FBDG usually refer to 'artificially sweetened beverages', as this terminology is widely known by the public. Hence, in this specific section, original terminology from FBDG was maintained.

In **France**, an opinion from the HCSP concludes that artificially sweetened beverages present the advantage of providing no calories compared to regular version, but as they maintain the taste for sweetness, their consumption should be limited as for SSB [27]. The French Food Safety Agency additionally mentions in a 2015 statement that "artificially sweetened beverages, as SSB, should not be used as substitutes for water" [28].

In **Switzerland**, artificially sweetened beverages are classified on top of the national food pyramid together with sugar sweetened beverages, alcoholic beverages, sweets and snacks. The following recommendations are made in the related guidelines "Even though they have a low caloric content, they can't be recommended to quench thirst. They can cause people to get used to a sweet taste and often contain acids that damage teeth. » (Dietary Guidelines of the Swiss Society of Nutrition, 2011, updated in 2020 [24])". In preparation for a review and update of the Swiss FBDG, the expert report of the Federal Committee for Nutrition (FCN / EEK / CFN) (2019))[29] complements that "There is presently **no evidence that the consumption of artificially sweetened beverages is associated with a lower risk of non-communicable diseases**. At the opposite, there is emerging concern that it may have adverse health effects, through mechanisms which remain however hypothetical. Alterations of food intake control by the brain and changes in gut microbiota may possibly be involved. Artificially sweetened beverages should not be recommended as substitutes for SSB, and water should be the main source of fluid intake."

In **Germany**, the FBDG provided by the DGE do not recommend calorie-free or calorie-reduced so-called "light drinks", since these products contain food additives such as sweeteners, colorings and flavourings and are therefore less recommended (10 guidelines of the German Nutrition Society (DGE) for a wholesome diet) [30].

In **the Netherlands**, according to the Wheel of five -FBDG, artificially sweetened soft drinks are not recommended, mainly because of the potential cariogenic effects of acidic beverages.

Of note, in **Mexico**, concerns about the use of NNS in children goes a step further. Indeed, intake of NNS by children is being discouraged, since the Mexican Ministry of Health has acknowledged that such sweeteners can be harmful to children. As a result, a front-of-pack nutritional warning label indicating the presence of NNS (translating into "not recommended in children") is mandatory (NOM-051) since 2020.

3.4. Fruit juices

Given their substantially high sugar content, the position of fruit juices within dietary guidelines of the COEN countries was reviewed. The categorization of fruit juices is mixed, with Belgium excluding fruit juices

from the food group of fruits, and other countries including them as sweetened beverages given their sugar content (e.g. France [27], the Netherlands [26]). Some countries still consider that occasionally one portion of fruit can be exchanged by a fruit juice or smoothie (Germany, Switzerland). In Spain, the most recent dietary guidelines state that fruit juices should not be considered as a substitute for whole fruit [19]. Note that in Germany and Switzerland, dietary guidelines are currently under revision and the position of fruit juices is expected to change.

3.5. Milk and dairy beverages

Milk and dairy beverages are considered as an important source of proteins, calcium, Vitamin B2 and Vitamin B12 (SHC, FBDG, 2019)[20]. Due to their composition (i.e. being rich in proteins and calcium) and/or the evidence related to their beneficial effects, dairy products are recommended within dietary guidelines, and acknowledged to contribute to a healthy diet. The intake recommended is rather constant from one country to another, from 2 to 4 servings per day. Of note, recommendations within FBDG relate to **dairy products** as a whole, and though they provide information as to the recommended portion size for milk, they do not necessarily include specific guidance as to milk consumption. In various COEN their FBGs includes a recommendation of choosing dairy products with lower fat content when caloric intake needs to be reduced.

In **France**, the HCSP recommends the consumption of 2 dairy products per day in adults (1 portion being equivalent to 150 mL of milk).

In **Belgium** a daily intake between 250 and 500 mL of milk and dairy products is recommended.

In **Germany**, the DGE recommends consuming dairy foods on a daily basis - including milk and milk-based beverages. Herein, the consumption of 1 portion of fermented dairy products (≙ 150 g/day) such as kefir, yoghurt or buttermilk is recommended. For consumers that want to save calories on milk and dairy products, the respective low-fat variants are recommended.

The current **Swiss** recommendations advise the consumption of three portions of diversified dairy products per day (e.g. 1 portion can be 200 mL milk), based on the current scientific evidence related to dairy products and health. The guidelines do not generally recommend dairy products with a reduced fat content but recommend “to choose dairy products with lower fat content (e.g. partially skimmed milk) if someone wishes to reduce energy intake”. The expert report of the Federal Committee for Nutrition (FCN / EEK / CFN) (2019)) [29] highlights that recommendations should not emphasize reduced-fat dairy products since there is no evidence indicating that whole-fat products are detrimental to health. High-fat (e.g. cream) and sugar-sweetened dairy products should be consumed in smaller portions.

In **the Netherlands**, the Health Council also recommends the daily intake of a few dairy portions, including milk or yogurt (Health Council of the Netherlands, 2015) [26].

In **Spain**, a maximum of three servings of dairy products per day is recommended, avoiding those with added sugars and highly salted. It is also suggested to reduce the number of servings of dairy products on the days in which other animal products are consumed [19]. While no specific distinction is made between the specific number of recommended servings of skimmed/semi-skimmed vs. full-fat dairy, the *Healthy and Sustainable Dietary Guidelines in Spain* indicate that it is preferable to consume whole milk products to avoid wasting the extracted fat or transforming it into butter, cream or saturated fat to be incorporated into other products [18; 19]. However, it is also recommended to consume low-fat dairy products if the person needs to control caloric intake.

3.6. Plant-based beverages

Few COEN countries have emitted a position related to plant-based beverages within dietary guidelines.

In **Switzerland**, the dietary guidelines recommend to those who prefer to consume plant-based beverages instead of dairy products, to favour soy-based products with added calcium (e.g. soy drink). Beverages made from oats, rice, almonds, etc. cannot be considered equivalent to dairy products in terms of nutritional value.[24]

In Belgium, plant-based beverages are not included in the food group of milk and dairy products, because there is no link between their consumption and health according to data from the Global Burden of Disease Study. These alternatives are not considered equivalent to milk in terms of health effects (even if they are fortified to reach nutrient compositions more similar to milk)[20].

In **France**, soy-based products are not recommended for pregnant women due to their rather high content in phyto-estrogens following the precautionary principle[31].

4. Results – literature review

4.1. Water and naturally low-calorie beverages

4.1.1. Definition

Low-calorie beverages considered in this category refer to beverages that naturally contain no or very limited calories, with the exclusion of beverages containing NNS. Beyond water, these therefore refer to coffee, tea, herbal tea or flavoured waters. Of note, the definition of the various sub-types of beverages may differ depending on the study, and very limited data is available regarding flavoured waters.

4.1.2. Nutrient composition and population consumption

Coffee, tea and herbal tea contain bioactive compounds, most notably caffeine in coffee and tea. Other bioactive compounds include polyphenols such as phenolic acids or flavonoids. They may also contain residual amounts of sugars and other components (in particular for products containing flavouring ingredients). It has been stated in the scientific literature that added flavours can be an indicator of ultra-processed foods, and that added flavours could contribute to overeating and body weight gain, as reviewed previously [32]. Promoted hedonic eating that overrides homeostatic energy intake as well as disrupted flavour-nutrient learning have been emphasized as a hypothesis for this association.

Water is the main beverage consumed across COEN (representing more than half of the total consumption of beverages) [33; 34; 35]. Coffee, tea and herbal tea appear to be the seconf highest consumed beverages, with variations depending on gender and age.

4.1.3. Associations with health outcomes

Water

Water is an essential nutrient in the diet for practically all functions in the body and is particularly important for thermoregulation and appropriate hydration [36]. Sufficient fluid intake has also been related to skin health and neurological functions, gastrointestinal and renal functions among other [37; 38]. Under normal conditions (not extreme heat or dry air), about 2.7-3.7 l of body fluid have to be replaced daily [39], of which the majority should come from beverages (with the remainder from water in food items and oxidation water produced during food metabolism).

While studies investigating water consumption *per se* are relatively few, studies investigating the associations between SSB consumption and health use no consumption (i.e. water consumption) as a reference category. Hence, effects associated with water consumption can be inferred by contrast (see section 4.2.3 Association with health outcomes page 25 for further details).

Water intakes have been shown to be associated with reduced weight gain in observational studies [40; 41; 42]. Of note, coffee consumption (but not tea) showed similar associations in the same study. Substitution studies have shown that replacement of SSB with water was associated with a reduction in weight over 12 months. Low-caloric alternatives to SSB (including coffee, tea or beverages with NNS) were associated with somewhat smaller effects than water [43]. A 2021 meta-analysis of observational studies reported that consumption of plain water was associated with a reduced risk of type 2 diabetes [44].

Coffee, tea and caffeine-containing beverages

A recent umbrella review of meta-analysis (observational and interventional studies) of the association between coffee consumption and health has shown a rather protective effect of coffee or tea on health outcomes in the general adult population [45], including all-cause mortality, cardiovascular mortality and cardiovascular diseases, with evidence of a non-linear relationship (highest risk reduction for 3-4 cups of coffee/day). For cancer outcomes, coffee consumption was associated with lower risk of certain cancer locations (prostate cancer, endometrial cancer, melanoma, oral cancer, leukaemia, non-melanoma skin cancer and liver cancer). For lung cancer, harmful associations were found to be mitigated when stratifying or controlling for smoking status.

In pregnant women, authors found a consistent harmful association with high vs. low consumption of coffee associated with increased risks of low birth weight, preterm birth and pregnancy loss [45].

Amounts of 400 mg/day of caffeine in adults and 300 mg/day in healthy pregnant women have been found not to be associated with adverse health effects [46]. However, data in children is more scarce, and data suggest that children and adolescents limit their consumption of caffeine to 2.5 mg/kg/day, corresponding to two cups of tea or one small cup of coffee [47]. This is based on systematic reviews suggesting potential neuro-cognitive disturbancies and even growth related problems in children [47; 48], as well as a – based on a meta-analysis- higher risk of miscarrieges in pregnant women consuming caffeine [49], and may also cause changes in newborns if breastfed by mothers consuming caffeine, though data is more scant here [50], as caffeine will be passed on into mother's milk.

EFSA has assessed the safety of caffeine, and concluded that habitual caffeine consumption up to 400 mg per day does not give rise to safety concerns for non-pregnant adults. Habitual caffeine consumption up to 200 mg per day by pregnant and lactating women does not give rise to safety concerns for the fetus and breastfed infants respectively. For children and adolescents, the information available is insufficient to derive a safe caffeine intake. The Panel considers that caffeine intakes of no concern derived for acute caffeine consumption by adults (3 mg/kg bw per day) may serve as a basis to derive single doses of caffeine and daily caffeine intakes of no concern for these population subgroups [51].

In 2020, a Cochrane review on the effects of green tea consumption on cancer prevention found limited evidence of a protective role of green tea on some types of cancer such as oral cancer [52], though another meta-analysis found some protection against oral cancers [53]. Very hot mate tea consumption (>65°C) has been found to be associated with increased risks of oral and oesophageal cancer [54].

Flavoured water

Flavoured waters are mentioned within the Codex Alimentarius under 14.1.4.[13] as "water-based flavoured drinks including "sport," "energy," or "electrolyte" drinks and particulated drinks," which also comprises the categories of sodas. It is also clearly stated that table and soda waters containing flavour are found in 14.1.4, and not in the waters category (14.1.1.). Of note, flavoured waters or water with flavouring ingredients are not necessarily investigated separately in epidemiological studies. Hence, the specific association between these products and health is unavailable.

Studies investigating the potential relation between flavoured food intake in beverages and overeating are scant, and those that have been conducted do not suggest a negative effect of adding flavour to water on short-term energy intake. A study with 26 adult females consuming either water or water with strawberry flavour (0 kcal), there was no difference in short-term satiety or subsequent energy intake from paste [55]. Similar findings were obtained earlier in men consuming either water or orange flavoured water ([56], n=6 per group), regarding fluid intake and energy intake during lunch and dinner did not differ significantly.

4.1.4. Policy actions and interventions promoting water intakes

Multiple policy actions promote water as the beverage of choice through increased access to tap water, bottled water or water fountains in schools in COEN.

In Luxembourg, a new law was passed to improve quality of tap water [57] and the intake of water is especially promoted via the activity "healthy eating, more activity" [58].

In **Spain**, a recent law for a circular economy places specific emphasis on reducing packaging and promoting the use of tap water sources and reusable packaging [59].

Providing easy access to free drinking water was one of the policy actions implemented in the EU Action plan on childhood obesity 2014-2020 [60].

Intervention trials promoting water as the beverage of choice in schools have shown a significant reduction in the average SSB consumption [61] and its effectiveness to slightly increase water consumption [62] and the provision of water in schools was shown to lead to decreases in BMI [63]. A meta-analysis of intervention studies involving both decrease of SSB and increase in water consumption showed a significant reduction in the consumption of SSB and increase in water consumption [64].

Overall, water intake is associated with reduced risks of chronic diseases, and its singling out in public health nutrition policies and intervention suggests significant positive results. While some other naturally low-calorie beverages are suggested to have similar positive effects in adults, these effects may not necessarily extend to all groups of the population, some concerns having been raised over the consumption of coffee in children or the use of artificial flavourings.

4.2. Sugar Sweetened Beverages

4.2.1. Definition

SSB include a large group of beverages, such as (according to the Codex Alimentarius classification, see Table 1, page 13) flavoured milk drinks, fruit and vegetable nectars, as well as water-based flavoured drinks including sport, energy, and electrolyte drinks and particulated drinks. A main general feature of SSB is their added sugars content (in most cases either glucose, fructose, saccharose, or high fructose rich corn syrup (also termed isoglucose or glucose-fructose syrup), though the latter is not as prevalent in the EU market as in the US). The sugar content can vary widely but may reach up to 14% or in few cases even 20% of energy in some type of sodas/carbonated beverages [65; 66].

4.2.2. Nutrient composition and population consumption

Due to their often high sugar content and often low fruit/vegetable or dairy content, the nutritional density of sodas/carbonated beverages is rather low (unless fortified), and the simple liquid matrix results in a typical medium to high glycemic index, about 63±7 according to certain sources [11]. The high caloric value, medium to high glycemic index, and low satiety values [67] have raised strong concerns about the

contribution of the consumption of sodas/carbonated beverages to overweight, obesity, and related co-morbidities such as cardiovascular disease and type 2 diabetes, among other diet-related diseases in the general population. The current consumption in many European countries varies largely, with also younger adults consuming more than the elderly, but appears to average 0.5 servings (4 ounces or approx. 120 mL) per capita and day [68]. This is well in line with a recent report from the UK, indicating that children consumed around 142 g/day sweetened beverages per day, and adults 106 g/day [69], which represents around 10 g of sugars or 40 kcal, which is a significant contributor to the target value of maximum 10% energy coming from free sugars.

4.2.3. Association with health outcomes

A summary report by the European Commission in 2018 [70] stated that there is « reviewed evidence to support a positive relationship between SSB consumption and weight status, BMI and/or body fat in both children and adults ». These findings are based on several meta-analyses on the association between the intake of SSB and health outcomes. In the EPIC study, Mullee et al. (2019) [71] investigated the association between soft drink consumption, including sugar-sweetened soft-drinks and total mortality in 10 European countries in a cohort study with over 0.5 million individuals enrolled. It was found that the consumption of sugar-sweetened soft-drinks (that is, ≥2 glasses per day vs. <1 glass per month) was associated with an increased total mortality risk (HR: 1.08, 95% CI: 1.01-1.16). Though there is more evidence from cohort studies regarding the positive association of SSB and weight gain (which bears the risk of residual confounding, with reverse causality possibly playing less of a role), meta-analysis of RCTs, especially on children, also suggest a positive association with weight gain [72].

Overall, there is consensus in the literature that SSB are a significant source of sugar intake, and that SSB consumption should be reduced. This is in line with the consideration that added and free sugars intake should be reduced as much as possible according to a recent EFSA report [73].

4.3. Non-nutritive sweeteners

4.3.1. Definition

NNS are no-calorie or low-calorie artificial and natural sweeteners that are used as an alternative to sugars and are added to various foods and drinks to limit energy intake, in particular from sugar, with an expected benefit on energy intake reduction and the management of weight. An additional expected benefit is less cariogenic problems derived from sugar consumption.

A list of sweeteners/intensive sweeteners allowed for their usage in food items has been defined by the European Commission, published in the regulation (EC) No 1333/2008 of the European Parliament and of the Council of 16 December 2008 on food additives [74].

Note that this list includes non-caloric sweeteners as well as sugar alcohols (with about 2 kcal/g). Note also that some are artificial (e.g. cyclamate) and some occur in nature (e.g. steviosides). An alternative list from 2019 is provided by the Codex Alimentarius [13]. Both lists are given in

Table 2. Except for neohesperidine (not in Codex) and alitame (not in EU list), the list is the same.

Table 2 List of authorized sweeteners in the EU, for food items

Running no.	E-number	Name	EU authorized	Codex Alimen-tarius	EU-use in fruit nectars	EU-Use in flavoured drinks	Included for the purpose of Nutri-Score classification
1	E 420	Sorbitols	x				
2	E 421	Mannitol	x				
3	E 950	Acesulfame K	x	x	x	x	X
4	E 951	Aspartame	x	x	x	x	X
5	E 952	Cyclamates	x	x	x	x	X
6	E 953	Isomalt	x	x			
7	E 954	Saccharins	x	x	x	x	X
8	E 955	Sucralose	x	x	x	x	X
9	E 956	Alitame		x			
10	E 957	Thaumatin	x	x		x	X
11	E 959	Neohesperidine DC	x		x	x	X
12	E 960a	Steviol glycosides from Stevia	x	x	x	x	X
13	E 960b	Rebaudioside from multiple gene donors expressed in *Yarrowia lipolityca*		x			
14	E 960c	Enzymatically produced steviol glycosides	x				
15	E 961	Neotame	x	x	x	x	X
16	E 962	Salt of aspartame-acesulfame	x	x	x	x	X
17	E 964	Polyglycitol syrup	x	x			
18	E 965	Maltitols	x	x			
19	E 966	Lactitol	x	x			
20	E 967	Xylitol	x	x			
21	E 968	Erythritol	x	x		x	
22	E 969	Advantame	x	x	x	x	X

Of note, this list may be extended in the future. It should also be emphasized that EFSA (its Panel on Food Additives and Flavouring, FAF) is currently (since 2019) re-evaluating the safety of 15 sweeteners in total, following a mandate from the EC. This includes setting up protocols, one on the hazard identification and characterisation of sweeteners [(75)] and the other focusing on the exposure assessment [(76)]. Both protocols underwent a public consultation and the comments received were considered in the finalisation of the two protocols. The implementation phase of these two protocols has started for more than half of the sweeteners to be re-evaluated. Thaumatin (E 957) was the first scientific opinion to be published in November 2021 [(77)]. Possibly two other scientific opinions are in their final stage, hopefully to be finalised by the end of 2022. However, some of the assessments have been put on hold as additional data and/or clarifications have been requested from the business operators or a need to launch other calls for data has been identified more recently (e.g. call for data on genotoxicity).

However, though the EU regulation on sweeteners includes both NNS and sugar alcohols, scientific evidence regarding sweeteners has focused primarily on NNS, i.e. non-caloric sweeteners that are artificial sweeteners or natural sweeteners. Additionally, sugar alcohols (e.g. mannitol, isomalt, maltitol, lactitol,

xylitol) are caloric (kcal/g) and can be considered nutrients, and more importantly, these are – except for erythritol – not used in beverages. Of note, erythritol is used in beverages in combination with NNS.

Hence, the ScC agreed to consider only NNS in the update of the Nutri-Score algorithm.

4.3.2. Use of non-nutritive sweeteners in the food supply and consumption in the population

To obtain information on trends in the use of NNS in the food supply, available data sets were investigated, i.e., specific searches of databases of food composition in Belgium, and literature reviews in various markets were performed.

Use of non-nutritive sweeteners in Belgium – specific analysis

Using web scraping data for the three biggest Belgian retailers (Delhaize, Carrefour, Colruyt) for the years 2018, 2019 and 2020, the following sweeteners (not only non-nutritive ones) were searched in the available ingredient lists. It is however not really possible to compare the use of sweeteners over time as the percentage of products with missing ingredient list changes dependent on the year of web scraping.

Of note, all non-sugar sweeteners (including sugar alcohols) were taken into account, and explored through the entire food supply, and not only in beverages.

