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Food composition data and labelling - A challenging dialogue

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Total number of authors:
17

Link to article, DOI:
10.6027/temanord2020-508

Publication date:
2020

Document Version
Publisher's PDF, also known as Version of record

Citation (APA):
Christensen, T., Nielsen, C. W., Valsta, L., Aalto, S., Haario, P., Reinivuo, H., Virtanen, S., Pastell, H., Nieminen, J., Reykdal, Ó., Axelsson, C., Petrelius-Sipinen, J., Kielland, E., Østerholt Dalane, J., Hauger Carlsen, M., Salupuu, K., & Jõgi, Ä. (2020). *Food composition data and labelling - A challenging dialogue*. Nordisk Ministerråd. TemaNord No. 508 https://doi.org/10.6027/temanord2020-508

Nordic Council of Ministers

Food composition data and labelling

A challenging dialogue

Contents

Abbreviations

AI	Artificial intelligence
AOAC	Association of Official Analytical Chemists
DTU	Technical University of Denmark (National Food Institute)
EFSA	European Food Safety Authority
EuroFIR	European Food Information Resource
Evira	Finnish Food Safety Authority
FCDB	Food composition database
FFA	Ruokavirasto (Finnish Food Authority since 1 January 2019)
FOPL	Front-of-pack label
FSA	Food Standards Agency
GC	Gas chromatography
HPLC	High performance liquid chromatography
ICP-OES	Inductively-coupled plasma atomic emission spectroscopy
ICT	Information and communication technology
GNPD	Global New Products' Database (Mintel GNPD)
NCM	Nordic Council of Ministers
NFAN	Nordic Food Analysis Network
NKMT	Nordic Working Group for Diet, Food & Toxicology
NMKL	Nordic Committee on Food Analysis
NordCoLa	Nordic Food Composition for Labelling
RI	Refractive index (detection)
SFA	Swedish Food Authority
SME	Small and medium-sized enterprises
SPE	Solid phase extraction
TAI	Tervise Arengu Instituut (National Institute for Health Development, Estonia)
THL	Terveyden ja hyvinvoinnin laitos (Finnish Institute for Health and Welfare)
UIO	University of Oslo
USDA	U.S. Department of Agriculture

Preface

This report describes two phases of activities that were carried out using the infrastructure of the Nordic Food Analysis Network. The primary contents of this report are the result of activities of the 'Nordic Food Composition Data for Labelling (NordCoLa)' project carried out between 2018–2020. In addition, the results of the preceding project 'Fostering the quality and use of Nordic food composition data' carried out under the Nordic Council of Ministers´ (NCM) Finnish Presidency in 2016 are reported in this publication, while results obtained from that project were also utilised by the NordCoLa project as starting material.

The Nordic Food Analysis Network activities have been supported by the NCM since 2012. The network has been coordinating the chemical food analyses carried out in the Nordic countries and Estonia. The participation of Nordic and Estonian food database compilers in this network has further facilitated getting the best out of the limited resources available to keep the national food composition databases (FCDBs) up to date.

The primary aim of the NordCoLa project was to evaluate the needs, synergies and critical points of the Nordic FCDBs (e.g. food ingredient and nutrient value gaps) in relation to the composition data to be used to implement the new European nutrient labelling legislation. This was to ensure quality food composition data in the Nordic countries and Estonia for food producers and other users for nutrient labelling purposes. This document also reports on the outcomes of two open seminars organised by the network, and desk research carried out in relation to the topic area.

Acknowledgements

The work of the Nordic food composition for labelling project (NordCoLa) group was funded by the Nordic Council of Ministers' (NCM) Nordic Working Group for Diet, Food & Toxicology (NKMT). Part of the work described in this report was funded by the NCM through the Finnish Presidency period in 2016. We would like to thank the Finnish Food Authority, Chemistry Unit, which kindly carried out the food analyses for the NordCoLa project.

We would also like to thank the speakers at the open seminars organised in October 2016 and April 2019: Sirpa Sarlio, Janne Nieminen, Ruth Charrondiere, Hanna Sara Strandler, Anders Mogensen, Irene Mattisson, Tue Christensen, Katja Ratamäki, Hannes Heikinheimo, Veronica Öhrvik, Anna Kara, Chantal Julia, Anne Haikonen, Kristin Salupuu and Timo Kettunen. Without your contributions we would not have experienced the fruitful discussions or seen the light, and we would not have received all the take-home messages.

The work of the NordCoLa group members listed below, who contributed to the work and commented on the draft report, is highly appreciated:

Tue Christensen, Cecilie Wirenfeldt Nielsen	DTU Food, Denmark
Liisa Valsta, Sanni Aalto, Peppi Haario, Heli Reinivuo, Suvi Virtanen	THL, Finland
Helena Pastell, Janne Nieminen	FFA, Finland
Ólafur Reykdal	Matís, Iceland
Cecilia Axelsson, Jessica Petrelius-Sipinen	SFA, Sweden
Ellen Kielland, Jorån Østerholt Dalane	NFSA, Norway
Monica Hauger Carlsen	UIO, Norway
Kristin Salupuu, Änn Jõgi	TAI, Estonia

Executive summary

This report describes the activities of two projects that were carried out using the infrastructure of the Nordic Food Analysis Network, i.e. the 'Nordic Food Composition Data for Labelling (NordCoLa)' project carried out between 2018 and 2020, and the preceding project 'Fostering the quality and use of Nordic food composition data', carried out under the Finnish Presidency of the NCM in 2016.

The primary aim of the NordCoLa project was to evaluate the needs, synergies and critical points of the Nordic FCDBs (e.g. food ingredient and nutrient value gaps) in relation to the composition data to be used to implement the new European nutrient labelling legislation. This was to ensure quality food composition data in the Nordic countries for food producers and other users for nutrient labelling purposes. The most important gaps were evaluated and summarised by this project.

This project included an exercise comparing calculated and analysed nutrient information of selected Nordic food samples. This information was then compared with the acceptable tolerance limits in use in the EU.

As part of the projects, two open seminars were organised in Helsinki; the first one on 16 October 2016 and the second on 17 April 2019. The seminars gathered a total of around 150 participants together to hear about challenges in the area of food composition data and their use in food labelling and related quality issues.

In addition, the project included research on food label information in order to evaluate the usefulness of the Mintel Global New Products' Database (Mintel GNPD) and GS1 in the work of updating and compiling information used in food composition databases.

The network's main conclusions and strategical proposals are as follows:

- There is a need for more analyses and continuous compiling work in order to ensure updated FCDBs for the users. Opportunities for Nordic collaboration in food analyses should be carefully evaluated.
- More industrial ingredients need to be analysed and added to FCDBs. Obtaining such information is important to keep the databases useful, especially for SMEs in the food business.
- The calculated values are of overall good quality when compared with analysed values, with the exception of protein, sugars and salt. This warrants more attention to take carbohydrates and especially simple sugars into account when planning future national food analysis programmes. Collecting more information on salt content and comparing it with the analysed information on food products is also needed.
- There is no legislation for the methods to be used in the food analysis. This means that different methods are used and even different components may be measured resulting variation in nutrient contents. Sugars are an example of that, since different techniques measure total sugar content or different

sugar components separately and both ways are accepted for labelling purposes.

- Calculating nutrient contents of food items according to a standardised method is a good and affordable way of producing values for food composition databases and food labelling purposes, if the data quality of the FCDBs are based on analysed values.

- The acceptable variation in nutrient label information based on EC legislation tolerances is very large. The tolerances may even threaten the meaningful reformulation of food products and reliable consumer information due to uncertainties over the labelled nutrient values.

- More information is needed regarding the validity of nutrient labelling at the Nordic and European level. To avoid misleading consumer information, food analyses should be used to check the validity of nutrient labelling and to monitor reformulation efforts.

- Nutrient label data from commercial food label databases, for example, is not recommended to be used, in general, for updating nutrient values of foods in the national FCDBs. However, such databases were found to be partially useful in updating the coverage, i.e. food lists of national FCDBs, if the used databases cover most of the national market.

- Nordic collaboration should be further intensified in the fields of analysing nutrient content of missing ingredients in FCDBs, harmonising nutrient label calculation procedures and proposing improvements to the European legislation concerning tolerances of nutrient values in labelling.

1. Background

Up-to-date, accurate and relevant food composition data has recently become essential for nutrient labelling of packaged foods. This is due to the new European legislation on food labelling (EU) No. 1169/2011, which includes mandatory nutrient labelling of energy, fat, saturated fat, carbohydrates, sugars, protein and salt on the food labels on all packaged foods by 13 December 2016. In addition, vitamin and mineral values may be labelled in case the amounts in the food can be considered significant. The national food composition databases (FCDBs) are used to compile the mandatory nutrient information of a product or to calculate nutrient values in recipes, especially by small and medium-sized enterprises (SMEs) or manufacturers that are not able to routinely analyse the nutrient content of their packaged food products. The limitation of FCDBs are the lack of information on certain ingredients in use by food producers and the industry. These are both new industrially-used and more traditional and locally-used ingredients in the Nordic countries that are missing from FCDBs.

Food label and ingredient information are today available through food label and market analysis databases (e.g. Mintel GNPD[1] and GS1[2]), which may be used to efficiently find gaps in modern food and ingredient coverage of FCDBs. However, while food label and market analysis databases may be useful for updating food lists of FCDBs, their accuracy needs to be tested before using them to fill nutrient value gaps of FCDBs.

In addition to serving as a data source for labelling, dietary monitoring and research food composition data is also a promising source of information for new applications, e.g. in the personalised health monitoring area.

1. https://www.mintel.com/
2. https://www.gs1.org/

2. Activities of the Fostering and NordCoLa projects

2.1 Participants in the network

The participants in the two projects were experts from different fields of chemical food analysis, food composition databases and information technology in the Nordic countries and Estonia (Table 1). In addition, the Nordic Committee of Food Analysis (NMKL) has participated as a silent member in the project.

Table 1: Partner institutions of the NordCoLa and the Fostering project

Institution	Country
National Food Institute, Technical University of Denmark (DTU), www.food.dtu.dk	Denmark
Finnish Institute for Health and Welfare (THL), Public Health Promotion Unit, www.thl.fi	Finland
Finnish Food Authority (FFA), Ruokavirasto, www.ruokavirasto.fi	Finland
Matís ohf. / Icelandic Food and Biotech R&D (Matís), www.matis.is	Iceland
Mattilsynet, Norwegian Food Safety Authority (NFSA), www.mattilsynet.no	Norway
University of Oslo (UIO), www.uio.no	Norway
Swedish Food Agency (SFA), www.slv.se	Sweden
National Institute for Health Development (TAI), www.tai.ee	Estonia
Nordic Committee on Food Analysis (NMKL), www.nmkl.org	Nordic

Several experts from each institution have contributed to the activities of the two projects. These projects have been coordinated by THL in Finland. The work has been led by information coordinator Liisa Valsta (from January 2015 to February 2020). The active members of the network that have contributed to the NordCoLa project are presented in Table 2.

Table 2. Members of the NordCoLa project

Members	Institution
Tue Christensen, Cecilie Wirenfeldt Nielsen	DTU Food
Liisa Valsta, Sanni Aalto, Peppi Haario, Heli Reinivuo, Suvi Virtanen	THL
Helena Pastell, Janne Nieminen	FFA
Ólafur Reykdal	Matís
Cecilia Axelsson, Jessica Petrelius-Sipinen, Hanna Sara Strandler	SFA
Ellen Kielland, Jorån Østerholt Dalane	NFSA
Monica Hauger Carlsen	UIO
Kristin Salupuu, Änn Jõgi	TAI

2.2 Summary of the activities of the two projects

The Finnish Presidency project, which included the seminar held on October 2016, acted as a preparatory project for NordCoLa co-operation. The previous co-operation of the Nordic Food Analysis Network (NFAN) was considered so important that maintenance and further development of Nordic co-operation was encouraged by the NCM/NKMT. This led to the NordCoLa project, which received funding in 2017. The activities of the network are summarised in Table 3.

As one of the activities of the Finnish Presidency of the Nordic Council of Ministers, a seminar on *How to Foster Innovative Use of Food Information* was held in October 2016 at the Finnish Food Authority's premises. The Finnish Presidency project included a lot of research in the field of food package labelling and sustaining communication between the network members.

The NordCoLa project had its kick-off meeting in January 2018. Since then, the network members have kept in touch via several virtual meetings and electronic questionnaires. A nutrient label calculation exercise was conducted in order to identify differences and vulnerabilities related to Nordic FCDBs. This exercise is described in more detail later in this report, in Chapter 4. The preliminary results of the nutrient label calculation exercise were presented in the seminar *Nordic Food Composition Data for Labelling and Public Health* which was held on April 17 2019 at THL's premises.