Table 3 Non-sugar sweeteners investigated – NNS used in beverages are highlighted

E number	Index	Classification	Ingredients index
E420	Sorbitol	Sugar Alcohol	"sorbitolen", "Sorbitolen" ,"sorbitol", "Sorbitol", "E420","e420"
E421	Mannitol	Sugar Alcohol	"Mannitol", "Mannitol", "E421","e421"
E950	Acesulfame K	Artificial Sweetener	"Acesulfaam-K", "acesulfaam-K", "Acésulfame potassium", "acésulfame potassium", "E950","e950"
E951	Aspartame	Artificial Sweetener	"Aspartaam", "aspartaam", "Aspartame", "aspartame", "E951","e951"
E952	Cyclamate	Artificial Sweetener	"Cyclamaten","cyclamaten", "E952","e952"
E953	Isomalt	Sugar Alcohol	"Isomalt", "isomalt", "E953","e953"
E954	Saccharin	Artificial Sweetener	"Sacharinen", "sacharinen", "E954","e954"
E955	Sucralose	Artificial Sweetener	"Sucralose ", " sucralose ", "E955","e955"
E957	Thaumatin	Natural Sweetener	"Thaumatine", "thaumatine", "E957","e957"
E959	Neohesperidin DC	Artificial Sweetener	"Neohesperidine-DC", "neohesperidine-DC", "E959","e959"
E960	Stevioside	Natural Sweetener	"Steviolglycosiden", "steviolglycosiden", "E960","e960"
E961	Neotame	Artificial Sweetener	"Neotaam", "neotaam", "E961","e961"
E964	Polyglycitol syrup	Sugar Alcohol	"Polyglycitolstroop", "polyglycitolstroop", "E964","e964"
E965	Maltitol	Sugar Alcohol	"Maltitolen", "maltitolen ", "Maltitol ", "maltitol","Maltitolstroop", "maltitolstroop","E965","e965"
E966	Lactitol	Sugar Alcohol	"Lactitol", "lactitol", "E966","e966"
E967	Xylitol	Sugar Alcohol	"Xylitol", "xylitol", "E967","e967"
E968	Erythritol	Sugar Alcohol	"Erytritol", "erytritol", "E968","e968"
E969	Advantame	Artificial Sweetener	"Advantaam", "advantaam", "E969","e969"

Table 4 Overview of the percentage of products with sweeteners by food category for Belgium

Food category	***2018***				***2019***				***2020***			
	N	missing*	none	yes	N	missing*	none	yes	N	missing*	none	yes
		%	%	%		%	%	%		%	%	%
Soft drinks & other drinks	581	0.0	42.3	57.7	618	5.5	40.9	53.6	640	0.3	42.8	56.9
Energy drinks	50	0.0	56.0	44.0	99	3.0	51.5	45.5	110	0.0	41.8	58.2
Plant-based beverages	46	2.2	93.5	4.3	48	2.1	93.8	4.2	53	0.0	96.2	3.8
Juices	391	9.5	87.0	3.6	394	12.4	85.5	2.0	421	6.9	91.2	1.9
Dairy milk drinks	312	9.0	86.5	4.5	358	9.5	86.0	4.5	329	8.2	88.4	3.3
Bread & bread products	281	2.8	96.8	0.4	338	8.0	91.7	0.3	411	4.6	94.9	0.5
Breakfast cereals	347	1.4	97.4	1.2	406	5.7	91.9	2.5	425	12.5	84.0	3.5
Cakes, pastries & sweet biscuits	1052	0.6	85.6	13.8	1236	3.4	84.1	12.5	1608	3.1	81.7	15.2
Cheese	1063	6.9	92.7	0.5	1150	11.0	88.5	0.4	1252	6.0	93.7	0.3
Chocolate & confectionery	1995	1.8	87.3	11.0	2298	5.8	81.7	12.5	3119	4.0	78.0	17.9
Edible ices	445	2.7	93.9	3.4	443	5.0	92.8	2.3	456	3.1	91.0	5.9
Plant-based food/meat analogues	171	25.1	73.1	1.8	203	26.1	72.9	1.0	261	5.0	94.6	0.4
Processed fish	750	1.2	81.1	17.7	836	6.0	78.8	15.2	915	5.2	85.0	9.7
Processed fruit & vegetables	1986	5.4	94.0	0.6	2123	8.8	90.6	0.6	2250	7.4	91.5	1.2
Processed meat	1778	3.3	96.3	0.4	1798	9.3	90.3	0.3	2143	7.3	92.3	0.4
Ready-made & convenience foods	917	2.1	97.6	0.3	972	10.1	89.7	0.2	1198	11.9	88.0	0.1
Sauces, dips & dressings	1192	3.7	95.3	1.0	1485	8.6	90.6	0.8	1624	3.2	95.9	0.9
Savoury snacks	858	1.5	97.6	0.9	968	5.9	93.1	1.0	1090	4.1	95.0	0.9
Soups	288	1.0	99.0	0.0	374	7.8	92.2	0.0	400	5.0	95.0	0.0
Yogurt & sour milk	590	2.2	90.7	7.1	642	4.7	88.8	6.5	707	1.0	91.8	7.2

*Missing ingredient lists

Use of sweeteners on the EU market (literature)

Slovenia

NNS were present in 13.2% and 15.5% of non-alcoholic beverages in the years 2017 and 2019, respectively, in Slovenia, based on information collected at the point of purchase. The use of NNS has significantly increased only in energy drinks ($p < 0.01$). The most used NNS in 2017 were acesulfame K, aspartame, and cyclamate. In 2019, the use of sucralose increased significantly ($p < 0.01$) to become the second most used NNS. Comparison between the energy value and the presence of the NNS showed an almost 50% lower energy content of beverages containing both added sugar and NNS (2017 = 92.8 kJ; 2019 = 96.2 kJ per 100 mL), compared with beverages with only added sugar (2017 = 161.8 kJ; 2019 = 159.0 kJ per 100 mL). In beverages sweetened only with NNS, the difference was even more noticeable (2017 = 22.3 kJ; 2019 = 14.3 kJ per 100 mL) [(78)].

Europe (based on Euromonitor data and including Central Asia as well)

Per capita volumes of NNS from beverage sales increased globally over the period 2007-2019 (36 %). Regions with more policy actions had a significant increase in NNS quantities from beverage sales ($r = 0.68$, $p = 0.04$). The sweetness of the packaged food supply (the sweetness of each NNS and added sugar, relative to sucrose, multiplied by sales volume) increased over time [(79)].

Per capita quantities of NNS sold in packaged foods from 2007 to 2019 increased globally, though by only 2.0 g/capita (3 %). Per capita quantities increased in Europe and Central Asia, East Asia and the Pacific, the Middle East and North Africa, and South Asia, with increases from 4.2 to 13.8 g/capita. Despite being the most prolific source of NNS in the data, the amount of NNS supplied by confectionary sales decreased from 2007 to 2019 by 2.1 g/capita (3 %) globally. The ratio of added sugar to NNS quantities supplied by packaged food remained stable in all regions [(79)].

Table 5 Use of various sweeteners over the period 2007-2019 (sales volume in g/capita in 2007 and 2019) and % change (from Russell et al, 2022)[(79)]

Europe and Central Asia	Acesulfame K	2.4	3.1	↑ 30%
	Aspartame	7.3	8.5	↑ 18%
	Cyclamate	2.1	1.8	↓ 12%
	Erythritol	1.7	2.2	↑ 27%
	Maltitol	29.1	34.2	↑ 18%
	Maltitol syrup	8.6	11.2	↑ 29%
	Mannitol	6.8	6.7	↓ 2%
	Saccharin	3.0	2.9	↓ 4%
	Sorbitol	84.7	87.3	↑ 3%
	Stevia	0.0	0.3	n/a
	Sucralose	0.6	1.2	↑ 92%
	Xylitol	12.0	11.6	↓ 3%

Use of sweeteners in relation to front-of-pack labelling

Outside of COEN, some front-of-pack labelling regulations have been evaluated with regards to food industry reformulation. In Chile and in Australia, specific investigations pertained to the use of NNS in the food supply following the introduction of food labelling regulations.

Warning labels Chile – Implemented in 2016

Changes in the NNS use in foods and beverages were evaluated after the initial implementation of the labelling law in Chile. Longitudinal data were used on packaged foods and beverages collected in six major supermarkets and three candy distributors in Santiago, Chile, in January–February 2015/2016 and in January–February 2017. The following food categories were included: beverages, dairy-based beverages, yogurts, breakfast cereals, desserts and ice creams, candies and sweet confectioneries, and sweet spreads with a market share ≥1% of their food groups. The use of any NNS increased from 37.9 to 43.6% ($p < 0.001$) after the law's implementation. NNS increased among beverages, dairy-based beverages, yogurts, and desserts and ice creams ($p <0.05$), driven mostly by increases in sucralose and steviol glycosides use ($p < 0.05$). Reformulated products that reduced the amount of sugars below the law's cutoff were more likely to start using an NNS in the post-implementation period (prevalence ratio: 12.1; 95% CI: 7.2–20.2; $p < 0.001$). NNS thus likely replaced sugars after the initial implementation of the law [(80)]. In addition, the proportion of children consuming of at least one NNS increased from 77.9% to 92.0% ($p < 0.01$) (from 24h detailed dietary recalls pre- and post-law). The mean intake increased for sucralose, aspartame, acesulfame K and steviol glycosides (+20.3, +15.1, +6.1 and +3.3 mg/day, respectively) [(81)].

Health Star Ratings Australia New Zealand – Implemented in 2014

An objective of the Australian Health Star Rating (HSR) system is to encourage the reformulation of packaged foods. A recent study determined whether the implementation of the HSR system has impacted the use of added sugars and NNS in food supply. Four product categories were used: products with no added sweetener, products containing added sugar only, products containing NNS only, and products containing a combination of added sugar and NNS. Of 6,477 newly released products analyzed displaying a HSR in Australia between 2014–2020, 63% contained added sugars. The proportion of new products sweetened with added sugars increased over time, while NNS use did not, despite a higher average and median HSR for products sweetened with NNS. These findings suggest that, the HSR system may not discourage the use of added sugars in new products or incentivize the reformulation of added sugar with NNS [(82)]. In New Zealand, products available in 2013 (n = 12,153) and 2019 (n = 14,645) were compared. Between 2013 and 2019, the prevalence of NNS in products increased from 3% to 5%.

The most common NNS in both years were acesulfame K, sucralose, aspartame, and steviol glycosides, which were predominantly found in special foods (breakfast beverages and nutritional supplements), non-alcoholic beverages, dairy products, and confectionery. The prevalence of NNS is increasing over time in New Zealand's packaged foods and beverages and is likely a consequence of consumer demand for lower-sugar products. [(83)].

Overall, data from these case reports suggest that the use of NNS in the food supply are increasing, with some diversification over time of the food products including NNS, even if soft drinks remain the category of foods in which NNS are used the most. Also, some data suggest that the introduction of labelling systems can incentivize the use of NNS in replacement of sugars, although no specific data has been released in the case of Nutri-Score.

4.3.3. Association with health outcomes

Several studies reported that the consumption of NNS, notably via artificially sweetened beverages, is associated with metabolic disorders such as type 2 diabetes and cardiovascular disease, as well as

weight gain. In this context, the ScC reviewed scientific literature to assess the potential health benefits and risks associated with the consumption of NNS.

A recent systematic review and meta-analysis conducted by the WHO (2022) has assessed inherent health effects of NNS (i.e. health effects attributable to NNS regardless of the comparator), as well as health effects of NNS when compared with sugars or water, when consumed at safe levels as established by authoritative bodies. This review focused on randomized controlled trials (RCT, n=50 studies), prospective cohort studies (n=97) and case–control studies (n=47) [84].

Summary of findings from RCTs

In the short term, NNS use results in a small reduction in body weight (-0.71 kg, 95% CI: -1.13; -0.28, n=29) and BMI in adults (-0.14 kg/m^2, 95% CI: -0.30; -0.02, n=23), as well as a reduction in energy intake (-569 kJ, 95% CI: -859; - 278), as assessed in RCTs (*low* certainty evidence). No significant effects were found on other measures of adiposity (e.g. body fat mass (n=6) or waist-circumference (n=10)) and cardiometabolic health (including fasting glucose, insulin, blood lipids and blood pressure) (*very low* to *high* certainty evidence). This effect was observed in particular when compared with sugars (including when NNS were explicitly used as replacements for sugars), but not when compared with water. About one third of the RCTs in adults were either partially or fully funded by industry (18/46).

Two RCTs were identified that lasted one year or more (the duration of most of the RCTs was less than 6 months) [85; 86]. Both trials reported a modest reduction in body weight (-5.10 kg and -0.35 kg – not significant) associated with NNS, although one trial, which consisted of active weight loss with or without NNS for 16 weeks followed by 12 months of active maintenance and another 18 months of post-trial follow-up, reported significant differences only at the two latter time points: in fact, weight loss was similar between NNS and no NNS at the end of the 16-week active weight loss phase [85]. This latter study was financially supported by industry.

Former meta-analyses also found this modest effect of NNS on weight management [87; 88], but conclusions from studies assessing such endpoints are not consistent [89; 90].

In the short-term, these results suggest that NNS may lead to small reductions in body weight without any significant benefit for cardiometabolic risk. No clear conclusion can be made regarding the effectiveness of NNS with respect to weight management.

Summary of findings from observational studies

In contrast to short-term effects**, longer-term effects** of the consumption of NNS have been assessed through prospective cohort studies, and data suggest that higher NNS-containing beverage consumption is **positively associated with BMI (+0.14 kg/m^2, 95% CI: 0.03; 0.25, n=5) and incident obesity (hazard ratio (HR): 1.76, 95% CI: 1.25; 2.49, n=2) and increased risk of type 2 diabetes (HR: 1.23, 95% CI: 1.14; 1.32, n=13) , cardiovascular disease (HR: 1.19, 95% CI: 1.07; 1.32, n=5) and all-cause mortality (HR: 1.12, 95% CI: 1.05; 1.19, n=8 – *very low* to *low* certainty evidence)** [84]. Interestingly, no significant associations were found with fasting blood glucose (n=3), triglycerides (n=4) and HDL-cholesterol (n=4). Also body weight did not change significantly in observational studies (n=5).

Results from case–control studies suggest an association between saccharin intake and bladder cancer (*very low* certainty evidence, (HR 1.77, 95% CI: 1.11; 2.82, n=11)), but significant associations for other types of cancer were not observed in case–control studies or meta-analysis of prospective cohort studies (*very low* to *low* certainty evidence) [84].

Former analysis from systematic reviews and meta-analyses of prospective cohort studies also showed positive associations between the consumption of NNS and a higher risk of cardiovascular diseases [91],

cardiovascular mortality [91], type 2 diabetes [92] and mortality from all-causes [93]. Because the intake of NNS observed in cohort studies is particularly prone to reverse causality, this aspect was specifically evaluated by the committee. Reverse causality biases specifically regarding weight or BMI were investigated adequately in most individual studies (i.e. through stratified analyses according to BMI status, additional adjustment procedures or exclusion of participants with specific risk factors), with some studies suggesting reverse causality may be at play but others showing stable results across sensitivity or stratified analyses.

Recent data from a large cohort study including 102,865 adults in the Nutrinet-Santé cohort (2009-2021) showed that, compared to non-consumers, a higher intake of NNS (especially aspartame and acesulfame K) was associated with a higher risk of overall cancer (HR for higher consumers (those above the median exposure in consumers) compared to non-consumers = 1.13 [95% CI 1.03 to 1.25], *P*-trend = 0.002)[94]. In this same cohort, a recent analysis has shown that total NNS intake was associated with increased risk of cardiovascular diseases (HR: 1.09, 95% CI 1.01 to 1.18, p=0.03), where exposure was coded as $\log_{10}$ of artificial sweetener intake in mg/day +1. NNS were more particularly associated with cerebrovascular disease risk (HR: 1.18, 1.06 to 1.31, p=0.002). Aspartame intake was associated with increased risk of cerebrovascular events (HR: 1.17, 1.03 to 1.33, p=0.02), and acesulfame K and sucralose were associated with increased coronary heart disease risk (acesulfame K: HR: 1.40, 1.06 to 1.84, p=0.02; sucralose: HR: 1.31, 1.00 to 1.71, p=0.05) [95].

In summary, with respect to intermediate markers, RCTs found, on the short term, slight health benefits for weight and BMI loss, but no effects on metabolic endpoints, whereas positive associations toward weight gain and increased risk in some chronic diseases and total mortality were found in the prospective cohort studies for NNS use.

Given the nature of observational studies, cause-effects relationship (including exposure assessment) cannot be outright demonstrated but only approached. Moreover, the interpretation of findings from cohort studies may be affected by reverse causation (particularly for adiposity), selection of comparator and residual confounding, though investigation of individual studies showed that reverse causation was often adequately addressed. **As such, results from cohort studies should be considered carefully, though overall they show no long-term benefit of NNS consumption and do not preclude potential long-term harm.**

Summary of findings in children

In children, meta-analyses of the small number of studies available showed **no significant results for NNS in relation to measures of adiposity such as body weight (n=2 cohort studies), BMI (n=5 cohort studies) or BMI-z-scores (n=2 RCTs and n=3 cohort studies)** [84]. One large RCT (n=640) reported significant reductions in body weight, BMI z-score (increase of 0.02 SD units in the sugar-free group and 0.15 SD in the sugar group, the 95% CI of the difference being -0.21; -0.05), waist circumference and body fat mass when SSB were replaced with NNS-sweetened beverages (moderate certainty evidence) [96]. Data from a former meta-analysis did not evidence effects of the use of NNS on weight management, and a small increase in BMI z-score in children consuming NNS was found [97]. Results are thus largely inconclusive, and no clear benefit related to the use of NNS is currently shown in children and adolescents from the data available so far.

Summary of findings in pregnant women

In **pregnant women**, possible unfavourable effects are suggested, for which higher NNS intake is associated with increased risk of preterm birth (low certainty evidence) and possibly adiposity in offspring (very low certainty evidence) [84].

In conclusion, based on current recent evidence, caution related to the excessive intake of non-nutritive, non-sugar-sweetened beverages should reasonably be advised. This contention is somewhat reinforced by the observation that the reduction in sugar content in beverages may be associated with increased use of NNS as replacement.

4.4. Fruit juices

4.4.1. Definition

Fruit juice is defined in the Codex Alimentarius [98] as "the unfermented but fermentable liquid obtained from the edible part of sound, appropriately mature and fresh fruit or of fruit maintained in sound condition by suitable means including post-harvest surface treatments applied in accordance with the applicable provisions of the Codex Alimentarius Commission. Some juices may be processed with pips, seeds and peel, which are not usually incorporated in the juice, but some parts or components of pips, seeds and peel, which cannot be removed by Good Manufacturing Practices (GMP) will be acceptable. The juice is prepared by suitable processes, which maintain the essential physical, chemical, organoleptical and nutritional characteristics of the juices of the fruit from which it comes. The juice may be cloudy or clear and may have restored aromatic substances and volatile flavour components, all of which must be obtained by suitable physical means, and all of which must be recovered from the same kind of fruit. Pulp and cells obtained by suitable physical means from the same kind of fruit may be added. A single juice is obtained from one kind of fruit. A mixed juice is obtained by blending two or more juices or juices and purées, from different kinds of fruit". Fruit juice can be produced by direct mechanical extraction or be produced by reconstituting concentrated fruit juice with potable water.

4.4.2. Nutrient composition and population consumption

Fruit juices are regularly consumed by most persons; according to certain sources, fruit juice consumption per person in Europe averaged around 19 L per year (52 g per day) [99]. Fruit juices do not contain added sugars (as defined by European food regulations), are derived from fruits without heavy processing, and their consumption has on one hand been perceived as a possible replacement of a fruit portion (see section 3.4 Fruit juices page 20) and thus as being part of a healthy and balanced diet. On the other hand, fruit juices contain high amounts of sugars (ca. 8-18 g/100 mL, Ciqual database), and are considerably lower in dietary fibre (typically below 1 g/100 mL, Ciqual database) compared to the fruits they are derived from. The liquid nature facilitates a fast uptake by the human body, yet fruit juices generally have a low glycemic index (47 ± 9%) [11].

4.4.3. Associations with health outcomes

The following meta-analyses were retrieved from the literature:

1. One review of meta-analyses or umbrella-meta-analysis [100].
2. Sixteen meta-analyses of RCTs [101; 102; 103; 104; 105; 106; 107; 108; 109; 110; 111; 112; 113; 114; 115; 116].
3. Sixteen meta-analyses of observational studies, mostly cohort-studies [42; 117; 118; 119; 120; 121; 122; 123; 124; 125; 126; 127; 128; 129; 130; 131].

Regarding the umbrella-meta-analysis by Fardet et al. 2019 [100], which considered 10 meta-analyses, consuming 100% fruit juices had neither clearly positive nor negative effects on health outcomes, while fruit nectars were clearly related to increased risk of type 2 diabetes. As meta-analyses related to RCTs have been mostly reporting intermediate biological markers, we also report some of these findings.

Regarding type 2 diabetes, the review of meta-analyses reported no overall effect of 100% fruit juices based on the meta-analysis of 4 cohort studies by Xi et al. (2014) [131] – with a multi-adjusted summary relative risk (RR) of 1.03 (95% CI: 0.91-1.18). Other endpoints included coronary heart disease as investigated by the meta-analysis of two cohort studies and fruit juices by Aune et al. (2017)[132] , suggesting protective effects (RR: 0.79 (95CI: 0.63-0.98)) as well as for total stroke (RR: 0.67 (95% CI: 0.60-0.76)) and also cardiovascular disease – based on one study (RR: 0.67 (95% CI: 0.41-1.10)). No significant effects were reported for total cancers, colon cancer and breast cancer.

Regarding intermediate biological markers and anthropometric outcomes, one cohort-based meta-analysis (n=3 studies) study reported a slight increase in BMI with the consumption of fruit juices, i.e. +0.22 kg/m^2 (95% CI: +0.15; +0.28) with 1 serving (240 mL) per day over 16-20 years follow-up [42]. Regarding other endpoints, all investigated in RCTs, no significant effects on fasting glycemia, fasting insulinemia, total-C, HDL-C, LDL-C, and systolic blood pressure were reported. However, positive effects on health were reported for diastolic blood pressure (-2.07 mmHg (95% CI: -3.75 to -0.39)), while a negative one was for HOMA-IR (+0.59 (95% CI: 0.20, 0.97)) [100] .

Thus, as summarized also by the review of meta-analyses [100], consuming fruit juices appears to have a rather neutral effect on health-related outcomes. This was different for more heavily processed fruit nectars (i.e. nectars -sweetened fruit juices – though few studies were included in this review), which generally showed negative results regarding the observed outcomes, while fresh and dry fruits showed more pronounced positive health benefits. Of note, the review was in part funded by a producer of fruit purees.

Summary of findings from RCTs

When investigating effects separately by the type of studies additional insights regarding the potential health effects of consuming fruit juices may be obtained. In RCTs, mostly surrogate or intermediate markers related to disease outcomes have been investigated, thus providing a lower level of evidence than studies directly reporting health outcomes. Of note two RCTs based meta-analyses were funded by the industry [104; 110]. The duration of RCTs differed from 2 weeks to 72 weeks.

The main findings regarding fruit juice intake and cardiovascular markers such as blood pressure or blood lipids (e.g. triglycerides) are rather mixed. Out of 7 meta-analyses, 6 report mixed findings, i.e. positive or no significant differences on the outcomes [102; 103; 104; 106; 107], while one presents rather beneficial effects on blood pressure [112]. It is noteworthy that no adverse effects on the intermediate health-outcomes were reported, which included a large array of biomarkers, including total cholesterol and other blood lipids, vascular adhesion factors, HOMA-IR, pulse-wave velocity, and fasting blood glucose.

Overall, the outcomes from RCTs do not point out towards negative effects of fruit juices on biomarkers of cardio-metabolic diseases, though no studies investigated the direct associations with health outcomes. Contrarily, rather positive effects on health markers were encountered (also in studies not indicating funding by the industry).

Summary of findings from observational studies

Except for one review [128], no meta-analyses appeared to be funded by the food and beverage industry.

Regarding fruit juice intake and total mortality, two out of two meta-analyses reported no significant association [119; 121]. For fruit juice intake and cancer, rather detrimental associations were found, with three/five meta-analyses [117; 120; 122] pointing out adverse effects, while one study showed no significant effect [119] and another lacked data for a quantitative summary [121].

As for weight gain/BMI changes, two out of three meta-analyses [42; 127] reported an increased weight in young children and also in adults, while one found no significant effect [128] – which was funded by Pepsico.

With regards to type 2 diabetes, two out of four meta-analyses reported a positive association, i.e. increased risk of developing diabetes [129; 130], while two found none [118; 131].

As for markers of cardiovascular disease, including metabolic syndrome, three out of five meta-analyses found a protective association [123; 124; 125] for metabolic syndrome, stroke mortality and hypertension, respectively, while two did not find a protective association with cardiovascular mortality [119; 121]. Of the latter two studies, one found a negative effect on total cardiovascular mortality when contrasting highest vs. lowest intake of juices [121].

As for all observational studies, the results may have been influenced by residual confounders (such as other eating patterns, physical activity etc.) and also by reverse causality, i.e. persons known to be at risk or with subclinical disease consuming more fruit juices.

When evaluating published meta-analyses, several limitations were noted, which included that often it remained unclear whether 100% pure fruit juices were examined only, or also fruit nectars. There is also some indication that there is no clear linear dose-response relationship between consumption of fruit juices and health outcomes. Lower amounts may be health beneficial, but quality data for dose-response effects appears to be lacking. In addition, the cause-and effect relationship is likely to be influenced by not differentiating between the various types of juices (containing different amounts of sugars, dietary fibre, vitamins and minerals, as well as secondary plant compounds such as polyphenols and in part carotenoids).

Overall, some adverse associations between the intake of fruit juice and cancer, type 2 diabetes and weight gain have been reported. However, lower doses (<200 mL/d) may be associated with some benefits on cardiovascular mortality, stroke, or components of the metabolic syndrome, although evidence comes from RCTs for intermediate biomarkers and from prospective studies for cardiovascular outcomes. Overall, the evidence is mixed. These findings are also in line with a review of meta-analyses in 2019 [100].

4.5. Milk, milk-based beverages and fermented milk-based beverages

4.5.1. Definition

Fluid milk and milk products are defined under Codex standards as including all plain and flavoured fluid milks based on skim, part-skim, low-fat and whole milk, excluding plain fermented products and plain renneted milk products of food category 1.2. Fluid milks are 'milk products' as defined in CODEX STAN 206-1999, that are obtained by the processing of milk, and may contain food additives and other ingredients functionally necessary for processing. Raw milk ("milk" as defined in CODEX STAN 206-1999) shall not contain any food additives. Fluid milk (plain) is defined under Codex standards as plain fluid milk obtained from milking animals (e.g. cow, sheep, goats, buffalo) that has been processed. It includes pasteurized, ultra-high temperature (UHT) treated, sterilized, homogenized, or fat adjusted milk. Fermented milk is obtained by fermentation by the action of suitable micro-organisms and resulting in refuction of pH with or without coagulation. The term 'yoghurt' can only be applied if cultures of *Streptococcus thermophilus* and *Lactobacillus delbrueckii* subsp. Bulgaricus are used as micro-organisms.

For definition of the various types of flavoured or fermented milk-based beverages, please refer to section 1.2 Definition of beverages included page 12)

Of note, whilst definition of food groups differs across studies, fermented milk-based beverages are commonly grouped with other milk-based and weetened dairy beverages rather than with yogurts. Also, information is not always available on whether sweetened milk-based beverages are classified along with milk or with sweetened beverages.

4.5.2. Nutrient composition and population consumption

Plain cow milk contains on average 32g/L proteins [133], with limited variation between skim, partial skim or whole milk. Fat composition includes mainly saturated fats, with variations depending on the fat-adjusment, from 0.5-0.9% for skimmed milk to an average of 3.5% for whole milk. Fat and protein composition are more variable for milk from other animals, with 6.2% proteins and 7.9% fat in sheep milk [133]. Sugar content in cow milk include mainly lactose, which is not included in the definition of free sugars. Fermented products contain similar amounts of proteins, but typically lower contents in lactose (2.18 g lactose/100 ml for plain skim fermented milk vs. 4.64 g/100 ml for plain skim milk) than plain milk. Contents in fat depend on the type of milk that is processed [134].

Flavoured milk and fermented milk-based beverages may include sweeteners (including added sugars) and flavourings, including NNS. Considering that fermented milks generally contain lower levels of lactose than milk, it follows that the content in added sugars is higher in fermented milk-based beverages than in milk-based beverages with similar contents in total sugars.

Consumption of milk, milk-based beverages and fermented milk-based beverages varies depending on the country and sub-population (children vs. adults). In COEN, consumption of milk and milk-based beverages ranges from 75.3 g in France [135] to 147 g in the Netherlands [136] in adults. Milk and milk-based beverages are generally the second highest consumed beverages in children [135].

4.5.3. Association with health outcomes

The following elements on the association between milk consumption and health have been reproduced from the 2021 annual report of the ScC of the Nutri-Score.

Consumption of 200 g of milk per day has been found to be associated with a 10% lower colorectal cancer risk [137; 138].

“In a recent systematic review of prospective observational studies of Jakobsen et al. [139] high-fat milk was associated with a higher risk of CHD (based on 6 studies). There was, however, considerable heterogeneity between studies, which limits a clear interpretation of the results. Regarding stroke, a recent analysis based on the EPIC study showed inverse associations of milk, yogurt and cheese consumption with stroke risk [140].

With regard to associations with health outcomes, one systematic review and meta-analysis investigated the association of fermented milk and yogurt consumption with cardiometabolic diseases. A high versus low consumption of fermented milk was associated with a 4% reduction in stroke, ischemic heart disease and cardiovascular mortality risk in 4 studies (RR=0.96; 95%-CI: 0.94-0.98). A high versus low yogurt consumption was associated with a 27% reduced risk of type 2 diabetes (RR=0.73; 95%-CI: 0.70-0.76; 7 studies) and a 20% reduced risk of the metabolic syndrome (RR=0.80; 95%-CI: 0.74-0.87; three studies) [141]. Several studies investigated the association of high-fat and low-fat dairy with different chronic disease outcomes. These studies showed that a high low-fat milk or dairy intake was associated with lower risk of hypertension, stroke and type 2 diabetes. A high intake of high-fat milk or dairy was associated with higher risk of cardiovascular disease, all-cause and CVD and cancer mortality, but lower risk of overweight/obesity and stroke [139; 142; 143; 144].

Emerging evidence suggests that the benefits of the consumption of yogurts may not extend to yogurt drinks. Recent cross-sectional evidence links yogurt consumption to lower odds for overweight and

obesity, yet consumption of flavoured yoghurt drinks to increased odds [145]. Two recent analyses from the UK biobank provide novel prospective evidence for differences arising from the interplay between texture and sugar intake: the authors examined sugar from milk-based drinks (defined as dairy/yogurt-based smoothies, yogurt drinks, flavoured milks or milkshakes, hot chocolate or other milk-based drinks, excluding plain milk) separately for intrinsic sugar (i.e. sugar naturally present) and free sugar (i.e. added to the drink). Of note, only consumption of free sugars from milk-based drinks was associated with an increased hazard for all-cause mortality. The authors also reported that consumption of free sugar from solid foods was not related to all-cause mortality; an observation that also held true for the subtype of "treats", which included sweetened yoghurt (treats: pastries, candies, chocolate, ice cream, sweetened yogurt). [146]. Similar observations were made for the risk of developing depression: free sugars from milk-based drinks (including yogurt drinks) increased the risk comparably to free sugars from soda/fruit drinks, whereas free sugars from solid foods (including sweetened yogurt) did not [147]. These findings suggest that free sugars added to yogurt drinks may be notably more detrimental than free sugar added to yogurt [145; 146; 147].

Consumption of milk, and more particularly low-fat milk appears rather associated with reduced risks of chronic diseases, albeit with some heterogeneity depending on the study and the health outcome investigated. Limited evidence is available regarding sweetened milk and fermented milk beverages, though emerging evidence would tend to suggest they are not associated with the same beneficial effects as solid fermented products.

4.6. Plant-based beverages

4.6.1. Definition

Plant-based beverages include beverages based on soy, almond, oat, rice, coconut and cashew-nuts. They are sold as plant-based substitutes for milk, milk-alternatives, or (plant-based) milk-replacement beverages, and include primarily dairy-free alternatives in particular for vegetarians/vegans or those with lactose intolerance or dairy allergies. The most common products on the European market include beverages based on soy, almond, oat, rice, and coconut. Less frequently, other drinks based on cashew-nuts, peas, lupines, hemp etc. can also be found.

In the following, health-related aspects of consuming these beverages, as well as their nutritional composition, will be briefly summarized.

4.6.2. Nutrient composition and population consumption

From a nutritional point of view, aspects of milk replacements were reviewed recently [148], emphasizing that soy milk has a somewhat similar nutrient profile as cow's milk, at least compared with the other plant-based beverages. All nutritional compositions were obtained from the French CIQUAL database.

- Plain soy beverages contain about 3.3 g/100 g proteins, 0.7 g/100 g carbohydrates (mostly simple sugars) and 2.1 g/100 g fat (vs. 3.3 g/100 g protein, 4.9 g/100 g carbohydrates (mostly lactose), and 3.6 g/100 g fat for whole milk). Therefore, especially in sights of the protein content, soy milk compares to whole milk. Note however that the calcium content is about 10 times lower – 12 mg/100 g vs. 120 mg/100 g in cow's milk. Furthermore, there is a risk of allergies – the prevalence of soy allergies in the general population has been reported to be as high as 0.5% [149], which appears lower than the reported prevalence for cow-milk allergies reported for adults, 1.9% [150].

These contents are different for other plant-based beverages, which are all considerably lower in proteins, and tend to contain more sugars compared to soy-based beverages.

Table 6 Average composition of plant-based beverages, CIQUAL food composition table

	Energy (kJ/100 g)	Proteins (g/100 g)	Carbohydrates (g/100 g)	Fats (g/100 g)	Sugars (g/100 g)	Fibres (g/100 g)	Saturates (g/100 g)	Sodium (g/100 g)
Almond-based, unsweetened	150	1.06	0.68	3.2	traces	< 0.5	0.31	0.051
Almond-based, sweetened	185	0.69	3.96	2.8	3.44	< 0.5	0.58	0.095
Soy-based, unsweetened	155	3.31	0.7	2.07	< 0.4	0.6	0.26	0.061
Soy-based, sweetened	254	2.96	7.24	1.92	6.72	0.6	0.3	0.12
Rice-based, unsweetened	227	< 0.46	10.8	1	5.6	< 0.5	0.11	0.074
Oat-based, unsweetened	179	< 0.46	7.8	1.1	5	< 0.5	0.2	0.066
Coconut-based, unsweetened	131	< 0.42	2.75	2.1	2.46	< 0.5	1.87	0.089

In terms of consumption, limited data is available considering the relatively new segment that these products cover in the market.

4.6.3. Associations with health outcomes

An insightful summary of available data can also be retrieved from the website of the joint SACN/COT working group of the UK on plant-based drinks [151]:

Of note, there is a lack of studies investigating the association between the consumption of plant-based beverages and health outcomes, with studies typically investigating surrogate markers of cardiovascular risk. This may be partly due to their rather recent expansion in the market and the public debate surrounding the shift towards more plant-based diets.

For soy-based beverages, one meta-analysis [152] and one systematic review [153] of intervention studies were found. The meta-analysis summarized results from 18 RCTs, focussing on cardiovascular risk factors in the general adult population, with an intervention time of 4-12 weeks. It was found that consuming soy beverages significantly reduced systolic ($p < 0.001$) and diastolic ($p = 0.002$) blood pressure ($p = 0.001$), as well as LDL-C ($p = 0.041$) waist-hip circumference ($p = 0.005$), CRP ($p < 0.001$), and TNF-alpha ($p = 0.016$). Significant between-study heterogeneity was found for the pooled effect on blood pressure and LDL-C. In addition, subgroup analyses indicated that the decrease in systolic blood pressure was more pronounced when soy drink was consumed for ≤4 weeks, a somewhat unusual finding. There were no significant differences between soy drink and control groups for other factors, namely body weight, BMI, HDL-C, triglycerides, fasting blood glucose, fasting insulin, IL-6 and fibrinogen. Of note, about half of the studies were funded by the beverage industry. The systematic review was 2 years older and results were similar to the meta-analysis. Therefore, limited data suggests that consuming soy-based beverages may have some benefits on cardiovascular risk factors. These findings may be attributed mechanistically to either soy isoflavonoids or soy proteins [154; 155], both of which have been found to be related to some of these benefits.

Compared to soy-based beverages, much less data is available for other plant-based beverages. No meta-analysis or systematic review was found. Therefore, we investigated individual studies on plant-based beverages and any health outcome. For almond-based beverages, two human studies were found, one intervention trial by Al Tamimi et al. [156], which lacked a control group, and another study [157], in which only post-prandial effects of consuming almond-drink vs. carbohydrate-matched dairy milk was compared, thus no effects could be extrapolated to long-term consumption of almond drink.

For coconut drink, a single study was retrieved [158], a cross-over trial in healthy volunteers (n=60) who consumed 36 g of a dried coconut drink product per day, however, also in this study results were not contrasted against a control group (again a real control group was lacking). No studies were found for rice-based beverages. Two RCT studies were found for oat-based beverages, both by the same authors and both sponsored by a farmers' research association [159]. Compared with the control drink, intake of oat milk resulted in somewhat improved total cholesterol and LDL-C. Thus, there may be very limited evidence that consuming oat drink may be beneficial for reducing blood lipids. This has been mechanistically explained by the presence of the dietary fibre beta-glucan, a soluble, fermentable dietary fibre, which has been reported to have lipid-lowering effects [160].

Three further additional cross-sectional studies were retrieved, which investigated the combined association of consuming plant-based beverages with some health outcomes. The first one was related to the consumption of plant-based beverages and the growth of children [161]. In this study in over 5,000 children in Canada, aged 24-72 months, a dose-dependent association between higher plant-based beverage consumption and lower height ($p < 0.0001$) was found. For each daily cup (ca. 240 mL) of plant-based beverages consumed, children were 0.4 cm (95% CI: 0.2, 0.8 cm) shorter**.** However, the study was conducted in Canada where milk can be voluntarily fortified (e.g. with vitamin D), which could have played a role. In another study, also on Canadian children, vitamin D levels in children 1-6 years (n > 2,800) who consumed plant-based beverages was compromised [162]. Specifically, drinking plant-based beverages was associated with a 4.2-nmol/L decrease in 25-hydroxyvitamin D (25-OH-D) per 250 mL cup consumed among children who also drank cow's milk ($p = 0.008$). Children who drank plant-based beverages were at higher risk of having a 25-OH-D level < 50 nmol/L than children who drank only cow's milk (OR: 2.7, 95% CI: 1.6 to 4.7). Again, fortification with vitamin D is likely to play a role. In a third study, the effect of consuming plant-based beverages on iodine status was studied in UK children aged 1-5 years (n > 3,900) [163]. It was shown that iodine intake was significantly lower in exclusive consumers of milk alternatives than cows' milk consumers (94 v. 129 µg/d; $p < 0{\cdot}001$). However, it is possible that children (and their families) of non-dairy products were rather following a vegetarian diet, and milk in the UK is not fortified with iodine.

At present, the relationship between plant-based beverages and health is generally lacking data, especially for long-term disease risk. For soy-based beverages, and also to a lesser degree for oat-based beverages there is some indication – plus mechanistic plausibility (beta-glucans for oat milk and isoflavonoids and soy protein for soy) – that their intake may lower blood lipids. For almond-, rice- and coconut-based beverages, too little evidence is present and thus no relation to cardiovascular or other health outcomes can be established. Due to this lack of data and reverting to the nutritional aspects, soy drink comes closest in macronutrients to the composition of cow milk, though its calcium content is lower by about one magnitude.

5. Priority areas for the update of the algorithm in beverages

Following the literature reviews and the analysis of the COEN FBDG, the following priorities were set for the classification of beverages, in comparison with the current classification:

1. Water and naturally low-calorie beverages

Water is the only beverage unanimously recommended by international bodies in all COEN.

Naturally low-calorie beverages can contribute to fluid intake and may be recommended in some countries. However, FBDG and results from scientific literature suggest that caffeine-containing beverages for children as well as for pregnant and lactating women should be avoided or very much limited.

Water containing flavours is typically not mentioned as a fluid source in food based dietary guidelines and data on long-term effects is generally absent. It has been argued for foods in general whether the presence of flavours is a characteristic of ultra-processed foods, and it has also been cautioned that flavour addition – at least in solid foods – could contribute to higher energy intake, as summarized in an opinion article recently [32].

Unlike water, milk is not a beverage that is recommended to quench thirst. Milk contains lactose, protein, fat and relevant amounts of various micronutrients. It therefore provides the body not only with fluid but also with substantial amounts of nutrients and energy. From this compositional and caloric perspective, it can be argued that milk is not comparable to water and should not reach the same rating as water.

Therefore, given that water is the only beverage unanimously recommended by international bodies, the ScC agreed that the specific positioning of water within the Nutri-Score classification was justified and should be maintained.

From this contention, it follows that all other beverages, including naturally low-calorie beverages are classified between the B and E classification.

2. Water-based beverages (sugar or non-sugar sweetened beverages, sodas)

Overall, the current algorithm allows for a good discrimination between SSB at the high end of the spectrum (i.e. for rather high-sugar beverages). However, the ScC noted areas of improvement for the discrimination of beverages based on sugar content for low-sugar beverages. Indeed, in the current algorithm, no beverage containing sugars can reach the B category, as sugars contents >0 g/100 mL is rated C. Only beverages with NNS or flavourings can reach the B category.

Also, from a regulatory perspective, the FIC regulation regarding labelling of sugars allows beverages with very limited amounts of sugars to display the content in sugars either as “0 g” or “<0.5 g”. In contrast, the Nutri-Score allocates one point for sugars if the declaration is >0 g. Hence, beverages with similar very limited sugar contents may be classified differently in the Nutri-Score according to the expression of the nutritional declaration.

Hence, the ScC agreed that the algorithm could be improved to allow a better discrimination of beverages according to sugar content for low-sugar beverages, and to align its expression on the lower boundary threshold for sugar content declaration.

3. Fruit juices

Following the analysis of the literature and the position of fruit juices within FBDG, the ScC agreed that the current algorithm of the Nutri-Score adequately classified fruit juices and diluted fruit juices, that are discriminated according to their sugar content.

Hence, the ScC aimed for the modification in the algorithm to reach status quo for fruit juices.

4. Milk and milk-based beverages

Currently in the Nutri-Score algorithm, as milk and milk-based beverages are classified as 'general foods', they are ranked in the A and B classes for milk and B and C for sugar-sweetened milk-based beverages. However, this classification within the 'general foods' algorithm does not appear adequate, in particular for sweetened milk-based beverages, as there is little to no discrimination with plain milk while FBDG do make this distinction.

Considering the specific condition under which water is classified within the beverages algorithm, being the only reference beverage classified as A, it follows that milk will no longer reach the A classification. However, considering the place of milk and dairy products in general in the various FBDG, the ScC considered that the classification of milk and milk-based beverages in the range between 'B' and 'E' categories of the Nutri-Score was adequate, with a discrimination between types of milk and milk-based beverages based on their saturates and sugar content.

Overall, the ScC considered that the classification of sugar-sweetened milk-based beverages within the 'general foods' category did not allow to adequately discriminate them based on their sugars content. As for milk, the ScC agreed that skimmed and partially skimmed milk should be maintained in the favourable categories of the Nutri-Score and allow for a potential discrimination between skimmed/partially-skimmed milk and whole milk given their substantial difference in saturates and energy content.

5. Beverages with non-nutritive sweeteners

Following the literature review on NNS, and the analysis of FBDG in the COEN, the ScC agreed that the use of NNS should not be promoted within the Nutri-Score algorithm for beverages. It appears important to the ScC that the Nutri-Score algorithm also does not signal any incentive to industry in using NNS as a sugar replacement in reformulation rather than lowering the content of sugars of beverages.

Hence, the ScC agreed to take specific measures to ensure that the use of NNS is not promoted within the Nutri-Score algorithm comparatively to SSB to align the classification with literature findings and FBDG.

6. Main scenarios tested

6.1. Main components being modified

Considering the data-driven approach to the definition of the scenarios, the components for which a wide variability within the beverages category exists were considered as the primary targets for modifications. Hence, as in the initial adaptation of the Nutri-Score algorithm in 2015 in France by the HCSP, energy, sugars and the "fruit, vegetables and legumes" component were modified.

Considering the inclusion of milk and milk-based beverages, which are sources of calcium intakes in the population, the protein component was also included within the primary targets for modification.

Of note, the ScC acknowledges that proteins are included as a proxy for calcium content within the algorithm. However, fortification with calcium is frequent in plant-based beverages that contain low amounts of proteins. In the case of beverages, then, protein content will not always act as an adequate proxy for calcium. The ScC agrees that this is a limitation to the Nutri-Score beverage algorithm, following the constraints related to the current nutrients included in the mandatory nutrient declaration according to the FIC regulation.

Finally, for other components (salt and fibres), the ScC investigated their distribution within food composition databases in the beverages categories, to ensure that the components as they are defined for the updates algorithm for 'general foods' category were adequate to include in the updated beverages algorithm.

For salt specifically, the distribution of salt within beverages showed that the vast majority of beverages contained amounts <0.4g/100mL. However, in some very specific cases (vegetable juices or salted dairy beverages), the amounts were up to 0.8 g/100mL, which could contribute significantly to salt intakes. However, from a population perspective, beverages are not an important contributor to salt intakes, in particular in comparison to soups and stock, which are classified under the 'general foods' algorithm. After careful consideration, the ScC agreed to maintain the salt component for beverages equal to the component for the 'general foods' algorithm. The ScC retains the possibility of revising this issue in the next update of the algorithm if necessary.

6.2. Energy

6.2.1. Rationale

The energy component was adapted with a pragmatic approach for the specific case of beverages by the HCSP in France in 2016. Therefore, the basis for the component, with a point allocation scale by 30 kJ/point appears adequate.

Considering the energy content in beverages, in particular with the addition of milk-based beverages, the ScC explored non-linear approaches to the point allocation within the component, to ensure an adequate distribution based on the objectives set by the group.

Finally, a starting point of the scale at 0 kJ was considered a limitation with regards to the aim of the group to improve discrimination within low-sugar beverages.

Therefore, the ScC agreed to modify the energy component using a non-linear approach, with a modification in the starting point of the scale.

6.2.2. Main scenario

Considering the energy distribution within beverages with the addition of milk and milk-based beverages, which contain sugars, proteins and fats as energy-providing nutrients, a non-linear scale was considered more appropriate to adequately cover their energy density. The scenario was therefore tailored so not to overly penalize energy density within the range of the observed distribution in plain milk, but otherwise adapted to maintain an adequate distribution for higher energy density beverages.

The main scenario for the energy component was structured taking into account the distribution of energy in milk, with a modified starting point at 30 kJ/100 mL, a non-linear approach with an initial scale of 60 kJ/point followed by a 30 kJ/point scale, as follows:

Table 7 Point allocation of the current Nutri-Score algorithm and alternative scenario tested for energy

Points-Energy	Current scenario (kJ/100 mL)	Scenario 1 (kJ/100 mL)
0	≤0	≤30
1	≤30	≤90
2	≤60	≤150
3	≤90	≤210
4	≤120	≤240
5	≤150	≤270
6	≤180	≤300
7	≤210	≤330
8	≤240	≤360
9	≤270	≤390
10	>270	>390

6.3. Sugars

6.3.1. Rationale

In line with the energy component, the sugars component for the beverages was initially adapted specifically to the distribution of sugars in beverages by HCSP in France in 2016. Therefore, the basis for the component, with a point allocation scale by 1.5 g/point appears adequate.

However, as for the energy component, a non-linear approach was taken, with a more lenient approach within the range of the observed distribution of sugars in plain milk, and a more stringent approach at the higher end of the distribution of sugars. This non-linear distribution would lead to adequately classify beverages according to their sugars content and lead to further incentives to limit the amount of sugars in beverages.

Finally, the starting point for the point allocation scale in sugars was modified from “0 g/100 mL” to “<0.5 g/100 mL”, in alignment with the EU Nutrition and Health Claim Regulation [(164)] within which a ‘sugars-free’ claim can be made if a product contains no more than 0.5 g of sugars per 100 g or 100 mL.