Table 3. Summary of the main network activities 2016–2019

Year	2016				2017				2018				2019***			
Activity of the network	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
Seminars in Finland [* and **]				X										X		
Case studies: Mintel GNPD					X	X	X	X								
Virtual meetings of the network	X								X			X		X	X	X
NordCoLa questionnaire										X						
Nutrient label calculation exercise												X	X	X	X	
Face-to-face meeting (Finland, Helsinki)		X												X		
Study protocols created and funds applied as appropriate	X		X			X										
Project management reporting															X	
Final report														X	X	X

**Seminar of the Finnish Presidency of the Nordic Council of Ministers held on 19 October 2016.*

*** Seminar of the NordCoLa project held on 17 April 2019.*

**** Publishing of the report during I/2020.*

3. Nutrient label calculation exercise

3.1 Aims and design

The aim of the exercise was to make a comparison of calculation tools (hereafter: calculation tool or calculator) used to calculate nutrient composition for labelling purposes in different Nordic countries. The identification of possible ingredient and nutrient value gaps in FCDBs and challenges related to calculated nutrient values was an additional aim. The values calculated with different calculators were then compared to analysed nutrient values which were analysed by the Finnish Food Authority.

Every participating country was sent on a search for a food product and its recipe. SMEs were contacted and the analysed results were offered as a motivation for participating. The companies were asked to provide the recipe, a detailed list of ingredients, amounts of the ingredients before and after processing, and the total weight of the recipe and the ready food product when purchased. Confidentiality agreements were developed if requested.

The recipes of the food products were sent to THL, Finland to be anonymised. The recipes were blinded and distributed to countries for the first calculation procedure (Step 1 described in Section 3.3.3). Ideally, one person was responsible for the recipe information and another for the calculation procedure so that the calculations would not be compromised. The countries that participated in this exercise were Denmark, Estonia, Norway, Sweden and Finland, with Finland being the coordination centre.

The nutrients selected in the comparison exercise were the mandatory nutrients according to EU regulation (1169/2011) on nutrient declaration:

- Energy (kJ)
- Total fat (g)
    - of which saturated fat (g)
- Carbohydrates (g)
    - of which sugars (g)
- Protein (g)
- Salt (g)

3.2 Sampling

The samples of the food products were sent to the Finnish Food Authority for nutrient analyses. Three samples (each weighing 100 g), or one pooled sample (300 g), from three different batches (and/or best before dates) were sent for analysis. The possible seasonal variations in raw materials or the changes in production could not be taken into account because of the limited time frame reserved for the exercise. No statistical analyses were done due to the small number of samples.

All three samples were combined as one pooled sample and the laboratory analyses were performed as duplicates or triplicates. The combining of the samples was performed in the laboratory. To reduce the sample size, possible sample batches were allowed to be combined before sending them to Finland. Any pre-handling of the samples was not required. To avoid spoilage of the samples, they had to be packed well with ice coolers. The samples were sent to the Finnish Food Authority by the beginning of February 2019.

3.3 Methods

3.3.1 Laboratory methods

The contents of moisture, ash, crude protein (nitrogen), total fat, fatty acids, sugars (glucose, fructose, galactose, sucrose, maltose, lactose), starch, dietary fibre and salt (sodium) was analysed in the laboratory of the Finnish Food Authority during February and March 2019. All samples were homogenised and freeze-dried for the analyses.

Moisture was analysed gravimetrically by drying in the oven at 103 degrees Celsius for four hours. The samples were cooled in an exsiccator for 30–45 minutes and then weighed. The loss of weight indicated the moisture content of the samples. Ash was analysed by burning the sample in a muffle furnace at 550 degrees Celsius for approximately three hours. The samples were cooled and weighed. All the remaining matter was ash.

The protein content of the samples was investigated by analysing nitrogen using the Kjeldahl method. Jones's factor 6.25 (Jones, 1941) was used to convert the nitrogen content of the sample as protein. Total fat content of the samples was determined gravimetrically. The samples were boiled with hydrochloric acid, then cooled and filtered. The residue was washed and dried and the fat was extracted with petrolic ether, which was evaporated. The samples were weighed, which indicated the total fat content of the samples. Fatty acids (% as total fat) were analysed with a gas chromatograph (GC). The fatty acids were first liberated from glycerol and esterified as methyl esters and then analysed with GC.

Sugars were extracted with warm water. Protein and other disturbing components were removed with solid phase extraction (SPE) and sugars were analysed by high performance liquid chromatograph (HPLC) coupled with refractive index (RI) detector. The following mono- and disaccharides were analysed: fructose, galactose, glucose, maltose, sucrose and lactose. Starch was analysed by a recently introduced method where the sugars were washed off and starch was decomposed enzymatically into glucose, which was quantified with HPLC-RI.

Dietary fibre was analysed by using the enzymatic-gravimetric method AOAC 2011.25 (McCleary *et al.*, 2012). First the starch and protein were enzymatically removed. The samples were fractionated in three groups: waters-insoluble polysaccharides, water-soluble polysaccharides and oligosaccharides. The polysaccharides were dried and weighed. The oligosaccharides were analysed by using HPLC-RI. Residual protein and ash were analysed from the polysaccharides. Finally, the total dietary fibre was calculated by summing up the poly- and oligosaccharides from which the amounts of ash and protein were subtracted.

The salt content of the samples was determined by analysing sodium with inductively coupled plasma atomic emission spectroscopy (ICP-OES). The salt was calculated from sodium with a factor of 2.5.

The method uncertainties of the food analyses are presented in Table 4.

Table 4. Method uncertainties of the nutrient analyses carried out by the Finnish Food Authority.

Nutrient	Used method	Uncertainty
Total fat	Gravimetric method	0.7% units
Sugars	HPLC-RI	16.5%
Starch	HPLC-RI	6%
Protein	Kjeldahl method (nitrogen)	0.5% units
Salt	ICP-OES	25%
Dietary fibre	AOAC 2011.25	20%
Moisture	Drying	6% units

3.3.2 Calculation tools and methods

Participating countries were asked to list background information related to the calculators used in the exercise. The following information had to be provided: name and version of the tool used, version of the database used in the calculations, as well as information on the use of yield and retention factors (whether they are included in the tool). The detailed information about the tools used is presented in Table 5 by participating country.

From Table 5 it can be seen that every participating country had updated their food composition databases quite recently. In addition, some of the tools have been updated into a newer version in the past few years. Finland and Norway used more than one calculator in the exercise. The Finnish Finarkki tool (THL) and FoodCASE (NFSA) are designed for database managers and compilers to use and is not for public use. Fineli Food Diary (of THL) is, however, available for the public use but the selection of the food items is more limited in comparison to Finarkki. As mentioned earlier, the calculation tools presented in Table 5 were originally not meant for calculating nutrient labels; they have more or less been created for research purposes (food consumption surveys, etc.) The calculators' suitability for calculating nutrient composition from industry recipes was put to the test in the exercise described in Chapter 3.

3.3.3 Calculation steps 1 and 2

Step 1 of the nutrient label calculation exercise was carried out in March 2019. The participating countries were given the four different anonymised recipes of the four different samples, where the amounts of ingredients, information on the main processing method and the weight of the sample before and after processing were provided. The individuals from each country who were to perform the calculations were not the ones gathering the food samples from the companies. Following the calculations, the participating countries sent the results to the project coordinating centre (THL) to compile.

The calculated nutrient values were compared to the analysed nutrient values (analysed by the Finnish Food Authority, methods used described in section 3.3.1). In the recipes there were a few ingredients that were not specified in detail or did not have a proper translation, which resulted in different ingredient choices depending on the calculator.

Table 5. Information on the recipe calculation tools used in the recipe calculation exercise.

Country	Tool names used in the exercise (Chapter 4)	Official name of the tool	Version of the tool	Version of the data-base	Organisation responsible for the tool	Yield factors included in the tool (YES/NO)	Retention factors in-cluded in the tool (YES/ NO)	Guidance for users for labelling purposes (YES/NO)
Denmark	Denmark	Deklarations-beregneren	V2 - 2019	Frida 2017	DTU	NO	NO	YES
Estonia	Estonia	Toote arvutus- ja sisestus-programm	2018	9 / 2019	TAI	YES	YES (partly)	NO
Finland	Finland I	Finarkki	1.9.2.556	FND_DEV	THL	YES	YES	NO
	Finland II	Fineli Food Diary	13.3.2018	REL19	THL	YES (partly)	YES (partly)	YES
Norway	Norway I	Kostholds-planleggeren	2014	2018	NFSA	NO	NO	YES (partly)
	Norway II	FoodCASE	5.7.0	2018	NFSA/ Premotec	YES	YES	NO
	Norway III	KBS	7.3 / 2019	AE18	UIO	YES	YES (partly)	NO
Sweden	Sweden	Livsmedels-systemet*	2015-12-14	2019-03-18	SFA	YES	YES	YES

**Name of the system containing the tool.*

The selection of ingredients can also vary between the calculators – and even between two calculators from the same country, because the other calculator can be designed for research and may have confidential data in it, for example, while another is meant for public use. Although the selection of ingredients in FCDBs can be quite extensive, they might still lack the exact matches for the ingredients given in the recipe (e.g. protein or fat content of meat can vary). Nutrient gaps and/or outdated data in FCDBs affect the calculation results. Some of the calculators did not have any feature for using weight yield factors. The content of nutrients might therefore be lower than expected due to the change of water content in the recipes where heat treatment was not taken into account.

Industrial ingredients were problematic in this exercise because FCDBs rarely include them. Industrial ingredients were normally left out of the calculations, which may have an effect on the salt content of the product, for example. According to the results there were gaps in several FCDBs regarding mono- and disaccharides. The calculated sugar values were systematically lower than the analysed values. Regarding the analysis of sugars, it was unclear how artificial sweeteners behave in sugar analysis, for example. This should be taken into account when analysing artificially sweetened products. It is not clear what actually happens to the nutrients when cooking liver, for example. This exercise indicated that there is a burning need for sugar analysis in most countries in order to acquire up-to-date nutrient composition information in FCDBs.

After step 1 of the calculator comparison exercise it was concluded that a recalculation round (step 2) had to be carried out in order to see if using more precisely described ingredients in the calculation would have an effect on the calculated nutrient values. The purpose of step 2 was to imitate a realistic situation where an SME entrepreneur is trying to calculate the nutritional value of their food product. The recipes used in step 2 were from the same samples as in step 1.

The more specific information on the ingredients used in this part of the exercise was obtained from the co-operating companies. This additional, more specific information was applied to the recipes at the project coordinating centre and then delivered to the participating countries to be used in the recalculation. Some ingredient gaps were still recognised at this stage. Step 2 of the calculation exercise was carried out between June and August 2019.

3.4 Results and discussion of the calculation exercise

3.4.1 Comparisons between labelled and analysed nutrient values

A summary of the final comparisons (Step 2) between labelled and analysed nutrient values are presented in Table 6 and a comparison of calculated values between different calculators in Table 7.

The acceptable tolerances, based on declared tolerable ranges in the guidance document of the European Commission (2012), were applied to the labelled nutrient values to see if the analysed values fit within the ranges. The results are presented in Table 6. In this part of the exercise the nutrient label values were compared with the analysed values to see how far the nutrient label value is from the analysed value (%). The percentage indicates how large the difference was between the nutrient labelling and the analysed nutrient values (if <100, the analysed nutrient value exceeded the value declared in the nutrient label).

In sample 1, the analysed values for total fat, saturated fat and carbohydrates were lower than the nutrient label values. This led to the observation that the analysed value for carbohydrates was below the tolerance limits declared in the guidance document. Apart from the carbohydrates, all analysed nutrient values were within the tolerance limits in sample 1.

The analysed values for total fat as well as protein were the only ones which were lower than their nutrient label values but not more than 6% (total fat). The analysed values for carbohydrates and sugars were higher than the nutrient label values in sample 2. The nutrient label value for sugars was only one-third and carbohydrates only one-half of the nutrient label value. Due to this, the analysed values for sugars and carbohydrates did not fit within the tolerance.

In sample 3 the analysed values for total fat and salt were equal to the nutrient label values and there was practically no difference at all between them. The analysed value for carbohydrates was slightly lower than the nutrient label value. The nutrient label value for sugars was the same as the analysed value. All the nutrient values fit within the tolerance limits set for sugars in sample 3.

The only two analysed nutrient values fitting inside the tolerance declared in the guidance document (2012) in sample 4 were total fat and protein. The nutrient label value for carbohydrates was 29% larger than the analysed value. The nutrient label value for sugars and salt were only one-third of the analysed values, leading to the conclusion that they were outside the tolerance limits.