6.3.2. Main scenario

The main scenario for the sugar component was structured taking into account the distribution of sugars in milk with a modified starting point at 0.5 g of sugar/100 mL, a non-linear approach with an initial scale of 1.5g/point followed by a 1g/point scale, as follows:

Table 8 Point allocation of the current Nutri-Score algorithm and alternative scenario tested for sugars

Points-Sugars	Current scenario (g sugars/100 mL)	Scenario 1 (g sugars/100 mL)
0	≤0	≤0.5
1	≤1.5	≤2
2	≤3	≤3.5
3	≤4.5	≤5
4	≤6	≤6
5	≤7.5	≤7
6	≤9	≤8
7	≤10.5	≤9
8	≤12	≤10
9	≤13.5	≤11
10	>13.5	>11

6.4. Proteins

6.4.1. Rationale

Proteins act within the algorithm as proxies for calcium content. Within beverages, proteins can be considered as an adequate proxy for calcium content in milk and milk-based products.

As mentioned previously, considering the fortification of beverages in calcium in particular in plant-based beverages, protein content cannot always act as an adequate proxy for calcium. The ScC agrees that this is a limitation to the Nutri-Score algorithm, following the constraints related to the current nutrients included in the mandatory nutrient declaration according to the FIC regulation.

Following the same general *a posteriori* approach of the group, the ScC structured the proteins content to the distribution of proteins in beverages, and specifically to milk and milk-based beverages, using a linear approach. Furthermore, the maximum number of proteins points in beverages was aligned with the maximum number of protein points allocated in the algorithm for general foods to increase consistency between algorithms of the Nutri-Score for general foods and beverages.

6.4.2. Main scenario

Based on the distribution of proteins in milk, the point allocation scale for proteins was adapted with a starting point at 1.2 g/100 mL and a linear scale at 0.3 g/100 mL of proteins/point up to a maxiumum of 7 points, as follows:

Table 9 Point allocation of the current Nutri-Score algorithm and alternative scenario tested for proteins

Points - Protein	Current scenario (g proteins/100 mL)	Scenario 1 (g proteins/100 mL)
0	≤1.6	≤1.2
1	≤3.2	>1.2
2	≤4.8	>1.5
3	≤6.4	>1.8
4	≤8.0	>2.1
5	>8.0	>2.4
6		>2.7
7		>3.0

Also, based on the distribution of the FNS and in order to avoid threshold effects, the ScC agreed to remove the protein cap threshold in the beverages category (set in the 'general foods' at 11 A points). Indeed, maintaining the protein cap threshold would have led to some whole-milk products at the threshold for A points to shift by two classes of the Nutri-Score, while displaying very limited differences in terms of nutritional composition.

6.5. Fruit, vegetables and legumes

6.5.1. Rationale

The current algorithm doubles the points for contents in the 'fruit, vegetables and legumes' component, up to 10 points. Considering the modification in the energy and sugars component, and the aim of the ScC to maintain the status quo in the category of fruit juices, to which the maximum number of points are allocated, the 'fruit, vegetables and legumes' component was modified to adjust to the updated algorithm.

6.5.2. Main scenarios tested

The initial scale for the component was maintained. However, the maximal number of points was adapted using an *a posteriori* approach.

The main scenarios tested included 3 scenarios with increasing number of points being allocated to beverages with ≥80% fruit and vegetables (i.e. fruit juices).

Table 10 Point allocation of the current Nutri-Score algorithm and alternative scenarios tested for the 'fruit, vegetables and legumes' (FVL) component

% of FVL	Current scenario (FVL points)	Scenario 1 (FVL points)	Scenario 2 (FVL points)	Scenario 3 (FVL points)
<40%	0	0	0	0
≥40%	2	2	2	2
≥60%	4	4	4	4
≥80%	10	5	6	7

6.6. Non-nutritive sweeteners

6.6.1. Rationale

Considering the results of the literature review, along with the position of the various FBDG on artificially-sweetened beverages (see section 5 Priority areas for the update of the algorithm in beverages page 41), the ScC agreed to the inclusion of an additional component within the algorithm specifically for the use of NNS.

Of note, the addition of a component based on use of NNS is proposed for beverages only in the current update of the Nutri-Score algorithm. Considering the current use of NNS in other types of foods (see section 4.3.2 Use of non-nutritive sweeteners in the food supply and consumption in the population page 28), the ScC agreed to revisit the issue of the use of NNS in general in the future, considering trends in the use of NNS in the food supply, as well as updating the literature review relating to NNS.

6.6.2. Main scenario

Beverages containing NNS (see list in section 4.3.1 Definition page 25) were allocated **4** A points (i.e. as an unfavourable element) in the algorithm in order to correspond to the minimal amount of points necessary for a shift by one category of the overall Nutri-Score. Of note, considering that the current FIC regulation does not provide information as to the **amounts** of NNS used in products, only the **presence** of NNS in the list of ingredients can be used in the algorithm.

6.7. Final combination scenario and adjustment of thresholds

6.7.1. Selection of the main scenario for the 'fruit, vegetables and legumes' component

Considering the objective of maintaining the status quo for the classification of fruit juices within the algorithm, and the fact that in this category the main components intervening are energy, sugars and 'fruit, vegetables and legumes' (with maximal points for 100% fruit juices), it was therefore possible to set the main scenario.

The ScC explored the distribution of sugars within the Nutri-Score categories in fruit juices (with >80% fruit and vegetables) to select the most adequate number of maximal points to obtain the status quo in the classification within the algorithm.

Table 11 Theoretical sugar thresholds for fruit juices (with >80% 'fruit, vegetables and legumes') in the various classes of the Nutri-Score according to the testing scenarios

Scenario 1	Current scenario (10 max points)	Scenario 1 (5 max points)	Scenario 2 (6 max points)	Scenario 3 (7 max points)
B	≤8 g	≤7.0 g	≤7.5 g	≤8.0 g
C	≤11.1 g	≤9.9 g	≤10.9 g	≤11.1 g
D	≤14.7 g	≤12.9 g	≤14.7 g	≤16.4 g
E	>14.7 g	>12.9 g	>14.7 g	>16.4 g

Theoretical approach: Energy was modelized as Sugar*16.8+23; small amounts of protein and fats not considered

Overall, the ScC considered that the sugars content distribution of fruit juices (with >80% fruit and vegetables) that allowed to obtain the status quo within the beverages category was Scenario 2.

The ScC agreed that Scenario 2, with a maximal number of points for contents in fruit and vegetables >80% set at 6 points should be retained in the update of the algorithm for beverages.

6.7.2. Final combination

The combined algorithm included testing of the following modifications:

- Component modifications
  - A modified Energy component, using a non-linear point allocation scale, starting at 30 kJ/point, followed by a point allocation scale of 60 kJ/point up to 3 points, then 30 kJ/point up to 10 points;
  - A modified Sugars component, using a non-linear point allocation scale, starting at 0.5 g sugar/point, followed by a point allocation scale of 1.5 g/point up to 3 points, then 1g sugar/point up to 10 points;
  - A modified Proteins component, using a linear point allocation scale, starting at 1.2 g/100 mL, followed by a point allocation scale of 0.3 g proteins/point up to 7 points;
  - A modified 'Fruit and Vegetables' component, with a modification in the maximal number of points up to 6 maximal points;
  - An additional 'NNS' component, with 4 A points allocated to the presence of NNS in the beverage (i.e. as an 'unfavourable element').
  - For salt and fibres, the components are maintained equal to the updated algorithm for 'general foods'
- Overall computation modification
  - A removal of the protein cap threshold (initially set for products with A points ≥11)

6.7.3. Thresholds adjustment

Considering the modifications in the algorithm, the thresholds were explored taking into account the main areas of improvement set at priorities by the ScC in the various beverages categories.

The ScC therefore recommends the following final thresholds for the Nutri-Score algorithm to align with the objectives set by the ScC:

FNS points	Nutri-Score classification	Colour
Water	A	Dark green
Min to 2	B	Light green
3 to 6	C	Yellow
7 to 9	D	Light orange
10 to max	E	Dark orange

6.8. Impact on the final classification of beverages

6.8.1. France

Water-based beverages

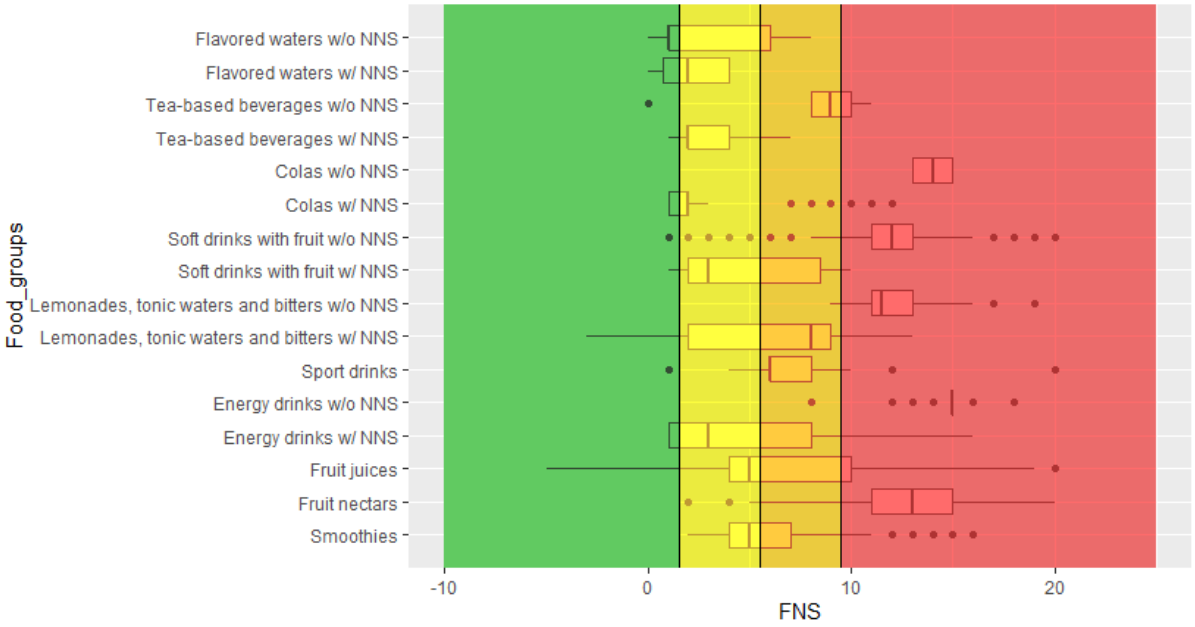

Figure 3 Current distribution of water-based beverages in the FNS score and corresponding Nutri-Score classification – FR

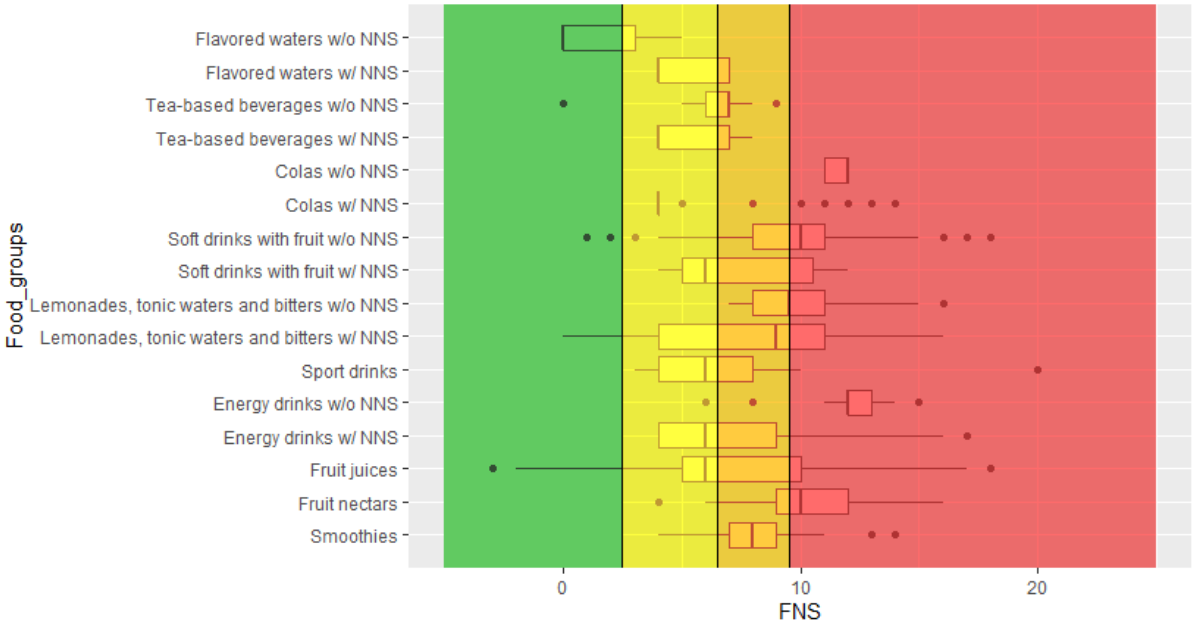

Figure 4 Updated distribution of water-based beverages in the FNS score and corresponding Nutri-Score classification – FR

Milk- and plant-based beverages

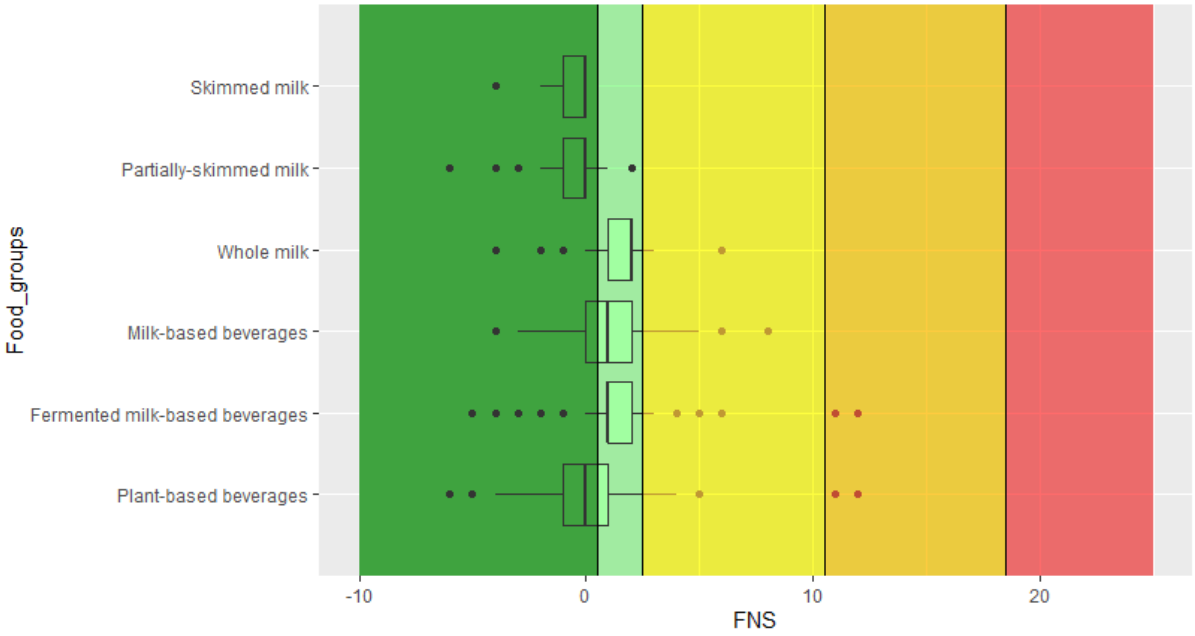

Figure 5 Current distribution of milk- and plant-based beverages in the FNS score and corresponding Nutri-Score classification – FR

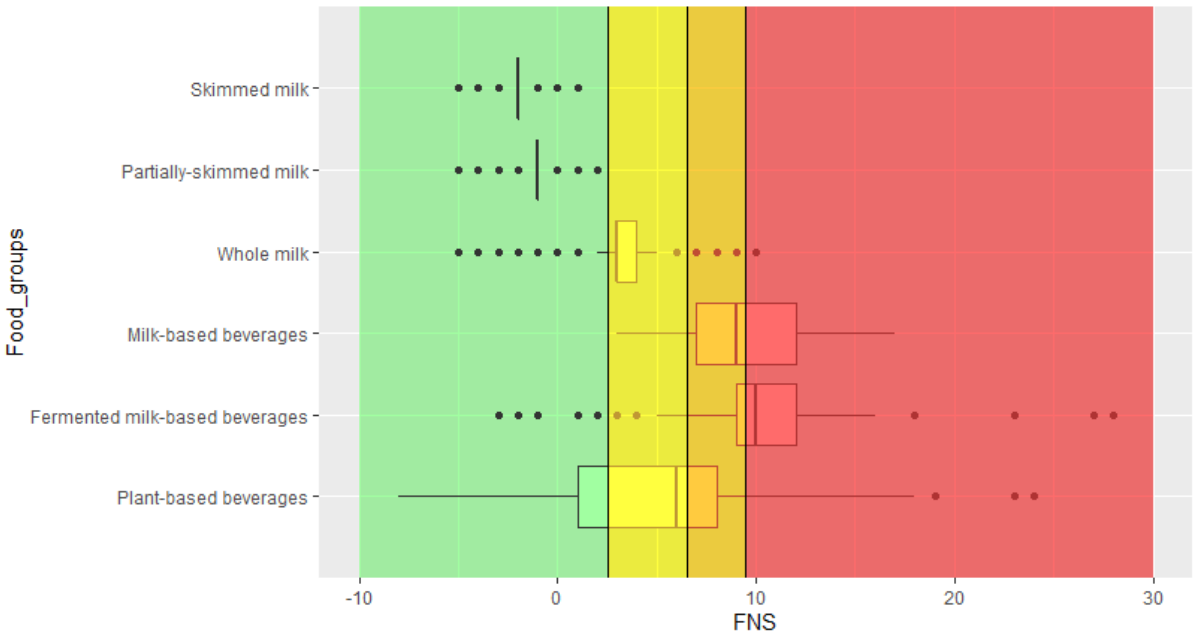

*Figure 6 Distribution of milk- and plant-based beverages in the FNS score and corresponding Nutri-Score classification using the Nutri-Score update algorithm for beverages (**protein component up to 7 points**) – FR*

6.8.2. Germany

Water-based beverages

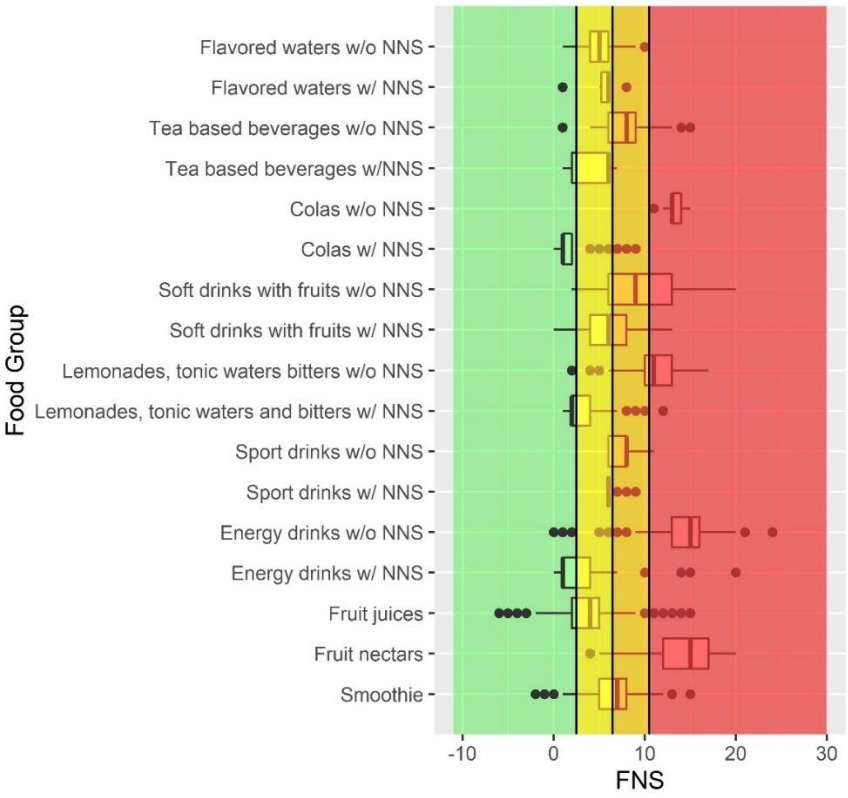

Figure 7 Current distribution of water-based beverages in the FNS score and corresponding Nutri-Score classification – DE

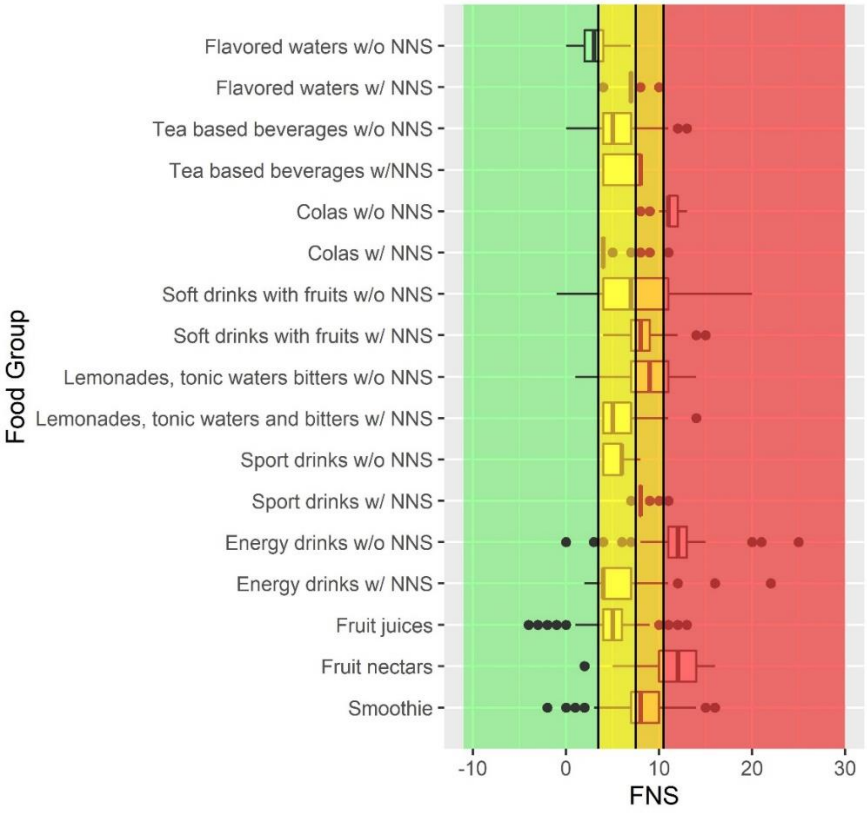

Figure 8 Updated distribution of water-based beverages in the FNS score and corresponding Nutri-Score classification – DE

Milk and plant-based beverages

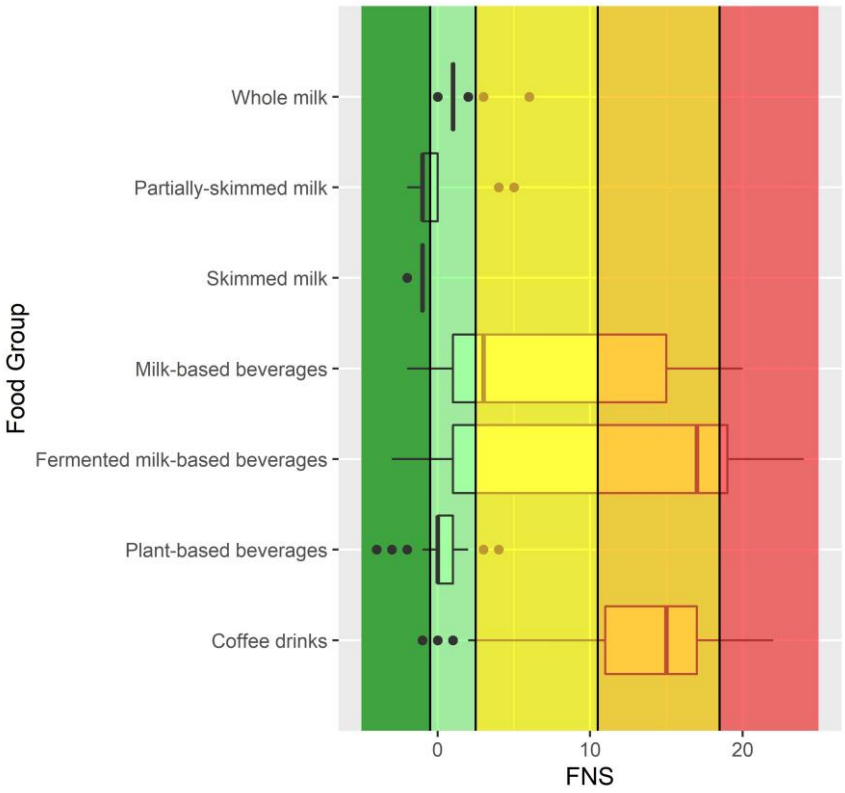

Figure 9 Current distribution of milk- and plant-based beverages (incl. coffee drinks) in the FNS score and corresponding Nutri-Score classification – DE

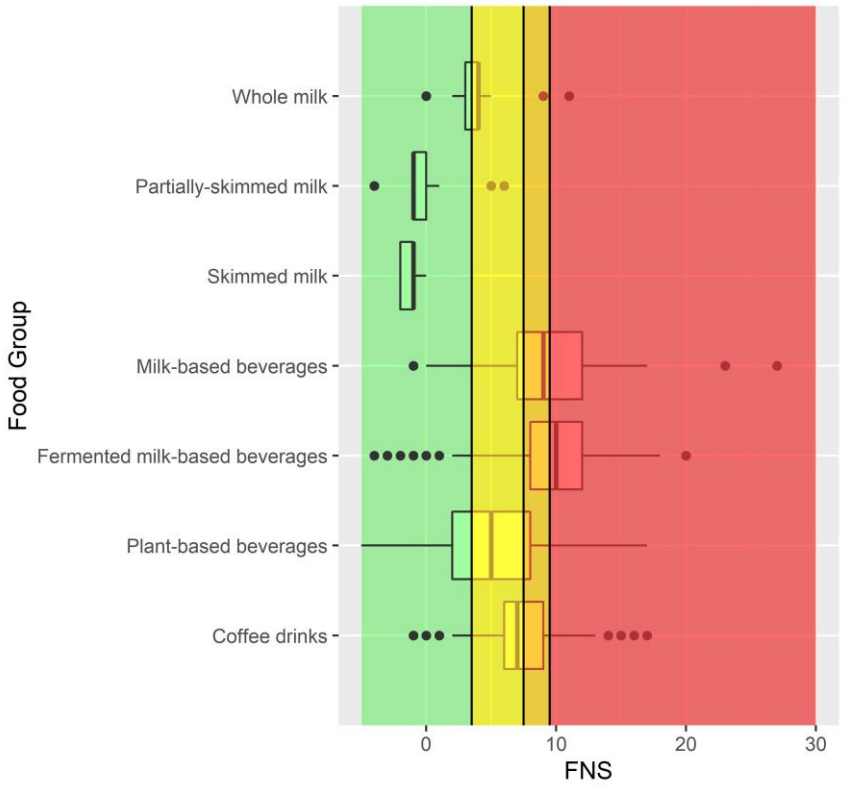

Figure 10 Updated distribution of milk- and plant-based beverages (incl. coffee drinks) in the FNS score and corresponding Nutri-Score classification – DE

6.8.3. The Netherlands

Water-based beverages

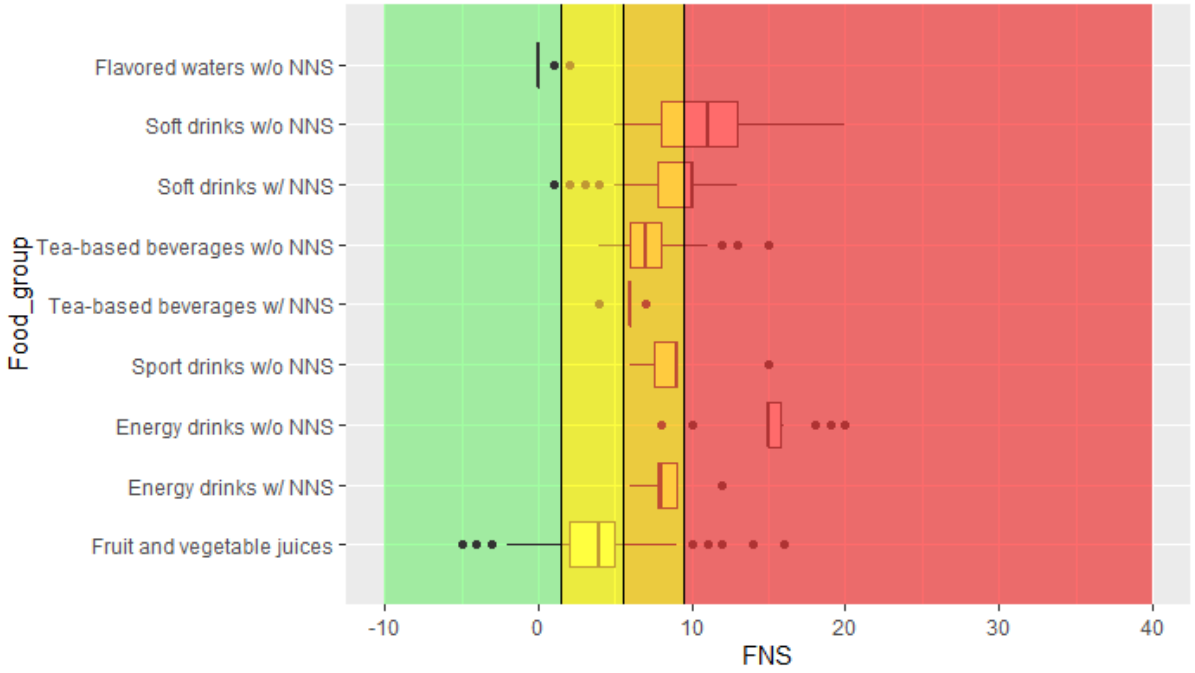

Figure 11 Current distribution of water-based beverages in the FNS score and corresponding Nutri-Score classification – NL

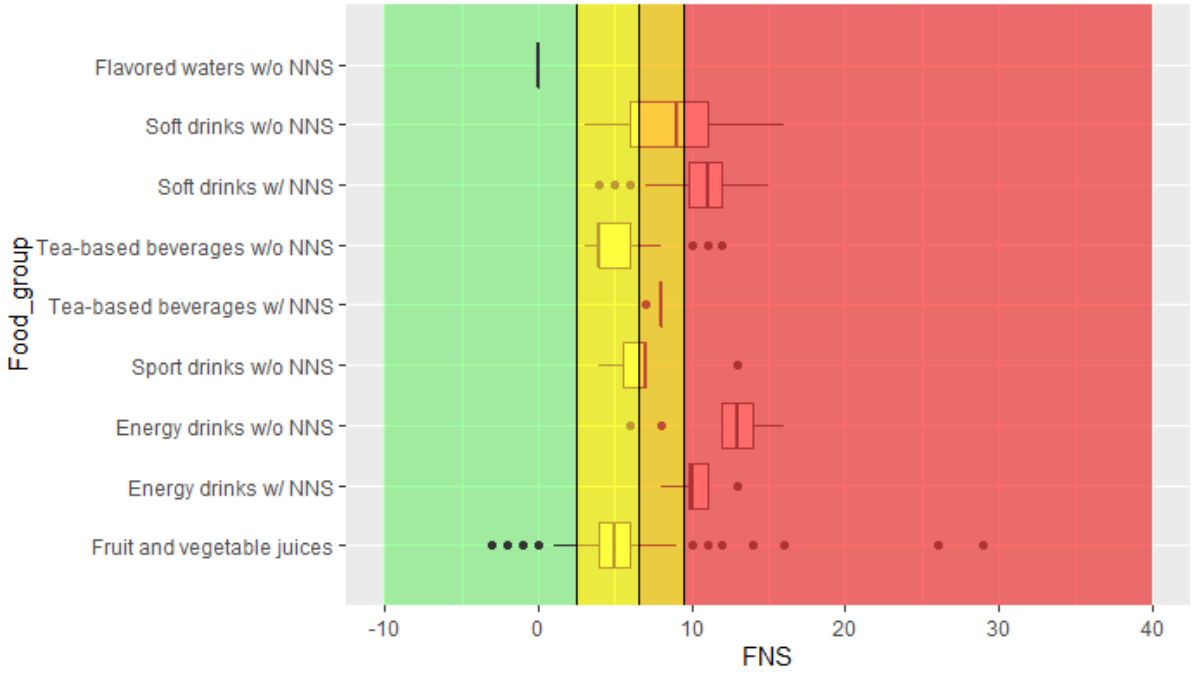

Figure 12 Updated distribution of water-based beverages in the FNS score and corresponding Nutri-Score classification – NL

Milk and plant-based beverages

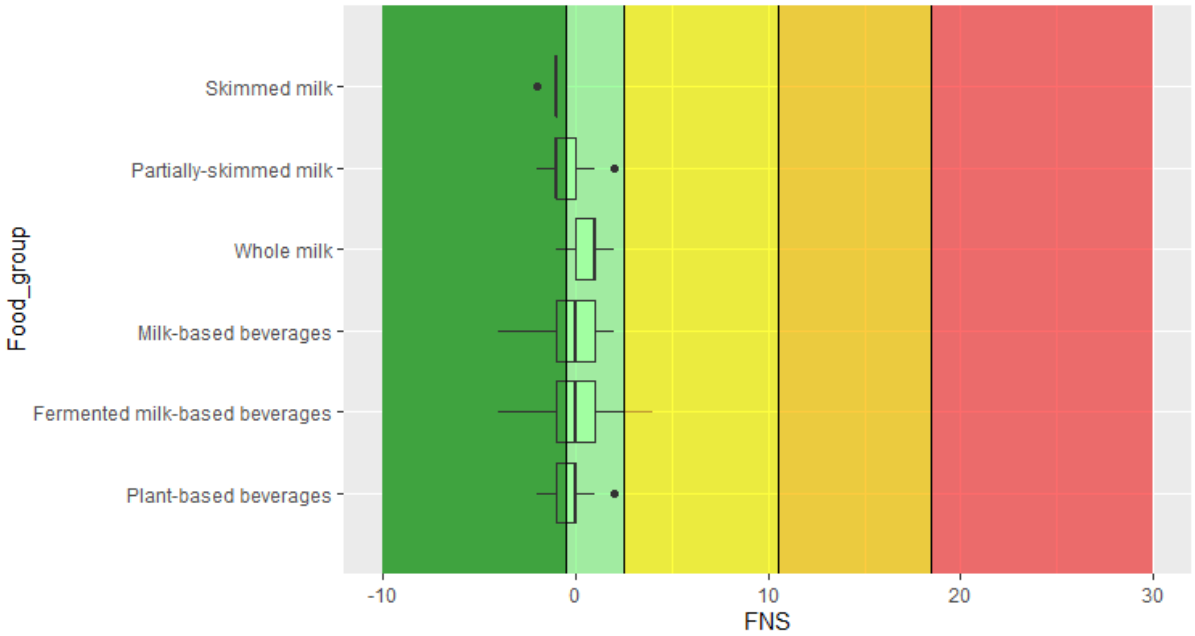

Figure 13 Current distribution of milk- and plant-based beverages in the FNS score and corresponding Nutri-Score classification – NL

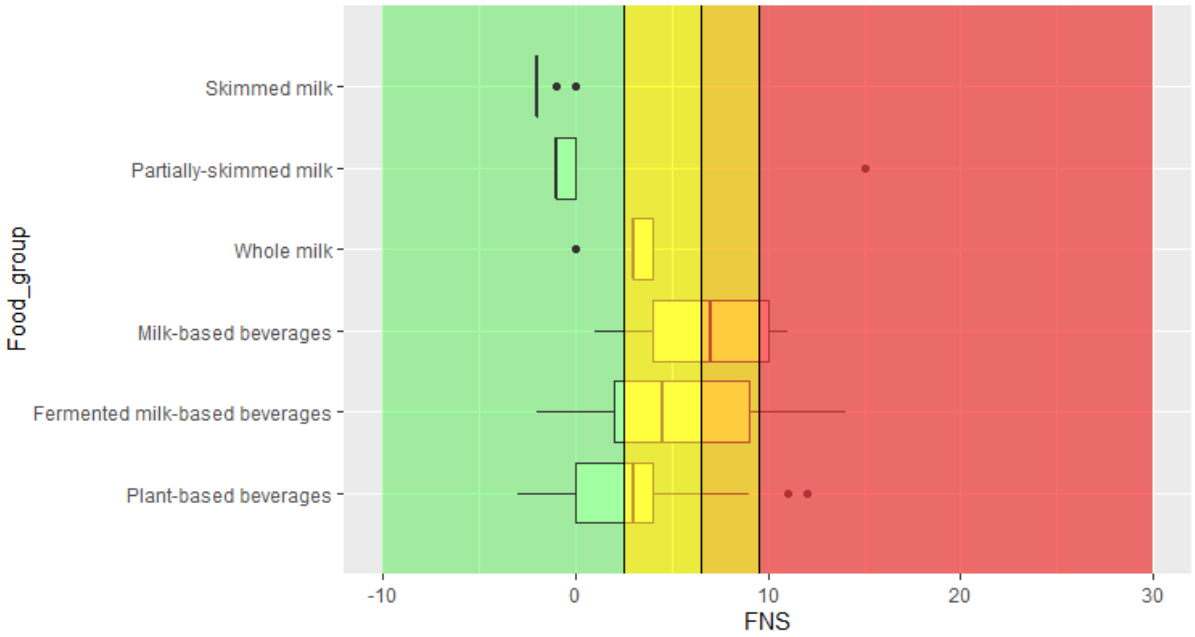

Figure 14 Updated distribution of milk- and plant-based beverages in the FNS score and corresponding Nutri-Score classification – NL

6.8.4. Overall results

Table 12 Current and updated classification of beverages in the Nutri-Score categories – results from FR, DE, NL

Food group	N	Nutri-Score (%) Current algorithm A	B	C	D	E	Nutri-Score (%) Updated algorithm A	B	C	D	E
France											
Dairy beverages											
Skimmed milk	160	39	61	0	0	0	0	100	0	0	0
Partially-skimmed milk	1041	28	72	0	0	0	0	98	2	0	0
Whole milk	323	4	94	2	0	0	0	6	87	4	3
Milk-based beverages	97	6	88	6	0	0	0	0	25	28	47
Fermented milk-based beverages	337	13	74	12	1	0	0	10	7	25	58
Plant-based beverages	**972**	**30**	**69**	**1**	**0**	**0**	**0**	**30**	**31**	**23**	**16**
Water-based beverages											
Flavoured waters	88	0	49	30	21	0	0	48	43	9	0
Flavoured waters w/o NNS	68	0	52	20	28	0	0	62	38	0	0
Flavoured waters w/ NNS	20	0	40	60	0	0	0	0	60	40	0
Tea-based beverages	141	0	5	16	60	19	0	0	38	62	0
Tea-based beverages w/o NNS	104	0	1	0	73	26	0	1	28	71	0
Tea-based beverages w/ NNS	37	0	16	59	24	0	0	0	65	35	0
Colas	142	0	22	35	7	36	0	0	57	1	42
Colas w/o NNS	39	0	0	0	0	100	0	0	0	0	100
Colas w/ NNS	103	0	30	49	10	12	0	0	79	2	19
Soft drinks with fruit	580	0	1	15	15	69	0	1	17	22	60
Soft drinks with fruits w/o NNS	461	0	0	4	12	84	0	1	7	26	66
Soft drinks with fruits w/ NNS	119	0	2	58	28	14	0	0	59	7	34
Lemonades, tonic waters and bitters	150	0	10	11	24	55	0	0	19	33	48
Lemonades, tonic waters and bitters w/o NNS	84	0	0	0	5	95	0	0	0	50	50
Lemonades, tonic waters and bitters w/NNS	70	0	21	24	46	9	0	0	41	13	46
Sport drinks	18	0	11	6	67	17	0	0	55	28	17
Energy drinks	49	0	10	6	6	78	0	0	16	8	76
Energy drinks w/o NNS	36	0	0	0	3	97	0	0	3	3	94
Energy drinks w/ NNS	13	0	39	23	15	23	0	0	54	23	23
Fruit-based beverages											
Fruit juices	1080	0	5	54	15	26	0	4	49	20	26
Fruit nectars	262	0	0	2	11	87	0	0	2	30	68
Smoothies	37	0	0	54	30	16	0	0	24	57	19
Germany											
Dairy beverages											
Skimmed milk	14	100	0	0	0	0	0	100	0	0	0
Partially-skimmed milk	60	68	28	3	0	0	0	97	3	0	0
Whole milk	87	0	98	2	0	0	0	2	94	2	1
Milk-based beverages	327	7	35	19	4	35	0	2	10	24	64
Fermented milk-based beverages	341	7	24	3	3	58	0	7	7	26	60

Food group	N	Nutri-Score (%) Current algorithm A	B	C	D	E	Nutri-Score (%) Updated algorithm A	B	C	D	E
Plant-based beverages	**392**	**24**	**74**	**2**	**0**	**0**	**0**	**26**	**31**	**26**	**17**
Plant-based, not sweetened	244	18	81	1	0	0	0	30	23	31	17
Plant-based, sweetened	148	33	63	4	0	0	0	30	42	15	14
Coffee drinks	**287**	**1**	**2**	**2**	**13**	**82**	**0**	**3**	**19**	**43**	**35**
Coffee drinks not sweetened	59	0	3	5	27	64	0	22	37	29	12
Coffee drinks sweetened	228	1	2	2	9	86	0	3	38	33	26
Water-based beverages											
Flavoured waters											
Flavoured waters w/o NNS	125	0	20	33	46	1	0	31	66	3	0
Flavoured waters w/ NNS	14	0	7	21	71	0	0	0	7	86	7
Tea-based beverages											
Tea-based beverages w/o NNS	159	0	4	9	67	21	0	4	58	31	6
Tea-based beverages w/ NNS	38	0	5	37	58	0	0	0	37	63	0
Colas											
Colas w/o NNS	93	0	0	0	0	100	0	0	0	11	89
Colas w/ NNS	69	0	54	32	14	0	0	0	83	14	3
Soft drinks with fruit											
Soft drinks with fruits w/o NNS	500	0	0	3	52	44	0	2	46	16	35
Soft drinks with fruits w/ NNS	89	0	2	33	51	15	0	0	25	51	25
Lemonades, tonic waters and bitters											
Lemonades, tonic waters and bitters w/o NNS	570	0	0	1	21	79	0	0	17	40	43
Lemonades, tonic waters and bitters w/ NNS	178	0	22	56	21	1	0	0	70	28	2
Sport drinks											
Sport drinks w/o NNS	9	0	0	0	89	11	0	0	78	22	0
Sport drinks w/ NNS	76	0	0	0	100	0	0	0	0	92	8
Energy drinks											
Energy drinks w/o NNS	70	0	7	3	9	81	0	7	10	6	77
Energy drinks w/ NNS	55	0	55	22	13	11	0	4	67	16	13
Fruit-based beverages											
Fruit juices	812	0	14	62	19	5	0	14	61	19	6
Fruit nectars	191	0	0	2	9	88	0	1	5	16	79
Smoothies	242	0	3	28	54	16	0	3	19	53	26
The Netherlands											
Dairy beverages											
Skimmed milk	30	100	0	0	0	0	0	100	0	0	0
Partially-skimmed milk	120	64	36	0	0	0	0	99	0	0	1
Whole milk	71	3	97	0	0	0	0	3	97	0	0
Milk-based beverages	23	35	65	0	0	0	0	9	26	30	35
Fermented milk-based beverages	74	49	50	1	0	0	0	32	31	14	23
Plant-based beverages	**78**	**38**	**62**	**0**	**0**	**0**	**0**	**35**	**50**	**12**	**4**
Water-based beverages											
Flavoured waters											
Flavoured waters w/o NNS	83	0	95	5	0	0	0	100	0	0	0

Food group		Nutri-Score (%) Current algorithm					Nutri-Score (%) Updated algorithm				
	N	A	B	C	D	E	A	B	C	D	E
Tea-based beverages	187	0	0	3	94	3	0	0	27	71	2
Tea-based beverages w/o NNS	59	0	0	3	86	10	0	0	86	8	5
Tea-based beverages w/ NNS	128	0	0	3	97	0	0	0	0	100	0
Soft drinks (with fruit)	496	0	1	9	32	58	0	0	22	18	60
Soft drinks (with fruit) w/o NNS	248	0	0	1	33	66	0	0	31	23	46
Soft drinks (with fruit) w/ NNS	248	0	2	16	30	51	0	0	13	13	75
Sport drinks											
Sport drinks w/o NNS	32	0	0	0	81	19	0	0	38	44	19
Energy drinks	34	0	0	0	41	59	0	0	3	15	82
Energy drinks w/o NNS	18	0	0	0	6	94	0	0	6	6	89
Energy drinks w/ NNS	16	0	0	0	81	19	0	0	0	25	75
Fruit-based beverages											
Fruit and vegetable juices	736	0	10	76	12	2	0	8	76	13	3

Overall, the classification of beverages using the updated algorithm of the Nutri-Score is aligned with the priority areas of improvement identified in the ScC.

SSB with very limited amounts of sugar (i.e. <2 g/100 mL) were allowed to reach an improved classification (in the B category) while those with high amounts of sugar were maintained in the D/E categories in majority, therefore leading overall to a better discrimination of beverages based on sugars content.

The updated algorithm also allowed for an alignment between the classification of beverages with NNS and SSB, with beverages with NNS in the C category. Of note, beverages containing both sugars and NNS were shifted towards less favourable categories (and up to the E category), and even more so than beverages containing either only sugars or NNS. From a mathematical standpoint, this reflects the fact that the reduced amount of sugars in these beverages does not compensate fully for the additional NNS component. This is aligned with the aim of the ScC not to promote the use of NNS as a replacement for sugars and not incentivizing their use in beverages.

Overall, for fruit juices the status quo was maintained with a clear discrimination between fruit juices based on their sugars content.

Finally, skimmed and partially-skimmed milk were largely in the 'B' category, with a discrimination with whole milk, in the 'C' category. Of note, some whole milks from other animals than cows may have different nutrient composition (in particular saturates) that may lead them to shift them towards lower nutritional value categories compared to cow's milk.