In addition to the four samples presented above, there was one sample which was not included in the nutrient label calculation exercise because no recipe was obtained from the company and therefore its nutrient label could not be calculated with the calculation tools. However, the sample was analysed and included in the comparison between nutrient label values and analysed values. This sample is hereafter referred to as sample 5. Total fat, saturated fat and carbohydrates were the only nutrients that fit within the tolerance. Sugars, protein and salt, however, exceeded the tolerable ranges of the nutrient labelling. The analysed values in sample 5 were systematically higher than declared on the product's nutrient label.

From Table 6 it can be concluded that in some cases, the analysed values (most often in sugars, carbohydrates and salt) exceeded the tolerance limits when compared to the nutrient labelling values. The tolerance limits were considered insufficient, especially when it came to salt, because the range was so broad that it could compromise the whole idea of salt reformulation.

3.4.2 Differences between the calculators

One aim of the calculator exercise was to evaluate and compare the calculators from different countries with each other. The calculated values were compared to the analysed values to see if the calculated values fit within the measurement uncertainty of methods used in the analyses. The selected nutrients, measurement uncertainties, the limits for measurement uncertainties as well as the results of different calculators are presented in Table 7. The comparison included only the nutrients that producers are obligated to publish on the packaging label. Calculated values which exceeded, i.e. did not fit within, the limits of the uncertainty are marked in red in the table.

Table 6. Results of step 2 of the nutrient label calculation exercise – nutrient labelling values compared to the tolerances declared in the guidance document of the European Commission (2012) and the analysed nutrient values.

SAMPLE 1	Nutrient labelling on the package (g/100 g)	Analysed value (g/100 g)	Nutrient labelling/ Analysed value (%)	Tolerance category (g/100 g)	Tolerance (g or %)	Tolerable range of the nutrient labelling (g/100g)	Analysed value within the tolerance (YES/ NO)
Total fat	2.2	1.5	147	<10	±1.5 g	0.7–3.7	YES
Saturated fat	0.9	0.6	150	<4	±0.8 g	0.1–1.7	YES
Carbohydrates	10	5.4	185	10–40	±20%	8.0–12.0	NO
Sugars	1.6	1.1	145	<10	±2 g	0–3.6	YES
Protein	6.6	6.3	105	<10	±2 g	4.6–8.6	YES
Salt	0.6	0.6	98	<1.25	±0.375 g	0.225–0.975	YES

SAMPLE 2	Nutrient labelling on the package (g/100g)	Analysed value (g/100g)	Nutrient labelling/ Analysed value (%)	Tolerance category (g/100g)	Tolerance (g or %)	Tolerable range of the nutrient labelling (g/ 100g)	Analysed value within the tolerance (YES/ NO)
Total fat	8.9	8.4	106	<10	±1.5 g	7.4–10.4	YES
Saturated fat	2	2.4	82	<4	±0.8 g	1.2–2.8	YES
Carbohydrates	3.2	7	46	<10	±2 g	1.2–5.2	NO
Sugars	1.5	5.3	28	<10	±2 g	0–3.5	NO
Protein	10	10	100	10–40	±20%	8.0–12.0	YES
Salt	1.6	1.8	91	≥1.25	±20%	1.28–1.92	YES

SAMPLE 3	Nutrient labelling on the package (g/100g)	Analysed value (g/100g)	Nutrient labelling/ Analysed value (%)	Tolerance category (g/100g)	Tolerance (g or %)	Tolerable range of the nutrient labelling (g/ 100g)	Analysed value within the tolerance (YES/ NO)
Total fat	1.8	1.8	100	<10	±1.5 g	0.3–3.3	YES
Saturated fat	0.4	0.5	87	<4	±0.8 g	0–1.2	YES
Carbohydrates	7.7	6.6	117	<10	±2 g	5.7–9.7	YES
Sugars	1.2	1.2	100	<10	±2 g	0–3.2	YES
Protein	6.1	6.6	92	<10	±2 g	4.1–8.1	YES
Salt	0.6	0.6	102	<1.25	±0.375 g	0.225–0.975	YES

SAMPLE 4	Nutrient labelling on the package (g/100 g)	Analysed value (g/100 g)	Nutrient labelling/ Analysed value (%)	Tolerance category (g/100 g)	Tolerance (g or %)	Tolerable range of the nutrient labelling (g/100 g)	Analysed value within the tolerance (YES/ NO)
Total fat	7.8	6.8	115	<10	±1.5 g	6.3–9.3	YES
Saturated fat)*	-	4.4	-	-	-	-	-
Carbohydrates	20.4	15.8	129	10–40	±20%	16.3–24.5	NO
Sugars	3.7	12.4	30	<10	±2 g	1.7–5.7	NO
Protein	3.9	4.8	81	<10	±2 g	1.9–5.9	YES
Salt	0.2	0.7	30	<1.25	±0.375 g	0–0.575	NO

***** The amount of saturated fat (g) was not available in the nutrient labelling of Sample 4*

SAMPLE 5	Nutrient labelling on the package (g/100 g)	Analysed value (g/100 g)	Nutrient labelling/ Analysed value (%)	Tolerance category (g/100 g)	Tolerance (g or %)	Tolerable range of the nutrient labelling (g/100 g)	Analysed value within the tolerance (YES/NO)
Total fat	7.5	8	94	<10	±1.5 g	6.0–9.0	YES
Saturated fat	0.5	0.6	83	<4	±0.8 g	0–1.3	YES
Carbohydrates	46.0	47.5	97	˃40	±8 g	38.0–54.0	YES
Sugars	2.3	4.5	51	<10	±2 g	0.3–4.3	NO
Protein	4.6	7.3	63	<10	±2 g	2.6–6.6	NO
Salt	1.1	1.5	73	<1.25	±0.375 g	0.725–1.475	NO

Table 7. The comparison between different calculators and the measurement uncertainties of the methods used in the analyses. Calculated values which exceeded, i.e. did not fit within, the limits of the uncertainty are marked in red.

SAMPLE 1	Analysed values (g/100g)	Method uncertainty (g/100 g)	Tolerance limit (g/100 g)	Finland I (g/100g)	Finland II (g/100g)	Sweden (g/100g)	Estonia (g/100g)	Norway (g/100g)	Norway II (g/100g)	Norway III (g/100g)	Denmark (g/100g)
Total fat	1.5	±0.7	0.8–2.2	2.1	1.6	2.0	2.1	2.2	2.3	3.0	2.7
Sugars	1.1	±0.2	0.9–1.3	1.6	0.8	1.5	1.5	0.4	0.5	0.6	1.8
Protein	6.3	±0.5	5.8–6.8	6.1	4.1	5.8	6.4	4.8	5.6	6.2	6.6
Salt	0.6	±0.2	0.4–0.8	0.6	0.5	0.5	0.6	0.4	0.6	0.6	0.6

SAMPLE 2	Analysed values (g/100g)	Method uncertainty (g/100 g)	Tolerance limit (g/100g)	Finland I (g/100g)	Finland II (g/100g)	Sweden (g/100g)	Estonia (g/100g)	Norway I (g/100g)	Norway II (g/100g)	Norway III (g/100g)	Denmark (g/100g)
Total fat	8.4	±0.7	7.7–9.1	8.0	8.0	8.2	10.2	8.3	8.3	8.5	8.3
Sugars	5.3	±0.9	4.4–6.2	2.0	1.5	1.5	2	1.5	1.5	1	1.6
Protein	10	±0.5	9.5–10.5	10.8	10.8	10.8	24.8	10.2	10.2	10.9	10.7
Salt	1.8	±0.4	1.4–2.2	1.6	1.5	1.6	0.3	1.5	1.5	1.8	1.5

SAMPLE 3	Analysed values (g/100g)	Method uncertainty (g/100 g)	Tolerance limit (g/100g)	Finland I (g/100g)	Finland II (g/100g)	Sweden (g/100g)	Estonia (g/100g)	Norway I (g/100g)	Norway II (g/100g)	Norway III (g/100g)	Denmark (g/100g)
Total fat	1.8	±0.7	1.1–2.5	1.9	1.6	1.8	2.4	1.5	1.6	1.5	2.8
Sugars	1.2	±0.2	1.0–1.4	1.2	1.1	1.2	1.2	1.4	1.6	1.4	1.6
Protein	6.6	±0.5	6.1–7.1	6.4	4.6	6.1	6.5	5.7	6	3.9	6
Salt	0.6	±0.1	0.5–0.7	0.5	0.5	0.6	0.4	0.4	0.5	0.5	0.6

SAMPLE 4	Analysed values (g/100g)	Method uncertainty (g/100 g)	Tolerance limit (g/100g)	Finland I (g/100g)	Finland II (g/100g)	Sweden (g/100g)	Estonia (g/100g)	Norway I (g/100g)	Norway II (g/100g)	Norway III (g/100g)	Denmark (g/100g)
Total fat	6.8	± 0.7	6.1–7.5	6.8	6.8	8.4	6.1	7.4	7.5	7.5	6.1
Sugars	12.4	± 2.1	10.3–14.5	6.8	6.6	4	6.9	6.7	6.7	7.7	10.6
Protein	4.8	± 0.5	4.3–5.3	3.7	3.6	4.6	3.8	3.9	3.9	4.1	3.3
Salt	0.7	± 0.2	0.5–0.9	0.5	0.5	0.9	0.4	0.5	0.5	0.5	0.5

3.4.3 Nutrient label values/calculated values (%)

The recalculated nutrient values were also compared to the values presented on the nutrient labelling. The differences between these values are presented in percentages in Appendix 1.

Regarding the results of sample 1, the nutrient label values for sugars exceeded the calculated values the most often. Every calculator, except for the Danish calculator and one Finnish calculator (Finarkki), underestimated the amount of sugar in sample 1 in comparison to the nutrient label values. All three Norwegian calculators calculated lower sugar values than those declared on the nutrient label. One of the Norwegian calculators (Kostholdsplanleggeren) gave a value that was four times lower for sugar than was declared on the nutrient label. The Danish calculator gave the most overestimated calculated values in comparison to nutrient values regarding sample 1. The Swedish calculator was the only one to overestimate the nutrient label value for protein. This was probably due to the fact that the Swedish protein conversion factors are not routinely 6.25, but the Jones factors are used to convert nitrogen to protein (Jones, 1941). There were also differences between calculators from the same country, e.g. one Finnish calculator (Fineli Food Diary) gave systematically lower calculated values in comparison to the other (Finarkki) due to the fact that the Fineli Food Diary does not apply yield factors for added ingredients of recipes. One reason for the differences in calculated values was the fact that the overall sugar amount was low in the food product.

The calculated values for sample 2 for carbohydrates (but not for sugars) and for saturated fat (but not for total fat) were overestimated in comparison to the nutrient label values. The calculated values for sugars and total fat were nevertheless quite close to the nutrient label values in most cases. The Estonian calculator underestimated the salt content of sample 2.

There were no dramatic under- or overestimations of nutrient label values for sample 3 when compared to the calculated nutrient values. However, the calculated values for total fat and saturated fat were overestimated when calculated with the Estonian or the Danish calculators. Only the Danish calculator calculated all nutrient values higher than those declared on the label. The nutrient label of sample 3 had originally been calculated with the Swedish calculator, which was the reason for the perfect equivalence between the calculated and nutrient label values in this part of the exercise.

Regarding sample 4, all calculators overestimated the sugar and salt content in comparison to their declared nutrient values. However, the calculated value for carbohydrates was slightly underestimated in the calculations, especially when calculated with the Norwegian calculators. The Finnish calculators also gave higher values for carbohydrates.

3.5 Conclusions of the exercise

The preliminary results of step 1 of the exercise were disseminated at the *Nordic Food Composition Data for Labelling and Public Health* seminar in April 2019. The overall conclusion of the seminar was that food composition databases and analyses should not be taken for granted and more resources are needed to improve our databases and nutrient analyses. It was also discussed at the April seminar that this exercise was a pilot type of exercise with just a few samples and approximate results, and that there are logical explanations for every differing result.

Usually the situation is that the person doing the calculations is fully aware of the ingredients of the recipe and is able to choose the most suitable ingredients from the FCDB – but only if they belong to the FCDB's selection. In this exercise the person responsible for the calculations was not allowed to communicate with the person responsible for the recipe information of the sample to avoid compromising the exercise. The more detailed ingredient information in step 2 did not, however, affect the results as much as expected; some nutrient values changed for the better and some for the worse in comparison to the analysed results, despite the more detailed information. In addition, the sampling was not sufficient for producing statistically reliable results. It was also discussed how the monitoring of the nutrient declarations is poor and non-existent in almost every Nordic country (except for salt, which has become a topic for nutrient label monitoring).

From the exercise it could be concluded that there were differences between the calculated values and the nutrient label values, as well as between the analysed values and nutrient label values. The differences between calculators from the same country could be explained by the fact that the calculators have different purposes; e.g. one Finnish calculator (Finland I) is meant for research use and has a better selection of food items that are not available in the other calculator (Finland II). When comparing the analysed values to the nutrient label values, the analysed values tend to be lower in sample 1, higher in samples 2 and 5, and mixed in samples 3–4.

From a reformulation point of view, the tolerances declared in the guidance document of the European Commission (2012) are considered problematic for some nutrients. For instance, the tolerance regarding salt allows 20% variation when the salt content exceeds 1.25 g salt/100 g of food. If there is no more than 1.25 g salt/100 g, the tolerance is ±0.375 g. From a reformulation perspective, this is misleading, because bread with no more than 0.8 g salt/100 g, for example, is allowed to be labelled as having reduced salt content, since it has a tolerance range of 0.425–1.175 g according to the guidance document (2012). If there is salt content of over 1.1% in bread it is considered strongly salted, which must be indicated on the package labelling. According to the guidance document, bread with reduced salt content of 0.8% is actually allowed to contain 1.175 g of salt, which would make the bread strongly salted. However, when taking into account the measurement uncertainty (which is included in the tolerances already), seasonal variation of the ingredients and their nutrient composition and variation between different batches in the food industry, the tolerances are regarded as sufficient and acceptable.

Based on the results of this exercise it can be concluded that*:*

- The tolerances for nutrient labelling declared in the guidance document (2012) are to be re-evaluated, e.g. whether the uncertainty of measurement should be included in the tolerance or handled separately.

- To avoid misleading consumer information and to assure meaningful reformulation efforts, food analyses should be used to check the validity of nutrient labelling and to monitor reformulation efforts.

- Most of the Nordic FCDBs lack industrial ingredients like thickening agents and different food additives. More collaboration between the food industry and FCDB managers/compilers is needed in order to get nutrient information on these ingredients. The food industry could contribute more in terms of providing accurate, analysed nutrient information on foods and ingredients.

- FCDBs need to be improved and their gaps filled in order to enable e.g. SMEs to reliably calculate the nutrient declarations for their products. There are nutrient gaps present in the Nordic FCDBs, at least when it comes to sugars (mono- and disaccharides).

- More studies and analyses are needed to find out what happens to the nutrients, especially carbohydrates, during processing.

4. Comparing Available Food Information

4.1 Case Studies based on the Mintel GNPD

Today, food label information is available in commercial food label databases (e.g. the Mintel GNPD) and for free on retailers' websites (e.g. Foodie.fi in Finland). These databases might be useful for compilers in their database compilation and updating processes. To evaluate and compare the coverage and usefulness of these food label and food information databases in updating and evaluating national food composition databases, six case studies were carried out in the following topic areas: comparing a commercial food label database with free websites, examining the content of fortified food products found in a commercial food label database, investigating how a food product's salt content is informed in the product label and how the use of iodised salt, for example, and specific nutritional symbols are shown on product labels, and how well the commercial food label database has recorded them. In one case, gluten-free products were researched in order to find out whether the consumption of and demand for gluten-free products have increased in the past few years. In the last case, different vitamin and mineral supplements were searched for on the internet (manufacturers' and online pharmacies' websites) and from a commercial food label database to compare the availability of information from different sources. The commercial food label database was also tested if the unit sizes of the supplements could be calculated using the data that the database provides. These case studies were carried out and both databases (Foodie.fi and Mintel GNPD) were accessed between 2015 and 2016.

4.2 Spreadable margarines and other fat blends – Mintel GNPD vs. Foodie.fi

Foodie.fi is a website (http://www.foodie.fi) of one of Finland's largest retail markets, Prisma, which is part of the S Group (a Finnish network of companies operating in the retail and service sectors). It is possible to order home food products through Foodie.fi. For this purpose, Foodie.fi has listed all its food products, their pictures and their product information, including the nutrient content in most cases. Foodie.fi gives a good, up-to-date picture of what products are currently available in one of the largest retail shops in Finland.

According to the Mintel GNPD, a commercial food label database containing label information from pre-packaged products, since 2012, there were 40 different spreadable margarines and other fat blends at the time of searching that had been introduced in Finland. Finnish products found in the Mintel GNPD represented different manufacturers. The majority of these products were produced by the biggest manufacturers in Finland. Smaller manufacturers were also represented by one or two products.

When searching Foodie.fi for different margarines and other spreadable fat products, 88 different products (margarine tubs, wrapped margarine, liquid margarine, fat blends, butter tubs and wrapped butter) were found at the time. The variety of different fat products found on Foodie.fi was more than twice the size of the Mintel GNPD. The majority of the margarine and other spreadable fat products on Foodie.fi were manufactured by Unilever (total of 27 products), Valio (16 products) and Bunge (15 products). In comparison to search results from the Mintel GNPD, the variety of different products from these three manufacturers alone is much more comprehensive on Foodie.fi than in the Mintel GNPD. There were six products in the Mintel GNPD that were not found on Foodie.fi because Foodie.fi does not include products from companies like Lidl or brands from K group (Ruokakesko), the other Finnish network of companies operating in retail.

Still, when comparing search results from the Mintel GNPD and from Foodie.fi, 53% of the Mintel GNPD's 34 products could also be found on Foodie.fi. Out of the 88 products found on Foodie.fi, only 17 could also be found on the Mintel GNPD, i.e. fewer than 20% of the products found on Foodie.fi. It is possible that some of the products found in the Mintel GNPD had already been removed from the markets and that is why they couldn't be found on Foodie.fi. The Mintel GNPD does not keep track of which products in their database are still on the market. Foodie.fi updates its selection every now and then, removing products that are no longer available.

4.3 Fortified foods in Finland

4.3.1 National fortification policy in Finland

According to EC Regulation (2006), fortifying margarines and other spreads with vitamin A and vitamin D is voluntary in Finland. The National Nutrition Council (VRN) recommends fortifying milk products with vitamin D (2010). In milk products the amount of added vitamin A and vitamin D is 800 ug/100 g and 1 ug/100 g, respectively. Some milk products referred to as products with added values are designed to strengthen bones and muscles and contain more vitamin D than average milk. One of these added value milks contains vitamin D in the amount of 2 ug/100 g and 50% more protein than normal milk, and is rich in calcium (180 mg/ 100 g). Fortifying liquid soy products is also voluntary according to the Regulation of European Commission (2006). Like milk products, they are usually fortified with 1 ug/100 g of vitamin D in Finland. VRN (2015) also recommends fortifying salt with iodine (25 ug/g). There are no other fortifying policies in Finland. Fortified food products found in the Mintel GNPD searches also included imported products and were not all domestic products. Therefore, they could have had different amounts of added vitamins and minerals than mentioned above. The amounts of added vitamins and minerals may also vary because of the voluntary nature stated in the EC Regulation (2006). According to the regulation, fortification is only allowed within certain limits.

4.3.2 Fortified food groups

The aim of the case study regarding fortified food groups was to examine fortification levels in different food groups and how they were presented in the Mintel GNPD. All average values were calculated based on the nutrition information indicated on product labels (which were presented in the Mintel GNPD – for the most part). This case was written based on products that had been categorised as vitamin- and/or mineral-fortified in the Mintel GNPD. All the food groups included in this case study are listed in Appendices 2 and 3 together with their vitamin and mineral fortification levels (average values and range). A few examples of the food groups examined are presented more thoroughly below (white milk, spreadable margarine and other fats and plant-based drinks and fermented soy products).

White milk

In Finland, at the time of the research, there were 12 dairy products classified as white milk in the Mintel GNPD from 2012. According to the nutritional information collected in the Mintel GNPD, Finnish milk was fortified with vitamin D without exceptions. The amount of vitamin D added to milk is usually 1 ug/100 g. In powdered milk the vitamin D content is ten times higher. Milk naturally contains calcium and the amount is usually indicated on the product label. The amount of calcium in Finnish milk was 133 mg/100 g on average. Powdered milk had a higher calcium content, which was usually ten times higher than liquid milk. Milk also contains natural vitamin B2 (riboflavin) and vitamin B12 (cobalamin) and the amounts are indicated on the product labels. Milk also contains natural iodine. Powdered milk can also be fortified with chloride, copper, iron, magnesium, potassium, zinc, phosphorous and vitamin A.

There were also milk products referred to as products with added value, which are designed to strengthen bones and muscles. One of these milks found in the Mintel GNPD contains 50% more protein than normal milk and is rich in calcium and contains twice as much vitamin D than average milk. These added-value milks can also contain folic acid and potassium in addition to calcium, vitamin D, iodine, vitamin B2 and vitamin B12.

White milk is without exception (including organic milk) fortified with vitamin D in Finland. Milk naturally contains calcium, iodine, vitamin B2 and vitamin B12 and the amounts are indicated on the product labels since milk is considered a good source of these nutrients. Powdered milk has higher amounts of these previously-mentioned nutrients because it is in concentrated form. Powdered milk can be fortified with several minerals, unlike liquid milk.

Spreadable margarine and other fats

At the time of searching there were six spreadable margarines and other fat spreads introduced to the market after 2012 in Finland according to the Mintel GNPD. All the spreadable fat products found were fortified with vitamins D and A. Some of them were also enriched with iodine. The typical amount of vitamin A fortification is 400 ug/100 g on average, but two products designed especially for lowering blood cholesterol had twice as much vitamin A. Both of these products are functional foods designed to lower blood cholesterol levels with the help of plant sterols. They also both contain vitamin E.

Based on the search results, the vitamin D levels in spreadable fat products were usually no more than 20 ug/100 g. There were two products in the Mintel GNPD that contained less vitamin D than they should have; according to the products' manufacturers the amount should have been twice as high. Either the recipes for these two products had changed just recently or the reformulation had gone unnoticed by the Mintel GNPD. Both products were introduced in 2015. New fat spreads with milk salt (less sodium chloride) were the only ones fortified with iodine.

Spreadable margarines were fortified with vitamins D and A in Finland, without exceptions, according to the search results. The amount of fortification can be quite different when the product is designed to lower blood cholesterol levels, for example. As milk products, margarines are natural sources of calcium and iodine, but in some cases they can also be enriched with these minerals. Only six spreadable margarines with fortification were found in the Mintel GNPD. More margarine products could be found elsewhere on the internet, as the case in section 5.1 proved. The way in which the Mintel GNPD presents nutrients is clear, however, and being able to export them to Excel spreadsheet form is exceptionally convenient.

Plant-based drinks and fermented soy products

At the time of searching, according to Mintel GNPD most plant-based drinks were enriched with calcium and fortified with vitamin D, vitamin B2 and vitamin B12. In Finland there were 15 plant-based drinks in the Mintel GNPD and they all contained calcium regardless of the nut or seed used, except for one product that contained almost twice the amount of calcium. All plant-based drinks were also fortified with vitamin D except for two organic drinks.

The second most commonly used vitamin fortification in plant-based drinks was vitamin B12. Some (4 out of 15) were also fortified with vitamin B2, vitamin E (5 out of 15), and one product was also fortified with folic acid. Some of the products may naturally contain vitamin E depending on the nut or the seed used (almond, hazelnut).

At the time of searching, a total of 12 fermented soy products – soy yoghurts – were available on the market from 2012 onwards in Finland, according to the Mintel GNPD. The majority of them were manufactured by Alpro (9 out of 12 products). Raisio, Kavli and Lidl had only one product each. The amount of calcium used as fortification in soy yoghurts was similar to the plant-based drinks. Soy yoghurts were also fortified with vitamin D and vitamin B12. There were two products in the Mintel GNPD that contained less calcium than they should have according to the manufacturer. Either the recipes of these two products had recently changed, or the reformulation had gone unnoticed by the Mintel GNPD. One product was introduced in 2012 and the other in 2017.

In Finland, most plant-based drinks are fortified with several vitamins, including vitamin B2, folic acid, vitamin B12 and vitamin D. The reason for this is that users of plant-based drinks are usually vegetarian and their intake of these vitamins can be insufficient if they do not use milk products in their diet. Some plant-based drinks naturally contain vitamin E if they are made of almonds or hazelnuts, for example. Plant-based drinks can also be enriched with calcium.

4.4 Salt in Finnish food products

The aim of this case was to find out how many low-salt and heavily salted food products have been introduced in Finland according to the Mintel GNPD and how these claims have been taken into account in terms of food packaging. A search for food products containing salt as an ingredient was conducted in the Mintel GNPD. The search terms, including time periods used in the searches and the numbers of products containing salt are presented in Appendix 4.