Flavoured milk-based beverages were adequately discriminated compared to plain milk, reaching the D/E categories. Similarly, fermented milk-based beverages (including sweetened and flavoured yogurt drinks) were also discriminated according to sugar contents, with distributions across C and E classes. Therefore, sweetened milk and fermented milk-based beverages were adequately differentiated when compared to plain milk, either skimmed or partially skimmed and whole milk. Overall, this classification appears adequate when considering milk-based beverages (including fermented) as a whole in the beverages category.
Compared to 'solid' sweetened yogurts that are mainly classified in the C category of the Nutri-Score, sweetened and flavoured fermented milks intended to be drunk appear less well classified (mainly in

D and E). However, sweetened and flavoured fermented milks intended to be drunk under the 'general foods' algorithm would be mainly classified in the B category, which would lead to these products to be somewhat promoted and similarly rated with some unsweetened products.

Additionally, the difference between 'solid' products and products intended as drinks may be increased in the case of use of NNS, as the additional NNS component would be included for drinks only. However, as stated earlier, evidence regarding NNS mainly relies on studies investigating beverages with NNS, with only emerging evidence pertaining to NNS in general, regardless of the source. As such, this increased difference between 'solid' products and products to drink is considered acceptable by the ScC. Of note, this contention may be revised in the future should additional evidence arise of the effects of NNS beyond beverages.

Therefore, the ScC considered with a higher priority the comparability of products within the beverages algorithm, between plain milk, flavoured milks, fermented milks and flavoured and fermented milk products intended to be drunk. The limitation of a lower comparability of fermented milks intended as drinks and their counterparts with a firmer consistency was considered acceptable by the ScC.

7. Conclusion

The update of the algorithm in the beverages category achieved the objectives set by the ScC as priority areas for improvement, whereby a better discrimination between different types of beverages, and between beverages within the same category according to their sugar content. Also, the addition of a specific component for NNS use allowed for a better alignment between the classification of the Nutri-Score and FBDG and recommendations regarding the consumption of NNS.

Overall, the update of the Nutri-Score algorithm in the beverages category allowed for a better alignment between the classification and COEN FBDG.

8. Next steps

Next steps for the ScC is the investigation of the ingredients qualifying under the 'Fruit, vegetables and legumes' component. Indeed, multiple comments were made on this subject, including issues relating to the exhaustiveness of the qualifying ingredient list, and/or the processes that are allowed within the component and are described in the appendix of the Q&A document available.

The ScC aims at revising the list of ingredients and processes qualifying for the 'fruit, vegetables and legumes' component of the algorithm during the year 2023.

Of note, the update is not aimed at revising in depth the nature of the list, but rather to clarify which types of ingredients and processes would be allowed under the component, to align it with definitions used in FBDG.

9. Acknowledgements

The ScC would like to thank more particularly Hanna Haidar, Barthélémy Sarda and Elly Steenbergen, for the data management and analyses of the databases from Germany, France and the Netherlands,

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Appendix

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List of abbreviations

BMI	Body Mass Index
95% CI	95% Confidence Interval
COEN	Countries Officially Engaged in Nutri-Score
CRP	C-reactive Protein
DGE	German Nutrition Society (*Deutsche Gesellschaft für Ernährung*)
EFSA	European Food Safety Agency
EU	European Union
FBDG	Food-based dietary guidelines
FIC regulation	EU regulation No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers
FNS	Final nutritional score - final number of points in the algorithm of the Nutri-Score
FSA	Food Standards Agency
GMP	Good Manufacturing Practices
HCSP	French High Council for Public Health (*Le Haut Conseil de la Santé Publique*)
HDL-C	High Density Lipoprotein Cholesterol
HOMA-IR	Homeostatis Model Assessment of Insulin Resistance
HR	Hazard Ratio
HSR	Health Star Rating
IL-6	Interleukin 6
LDL-C	Low Density Lipoprotein Cholesterol
NDA Panel	Panel on Nutrition, Novel Foods and Food Allergens
NNS	Non-Nutritive Sweeteners
NPS	Nutrient profile model
OR	Odds Ratio
PRI	Population Reference Intakes
RCT	Randomized Controlled Trial
RR	Risk Ratio/Relative Risk
ScC	Scientific Committee of the Nutri-Score
SD	Standard Deviation
SSB	Sugar-Sweetened Beverages
StC	Steering Committee of the Nutri-Score
TNF-α	Tumor Necrosis Factor α
WCRF	World Cancer Research Fund
WHO	World Health Organization

Recap of the update algorithm for beverages

Products in the category

The products in the category include

- **Non-alcoholic beverages**
    - Water
    - Water-based beverages
        - Sugar-sweetened beverages
        - Beverages with non-nutritional sweeteners (also called 'artificially sweetened beverages') or flavourings
    - Fruit and vegetable juices and nectars
        - Fruit juices and nectars
        - Vegetable juices and nectars

Including coconut drinks
Of note coconut milk for culinary purposes are excluded from the beverages category

        - Smoothies
    - Coffee, coffee substitutes, tea, herbal infusion and other hot cereal and grain beverages,
- **Milk, milk-based beverages, fermented milk-based beverages**
    - Plain milk
    - Milk-based beverages (incl. flavored, sweetened, with NNS)
    - Fermented milk products intended to be drunk (incl. plain, flavored, sweetened, with NNS)

Of note, while powder cocoa, coffee or chicory mixes are not classified in the Codex as beverages, they should be included as beverages for Nutri-Score classification if their nutritional declaration (for 100g/mL) is reported 'as consumed' (i.e. after reconstitution with milk or water) rather than 'as sold'.

- **Milk analogues – referred to as 'plant-based beverages' throughout the document**

Milk analogues are defined in codex as 'products in which milk fat has been partially or wholly replaced by vegetable fats or oils'. However, this definition does not fully cover beverages made from plant.

The most common products on the European market include beverages based on soy, almond, oat, rice, coconut and cashew-nuts. They are sold as plant-based substitutes for milk, milk-alternatives, or (plant-based) milk-replacement beverages, and include primarily dairy-free alternatives in particular for vegetarians/vegans of those with lactose intolerance or dairy allergies.

For the purpose of the Nutri-Score classification, the term 'plant-based beverages' is applied to these products with the exclusion of fruit and vegetable juices.

Alcoholic beverages containing more than 1.2% alcohol are maintained **outside of the scope** of the Nutri-Score algorithm classification.

Points allocation

1.1. Unfavourable components – A points allocation

POINTS	Energy (kJ/100 mL)	Sugars (g/100 mL)	Saturates (g/100 mL)	Salt (g/100 mL)	Non-nutritive sweeteners (presence/absence)
0	≤30	≤0.5	≤1	≤0.2	
1	≤90	≤2	>1	>0.2	
2	≤150	≤3.5	>2	>0.4	
3	≤210	≤5	>3	>0.6	
4	≤240	≤6	>4	>0.8	Presence
5	≤270	≤7	>5	>1	
6	≤300	≤8	>6	>1.2	
7	≤330	≤9	>7	>1.4	
8	≤360	≤10	>8	>1.6	
9	≤390	≤11	>9	>1.8	
10	>390	>11	>10	>2	
11				>2.2	
12				>2.4	
13				>2.6	
14				>2.8	
15				>3	
16				>3.2	
17				>3.4	
18				>3.6	
19				>3.8	
20				>4	

1.2. Favourable components – C points allocation

POINTS	Proteins (g/100 mL)	Fibres (g/100 mL)	Fruit, vegetables and legumes (%)
0	≤1.2	≤3	≤40
1	>1.2	>3	-
2	>1.5	>4.1	>40
3	>1.8	>5.2	-
4	>2.1	>6.3	>60
5	>2.4	>7.4	-
6	>2.7		>80
7	>3.0		

1.2.1. Ingredients contributing to the 'Fruit, vegetables and legumes' component

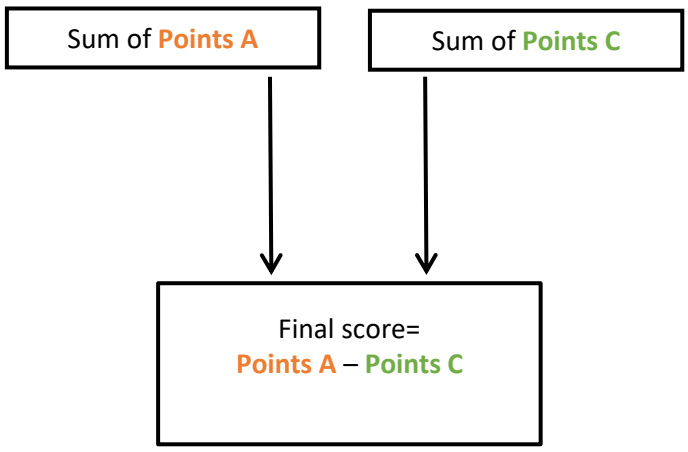
The list of ingredients qualifying for the "Fruit, vegetables and legumes" component has been revised to include the following Eurocodes

- Vegetables groups

- 8.10 (Leaf vegetables);
- 8.15 (Brassicas);
- 8.20 (Stalk vegetables);
- 8.25 (Shoot vegetables);
- 8.30 (Onion-family vegetables);
- 8.38 (Root vegetables);
- 8.40 (Fruit vegetables);
- 8.42 (Flower-head vegetables);
- 8.45 (Seed vegetables and immature pulses);
- 8.50 (Edible fungi);
- 8.55 (Seaweeds and algae);
- 8.60 (Vegetable mixtures)

- Fruits groups
  - 9.10 (Malaceous fruit);
  - 9.20 (Prunus species fruit);
  - 9.25 (Other stone fruit);
  - 9.30 (Berries);
  - 9.40 (Citrus fruit);
  - 9.50 (Miscellaneous fruit);
  - 9.60 (Fruit mixtures).
- Pulses groups
  - 7.10 (Pulses);

1.3 Algorithm computation



Final Nutri-Score thresholds

FNS	Class	Colour
Water	A	Dark green
Min to 2	B	Light green
3 to 6	C	Yellow
7 to 9	D	Light Orange
10 to max	E	Dark orange

Appendix tables

Appendix table 1 Description of the beverages groups available in the databases of nutritional composition of branded food products – Data from France, Germany and the Netherlands

Food groups	**Definition of food group**		
	France-Oqali/*OFF*	**Germany (Product Monitoring/MINTEL)**	**The Netherlands -Major supermarkets-GS1-SIM (Dutch Branded Food database)**
Dairy beverages			
Skimmed milk	*Milk from cow* up to 0.5% fat	Milk from cow, up to 0.9 % fat	Milk from cow, up to 0.5% fat.
Partially-skimmed milk	*Milk from cow* with 1%-2% fat.	Milk from cow, goat, with 1.5% - 1.8% fat	Milk from cow, with 1.5%-1.8% fat.
Whole milk	*Milk mainly from cow, with 3.5% fat and other animals (goat…) (higher fat percentages)*	Milk mainly from cow with >3.5% fat; whole milk from goat and sheep	Milk from cow, with 3.5% fat.
Fermented milk-based beverages	Fermented milk-based products to drink of which the main ingredient is yoghurt, fermented milk (e.g. Lactobacillus Casei starter culture). Includes flavored drinks. Does not include plain (butter) milk	Fermented dairy products intended to be drunk of which the main ingredient is fermented milk such as buttermilk, kefir or yoghurt.	Fermented milk-based products to drink of which the main ingredient is yoghurt, butter milk or fermented milk (e.g. Lactobacillus Casei starter culture). Includes flavored drinks. Does not include plain (butter) milk.
Milk-based beverages	Non-fermented milk-based beverages, such as flavored milks (chocolate or strawberry milks)	Non-fermented milk-based beverages including in particular flavored milks (e.g. chocolate or fruit). Does not include plain milk.	Other kinds of milk-based beverages, such as chocolate milk and lactose free variants.
Plant-based beverages	*Soy-based beverages, rice-based beverages, oat-based beverages, almond-based beverages*	Soy-based beverages, rice-based beverages, oat-based beverages, almond-based beverages.	Soy-based beverages, rice-based beverages, oat-based beverages, almond-based beverages.
Coffee drinks		Ready-To-Drink coffee drinks incl. milk-based, water-based, oat-based, almond-based, rice-based, soy-based coffee drinks.	
Water-based beverages			
Flavored waters	Water, carbonated or not, flavored, with no fruit juices	Water, carbonated or not, flavored, with no fruit juices	Water, carbonated or not, flavored, with no fruit juices.
Flavored waters w/o NNS			
Flavored waters w/ NNS			NA
Tea-based beverages	Beverages based on tea extracts, carbonated or not, plain or flavored	Beverages based on tea extracts, carbonated or not, plain or flavored.	

Food groups	Definition of food group		
	France-Oqali/*OFF*	**Germany (Product Monitoring/MINTEL)**	**The Netherlands -Major supermarkets-GS1-SIM (Dutch Branded Food database)**
Tea-based beverages w/o NNS			Beverages based on tea extracts, carbonated or not, plain or flavored, with added sugar without non-nutrititve sweeteners.
Tea-based beverages w/ NNS			Beverages based on tea extracts, carbonated or not, plain or flavored, with or without added sugar with non-nutrititve sweeteners.
Colas	Beverages flavored with cola	Beverages flavored with cola	
Colas w/o NNS			
Colas w/ NNS			
Soft drinks (with fruit)	Beverages, carbonated or not, containing fruit juices	Beverages, carbonated or not, containing fruit juices, including spritzer and still fruit juices.	Soft drinks (soft drinks with fruits, lemonades, colas) grouped together, and divided as 'soft drinks' with and without NNS.
Soft drinks (with fruits) w/o NNS			
Soft drinks (with fruits) w/ NNS			
Lemonades, tonic waters and bitters	Beverages based on water and flavors (lemon or other flavors), without juices, and/or sold under the name "Lemonade, and beverages, carbonated or not, that contain quinin	Beverages based on water and flavors, with or without juices sold as "lemonade"	
Lemonades, tonic waters and bitters w/o NNS			
Lemonades, tonic waters and bitters w/NNS			
Sport drinks	Beverages adapted to the sporting effort	Isotonic beverages	
Sport drinks w/o NNS			Beverages adapted to the sporting effort, with added sugar without non-nutrititve sweeteners.
Sport drinks w/ NNS			NA
Energy drinks	Beverages containing at least a stimulant ingredient (caffein, taurin, guarana…)	Beverages containing at least a stimulant ingredient (caffein, taurin, guarana, glucurono-lactone)	

Food groups	Definition of food group		
	France-Oqali/*OFF*	**Germany (Product Monitoring/MINTEL)**	**The Netherlands -Major supermarkets-GS1-SIM (Dutch Branded Food database)**
Energy drinks w/o NNS			Beverages containing at least a stimulant ingredient (caffein, taurin, glucurono-lactone), with added sugar without non-nutritive sweeteners.
Energy drinks w/ NNS			Beverages containing at least a stimulant ingredient (caffein, taurin, glucurono-lactone), with or without added sugar, with artificial sweeteners.
Fruit-based beverages			
Fruit juices	Fresh fruit juices and fruit juices obtained from concentrate (following the criteria listed in French decree n°2013-1049), smoothies and vegetable juices	Beverages made from 100% fruit & vegetable juices, direct juice and/or from concentrate*	100% fruit and vegetables juices, excluding smoothies.
Fruit nectars	Fruit nectars (following the criteria listed in French decree n°2013-1049): contain more than 25% or 50% fruit purees depending on the fruit and with potential addition of a sweetener	Fruit nectars with fruit contents between 25% and 100%	NA
Smoothies	Smoothies	Beverages sold under the name "Smoothie"	NA

Appendix table 2 Distribution of energy (in kJ/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	141	134	136	140	143	155
Partially-skimmed milk	1041	192	180	192	192	195	201
Whole milk	323	271	243	268	268	272	289
Milk-based beverages	97	294	222	262	289	335	368
Fermented milk-based beverages	337	287	130	270	296	322	385
Solid dairy products	**1153**	**576**	**192**	**373**	**472**	**684**	**1384**
Solid dairy products sweetened	493	401	192	347	396	453	569
Solid dairy products unsweetened	142	302	164	196	273	392	520
Solid dairy desserts	518	817	414	553	700	1001	1607
Plant-based beverages	**972**	**210**	**100**	**159**	**201**	**247**	**318**
Coffee drinks							
Water-based beverages							
Flavored waters	88	26	0	2	5	57	76
Flavored waters w/o NNS	68	27	0	2	6	61	78
Flavored waters w/ NNS	20	24	0	1	5	56	58
Tea-based beverages	141	92	5	83	107	120	140
Tea-based beverages w/o NNS	104	114	97	107	111	120	143
Tea-based beverages w/ NNS	37	31	0	7	14	54	83
Colas	142	69	1	2	5	162	185
Colas w/o NNS	39	177	160	170	180	185	188
Colas w/ NNS	103	28	1	2	2	5	128
Soft drinks with fruit	580	150	15	122	161	184	235
Soft drinks with fruits w/o NNS	461	173	119	153	170	193	241
Soft drinks with fruits w/ NNS	119	57	7	15	32	109	125
Lemonades. tonic waters and bitters	154	112	1	99	126	153	187
Lemonades. tonic waters and bitters w/o NNS	84	155	121	136	151	170	211
Lemonades. tonic waters and bitters w/NNS	70	63	0	2	96	110	122
Sport drinks	18	104	4	69	71	125	496
Sport drinks w/o NNS	-	-	-	-	-	-	-
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	49	104	4	69	71	125	496
Energy drinks w/o NNS	36	195	170	187	192	195	243
Energy drinks w/ NNS	13	73	0	13	40	122	203
Fruit-based beverages							
Fruit juices	1080	202	132	186	200	214	282

Fruit nectars	262	195	98	184	199	215	246
Smoothies	37	227	196	206	226	236	284
GERMANY							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	14	158	147	148	152	158	186
Partially-skimmed milk	60	199	193	197	198	200	208
Whole milk	87	276	266	267	276	280	285
Milk-based beverages	327	300	139	261	303	345	457
Fermented milk-based beverages	341	288	162	255	298	329	389
Solid dairy products	**1937**	**336**	**139**	**224**	**327**	**426**	**569**
Solid dairy products sweetened	1379	380	161	300	390	445	593
Solid dairy products unsweetened	558	227	106	178	212	274	345
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	**191**	**86**	**151**	**188**	**228**	312
Coffee drinks	**287**	**253**	**141**	**215**	**255**	**303**	350
Water-based beverages							
Flavored waters	139	50	1	36	60	65	86
Flavored waters w/o NNS	125	48	1	32	56	65	85
Flavored waters w/ NNS	14	61	38	61	63	64	81
Tea-based beverages	197	87	7	69	83	110	146
Tea-based beverages w/o NNS	159	95	38	71	92	114	158
Tea-based beverages w/ NNS	38	52	4	10	74	82	83
Colas	162	104	1	6	152	172	184
Colas w/o NNS	93	169	146	160	170	180	184
Colas w/ NNS	69	18	0	1	4	9	92
Soft drinks with fruit	589	131	61	98	118	166	223
Soft drinks with fruits w/o NNS	500	140	77	106	123	172	226
Soft drinks with fruits w/ NNS	89	80	14	54	81	106	139
Lemonades. tonic waters and bitters	748	116	9	79	135	158	185
Lemonades. tonic waters and bitters w/o NNS	570	142	80	124	146	163	187
Lemonades. tonic waters and bitters w/NNS	178	33	4	10	21	56	80
Sport drinks	85	82	72	77	80	83	104
Sport drinks w/o NNS	9	96	75	80	93	105	131
Sport drinks w/ NNS	76	81	72	77	80	82	92
Energy drinks	125	175	5	15	134	197	747
Energy drinks w/o NNS	70	267	9	170	195	219	1105
Energy drinks w/ NNS	55	58	5	10	15	49	201
Fruit-based beverages							

Fruit juices	812	189	82	176	193	209	274
Fruit nectars	191	207	98	187	217	236	264
Smoothies	242	254	189	223	246	272	344
THE NETHERLANDS							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	30	145	135	141	145	150	155
Partially-skimmed milk	120	198	190	192	194	200	204
Whole milk	71	267	258	262	268	271	275
Milk-based beverages	23	300	263	269	320	321	360
Fermented milk-based beverages	74	190	119	137	164	237	288
Solid dairy products	**389**	**587**	**138**	**284**	**410**	**903**	**1393**
Solid dairy products sweetened	219	379	164	270	363	459	638
Solid dairy products unsweetened	38	156	108	130	138	171	259
Solid dairy desserts	132	1058	410	891	1116	1309	1604
Plant-based beverages	**78**	**177**	**93**	**114**	**163**	**230**	**317**
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	1	0	0	0	0	4
Flavored waters w/ NNS	-	-	-	-	-	-	-
Tea-based beverages	187	78	62	67	77	81	108
Tea-based beverages w/o NNS	59	92	69	78	85	102	151
Tea-based beverages w/ NNS	128	71	61	67	68	78	83
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	122	20	98	126	146	190
Soft drinks with fruits w/o NNS	248	142	71	101	145	172	191
Soft drinks with fruits w/ NNS	248	103	17	93	122	130	138
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							
Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	119	71	88	109	118	210
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	34	153	80	93	142	196	251
Energy drinks w/o NNS	18	198	97	187	195	216	258
Energy drinks w/ NNS	16	101	80	89	93	109	142

Fruit-based beverages							
Fruit juices	736	194	131	175	187	205	259
Fruit nectars	-	-	-	-	-	-	-
Smoothies	-	-	-	-	-	-	-

Appendix table 3 Distribution of saturated fat (in g/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	0.1	0.0	0.0	0.1	0.1	0.2
Partially-skimmed milk	1041	1.0	0.8	1.0	1.0	1.0	1.1
Whole milk	323	2.3	1.0	2.2	2.2	2.4	2.8
Milk-based beverages	97	1.1	0.3	0.7	1.0	1.2	2.4
Fermented milk-based beverages	337	0.9	0.0	0.5	0.9	1.0	1.9
Solid dairy products	**1153**	**3.7**	**0.1**	**1.6**	**2.3**	**5.0**	**10.9**
Solid dairy products sweetened	493	1.9	0.0	0.9	1.8	2.3	5.0
Solid dairy products unsweetened	142	2.4	0.0	0.4	2.1	4.0	6.8
Solid dairy desserts	518	5.7	1.0	2.3	4.7	7.8	14.0
Plant-based beverages	**972**	**0.3**	**0.1**	**0.2**	**0.3**	**0.4**	**0.7**
Coffee drinks							
Water-based beverages							
Flavored waters	88	0.0	0.0	0.0	0.0	0.0	0.1
Flavored waters w/o NNS	68	0.0	0.0	0.0	0.0	0.0	0.1
Flavored waters w/ NNS	20	0.0	0.0	0.0	0.0	0.0	0.1
Tea-based beverages	141	0.0	0.0	0.0	0.0	0.0	0.1
Tea-based beverages w/o NNS	104	0.0	0.0	0.0	0.0	0.0	0.5
Tea-based beverages w/ NNS	37	0.0	0.0	0.0	0.0	0.0	0.1
Colas	142	0.0	0.0	0.0	0.0	0.0	0.1
Colas w/o NNS	39	0.0	0.0	0.0	0.0	0.1	0.1
Colas w/ NNS	103	0.0	0.0	0.0	0.0	0.0	0.1
Soft drinks with fruit	580	0.1	0.0	0.0	0.0	0.0	0.5
Soft drinks with fruits w/o NNS	461	0.1	0.0	0.0	0.0	0.0	0.4
Soft drinks with fruits w/ NNS	119	0.0	0.0	0.0	0.0	0.0	0.5
Lemonades. tonic waters and bitters	150	0.0	0.0	0.0	0.0	0.0	0.1
Lemonades. tonic waters and bitters w/o NNS	84	0.0	0.0	0.0	0.0	0.0	0.2
Lemonades. tonic waters and bitters w/NNS	70	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks	18	0.1	0.0	0.0	0.0	0.0	0.5
Sport drinks w/o NNS	-	-	-	-	-	-	-
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	49	0.0	0.0	0.0	0.0	0.0	0.4
Energy drinks w/o NNS	36	0.1	0.0	0.0	0.0	0.1	0.5
Energy drinks w/ NNS	13	0.0	0.0	0.0	0.0	0.0	0.0
Fruit-based beverages							
Fruit juices	1080	0.0	0.0	0.0	0.0	0.0	0.1
Fruit nectars	262	0.0	0.0	0.0	0.0	0.0	0.1
Smoothies	37	0.0	0.0	0.0	0.0	0.1	0.2
				GERMANY			
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**