The number of foods that contain salt as an ingredient seems to have decreased between January 2001 and March 2017, with 2,300 food products. The time periods are not the same length, which must be taken into account when comparing results. The percentage of food products containing salt of all food products increased by 8.2% from January 2001 to March 2017. Although food products containing salt have become less common according to the Mintel GNPD, the percentage of foods containing salt out of all foods has still increased. The salt listed as an ingredient in the food products was presumably not iodised.

4.4.1 Labelling salt content in food products

Labelling salt content has been mandatory in specific food groups that are traditionally regarded as strongly salted (Sarlio-Lähteenkorva, 2015). These food groups include bread and bread products (including crispbread), cheese, sausages and other meat products (cold cuts), fish products, prepared or semi-prepared foods, and cereals. The limits have been gradually tightened over the years, but after December 2014 labelling the nutrition content of all foods has become mandatory. The transition period ended on 13 December 2016. According to the Regulation of the European Parliament and of the Council (1084/2004), the following food products must be labelled as strongly or heavily salted if the salt content exceeds certain limits (presented in Appendix 5). There are also regulated salt limits for specific food groups that allow the use of the claim 'reduced salt content'.

Food products that have reduced sodium or low salt content can be searched for with a specific claim in the the Mintel GNPD. The number of Finnish food products in the Mintel GNPD that have a claim on their packaging referring to reduced sodium or low salt content (claim search) are presented in Appendix 4. The number of food products that have a claim referring to reduced sodium or low salt content on their packaging decreased between the first (January 2001–December 2007) and the last time period (January 2015–March 2017) by 52%.

There is no claim that exists in the Mintel GNPD for food products that are strongly or heavily salted. It is possible to search for strongly salted food products using the nutrition search by adjusting the search conditions according to a food product's salt content (greater/less than or equal to). Strongly salted food products can also be found using the free text search by using the search terms 'strongly salted' OR 'heavily salted'.

Bread and bread products

If the salt content in bread is no more than 0.8 g/100 g it is allowed to be labelled as having reduced salt content. In the Mintel GNPD, breads with reduced salt content can be found using a nutrition search (salt listed as a nutrient content being no more than 0.8 g/100 g) or with the claim low/no/reduced sodium. Combining nutrition and claim searches produces inconsistent results, which are presented in Table 8.

Table 8. The number of lower-salt breads with the claim low/no/reduced sodium according to the Mintel GNPD.

Time period	The number of breads that contain salt ≤0.8 g/100 g	The number of all breads with the claim low/no/ reduced sodium	The number of breads that contain ≤0.8 g/100 g salt and have the claim low/no/reduced sodium
1) 1/2001–12/2007	1	18	0
2) 1/2008–12/2011	4	9	0
3) 1/2012–12/2014	3	6	0
4) 1/2015–3/2017	6	5	5

The results are inconsistent because there are salt content limits that justify the use of the claim low/no/reduced sodium (Appendix 5). The claim is not allowed on the packaging if the salt content is higher than 0.8 g/100 g (in bread and bread products, yet there are more search results with the claim low/no/reduced sodium than there are where the maximum salt content is 0.8 g/100 g. Using the claim of reduced salt content is, however, voluntary in Finland.

Apparently, combining the nutrition search with the claim search produces the fewest results in the Mintel GNPD. Breads and bread products with claims of low/no/reduced sodium that have no more than 0.8 g/100 g salt listed as a nutrient seem to have been launched only between January 2015 and March 2017, or more precisely in 2016, according to the Mintel GNPD. It appears that breads containing no more than 0.8 g/100 g of salt and that bear the claim low/no/reduced sodium have become more common since December 2014 and the new regulation (828/2014) about labelling salt contents in foods – at least according to the Mintel GNPD's minor search results on bread and bread products.

Meat products

The number of meat (including poultry) products that have no more than 1.7 g/100 g of salt listed as a nutrient and have the claim of low/no/reduced sodium content is presented in Table 9.

Table 9. The number of meat products containing less salt with the claim low/no/ reduced sodium according to the Mintel GNPD.

Time period	The number of meat products that have ≤1.7g/ 100 g salt	The number of all meat products with the claim low/no/reduced sodium	The number of meat products that contain ≤1.7 g/100 g salt and have the claim low/no/ reduced sodium
1) 1/2001–12/2007	11	18	0
2) 1/2008–12/2011	13	9	0
3) 1/2012–12/2014	87	8	4
4) 1/2015–3/2017	129	1	1

Meat products that have no more than 1.7 g/100 g salt listed as a nutrient are allowed to carry the claim of reduced salt content. The number of meat products that have no more than 1.7 g/100 g salt has increased during the past decade. At the same time, using the claim low/no/reduced sodium has decreased, at least according to the Mintel GNPD. There may still be a mention about reduced salt content on the packaging but this has not been taken into account in the Mintel GNPD product description. Combining the nutrition search with the claim search produces the fewest results.

The number of meat products that have more than 2.2 g/100 g of salt listed as a nutrient (considered strongly salted) is presented in Table 10.

Table 10. The number of strongly salted meat products and their share of all meat products according to the Mintel GNPD.

Time period	The number of meat products that have >2.2g/ 100 g salt	The number of all meat products	The percentage of strongly salted meat products out of all meat prod-ucts (%)
1) 1/2001–12/2007	1	592	0.2
2) 1/2008–12/2011	0	377	0
3) 1/2012–12/2014	15	271	5.5
4) 1/2015–3/2017	26	218	12

The percentage of strongly salted meat products out of all meat products has increased between January 2012 and March 2017 from 5.5% to 12%. According to the Mintel GNPD, not a single meat product with both salt listed as a nutrient over 2.2 g/ 100 g and a mention about the product being 'strongly salted' or 'heavily salted' has been introduced. After 2016, if a meat product contains more than 2.2 g /100 g salt, it must be mentioned in the product packaging that the product is strongly salted. According to the Mintel GNPD, there were six meat products launched in 2017 that are actually strongly salted, but there is no mention about it in the Mintel GNPD product description. This was detected by looking closely at the pictures of the products that came up when searching for meat products with a salt content of over 2.2 g/100 g. Based on this, the Mintel GNPD failed to notice and report important claims on the product's labelling.

Ready-to-eat meals

Ready-to-eat meals are considered strongly salted if the salt content exceeds 1.2 g/ 100 g, and if the salt content is no more than 0.9 g/100 g the product can be said to have a reduced salt content. According to the Mintel GNPD, fewer strongly salted ready-to-eat meals have been introduced than those with reduced salt content. The number of products that list their salt content being over 1.2 g/100 g, no more than 0.9 g/100 g or have the claim on low/no/reduced sodium content is presented in Table 11.

Table 11. The numbers of less-salt-containing and strongly salted ready-to-eat meals and ready-to-eat meals with the claim low/no/reduced salt according to the Mintel GNPD.

Time period	The number of ready-to-eat meals with >1.2 g/ 100 g salt	The number of ready-to-eat meals with ≤0.9 g/ 100 g salt	The number of ready-to-eat meals with the claim low/no/reduced sodium
1) 1/2001–12/2007	6	6	1
2) 1/2008–12/2011	6	17	4
3) 1/2012–12/2014	11	39	1
4) 1/2015–3/2017	27	55	7

The fewest results are produced when only using the claim low/no/reduced sodium. Combining the claim search with the nutrition search (no more than 0.9 g/100 g salt) produces fewer results than just the nutrition search. It is possible that the claim of low/reduced salt content is missing in the Mintel GNPD or that the product manufacturer did not put it on the product label because it is voluntary. There were four ready-to-eat meals launched after 2016 and all four products were labelled as being strongly salted (in Finnish) when looking closely at the product picture, but only one had the claim mentioned in the Mintel GNPD product's description.

4.4.2 The use of iodised salt in Finnish food products

Iodine is an essential nutrient that is needed for the production of thyroid hormones and normal growth and development. Iodine deficiency causes goitre (enlargement of the thyroid), hypothyroidism and mental retardation in children whose mothers have suffered from iodine deficiency during pregnancy. At the beginning of the 1900s goitre was still a common sight in Finland. The World Health Organization (WHO) recommends that a population's iodine levels should be monitored by measuring the iodine concentration in urine.

In Finland the iodine status of the population has been monitored as part of the national FinHealth Study, which is conducted by the National Institute for Health and Welfare (THL) every five years. The FinDiet Study (part of the FinHealth Study and the former FinRisk Studies) has monitored the dietary habits and nutrient intake of the adult Finnish population since 1982. Based on the results of the FinDiet 2012 study, the iodine intake in the Finnish population was too low and therefore the National Nutrition Council (VRN) recommended in 2015 that iodine intake should be improved by switching from regular salt (sodium chloride) to iodised salt. The recommendation of using iodised salt includes:

- the salt used must contain 25 ug/g iodine
- all mass catering restaurants should only use iodised salt
- private households should use iodised salt
- the food industry should gradually switch to using iodised salt in all their products

The use of iodised salt must also be labelled on the food package. The largest food manufacturers in Finland have publicly stated that they have changed their recipes and are now using iodised salt. These manufacturers include Fazer Bakeries and Fazer Food Services, Vaasan Oy, Saarioinen Oy, HKScan Finland Oy and Atria Suomi Oy. However, some manufacturers have stated that although they are using iodised salt, the labelling of the packaging may state otherwise. The justification is that renewing the packaging material is expensive and takes time.

In the Mintel GNPD, all products that contain iodised salt as an ingredient can be found with a customised search. The numbers of product variants published in Finland during the past five years are presented in Table 12. Product variants also include otherwise identical products that might have a different flavour (e.g. manufacturers' product ranges).

Table 12. The number of food products (and their variants) with iodised salt as an ingredient according to the Mintel GNPD.

Year	Number of product variants introduced
2012	3
2013	3
2014	12
2015	2
2016	54
Total	**74**

According to the Mintel GNPD, products that contain iodised salt were introduced the most in 2016 in Finland, which is probably due to the recommendation made in 2015 by the National Nutrition Council. Between 2012 and 2015 only few products were launched, excluding a momentary increase in 2014. Products that contain iodised salt in the Mintel GNPD are categorised in different subcategories. The biggest subcategories containing iodised salt are:

- ready-to-eat meals & meal centres
- processed fish, meat and egg products
- bakery
- sauces and seasonings
- snacks
- side dishes
- breakfast cereals

The subcategories are presented in descending order according to the number of published products between 2012 and 2016. Iodised salt was most often used as an ingredient in the ready-to-eat meals subcategory. Processed fish, meat and egg products as well as bakery products were the second largest subcategories where iodised salt was used as an ingredient. The previously mentioned food manufacturers that have switched from regular to iodised salt are the companies that produce the most ready-to-eat meals as well as processed fish, meat and egg products and bakery products (Saarioinen Oy, HK Scan Finland Oy, Vaasan Oy, Fazer Bakeries) in Finland, according to the Mintel GNPD's search results.

In the Mintel GNPD, the product's salt content is presented as g/100 g or g/serving. When multiplying the amount of salt (g/100 g) with the amount of iodine recommended by the National Nutrition Council (25 ug of iodine per 1 g of salt), the range of salt and iodine content in products in the three largest subcategories varies greatly (Table 13).

Table 13. The food product categories containing the most salt with their salt content range as well as their possible iodine contents, calculated according to the recommendation of the National Nutrition Council (25 ug iodine per 1 g salt).

Sub-categories	Salt content (g/100 g)	Iodine content (ug/100 g)
Ready-to-eat meals	0.43–4.4	10.8–110
Processed fish, meat and egg products	0.5–6.5	12.5–162.5
Bakery products	0.7–1.7	17.5–42.5

The recommended daily intake of iodine for people aged over ten is 150 ug, for pregnant women 175 ug and for breastfeeding women 200 ug, according to the National Nutrition Council (2015). The total daily intake should not exceed 600 ug. Meals and meal centres (ready meals) as well as processed meat products and bakery products are the subcategories that contain the most salt in Finland according to the Mintel GNPD. The higher the salt content, the higher the iodine content – given that iodised salt is used. At the most, the iodine content was said to be 162.5 ug/100 g (processed fish, meat and egg products subcategory). At its lowest, the iodine content was estimated to be 10.8 ug/100 g (ready-to-eat-meals subcategory).

4.4.3 The Heart Symbol of the Finnish Heart Association

The Heart Symbol is the only Finnish symbol regarded as a nutritional claim (The Heart Symbol, 2017). The symbol guides consumers to pick products within the same food product category with better nutritional values. The Heart Symbol was developed by Finnish Heart Association together with Finnish Diabetes Association in 2000. Products labelled with the Heart Symbol are considered better choices regarding fat (quantity and quality) and sodium. The criteria are based on the Finnish nutrition recommendations. In order to carry the Heart Symbol, food companies must apply for the right to use it and pay an annual fee. The total number of different Heart Symbol products is over 1,200, but this also includes fresh unpackaged fruits, vegetables and berries. The aim of this case was to find as many Heart Symbol-bearing Finnish food products as possible in the Mintel GNPD and clarify the ways in which the symbol is noted and mentioned in the products found in the database.

The Mintel GNPD does not have a customised claim for the Heart Symbol, which is problematic when trying to search for all the products bearing the symbol. Food products labelled with the Heart Symbol can be found in the Mintel database only by using free text search. The possible presence of the symbol is mentioned in the product description. Another problem when searching for Heart Symbol products in the Mintel GNPD is the use of several different synonyms for the Heart Symbol. The official English term for the symbol is the Heart Symbol (in Finnish Sydänmerkki).

Food products featuring the Heart Symbol can be found by using free text search in the Mintel GNPD. Several different search terms and Boolean operators (AND and OR) had to be used because of the various synonyms used for the symbol. The number of food products found (in Finland) with different search terms is presented in Table 14 (on any date).

Table 14. All the different search terms used for searching for food products with the Heart Symbol in the Mintel GNPD with search results.

Free text search	Results
'parempi' AND 'valinta'	20
'better choice'	147
'better' AND 'choice'	156
'heart' AND 'symbol'	11
'heart' AND 'logo'	78
'better choice' OR 'parempi valinta' OR 'heart symbol' OR 'heart logo'	188

A combination of the search terms ('better choice' OR 'parempi valinta' OR 'heart symbol' OR 'heart logo') produced the best search result. If the symbol is mentioned in the product description in Finnish and in English, the product is only count once in the results. A combination of these different search terms produced 188 different food products and 87% of them were introduced between January 2012 and March 2017. The food products found with the search terms 'better' AND 'choice' (156 products) already included the food products found with the term 'better choice' (147 products). This was discovered by comparing the food products' record IDs. Every food product in the Mintel GNPD has its own ID number.

The most commonly used name for the Heart Symbol in the Mintel GNPD is the Better Choice Logo. The Heart Symbol itself is actually surrounded with a short text that says *parempi valinta* (available also in Swedish), directly translated as 'better choice', but the official equivalent for the symbol is the Heart Symbol. When searching with the Finnish search term 'parempi' AND 'valinta' the search produced the second-lowest number of results (20 products). A search with the terms 'heart' AND 'logo' produced the most unique food products (29 products), which could not be found with any other search terms in the database.

At the time of searching, the Heart Symbol had been awarded to over 800 Finnish pre-packaged food products (The Heart Symbol, 2017). In the Mintel GNPD there is a total of 214 different food products where the Heart Symbol is mentioned in the product description in some way. The 214 food products were summed up by comparing the record ID numbers of the products that were found with different search terms. It is still possible that there are food products in the database bearing the Heart Symbol, but it does not show in the product descriptions. There might also be more synonyms for the symbol than those mentioned before. It is also likely that some of the food products bearing the symbol are no longer on the market. The 214 food products found in the database do not necessarily represent the products that are currently entitled to carry the symbol. It is however clear that all the Finnish food products that have been awarded the Heart Symbol (over 800 pre-packaged food products) cannot be found in the Mintel GNPD, even by combining different search terms.

4.5 Gluten-free foods in the Nordic countries

The aim of this case was to investigate how many gluten-free products have been introduced to the market according to the Mintel's GNPD in the Nordic countries between 2012 and 2016 and what kind of food products they are. The aim was also to identify as many gluten-free food products as possible and find out the best search terms for finding them. Gluten-free food products introduced between 2012 and 2016 in Finland and in other Nordic countries (Norway, Sweden and Denmark) were searched for in the Mintel GNPD using the search terms presented in Table 15. Unfortunately, there was no information available on gluten-free food products on the Estonian or Icelandic food markets.

Table 15. The number of food products with a gluten-free claim per country according to the Mintel GNPD.

Date published	Claim	Country	Number of different food products
1/2012–12/2016	gluten-free	Finland	1,341
		Norway	797
		Sweden	627
		Denmark	551

During the selected time period, gluten-free food products were clearly launched more in Finland (1,341 products) than in other Nordic countries. In Norway and Sweden, a similar number of gluten-free food products were launched. The fewest gluten-free food products were launched in Denmark.

A gluten-free diet has recently become a trend among health conscious consumers (Kaaria, 2013). Some people who do not have coeliac disease favour gluten-free foods in order to reduce abdominal bloating, flatulence and stomach upset without any clinical diagnosis or proof of its efficacy or profitability. If a person with coeliac disease becomes predisposed to gluten, an inflammatory reaction will happen in the small-bowel which will damage the villi lining, negatively affecting the absorption of nutrients (Finnish Coeliac Society, 2017). The only treatment for coeliac disease is a life-long gluten-free diet. Based on the search results of the Mintel GNPD, it seems that food manufacturers have started to add gluten-free claims on the packaging of naturally gluten-free food products just to be on the safe side, and presumably to increase sales. It is possible that some of the food products introduced in Finland and other Nordic countries with the claim of being gluten-free would have been gluten-free anyway. According to Commission Implementing Regulation (828/2014), declaring a naturally gluten-free food product as gluten-free and giving the impression that such a food product would possess special characteristics is not allowed when all similar foods do so.

The food products published in the Mintel GNPD in 2012–2016 with the claim of being gluten-free were analysed based on which subcategory they belong. According to the Mintel GNPD, the claim 'gluten-free' was used the most in the meat products subcategory in every Nordic country (in Norway 9.7% and in Sweden 20.1%). Every Nordic country had the following subcategories in their top ten of the most gluten-free food products containing subcategories:

- snack/cereal/energy bar
- baking ingredients and mixes
- sweet biscuits and cookies

The following subcategories that rank in the top 20 of the subcategories containing the most gluten-free food products in every Nordic country are:

- savoury biscuits/crackers
- breakfast cereals
- plant-based drinks (dairy alternatives)
- pasta
- fruit snacks
- bread and bread products
- fish products

Prepared meals ranked in the top 10 of the subcategories containing the most gluten-free food products only in Finland (3.1%) and Sweden (3.0%). In Norway and in Denmark, the prepared meals subcategory did not even rank in the top twenty of the subcategories containing the most gluten-free food products.

In every country there were subcategories that did not contain any food products with gluten-free claims between 2012 and 2015, but in 2016 some gluten-free food products had appeared in those subcategories. For example, subcategories like eggs and egg products, oils, butter, syrups, hard and semi-hard cheese, vegetables, fruits, spoonable yoghurt, nuts and water-based ice lollies, pops and sorbets had gluten-free food products added to them in 2016, although in 2012–2015 there were none.

Rice is naturally gluten-free but the use of the claim 'gluten-free' has increased in 2016 in comparison to previous years. The use of the claim 'gluten-free' for rice among the Nordic countries is presented in Table 16.

Table 16. The use (%) of the claim gluten-free in all rice products in the past five years.

Sub-category	Country	2012	2013	2014	2015	2016
Rice	Finland	0.58	0.78	0.28	1.06	1.46
	Sweden	2.86	1.32	1.76	0.00	0.48
	Norway	0.00	1.80	1.05	0.88	0.85
	Denmark	10.5	0.00	0.00	0.00	2.84

In Finland the claim 'gluten-free' was used in rice products the most in 2016, whereas in Sweden and Denmark the use of the claim was more frequent in 2012. On the other hand, the claim was used in rice quite often in Denmark in 2012 (10.5%) but not at all in 2013–2015, but for some reason the use of the claim came back into use in 2016 (2.84%).

When searching gluten-free food products launched in Finland in 2012–2016 according to the Mintel GNPD, the best search result was achieved by using the free text search and 'gluten' as the search term (in the product description with word variants). All the food products that have product descriptions containing the word 'gluten' (gluten-free, gluten free, free from gluten) will be included in the search results and gluten as an ingredient will not. The second best search result is achieved by using the claim 'gluten-free'. When free text search is combined with the claim 'gluten-free', the search produces the fewest results. The search results are presented in Table 17.

Table 17. Combining claim search with free text search to find as many gluten-free products as possible in the Mintel GNPD, presented with search results.

Free text search	Category	Date published	Claim	Number of different food products
'gluten'	Food	1/2012–12/2016	-	1,369
	Food	1/2012–12/2016	gluten-free	1,341
'gluten'	Food	1/2012–12/2016	gluten-free	1,334

It is possible that food products found only by using the free text search are not actually gluten-free although they have the word 'gluten' in their product description. Still, it is more likely that the claim 'gluten-free' is just missing in them because of a human error. The most reliable search results are probably those made with the claim 'gluten-free'.

4.6 Supplements – size and selection

Size

Average sizes of servings and units (e.g. tablets, capsules, softgels, lozenges) of different vitamin and mineral supplements were calculated with the help of supplements found in the Mintel GNPD. When a product is added to the Mintel GNPD, all information on the product label is put into the database, including package size and amount of servings which, in this case, were used when investigating supplement sizes. The Mintel GNPD was searched for vitamins and dietary supplements published between January 2012 and May 2017. The search produced around 400 results (different products) and they were categorised by hand according to the type of the preparations, which were:

- vitamin-only supplements
- mineral-only supplements
- vitamin & mineral supplements
- probiotic supplements (lactic acid bacteria)
- fibre supplements
- herbal supplement
- fat supplements (special fatty-acids, omega-3, etc.)

These categories mimic the food use classes used in the Finnish food composition database. There were also a few supplements that would not fit into any of the categories mentioned above, such as amino acid preparations, diet preparations, enzyme preparations and sports nutrition preparations. Only botanical or probiotic preparations can be sorted out from the vitamin and dietary supplements category in the Mintel GNPD. Products found were also categorised according to the unit which were:

- tablet
- effervescent tablet
- tablet (chewable)
- capsule
- lozenge
- softgel

There were also liquid and powdery products in which the serving unit was presented as a gram or a milligram on the product label. First the search results, i.e. supplements, were grouped by hand according to the unit and then according to the type of preparation. In this way it could be defined what kinds of units are being used in each preparation category – e.g. vitamin-only supplements can exist in tablets as well as capsules. The filling materials are different in these units, which affects the weight of the unit. The average weight in grams (or if liquid in millilitres) ranges for each serving unit are presented in Appendix 6.

In the Mintel GNPD search, fat supplements appeared as capsules, chewable softgels and liquid products (ml). Herbal supplements appeared mostly as powdery substances and the serving was announced as grams, but herbal products were also found as capsules, lozenges, tablets and in liquid form (ml). Probiotic supplements were found mostly in the form of a chewable tablet but also in capsules, tablets and powdery or liquid form. Mineral supplements appeared as effervescent tablets, capsules, tablets (also chewable) and lozenges in addition to few powdery and liquid products. Not a single herbal, mineral or probiotic supplement was found where the serving would have been in the form of a chewable softgel. Supplements containing both vitamins and minerals were found in all serving forms, except for chewable softgel. Similar results were also found when searching for only vitamin containing supplements – no chewable softgels. Amino acid and diet preparations appeared only as capsules and in powdery form (g). Enzyme supplements were found only in capsules and in liquid form. Fibre supplement servings were all announced in grams. Sports nutrition products were in the form of tablets.

Selection – The Mintel GNPD vs. internet

Until the end of July 2017 approximately 130 different supplements, which were not in the national food composition database, were used by examinees who participated in the FinDiet study, which is part of the national FinHealth 2017 study in Finland. These 130 supplements were missing from the national food composition database (Fineli), which is based mostly on product averages and less on branded products. Because of the FinDiet 2017 study, the national food composition database had to be updated, which meant that missing supplements also had to be compiled into the database as well as the most important new products or dishes.

Supplements are usually compiled using product label information on the product manufacturers' or pharmacies' websites and other online stores. In some cases the product was found on the internet but the crucial concentration information was missing and it could not be derived from the product's picture. Usually the product pictures are taken only from one side of the package (the front).

The Mintel GNPD was searched for all the missing 130 supplements and only 14% of them were found in the GNPD. If the product was found in the GNPD, the product description was usually very helpful in the compiling work because of the high quality pictures of the products. Sometimes in the Mintel GNPD's product description, concentrations of certain vitamins were reported incorrectly as milligrams when they should have been reported as micrograms. Thanks to the high quality pictures, possible mistakes were easy to note and double-check from the product label.