Dairy beverages							
Skimmed milk	14	0.2	0.0	0.1	0.2	0.2	0.5
Partially-skimmed milk	60	1.0	0.9	1.0	1.0	1.1	1.1
Whole milk	87	2.4	2.1	2.3	2.4	2.5	2.7
Milk-based beverages	327	1.3	0.0	0.9	1.1	1.9	3.4
Fermented milk-based beverages	341	0.7	0.0	0.3	0.5	1.0	2.0
Solid dairy products	**1937**	**1.6**	**0.1**	**0.3**	**1.2**	**2.2**	**4.8**
Solid dairy products sweetened	1379	1.7	0.1	0.5	1.7	2.2	4.9
Solid dairy products unsweetened	558	1.2	0.1	0.2	0.6	2.2	2.7
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	**0.4**	**0.0**	**0.2**	**0.3**	**0.4**	1.3
Coffee drinks	**287**	**1.0**	**0.1**	**0.5**	**0.8**	**1.4**	2.5
Water-based beverages							
Flavored waters	139	0.0	0.0	0.0	0.0	0.0	0.1
Flavored waters w/o NNS	125	0.0	0.0	0.0	0.0	0.0	0.1
Flavored waters w/ NNS	14	0.0	0.0	0.0	0.0	0.1	0.1
Tea-based beverages	197	0.1	0.0	0.0	0.0	0.1	0.1
Tea-based beverages w/o NNS	159	0.1	0.0	0.0	0.0	0.1	0.1
Tea-based beverages w/ NNS	38	0.1	0.0	0.0	0.0	0.1	0.2
Colas	162	0.0	0.0	0.0	0.0	0.0	0.1
Colas w/o NNS	93	0.0	0.0	0.0	0.0	0.1	0.1
Colas w/ NNS	69	0.0	0.0	0.0	0.0	0.0	0.1
Soft drinks with fruit	589	0.0	0.0	0.0	0.0	0.1	0.1
Soft drinks with fruits w/o NNS	500	0.0	0.0	0.0	0.0	0.1	0.1
Soft drinks with fruits w/ NNS	89	0.0	0.0	0.0	0.0	0.0	0.1
Lemonades. tonic waters and bitters	748	0.0	0.0	0.0	0.0	0.1	0.1
Lemonades. tonic waters and bitters w/o NNS	570	0.0	0.0	0.0	0.0	0.1	0.1
Lemonades. tonic waters and bitters w/NNS	178	0.0	0.0	0.0	0.0	0.1	0.1
Sport drinks	85	0.0	0.0	0.0	0.0	0.1	0.1
Sport drinks w/o NNS	9	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks w/ NNS	76	0.0	0.0	0.0	0.0	0.1	0.1
Energy drinks	125	0.0	0.0	0.0	0.0	0.0	0.0
Energy drinks w/o NNS	70	0.0	0.0	0.0	0.0	0.0	0.0
Energy drinks w/ NNS	55	0.0	0.0	0.0	0.0	0.0	0.0
Fruit-based beverages							
Fruit juices	812	0.0	0.0	0.0	0.0	0.0	0.1
Fruit nectars	191	0.0	0.0	0.0	0.0	0.0	0.0
Smoothies	242	0.3	0.0	0.0	0.0	0.1	2.1

THE NETHERLANDS

	N	Mean	P5	P25	P50	P75	P95
Dairy beverages							
Skimmed milk	30	0.1	0.0	0.0	0.1	0.1	0.2
Partially-skimmed milk	120	1.0	0.9	1.0	1.0	1.0	1.1
Whole milk	71	2.4	2.1	2.3	2.5	2.5	2.5

Milk-based beverages	23	1.2	0.2	0.9	1.2	1.8	2.0
Fermented milk-based beverages	74	0.2	0.0	0.0	0.0	0.5	0.8
Solid dairy products	**389**	**4.1**	**0.0**	**0.6**	**2.0**	**6.1**	**15.0**
Solid dairy products sweetened	219	1.8	0.0	0.5	1.8	2.3	5.2
Solid dairy products unsweetened	38	0.3	0.0	0.0	0.0	0.2	2.1
Solid dairy desserts	132	9.2	1.1	6.0	9.0	13.3	17.5
Plant-based beverages	**78**	**0.4**	**0.1**	**0.2**	**0.3**	**0.3**	**1.0**
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/ NNS	-	-	-	-	-	-	-
Tea-based beverages	187	0.0	0.0	0.0	0.0	0.0	0.0
Tea-based beverages w/o NNS	59	0.0	0.0	0.0	0.0	0.0	0.0
Tea-based beverages w/ NNS	128	0.0	0.0	0.0	0.0	0.0	0.0
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	0.0	0.0	0.0	0.0	0.0	0.0
Soft drinks with fruits w/o NNS	248	0.0	0.0	0.0	0.0	0.0	0.0
Soft drinks with fruits w/ NNS	248	0.0	0.0	0.0	0.0	0.0	0.0
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							
Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	34	0.0	0.0	0.0	0.0	0.0	0.1
Energy drinks w/o NNS	18	0.0	0.0	0.0	0.0	0.1	0.1
Energy drinks w/ NNS	16	0.0	0.0	0.0	0.0	0.0	0.0
Fruit-based beverages							
Fruit juices	736	0.0	0.0	0.0	0.0	0.0	0.1
Fruit nectars	-	-	-	-	-	-	-
Smoothies	-	-	-	-	-	-	-

Appendix table 4 Distribution of sugars (in g/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	4.6	1.0	4.8	4.8	4.8	5.0
Partially-skimmed milk	1041	4.7	4.5	4.8	4.8	4.8	5.0
Whole milk	323	4.4	0.6	4.6	4.8	4.8	4.9
Milk-based beverages	97	10.0	5.0	8.6	10.0	11.4	12.7
Fermented milk-based beverages	337	10.1	3.2	10.0	10.8	12.0	13.6
Solid dairy products	**1153**	**14.2**	**3.6**	**11.0**	**13.7**	**18.0**	**25.5**
Solid dairy products sweetened	493	12.0	5.2	11.0	12.4	13.2	15.8
Solid dairy products unsweetened	142	3.6	0.4	3.4	3.8	4.3	5.0
Solid dairy desserts	518	19.2	12.0	15.7	18.4	21.0	30.0
Plant-based beverages	**972**	**4.3**	**0.0**	**2.4**	**4.1**	**6.0**	**9.2**
Coffee drinks							
Water-based beverages							
Flavored waters	88	1.4	0.0	0.0	0.0	3.0	4.5
Flavored waters w/o NNS	68	1.5	0.0	0.0	0.0	3.5	4.6
Flavored waters w/ NNS	20	1.2	0.0	0.0	0.0	3.0	3.0
Tea-based beverages	141	5.1	0.0	4.6	6.1	6.9	7.9
Tea-based beverages w/o NNS	104	6.4	5.4	5.7	6.3	6.9	8.0
Tea-based beverages w/ NNS	37	1.5	0.0	0.1	0.5	2.6	4.6
Colas	142	4.0	0.0	0.0	0.1	9.5	10.9
Colas w/o NNS	39	10.3	9.5	10.0	10.5	10.7	11.0
Colas w/ NNS	103	1.6	0.0	0.0	0.0	0.3	7.4
Soft drinks with fruit	580	8.0	0.7	6.8	9.0	10.1	12.3
Soft drinks with fruits w/o NNS	461	9.3	6.2	8.2	9.3	10.6	12.4
Soft drinks with fruits w/ NNS	119	3.0	0.2	0.7	1.3	6.1	7.0
Lemonades. tonic waters and bitters	154	6.5	0.0	5.0	7.3	9.0	11.0
Lemonades. tonic waters and bitters w/o NNS	84	9.0	7.0	7.9	8.9	9.7	12.4
Lemonades. tonic waters and bitters w/NNS	70	3.5	0.0	0.0	5.0	6.3	7.1
Sport drinks	18	5.3	0.0	3.9	4.1	5.1	25.5
Sport drinks w/o NNS	-	-	-	-	-	-	-
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	49	9.1	0.0	10.0	11.0	11.3	13.6
Energy drinks w/o NNS	36	11.0	7.3	10.7	11.0	11.5	14.0
Energy drinks w/ NNS	13	3.7	0.0	0.0	1.4	7.0	11.0
Fruit-based beverages							
Fruit juices	1080	10.5	6.0	9.5	10.3	11.4	15.1
Fruit nectars	262	10.3	5.1	9.7	10.5	11.6	13.2
Smoothies	37	11.1	8.4	10.4	11.0	11.9	13.1

	GERMANY						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	14	4.9	4.8	4.9	5.0	5.0	5.0
Partially-skimmed milk	60	4.9	4.7	4.9	4.9	5.0	5.1
Whole milk	87	4.7	4.6	4.8	4.8	4.8	5.0
Milk-based beverages	327	9.2	4.2	8.6	9.5	10.5	11.9
Fermented milk-based beverages	341	10.8	4.1	10.0	11.1	12.8	14.3
Solid dairy products	**1937**	**9.1**	**1.0**	**4.9**	**9.7**	**13.2**	**15.5**
Solid dairy products sweetened	1379	11.1	2.8	9.0	12.0	13.7	16.0
Solid dairy products unsweetened	558	4.1	0.0	3.8	4.8	5.2	7.0
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	**4.2**	**0.0**	**2.2**	**4.4**	**6.0**	8.0
Coffee drinks	**287**	**7.5**	**3.1**	**6.0**	**8.2**	**9.2**	10.5
Water-based beverages							
Flavored waters	139	3	0.0	2.0	3.0	4.0	5
Flavored waters w/o NNS	125	2.7	0.0	1.9	3.1	3.7	4.7
Flavored waters w/ NNS	14	3.4	2.1	3.3	3.5	3.5	4.5
Tea-based beverages	197	5	0.0	4.0	5.0	6.0	9
Tea-based beverages w/o NNS	159	5.3	2.1	4.0	5.0	6.4	8.8
Tea-based beverages w/ NNS	38	2.8	0.1	0.4	4.0	4.4	4.5
Colas	162	6	0.0	0.0	9.0	10.0	11
Colas w/o NNS	93	9.8	8.1	9.2	9.9	10.4	11.0
Colas w/ NNS	69	0.9	0.0	0.0	0.0	0.3	4.8
Soft drinks with fruit	589	7	3.0	5.0	6.0	9.0	12
Soft drinks with fruits w/o NNS	500	7.5	4.1	5.6	6.6	9.5	12.0
Soft drinks with fruits w/ NNS	89	4.1	0.4	2.6	4.3	5.4	7.6
Lemonades. tonic waters and bitters	748	6	0.0	4.0	8.0	9.0	11
Lemonades. tonic waters and bitters w/o NNS	570	7.9	4.2	6.8	8.1	9.3	11.0
Lemonades. tonic waters and bitters w/NNS	178	1.6	0.0	0.2	0.8	3.0	4.4
Sport drinks	85	4	4.0	4.0	4.0	4.0	6
Sport drinks w/o NNS	9	5.3	3.9	4.2	5.4	5.8	7.4
Sport drinks w/ NNS	76	4.3	3.9	4.1	4.3	4.4	5.2
Energy drinks	125	8	0.0	0.0	7.0	11.0	21
Energy drinks w/o NNS	70	13.4	0.0	9.7	11.0	11.5	52.0
Energy drinks w/ NNS	55	1.9	0.0	0.0	0.0	2.6	10.4
Fruit-based beverages							
Fruit juices	812	9.5	3.8	8.7	9.7	10.7	14.2
Fruit nectars	191	11.0	5.1	10.0	11.7	12.8	14.0
Smoothies	242	11.4	8.1	10.5	11.6	12.4	14.3
	THE NETHERLANDS						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**

Dairy beverages							
Skimmed milk	30	4.8	4.5	4.7	4.9	5.0	5.1
Partially-skimmed milk	120	4.8	4.5	4.6	4.7	4.8	5.0
Whole milk	71	4.6	4.5	4.5	4.6	4.7	4.8
Milk-based beverages	23	8.7	4.8	7.7	8.0	11.0	11.0
Fermented milk-based beverages	74	7.0	3.0	3.6	7.5	9.6	12.0
Solid dairy products	**389**	**12.9**	**3.5**	**8.7**	**11.3**	**17.0**	**24.0**
Solid dairy products sweetened	219	10.5	6.9	8.5	10.3	12.0	15.7
Solid dairy products unsweetened	38	3.7	2.7	3.3	3.5	3.7	5.7
Solid dairy desserts	132	19.6	10.7	15.4	19.8	21.2	32.6
Plant-based beverages	**78**	**4.1**	**1.4**	**2.5**	**3.0**	**6.0**	**8.5**
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/ NNS	-	-	-	-	-	-	-
Tea-based beverages	187	4.4	3.4	3.7	4.4	4.5	5.9
Tea-based beverages w/o NNS	59	5.2	4.0	4.5	4.7	5.8	8.9
Tea-based beverages w/ NNS	128	4.0	3.4	3.7	3.8	4.5	4.6
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	6.8	1.0	5.4	7.1	8.5	10.8
Soft drinks with fruits w/o NNS	248	7.9	3.7	5.5	8.5	9.8	11.0
Soft drinks with fruits w/ NNS	248	5.8	0.7	5.2	7.0	7.5	7.7
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							
Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	6.8	4.2	5.1	6.4	6.9	11.8
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	34	8.4	4.3	4.9	7.9	11.0	14.0
Energy drinks w/o NNS	18	11.1	5.4	10.4	11.0	12.0	14.0
Energy drinks w/ NNS	16	5.4	4.2	4.7	4.9	6.0	7.9
Fruit-based beverages							
Fruit juices	736	9.6	5.1	8.8	9.4	10.3	12.3
Fruit nectars	-	-	-	-	-	-	-
Smoothies	-	-	-	-	-	-	-

Appendix table 5 Distribution of salt (in g/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	0.11	0.07	0.10	0.10	0.13	0.13
Partially-skimmed milk	1041	0.11	0.09	0.10	0.10	0.13	0.13
Whole milk	323	0.11	0.0	0.10	0.10	0.13	0.20
Milk-based beverages	97	0.15	0.08	0.10	0.13	0.15	0.24
Fermented milk-based beverages	337	0.17	0.04	0.10	0.10	0.12	0.25
Solid dairy products	**1153**	**0.2**	**0.1**	**0.1**	**0.1**	**0.2**	**0.3**
Solid dairy products sweetened	493	0.2	0.1	0.1	0.1	0.1	0.2
Solid dairy products unsweetened	142	0.1	0.1	0.1	0.1	0.1	0.2
Solid dairy desserts	518	0.2	0.1	0.1	0.2	0.2	0.4
Plant-based beverages	**972**	**0.10**	**0.0**	**0.06**	**0.10**	**0.11**	**0.17**
Coffee drinks							
Water-based beverages							
Flavored waters	88	0.02	0.0	0.0	0.01	0.03	0.08
Flavored waters w/o NNS	68	0.02	0.0	0.0	0.01	0.03	0.10
Flavored waters w/ NNS	20	0.01	0.0	0.0	0.0	0.01	0.03
Tea-based beverages	141	0.06	0.0	0.03	0.05	0.08	0.15
Tea-based beverages w/o NNS	104	0.06	0.0	0.03	0.05	0.06	0.13
Tea-based beverages w/ NNS	37	0.07	0.0	0.03	0.05	0.13	0.25
Colas	142	0.02	0.0	0.01	0.03	0.03	0.04
Colas w/o NNS	39	0.02	0.0	0.01	0.02	0.03	0.03
Colas w/ NNS	103	0.02	0.0	0.01	0.03	0.03	0.05
Soft drinks with fruit	580	0.02	0.0	0.0	0.01	0.03	0.10
Soft drinks with fruits w/o NNS	461	0.02	0.0	0.0	0.01	0.03	0.10
Soft drinks with fruits w/ NNS	119	0.02	0.0	0.0	0.01	0.03	0.05
Lemonades. tonic waters and bitters	154	0.02	0.0	0.0	0.01	0.03	0.13
Lemonades. tonic waters and bitters w/o NNS	84	0.03	0.0	0.01	0.01	0.03	0.19
Lemonades. tonic waters and bitters w/NNS	70	0.02	0.0	0.0	0.01	0.03	0.03
Sport drinks	18	0.10	0.01	0.03	0.13	0.13	0.30
Sport drinks w/o NNS	-	-	-	-	-	-	-
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	49	0.12	0.0	0.05	0.13	0.18	0.25
Energy drinks w/o NNS	36	0.11	0.0	0.05	0.10	0.15	0.25

Energy drinks w/ NNS	13	0.15	0.0	0.05	0.18	0.25	0.30
Fruit-based beverages							
Fruit juices	1080	0.04	0.0	0.0	0.01	0.03	0.13
Fruit nectars	262	0.02	0.0	0.0	0.01	0.03	0.03
Smoothies	37	0.01	0.0	0.0	0.01	0.02	0.03
GERMANY							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	14	0.12	0.12	0.13	0.13	0.13	0.13
Partially-skimmed milk	60	0.16	0.10	0.13	0.13	0.13	0.13
Whole milk	87	0.14	0.10	0.12	0.13	0.13	0.13
Milk-based beverages	327	0.49	0.03	0.11	0.13	0.13	0.20
Fermented milk-based beverages	341	0.34	0.03	0.10	0.10	0.13	0.24
Solid dairy products	**1937**	**0.1**	**0.0**	**0.1**	**0.1**	**0.1**	**0.2**
Solid dairy products sweetened	1379	0.1	0.0	0.1	0.1	0.1	0.2
Solid dairy products unsweetened	558	0.1	0.0	0.1	0.1	0.1	0.2
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	**0.11**	**0.02**	**0.08**	**0.10**	**0.13**	**0.15**
Coffee drinks	**287**	**0.15**	**0.04**	**0.10**	**0.15**	**0.18**	**0.25**
Water-based beverages							
Flavored waters	139	0.0	0.0	0.0	0.0	0.0	0.02
Flavored waters w/o NNS	125	0.01	0.0	0.0	0.0	0.01	0.04
Flavored waters w/ NNS	14	0.01	0.0	0.0	0.0	0.01	0.02
Tea-based beverages	197	0.01	0.0	0.0	0.0	0.02	0.04
Tea-based beverages w/o NNS	159	0.03	0.0	0.01	0.01	0.05	0.10
Tea-based beverages w/ NNS	38	0.03	0.01	0.01	0.02	0.05	0.09
Colas	162	0.01	0.0	0.0	0.0	0.01	0.02
Colas w/o NNS	93	0.01	0.0	0.0	0.01	0.02	0.05
Colas w/ NNS	69	0.02	0.0	0.01	0.02	0.02	0.07
Soft drinks with fruit	589	0.01	0.0	0.0	0.0	0.0	0.02
Soft drinks with fruits w/o NNS	500	0.02	0.0	0.0	0.01	0.01	0.05
Soft drinks with fruits w/ NNS	89	0.01	0.0	0.0	0.01	0.02	0.04
Lemonades. tonic waters and bitters	748	0.01	0.0	0.0	0.0	0.01	0.02
Lemonades. tonic waters and bitters w/o NNS	570	0.01	0.0	0.0	0.01	0.01	0.06
Lemonades. tonic waters and bitters w/NNS	178	0.03	0.0	0.01	0.02	0.04	0.07
Sport drinks	85	0.01	0.0	0.0	0.01	0.01	0.05

Sport drinks w/o NNS	9	0.01	0.0	0.0	0.0	0.0	0.03
Sport drinks w/ NNS	76	0.03	0.0	0.01	0.02	0.03	0.13
Energy drinks	125	0.03	0.0	0.0	0.01	0.04	0.12
Energy drinks w/o NNS	70	0.10	0.0	0.0	0.04	0.11	0.30
Energy drinks w/ NNS	55	0.05	0.0	0.0	0.02	0.10	0.20
Fruit-based beverages							
Fruit juices	812	0.03	0.0	0.0	0.0	0.01	0.10
Fruit nectars	191	0.0	0.0	0.0	0.0	0.0	0.01
Smoothies	242	0.01	0.0	0.0	0.0	0.01	0.03
THE NETHERLANDS							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	30	0.11	0.10	0.10	0.11	0.13	0.13
Partially-skimmed milk	120	0.11	0.10	0.10	0.10	0.13	0.13
Whole milk	71	0.11	0.10	0.10	0.10	0.13	0.13
Milk-based beverages	23	0.1	0.1	0.1	0.1	0.1	0.2
Fermented milk-based beverages	74	0.1	0.1	0.1	0.1	0.1	0.1
Solid dairy products	**389**	**0.2**	**0.1**	**0.1**	**0.1**	**0.2**	**0.6**
Solid dairy products sweetened	219	0.1	0.1	0.1	0.1	0.1	0.2
Solid dairy products unsweetened	38	0.1	0.1	0.1	0.1	0.1	0.2
Solid dairy desserts	132	0.3	0.1	0.1	0.2	0.4	0.8
Plant-based beverages	**78**	**0.13**	**0.08**	**0.10**	**0.14**	**0.14**	**0.25**
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/ NNS	-	-	-	-	-	-	-
Tea-based beverages	187	0.03	0.0	0.02	0.03	0.03	0.10
Tea-based beverages w/o NNS	59	0.02	0.0	0.0	0.01	0.03	0.10
Tea-based beverages w/ NNS	128	0.04	0.02	0.03	0.03	0.06	0.10
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	0.01	0.0	0.0	0.0	0.02	0.05
Soft drinks with fruits w/o NNS	248	0.02	0.0	0.0	0.0	0.01	0.05
Soft drinks with fruits w/ NNS	248	0.01	0.0	0.0	0.0	0.02	0.05
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							

Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	0.05	0.01	0.03	0.06	0.07	0.08
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	34	0.17	0.01	0.10	0.22	0.24	0.25
Energy drinks w/o NNS	18	0.14	0.0	0.04	0.11	0.24	0.40
Energy drinks w/ NNS	16	0.20	0.01	0.22	0.22	0.23	0.24
Fruit-based beverages							
Fruit juices	736	0.06	0.0	0.0	0.0	0.01	0.10
Fruit nectars	-	-	-	-	-	-	-
Smoothies	-	-	-	-	-	-	-