The 14% of all the missing products found in the Mintel GNPD were eventually found from other websites as well – in other words there were no products that could not be found from anywhere else than the Mintel GNPD, regarding the 130 supplements that were used by the examinees in the FinDiet 2017 study. Websites that proved to be the most useful in the supplement compiling work were online pharmacies and online health food shops.

Regarding the updating work of the national food composition database Fineli, the Mintel GNPD was made good use of in 2016 when approximately 100 new supplements were compiled into Fineli based on our Mintel GNPD findings. The 100 new supplements were missing in Fineli. These 100 products were also found later from other Finnish websites. The comparison between the two different databases showed that the Mintel GNPD had more recently launched products and it is updated more rapidly than Fineli. On the other hand the supplement data in Fineli is not meant to be available for consumers (unlike the foods and dishes) and it is only used when a food consumption study is being carried out. The supplement data is not open data for consumers but neither is any data in the Mintel GNPD. The user fee for the Mintel GNPD is quite costly – so as long as the supplement data can also be found elsewhere on the internet, paying for the Mintel GNPD is not very profitable when it comes to the compiling work of the national food composition database.

4.7 The Mintel GNPD from a user's point of view – pros and cons

Food products that have low or reduced salt content can be searched for in the Mintel GNPD by using a specific claim. The Mintel GNPD offers a different variety of claims that are used by data compilers when putting in the data written on the labels of food products. If the product label mentions having lower salt content, the compiler adds the claim in the product description. In a way, finding food products with reduced salt content has been made relatively easy. The Mintel GNPD has also a feature which allows for searching products containing salt, e.g. less than 1 g/100 g. Food products that are considered strongly salted and have salt content that exceeds certain limits can be found with this feature. Unfortunately there were more than a few strongly salted products that mentioned being strongly salted on their label, but for some reason the Mintel GNPD failed to mention it in the product description. There is of course a language barrier which may be the cause of this failure, because most Finnish food product labels are written only in Finnish or Swedish.

In the Mintel GNPD, products can be searched for according to what ingredients they contain. In Finland, using iodised salt is recommended by National Nutrition Council in order to improve iodine intake in the Finnish population. Food products containing iodised salt can be found in the Mintel GNPD by using a customised ingredient search, which searches for all products that have iodised salt listed as an ingredient on their label. Currently all the biggest food manufacturers in Finland have announced that they use iodised salt, but the products' labels could still lack the ingredient 'iodised salt' because renewing packaging can be expensive. One reason for finding so few products with iodised salt in the Mintel GNPD could be that the product labels are out of date.

The Mintel GNPD uses individual record ID numbers for each food product, which makes it easier to compare search results made with different search words or terms, for example. When trying to find as many food products bearing the Heart Symbol as possible, a lot of synonyms were found for the symbol. By comparing record ID numbers, we were able to find out how many individual food products bearing the symbol could be found regardless of which synonym had been used in the Mintel GNPD product description. Unfortunately there were also Finnish food products in the Mintel GNPD that had the symbol on them, although it had gone unnoticed by the compiler and the product description did not mention the symbol. It is possible that the Mintel GNPD can contain a lot more Finnish food products bearing the symbol but finding all of them is impossible. There are over 800 pre-packaged food products in Finland that are entitled to carry the Heart Symbol, but only 214 products could be found in the Mintel GNPD.

Like products with low or reduced salt content, gluten-free products can also be searched for in the Mintel GNPD by using a specific claim for gluten-free products. A claim search produces the most reliable search results when compared with ingredients-based searches or free text searches, according to Mintel representatives. The Mintel GNPD is compiled by hand, which leaves room for human error. There were a few gluten-free products that had been described as gluten-free on the product label but that could not be found through a claim search. However, the product description might state that the product in question was gluten-free, which could be found when using the free text search.

The Mintel GNPD has its own category for health and hygiene products and a subcategory for vitamins and supplements. The problem is that there are no further subcategories that could be used to separate vitamin-only supplements from e.g. botanical or herbal supplements. In the Finnish food composition database, several 'subcategories' i.e. ingredient classes, are used when compiling and categorising supplements. One way to separate herbal supplements (with no vitamin value) from the vitamin-only supplements is to use the claim search for botanical and herbal supplements and then subtract the number of herbal supplements from all supplements. In addition, probiotic supplements with e.g. lactic acid bacteria can be searched for in the Mintel GNPD by using a specific claim. In Finland we are mostly interested in supplements containing just vitamins and/or minerals, fatty acids, fibre supplements, probiotic supplements and some herbal supplements with vitamin or mineral value. In the Mintel GNPD, supplements for sports nutrition, weight loss or superfood supplements are mixed in the subcategory called vitamins & supplements. It is possible to do a customised ingredient or nutrient search for only supplements containing vitamin D, for example, but it takes more time and effort than having more subcategories. There were also some supplements with faulty vitamin concentrations – e.g. vitamin D concentration was in milligrams when the label on the product had micrograms. This is probably because the Mintel GNPD is compiled by hand and human errors occur.

The coverage of the Mintel GNPD regarding Finnish food markets was found to be mediocre and insufficient. According to the philosophy of the Mintel GNPD, only one or two new food products are collected to represent an entire food group. The Mintel GNPD is not even trying to collect information on every single food product because it is very time consuming and difficult to execute. The turnover of the food market is rapid and new products come and go every day, such as seasonal products and flavours – not to mention constant packaging renewals and changes to recipes or product ranges. The Mintel GNPD does not follow up when a product is taken off the market, which means that there are products in the database that are no longer available. This information is important and necessary when examining food trends in recent years and looking back at some manufacturer's product ranges or old recipes, for example.

4.8 GS1 data in the Nordic countries

4.8.1 GS1 data availability in the Nordic countries

Another commercial food label database available in the Nordic countries is the barcode-based GS1 database, introduced in 1974. GS1 is a global, neutral, non-profit standards organisation that aims to bring efficiency and transparency to the supply chain. The basis of GS1 standards are that they as based on consensus, they are proven, open, and the aim is to collaborate with a range of organisations from global companies to local SMEs.[3] According to GS1, the tools are designed to help organisations exchange critical data, creating a common language that underpins systems and processes.

The food-related GS1 data (e.g. information on the food package information and nutrient declaration) is available in some countries for members and in some countries only through contract procedures with each separate data provider (e.g. in case of GS1 data in Denmark). In Finland, Sweden and Norway, it is possible for member organisations to purchase GS1 data. In Iceland and Estonia, GS1 databases are not yet available.

4.8.2 Nutrient label values compared with national FCDB values

Selected nutrient label information from GS1 databases in countries, where a GS1 database was available, were compared during this project with the national FCDB values in nine food groups concerning about 50 foods. The Finnish GS1 database was also used to compare some Swedish foods´ nutrient labelling. The results confirmed the finding that the reliability of nutrient contents vary. The most consistent data was seen in milk products, i.e. milks, yoghurts and cheeses. The differences found were not concentrated on only certain nutrients, but varied from food to food. These kinds of comparisons are challenging, because not all food codes in the FCDBs are product-specific or brand name-based, but largely more general in nature. Further analyses are warranted.

3. https://www.gs1.org/

5. Seminars

5.1 Preparations and participants

The seminar *How to Foster Innovative Use of Food Information* was held on 19 October 2016 at the Finnish Food Authority premises and served as a preparatory project for the NordCoLa project, which began in January 2018 with a virtual kick off meeting. The seminar on *Nordic Food Composition Data for Labelling and Public Health* was held in Helsinki, Finland at the premises of THL on 17 April 2019.

Both seminars had over 50 participants from several organisations, which are presented in Appendix 9. The seminar *Nordic Food Composition Data for Labelling and Public Health* was also streamed online. Around 50 viewers participated via the online streaming, of which the majority were from Finland together with a few participants from Sweden, Norway and Russia. In total, the seminar *Nordic Food Composition Data for Labelling and Public Health* engaged over 100 participants. Those who attended both seminars were from the same fields as the members of the project group, with additional participants from the food industry. There were also several governmental representatives from ministries of Finland, Sweden and Norway. In addition, invited speakers from Italy, the United Kingdom and France participated actively in the seminars. The agendas of both seminars are presented in Appendices 1 and 2.

The degree of success of both seminars was measured with evaluation forms (on paper and in the form of an internet questionnaire). The results based on the evaluation forms are presented in Appendix 10. The results have been disseminated to the food composition database network members in the Nordic countries through the NordCoLa project.

THL had the responsibility for carrying out the preparative research work and organising the seminars. The seminar *How to Foster Innovative Use of Food Information* was organised in collaboration with the Finnish Food Authority. Both projects have been led by info-coordinators, Dr Liisa Valsta and MSc Sanni Aalto, from THL, who were responsible for planning and carrying out the projects.

5.2 Seminar outcomes

Seminar on How to Foster Innovative Use of Food Information, 19 October 2016

The seminar was organised as one the activities of the Finnish Presidency of the NCM. The seminar was about the importance of food composition information and how this information is crucial for nutrition, population-based surveys, risk-benefit assessment, and for making political decisions on public health. The agenda for this seminar is presented in Appendix 7.

The seminar focused on the challenges of the quality and use of food information. In her speech Sirpa Sarlio-Lähteenkorva stated that the topic of the seminar is of great importance since the traditional ways of using food composition data have become insufficient. Food composition is being affected by environmental changes; modifications made in animal feed composition that affect the end-product composition and imported new products that are introduced to the markets at an accelerating rate. Janne Nieminen pointed out that the food composition data is used in institutions and research facilities by an increasing number of people with different needs and requirements.

In her presentation Ruth Charrondiere reminded everyone that food composition is not just about food ingredients and nutrients – it also includes nutrient requirements, intake, exposure assessment, total diet studies, nutrient losses, diet formulation, nutrition labelling, nutrition indicators, food based dietary guidelines, nutrition programmes and policies, and biodiversity. Food composition data is also needed in agriculture, which should be more sensitive to nutrition, she stated. According to Hanna Sara Strandler, the compilation of food information for food composition databases takes a lot of time and effort. In order to have updated, high-quality and accurate food information, it is crucial to gain more resources and funding. She also pointed out that the uncertainty in food composition databases comes from analysis as well as sampling (preparation, handling and analytical methods). Natural variations between different laboratories cannot be avoided. Improved analytical data improves the calculated data, which makes it possible to use analysed data when calculating other foods in the database with the help of yield and retention factors.

In his presentation, Anders Mogensen introduced a food label database, Mintel GNPD, which is compiled with the help of consumers who buy new pre-packaged products from markets and retail outlets. All the information that is written in the product label will be put in the database, including photos of the product. In the database the results can be limited by country, company, brand, nutrients or ingredients, for example. The methodology behind the database is that the product is bought if it is a new product, range extension or new variety, reformulation, has a new packaging or is relaunched. The Mintel GNPD does not collect information about products that are removed from the market. Trends formed with the database represent only those products that are on the database and not the whole market. With the Mintel Market Size tool, it is possible to evaluate the market shares and what kind of percentage the main manufacturers account for volume and value.

The panel discussion concluded that the following aspects are common to all Nordic databases:

- Generally the Nordic databases went online at the beginning of the 2000s and in Estonia in 2009.
- There are only 2–3 people working on the databases and in the worst case just one person is responsible for management.
- All Nordic databases contain food composition information from 1,000 to 6,000 foods; some of them are general foods or recipes and some are recorded by brand name.
- Almost every country has a steering group that consists of representatives from different ministries, universities and research facilities.

The main problem with food composition databases in all Nordic countries is insufficient funding for food analyses and insufficient resources to keep the databases fully updated. In Denmark, Norway and Sweden, one food group is analysed at a time each year and they have government-funded projects regarding them. When the national food safety authorities in Finland and Sweden perform risk analyses, the same products are often analysed for nutrients as well. There is still a serious shortage of funding, personnel and time invested in food composition work in all Nordic countries. The Nordic Food Analysis Network, which consists of members from every Nordic country and Estonia, has shared information on food composition and analyses at the Nordic level (Valsta *et al.*, 2017). It is important to keep up with Nordic collaboration. The network has its own joint extranet site where they can share plans for upcoming analysis and recent results and documents.

Improvements in food information are needed for better risk-benefit assessments, said Irene Mattisson. According to the European Food Safety Authority (EFSA), risk-benefit assessments are one of the cornerstones in risk analysis, with others being risk-benefit management and communication. In the risk-benefit assessment work, the potential health effect, as well as the dose at which different effects appear, is first identified and characterised. Mattisson stated that food composition information is needed when estimating whether the hazardous agent is present in the food. In exposure assessment, the food intake data and the food composition data is combined. Food composition information and dietary surveys are used by the risk-benefit assessors to determine the nutrient intake. According to Mattisson, toxicologists and nutritionists would benefit from working more actively together. Toxicologists would benefit greatly if the food composition databases were extended with substances like heavy metals, mycotoxins and pollutants. The competence of toxicologists could be useful to nutritionists and in the field of food composition. Communication between different specialists is key.