Appendix table 6 Distribution of proteins (in g/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	3.3	3.1	3.2	3.2	3.3	3.6
Partially-skimmed milk	1041	3.3	3.2	3.2	3.2	3.3	3.5
Whole milk	323	3.3	3.0	3.2	3.2	3.3	4.0
Milk-based beverages	97	3.2	1.9	2.8	3.2	3.5	6.6
Fermented milk-based beverages	337	2.9	1.7	2.7	2.9	3.0	3.6
Solid dairy products	**1153**	**4.0**	**2.4**	**3.0**	**3.7**	**4.6**	**7.4**
Solid dairy products sweetened	493	3.8	2.4	3.0	3.4	4.0	7.3
Solid dairy products unsweetened	142	5.4	3.1	3.8	4.4	7.0	9.2
Solid dairy desserts	518	3.9	2.2	2.9	3.8	4.6	6.7
Plant-based beverages	**972**	**1.6**	**0.1**	**0.5**	**0.9**	**3.1**	**3.8**
Coffee drinks							
Water-based beverages							
Flavored waters	88	0.0	0.0	0.0	0.0	0.0	0.2
Flavored waters w/o NNS	68	0.1	0.0	0.0	0.0	0.1	0.3
Flavored waters w/ NNS	20	0.0	0.0	0.0	0.0	0.0	0.1
Tea-based beverages	141	0.1	0.0	0.0	0.1	0.1	0.5
Tea-based beverages w/o NNS	104	0.1	0.0	0.0	0.1	0.1	0.5
Tea-based beverages w/ NNS	37	0.1	0.0	0.0	0.1	0.1	0.5
Colas	142	0.0	0.0	0.0	0.0	0.1	0.2
Colas w/o NNS	39	0.1	0.0	0.0	0.0	0.1	0.4
Colas w/ NNS	103	0.0	0.0	0.0	0.0	0.0	0.2
Soft drinks with fruit	580	0.2	0.0	0.0	0.1	0.2	0.6
Soft drinks with fruits w/o NNS	461	0.2	0.0	0.0	0.1	0.3	0.6
Soft drinks with fruits w/ NNS	119	0.2	0.0	0.0	0.1	0.1	0.5
Lemonades. tonic waters and bitters	154	0.0	0.0	0.0	0.0	0.0	0.3
Lemonades. tonic waters and bitters w/o NNS	84	0.1	0.0	0.0	0.0	0.0	0.3
Lemonades. tonic waters and bitters w/NNS	70	0.0	0.0	0.0	0.0	0.0	0.1
Sport drinks	18	0.1	0.0	0.0	0.0	0.1	0.5
Sport drinks w/o NNS	-	-	-	-	-	-	-
Sport drinks w/ NNS	-	-	-	-	-	-	-

Energy drinks	49	0.2	0.0	0.0	0.0	0.4	0.5
Energy drinks w/o NNS	36	0.2	0.0	0.0	0.1	0.4	0.5
Energy drinks w/ NNS	13	0.1	0.0	0.0	0.0	0.1	0.9
Fruit-based beverages							
Fruit juices	1080	0.5	0.0	0.3	0.5	0.6	1.0
Fruit nectars	262	0.3	0.0	0.2	0.3	0.4	0.6
Smoothies	37	0.6	0.4	0.5	0.6	0.6	0.7
GERMANY							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	14	3.6	3.4	3.4	3.5	3.6	4.4
Partially-skimmed milk	60	3.4	3.3	3.4	3.4	3.5	3.5
Whole milk	87	3.3	3.2	3.3	3.3	3.4	3.5
Milk-based beverages	327	3.2	0.3	3.1	3.4	3.5	4.2
Fermented milk-based beverages	341	2.8	2.2	2.6	2.8	3.0	3.4
Solid dairy products	**1937**	**3.1**	**0.3**	**2.5**	**3.4**	**3.9**	**5.4**
Solid dairy products sweetened	1379	3.4	0.6	2.9	3.4	4.0	5.6
Solid dairy products unsweetened	558	2.4	0.1	0.7	3.3	3.5	5.0
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	**1.3**	**0.1**	**0.4**	**0.9**	**2.0**	**3.7**
Coffee drinks	**287**	**2.6**	**0.3**	**2.1**	**2.8**	**3.0**	**3.6**
Water-based beverages							
Flavored waters	139	0.0	0.0	0.0	0.0	0.0	0.5
Flavored waters w/o NNS	125	0.0	0.0	0.0	0.0	0.0	0.4
Flavored waters w/ NNS	14	0.1	0.0	0.0	0.0	0.4	0.5
Tea-based beverages	197	0.2	0.0	0.0	0.1	0.5	0.5
Tea-based beverages w/o NNS	159	0.2	0.0	0.0	0.0	0.5	0.5
Tea-based beverages w/ NNS	38	0.2	0.0	0.0	0.1	0.4	0.5
Colas	162	0.1	0.0	0.0	0.0	0.1	0.5
Colas w/o NNS	93	0.1	0.0	0.0	0.0	0.5	0.5
Colas w/ NNS	69	0.1	0.0	0.0	0.0	0.1	0.5
Soft drinks with fruit	589	0.1	0.0	0.0	0.0	0.2	0.5
Soft drinks with fruits w/o NNS	500	0.1	0.0	0.0	0.0	0.2	0.5
Soft drinks with fruits w/ NNS	89	0.1	0.0	0.0	0.0	0.1	0.5
Lemonades. tonic waters and bitters	748	0.1	0.0	0.0	0.0	0.5	0.5
Lemonades. tonic waters and bitters w/o NNS	570	0.2	0.0	0.0	0.0	0.5	0.5

Lemonades. tonic waters and bitters w/NNS	178	0.1	0.0	0.0	0.0	0.1	0.5
Sport drinks	85	0.2	0.0	0.0	0.0	0.5	0.5
Sport drinks w/o NNS	9	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks w/ NNS	76	0.2	0.0	0.0	0.0	0.5	0.5
Energy drinks	125	0.1	0.0	0.0	0.0	0.0	0.9
Energy drinks w/o NNS	70	0.1	0.0	0.0	0.0	0.0	0.4
Energy drinks w/ NNS	55	0.2	0.0	0.0	0.0	0.2	1.1
Fruit-based beverages							
Fruit juices	812	0.4	0.0	0.0	0.3	0.6	0.8
Fruit nectars	191	0.1	0.0	0.0	0.1	0.3	0.4
Smoothies	242	0.7	0.0	0.5	0.6	0.8	1.1
THE NETHERLANDS							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	30	3.5	3.3	3.5	3.5	3.6	3.7
Partially-skimmed milk	120	3.5	3.2	3.4	3.5	3.5	3.6
Whole milk	71	3.4	3.2	3.3	3.4	3.5	3.5
Milk-based beverages	23	3.8	3.4	3.4	3.5	3.6	6.9
Fermented milk-based beverages	74	2.6	1.2	1.9	2.9	3.1	3.6
Solid dairy products	**389**	**3.9**	**1.9**	**2.7**	**3.4**	**4.6**	**6.3**
Solid dairy products sweetened	219	3.6	1.7	2.4	3.4	4.1	6.6
Solid dairy products unsweetened	38	3.7	2.4	3.1	3.1	3.6	6.2
Solid dairy desserts	132	4.4	2.0	3.0	3.8	4.9	5.8
Plant-based beverages	**78**	**2.0**	**0.1**	**0.5**	**2.6**	**3.0**	**3.6**
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/ NNS	-	-	-	-	-	-	-
Tea-based beverages	187	0.0	0.0	0.0	0.0	0.0	0.5
Tea-based beverages w/o NNS	59	0.1	0.0	0.0	0.0	0.5	0.5
Tea-based beverages w/ NNS	128	0.0	0.0	0.0	0.0	0.0	0.0
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	0.0	0.0	0.0	0.0	0.0	0.1
Soft drinks with fruits w/o NNS	248	0.1	0.0	0.0	0.0	0.0	0.1

Soft drinks with fruits w/ NNS	248	0.0	0.0	0.0	0.0	0.0	0.1
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							
Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	34	0.1	0.0	0.0	0.0	0.0	0.5
Energy drinks w/o NNS	18	0.1	0.0	0.0	0.0	0.1	0.5
Energy drinks w/ NNS	16	0.0	0.0	0.0	0.0	0.0	0.5
Fruit-based beverages							
Fruit juices	736	0.5	0.1	0.2	0.5	0.7	0.9
Fruit nectars	-	-	-	-	-	-	-
Smoothies	-	-	-	-	-	-	-

Appendix table 7 Distribution of fibres (in g/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	0.0	0.0	0.0	0.0	0.0	0.3
Partially-skimmed milk	1041	0.0	0.0	0.0	0.0	0.0	0.5
Whole milk	323	0.0	0.0	0.0	0.0	0.0	0.0
Milk-based beverages	97	0.0	0.0	0.0	0.0	0.0	0.0
Fermented milk-based beverages	337	0.2	0.0	0.0	0.0	0.0	0.3
Solid dairy products	**1153**	**0.7**	**0.0**	**0.0**	**0.4**	**1.0**	**2.4**
Solid dairy products sweetened	493	0.4	0.0	0.0	0.2	0.5	1.4
Solid dairy products unsweetened	142	0.2	0.0	0.0	0.0	0.1	1.3
Solid dairy desserts	518	1.1	0.0	0.3	0.9	1.6	3.1
Plant-based beverages	**972**	**0.6**	**0.0**	**0.5**	**0.6**	**0.7**	**1.0**
Coffee drinks							
Water-based beverages							
Flavored waters	88	0.1	0.0	0.0	0.0	0.0	0.5
Flavored waters w/o NNS	68	0.1	0.0	0.0	0.0	0.1	0.5
Flavored waters w/ NNS	20	0.0	0.0	0.0	0.0	0.0	0.3
Tea-based beverages	141	0.1	0.0	0.0	0.0	0.0	0.5
Tea-based beverages w/o NNS	104	0.1	0.0	0.0	0.0	0.0	0.5
Tea-based beverages w/ NNS	37	0.0	0.0	0.0	0.0	0.0	0.5
Colas	142	0.1	0.0	0.0	0.0	0.0	0.5
Colas w/o NNS	39	0.1	0.0	0.0	0.0	0.1	0.5
Colas w/ NNS	103	0.0	0.0	0.0	0.0	0.0	0.5
Soft drinks with fruit	580	0.2	0.0	0.0	0.1	0.1	0.6
Soft drinks with fruits w/o NNS	461	0.2	0.0	0.0	0.1	0.1	0.8
Soft drinks with fruits w/ NNS	119	0.1	0.0	0.0	0.1	0.1	0.5
Lemonades. tonic waters and bitters	150	0.1	0.0	0.0	0.0	0.0	0.5
Lemonades. tonic waters and bitters w/o NNS	84	0.1	0.0	0.0	0.0	0.0	0.5
Lemonades. tonic waters and bitters w/NNS	70	0.1	0.0	0.0	0.0	0.0	0.1
Sport drinks	18	0.1	0.0	0.0	0.0	0.1	0.5
Sport drinks w/o NNS	-	-	-	-	-	-	-
Sport drinks w/ NNS	-	-	-	-	-	-	-

Energy drinks	49	0.0	0.0	0.0	0.0	0.0	0.1
Energy drinks w/o NNS	36	0.0	0.0	0.0	0.0	0.0	0.3
Energy drinks w/ NNS	13	0.0	0.0	0.0	0.0	0.1	0.1
Fruit-based beverages							
Fruit juices	1080	0.3	0.0	0.1	0.2	0.5	0.9
Fruit nectars	262	0.3	0.0	0.0	0.1	0.3	1.0
Smoothies	37	1.2	0.1	0.9	1.2	1.5	2.0
GERMANY							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	14	0.0	0.0	0.0	0.0	0.0	0.0
Partially-skimmed milk	60	0.0	0.0	0.0	0.0	0.0	0.0
Whole milk	87	0.0	0.0	0.0	0.0	0.0	0.0
Milk-based beverages	327	0.2	0.0	0.0	0.0	0.3	0.7
Fermented milk-based beverages	341	0.3	0.0	0.0	0.0	0.4	1.5
Solid dairy products	**1937**	**0.4**	**0.0**	**0.0**	**0.2**	**0.5**	**1.5**
Solid dairy products sweetened	1379	0.5	0.0	0.1	0.3	0.6	1.6
Solid dairy products unsweetened	558	0.3	0.0	0.0	0.0	0.5	1.0
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	**0.5**	**0.0**	**0.2**	**0.4**	**0.7**	**1.1**
Coffee drinks	**287**	**0.2**	**0.0**	**0.0**	**0.0**	**0.2**	**1.0**
Water-based beverages							
Flavored waters	139	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/o NNS	125	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/ NNS	14	0.0	0.0	0.0	0.0	0.0	0.0
Tea-based beverages	197	0.0	0.0	0.0	0.0	0.0	0.5
Tea-based beverages w/o NNS	159	0.0	0.0	0.0	0.0	0.0	0.1
Tea-based beverages w/ NNS	38	0.1	0.0	0.0	0.0	0.0	0.5
Colas	162	0.0	0.0	0.0	0.0	0.0	0.0
Colas w/o NNS	93	0.0	0.0	0.0	0.0	0.0	0.0
Colas w/ NNS	69	0.0	0.0	0.0	0.0	0.0	0.1
Soft drinks with fruit	589	0.0	0.0	0.0	0.0	0.0	0.2
Soft drinks with fruits w/o NNS	500	0.0	0.0	0.0	0.0	0.0	0.2
Soft drinks with fruits w/ NNS	89	0.0	0.0	0.0	0.0	0.0	0.2
Lemonades. tonic waters and bitters	748	0.0	0.0	0.0	0.0	0.0	0.0
Lemonades. tonic waters and bitters w/o NNS	570	0.0	0.0	0.0	0.0	0.0	0.0

Lemonades. tonic waters and bitters w/NNS	178	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks	85	0.0	0.0	0.0	0.0	0.0	0.1
Sport drinks w/o NNS	9	0.0	0.0	0.0	0.0	0.0	0.0
Sport drinks w/ NNS	76	0.0	0.0	0.0	0.0	0.0	0.1
Energy drinks	125	0.1	0.0	0.0	0.0	0.0	0.0
Energy drinks w/o NNS	70	0.0	0.0	0.0	0.0	0.0	0.0
Energy drinks w/ NNS	55	0.2	0.0	0.0	0.0	0.0	0.0
Fruit-based beverages							
Fruit juices	812	0.2	0.0	0.0	0.0	0.2	1.0
Fruit nectars	191	0.1	0.0	0.0	0.0	0.1	0.7
Smoothies	242	0.5	0.0	0.0	0.0	1.0	1.7
THE NETHERLANDS							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	30	0.0	0.0	0.0	0.0	0.0	0.0
Partially-skimmed milk	120	0.0	0.0	0.0	0.0	0.0	0.0
Whole milk	71	0.0	0.0	0.0	0.0	0.0	0.0
Milk-based beverages	23	0.7	0.4	0.5	0.5	0.8	1.0
Fermented milk-based beverages	74	0.2	0.0	0.0	0.0	0.4	1.1
Solid dairy products	**389**	**0.7**	**0.0**	**0.1**	**0.4**	**0.8**	**2.2**
Solid dairy products sweetened	219	0.4	0.0	0.0	0.2	0.5	1.3
Solid dairy products unsweetened	38	0.2	0.0	0.0	0.0	0.3	1.0
Solid dairy desserts	132	1.2	0.0	0.3	0.7	1.5	3.0
Plant-based beverages	**78**	**0.5**	**0.1**	**0.4**	**0.5**	**0.7**	**1.1**
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	0.0	0.0	0.0	0.0	0.0	0.0
Flavored waters w/ NNS	-	-	-	-	-	-	-
Tea-based beverages	187	0.0	0.0	0.0	0.0	0.0	0.1
Tea-based beverages w/o NNS	59	0.0	0.0	0.0	0.0	0.0	0.1
Tea-based beverages w/ NNS	128	0.0	0.0	0.0	0.0	0.0	0.0
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	0.0	0.0	0.0	0.0	0.0	0.1
Soft drinks with fruits w/o NNS	248	0.0	0.0	0.0	0.0	0.0	0.1

Soft drinks with fruits w/ NNS	248	0.0	0.0	0.0	0.0	0.0	0.0
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							
Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	0.0	0.0	0.0	0.0	0.0	0.1
Sport drinks w/ NNS	-	-	-	-	-	-	-
Energy drinks	34	0.0	0.0	0.0	0.0	0.0	0.5
Energy drinks w/o NNS	18	0.1	0.0	0.0	0.0	0.0	0.5
Energy drinks w/ NNS	16	0.0	0.0	0.0	0.0	0.0	0.0
Fruit-based beverages							
Fruit juices	736	0.4	0.0	0.2	0.3	0.6	1.2
Fruit nectars	-	-	-	-	-	-	-
Smoothies	-	-	-	-	-	-	-

Appendix table 8 Distribution of fruits, vegetables, pulses (in %/100mL) across databases

	FRANCE						
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	160	0	0	0	0	0	0
Partially-skimmed milk	1041	0	0	0	0	0	0
Whole milk	323	0	0	0	0	0	0
Milk-based beverages	97	0	0	0	0	0	0
Fermented milk-based beverages	337	0	0	0	0	0	0
Solid dairy products	**1153**	**6.00**	**00**	**00**	**00**	**2.00**	**36.00**
Solid dairy products sweetened	493	100	00	00	00	100	48.00
Solid dairy products unsweetened	142	7.00	00	00	00	00	45.00
Solid dairy desserts	518	2.00	00	00	00	00	15.00
Plant-based beverages	**972**	0	0	0	0	0	0
Coffee drinks							
Water-based beverages							
Flavored waters	88	0	0	0	0	0	0
Flavored waters w/o NNS	68	0	0	0	0	0	0
Flavored waters w/ NNS	20	0	0	0	0	0	0
Tea-based beverages	141	1	0	0	0	1	1
Tea-based beverages w/o NNS	104	1	0	0	0	1	2
Tea-based beverages w/ NNS	37	0	0	0	1	1	1
Colas	142	0	0	0	0	0	0
Colas w/o NNS	39	0	0	0	0	0	0
Colas w/ NNS	103	0	0	0	0	0	0
Soft drinks with fruit	580	21	1	10	12	23	88
Soft drinks with fruits w/o NNS	461	23	2	12	13	25	99
Soft drinks with fruits w/ NNS	119	11	0	5	10	14	30
Lemonades. tonic waters and bitters	150	0	0	0	0	0	0
Lemonades. tonic waters and bitters w/o NNS	84	0	0	0	0	0	0
Lemonades. tonic waters and bitters w/NNS	70	0	0	0	0	0	0
Sport drinks	18	0	0	0	0	0	0
Sport drinks w/o NNS	-						
Sport drinks w/ NNS	-						

Energy drinks	49	2	0	0	0	0	5
Energy drinks w/o NNS	36	0	0	0	0	0	0
Energy drinks w/ NNS	13	7	0	0	0	0	50
Fruit-based beverages							
Fruit juices	1080	96	91	100	100	100	100
Fruit nectars	262	47	25	40	50	50	60
Smoothies	37	90	20	86	100	100	100
GERMANY							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	14	0	0	0	0	0	0
Partially-skimmed milk	60	0	0	0	0	0	0
Whole milk	87	0	0	0	0	0	0
Milk-based beverages	327	0	0	0	0	0	0
Fermented milk-based beverages	341	0	0	0	0	0	0
Solid dairy products	**1937**	**00**	**00**	**00**	**00**	**00**	**00**
Solid dairy products sweetened	1379	00	00	00	00	00	00
Solid dairy products unsweetened	558	00	00	00	00	00	00
Solid dairy desserts	-	-	-	-	-	-	-
Plant-based beverages	**392**	0	0	0	0	0	0
Coffee drinks	**287**	0	0	0	0	0	0
Water-based beverages							
Flavored waters	139	0	0	0	0	0	0
Flavored waters w/o NNS	125	0	0	0	0	0	0
Flavored waters w/ NNS	14	0	0	0	0	0	0
Tea-based beverages	197	0	0	0	0	0	0
Tea-based beverages w/o NNS	159	0	0	0	0	0	0
Tea-based beverages w/ NNS	38	0	0	0	0	0	0
Colas	162	0	0	0	0	0	0
Colas w/o NNS	93	0	0	0	0	0	0
Colas w/ NNS	69	0	0	0	0	0	0
Soft drinks with fruit	589	19	0	0	6	50	60
Soft drinks with fruits w/o NNS	500	21	0	0	10	50	60
Soft drinks with fruits w/ NNS	89	10	0	0	0	10	50
Lemonades. tonic waters and bitters	748	0	0	0	0	0	0
Lemonades. tonic waters and bitters w/o NNS	570	0	0	0	0	0	0

Lemonades. tonic waters and bitters w/NNS	178	0	0	0	0	0	0
Sport drinks	85	0	0	0	0	0	0
Sport drinks w/o NNS	9	0	0	0	0	0	0
Sport drinks w/ NNS	76	0	0	0	0	0	0
Energy drinks	125	1	0	0	0	0	0
Energy drinks w/o NNS	70	2	0	0	0	0	0
Energy drinks w/ NNS	55	0	0	0	0	0	0
Fruit-based beverages							
Fruit juices	812	99	100	100	100	100	100
Fruit nectars	191	42	25	29	50	50	60
Smoothies	242	99	100	100	100	100	100
THE NETHERLANDS							
	N	**Mean**	**P5**	**P25**	**P50**	**P75**	**P95**
Dairy beverages							
Skimmed milk	30	0	0	0	0	0	0
Partially-skimmed milk	120	0	0	0	0	0	0
Whole milk	71	0	0	0	0	0	0
Milk-based beverages	23	0	0	0	0	0	0
Fermented milk-based beverages	74	0	0	0	0	0	0
Solid dairy products	**389**						
Solid dairy products sweetened	219	0	0	0	0	0	0
Solid dairy products unsweetened	38	0	0	0	0	0	0
Solid dairy desserts	132	0	0	0	0	0	0
Plant-based beverages	**78**						
Coffee drinks							
Water-based beverages							
Flavored waters							
Flavored waters w/o NNS	83	0	0	0	0	0	0
Flavored waters w/ NNS							
Tea-based beverages	187	0	0	0	0	0	0
Tea-based beverages w/o NNS	59	0	0	0	0	0	0
Tea-based beverages w/ NNS	128	0	0	0	0	0	0
Colas							
Colas w/o NNS							
Colas w/ NNS							
Soft drinks with fruit	496	0	0	0	0	0	0
Soft drinks with fruits w/o NNS	248	0	0	0	0	0	0

Soft drinks with fruits w/ NNS	248	0	0	0	0	0	0
Lemonades. tonic waters and bitters							
Lemonades. tonic waters and bitters w/o NNS							
Lemonades. tonic waters and bitters w/NNS							
Sport drinks							
Sport drinks w/o NNS	32	0	0	0	0	0	0
Sport drinks w/ NNS							
Energy drinks	34	0	0	0	0	0	0
Energy drinks w/o NNS	18	0	0	0	0	0	0
Energy drinks w/ NNS	16	0	0	0	0	0	0
Fruit-based beverages							
Fruit juices	736	90	90	90	90	90	90
Fruit nectars							
Smoothies							