According to Tue Christensen, food composition information can also be used for other purposes, such as dietary services. For instance, the Keyhole symbol was introduced to help consumers make healthier choices. Calculating tools are convenient because nutrient analyses are expensive. Calculating is possible and reliable when using proper yield and retention factors. Calculators are vital for small enterprises that face challenges with mandatory food labelling. There are still many problems to be solved in the development of a food labelling tool, according to Christensen. He pointed out that all nutrients are not necessarily present in food composition databases, and there are different conversion factors of nutrients used regarding food composition data and labelling data.

There are different ways to use food composition information and one of them is the Miils meal planning software by Rategia Limited, which was presented by Katja Ratamäki. Miils was created to help plan meals that are in line with the recommended nutrition intake. It also takes possible allergies and other food-related restrictions of the user into account and then provides smart suggestions. Miils uses food composition data from Fineli and the U.S. Department of Agriculture (USDA), mainly because the data is available free of charge and is of high quality. According to Ratamäki, the ideology behind Miils is to make food composition data more transparent to consumers. When a recipe is planned in Miils one must be careful and use only those food items where the retention and yield factors are already taken into account (e.g. in Fineli there are both raw and cooked food items and the yield and retention factors are already in the cooked food). Otherwise the reported data by Miils may be misleading.

An app for smartphones was presented by its developer Hannes Heikinheimo from Chief Chief Technologies Oy. Heikinheimo stated that speech-enabled software technology can be used for meal tracking. According to Heikinheimo, the app can transcribe voice into text and then analyse the text. The spoken word is matched with the closest food in Fineli, the Finnish food composition database.

Seminar on Nordic Food Composition Data for Labelling and Public Health, 17 April 2019

The seminar was organised by the NordCoLa project funded by the NCM/NKMT. The network project aimed to improve food composition data in the Nordic countries and focused on food labelling, which has changed in recent years due to new legislation. The theme of the seminar was to evaluate how food composition data is utilised in package labelling, how reliable calculated nutrient declarations really are, and how the quality of food composition data is linked to public health issues. The first part of the seminar focused on the front-of-pack labels (FOPLs) and the second part was about food composition issues and the uncertainties related to them. The agenda of this seminar is presented in Appendix 8.

According to Sirpa Sarlio, it is constituted in EU regulations that food business operators can use calculated values from established and accepted databases. Sarlio stated that it must be ensured that our databases are usable, reliable and of high quality. In addition, consumers should have a right to accurate, understandable and easily usable information about foods. Improving nutritional information about food has been on the EU's agenda for years. Since December 2016 the declaration of nutritional information on pre-packaged foods is compulsory due to EU regulations. Prior to that, joint frameworks regarding reformulation of foods have been made on salt (in 2009), saturated fat (in 2012) and sugars (in 2015). The European Council's conclusions on food product improvement were accepted in 2016. Member states were asked to prepare national plans for food product improvements. Many activities have been initiated all over Europe. For instance, in Finland activities for reformulation has been going on for decades – the Heart Symbol, for example, has helped consumers choose healthier alternatives. In addition, a nutrition commitment system has been created to encourage food business operators, including big food companies and the retail sector, to improve the nutritional quality of their products, thus improving the Finnish diet. To track the process and speed up action, the latest EU health programme (accepted in 2019) will initiate joint action on nutrition, monitoring food reformulation as one of its focal points.

An efficient FOPL must manage nutritional risks that are relevant for the region, it must be used by consumers and industry, and it should be evaluated and monitored – otherwise consumers will not find it reliable, according to Veronica Öhrvik. The use of the Keyhole symbol began in Sweden in 1989 and has since spread to Norway and Denmark (in 2009), Iceland, Lithuania (in 2013) and Macedonia (in 2015). The Keyhole has its own Nordic working group, which is responsible for setting the criteria. When the final criteria have been set, they are notified as a nutrition claim in EU. The Keyhole symbol is easy to understand, it requires minimal pre-existing knowledge on nutrition, it does not require language skills and is used in foods that are important in a healthy diet. According to Öhrvik, the Keyhole is accepted by the food manufacturing industry and it can contribute towards reducing social differences related to health. She pointed out that the Keyhole symbol is not allowed to be used on foods that are generally regarded as unhealthy. The scientific basis for the Keyhole symbol is the Nordic nutrition recommendations. Foods with the Keyhole symbol are divided into 33 different food categories that have specific conditions. The conditions are containing less fat and more healthier fatty acids, less sugar, less salt, more dietary fibre and wholegrain and more fruit and vegetables. The Keyhole symbol should not be used on foodstuffs for children up to the age of 36 months. Simulations have been carried out in Sweden, Norway and Denmark to see what happens to nutrient intake when replacing normal products with similar Keyhole products – a dramatic increase in wholegrain and fibre and a decrease in added sugar and saturated fat were reported. Using the Keyhole symbol is free, independent and voluntary. It is up to the company to be consistent with the regulations and the products are controlled in relation to whether they are in line with the regulations. Keyhole labelling is controlled regionally, e.g. in Sweden national control studies have been carried out. In 2015, new legislation for the Keyhole symbol was introduced, which was stricter with wholegrain and salt than before. Products labelled with the Keyhole symbol do not have to be registered so there are no exact numbers for products containing the symbol – the information has to be bought from the retailers. The level of acceptance within the Nordic countries is high. The symbol is associated with healthier foods and it is considered trustworthy and helps people make healthier choices.

In her presentation, Anna Kara pointed out that the Heart symbol of the Finnish Heart Association and Finnish Diabetes Association has been used in Finland by FOPL for 20 years. According to Kara, the Heart symbol helps people make healthier choices in several food groups – like the Keyhole symbol does. The Heart symbol is an easy-to-notice addition to nutritional information on food packages. For the food industry the Heart symbol is an effective way to promote healthier products. The criteria for the use of the Heart symbol are based on Finnish nutrition recommendations and national population-based nutrition surveys. The criteria of the symbol focus on the main nutrition challenges in Finland, and are defined for 10 main food groups that are further divided into sub-groups, which all have specific criteria related to total fat, quality fat, salt, fibre and sugar. The criteria are regularly updated if needed by a group of professionals. The symbol can be applied for online and the product must comply with the set of criteria. The use of the symbol is subject to a charge. The right to use the Heart symbol is granted by a group of professionals. When applying for the right to use the symbol, no nutrient analyses are required because the food manufacturers are trusted to provide reliable information about their product in any case. Random controls are carried out where the nutrient compositions of the Heart symbol bearing food products are analysed. The Heart symbol has a high brand awareness of 87% in Finland, and the brand has increased in value, reaching the 22nd most valued brand in Finland in 2018. The Heart symbol is acknowledged by the Finnish authorities, and it is the only symbol on the Finnish market to be regarded as a nutritional claim. According to the results of the National FinDiet 2012 survey, choosing food products with the Heart symbol helps to meet the nutrition recommendations by reducing the intake of saturated fat and salt, Kara stated. The Heart symbol requires approved registration, which provides opportunities to keep a register on the number of food items in the system. On the other hand, the registration fee required might decrease the number of potential food items.

According to Chantal Julia, FOPLs function as complementary information to the nutrition declaration, which is considered difficult to understand for most consumers. In France the idea of an official FOPL was first introduced in a report to the French Minister of Health in January 2014. The report highlighted three new proposals in Public Health Nutrition:

- Consumer information
- Nutritional education
- Improvement of food supply

The development of the French FOPL was based on scientific literature, which showed that summary labels are more effective than nutrient-based labels, particularly for vulnerable populations whose knowledge of nutrition is very low. Secondly, labels that may be affixed on all foods instead of just a few have been proven to be more effective. Thirdly, colour-coded schemes are more efficient than numerical information because certain colours are already interpreted in a certain way. As a result, a graded coloured summary label was developed, the NutriScore scheme. The nutrient profiling system behind the label is based on the Food Standard Agency's (FSA) Ofcom score that is currently used in the UK for regulating food marketing addressed to children. The system considers several elements of the composition of a food per 100 grams or millilitres. It is based on unfavourable nutrients such as energy, sugars, saturated fats and sodium (0–10 points per nutrient) and then balances it with favourable elements of a food which are fruit, vegetables, nuts, fibre and protein (0–5 points). The final score can vary from -15 points (for higher nutritional quality) to +40 points (for lower nutritional quality). Depending on the score, the NutriScore is attributed with a letter and a colour. Adaptations were made for cheese, beverages, fats and oils to avoid discrimination within certain food groups. The validation of the system took into account two dimensions of FOPL: the nutrient profiling system and the graphical design. The nutrient classification of foods with the nutrient profiling system was tested in four different food composition tables ranging from databases for research to more commercial databases with branded foods (sold in France). The distribution of the nutrient profiling system depends on the food groups that are considered, e.g. fruit and vegetables are ranked higher in nutritional quality than snacking products. Some food groups can have high variability of the nutrient profile (nutritional quality). The second step of the validation was to transpose the nutrient profile of foods to the diet of individuals. A dietary index (FSA-NPS DI) was designed for this purpose based on the FSA score of foods and beverages consumed. The index was applied in several cohort and cross-sectional studies (NutriNet-Santé – SU.VI.MAX cohorts and ENNS cross-sectional study). Consuming foods that have lower nutritional quality according to the nutrient profile is associated with a higher risk of cancer, cardiovascular disease, obesity and metabolic syndrome. If the nutritional quality of the diet can be improved through the improvement of the nutritional quality of the foods that are consumed, a certain number of nutrition-related diseases could be prevented. The second element of the validation was the transposition of the graphical design of the FOPL. The question of the objective testing is: Does the consumer understand the information provided on the package in a way it was designed in the form of FOPL? Participants in the objective study were asked to rank different foods according to their nutritional quality with or without FOPL. The NutriScore added understanding up to 20 times more than a no-label situation. The NutriScore was also the most effective FOPL, in particular in vulnerable populations, according to Julia. The validation study was completed with an international comparative study that tested objective understanding, attitudes towards FOPLs and their effect of food choice in 12 different countries (six countries in Europe, six outside of Europe). A thousand participants were recruited for this study. Three different food categories were chosen for testing based on their high variability in nutritional quality (breakfast cereals, cakes and pizza). Julia stated that NutriScore led to the highest improvement in the ranking procedure in all countries. Also, comparative studies were conducted in France where graphical formats were compared. NutriScore performed best in households with lower incomes. After all these studies the NutriScore was considered an official FOPL in France in October 2017. In January 2019 over 110 brands have registered using NutriScore scheme. Also, the reformulation strategies are now based on the NutriScore scheme, which is owned by the Public Health Agency of France. In order to be able to use NutriScore, the food manufacturer has to be registered as a user but there are no fees for using it.

In her presentation, Anne Haikonen reminded us that EU regulation (1169/2011) on the provision of food information to consumers was adapted in 2011 but the transition period lasted until 2016. Nutrition labelling is, in general, mandatory. The rules of nutrition labelling do not apply to food supplements and natural mineral waters. There are specific rules for food supplements in terms of how to declare nutrient values. The rules of nutrient labelling are also applicable for foods under the health claim regulation, fortification regulation and foods for specific groups. The following nutrients are mandatory in nutrient labelling: energy, fat, saturated fat, carbohydrates, sugars, protein and salt. This information may be supplemented with one or more of the following nutrients: monounsaturated fat, polyunsaturated fat, polyols, starch, fibre, and vitamins and minerals. The nutrient values shall be expressed per 100 g or per 100 millilitres. The declared nutrient values shall be average values based on:

- Manufacturer’s analysis of the food
- Calculation from the known or actual average values of the ingredients used or
- Calculation from generally established and accepted data

According to Haikonen, it is mentioned in the regulation that the Commission may adopt implementing acts setting out detailed rules for the uniform implementation of tolerances, but no implementing acts have been adopted, i.e. there are no legally binding rules for tolerances. A guidance document for setting tolerances for nutrient values declared on a label was prepared and negotiated in co-operation with the European Commission and the member states. The guidance document was published in December 2012. The document was given to provide guidance to member states’ control authorities and food business operators on tolerances, and to define acceptable differences between nutrient values declared and those established in official controls. The guidance document is generally applicable to the nutrition labelling purposes of the foods under the health claim regulation, fortification regulation and food supplements, but is not applicable to foods for specific groups. The actual amount of a nutrient in a foodstuff may vary compared to the value declared on a label for various reasons, such as the source of values, variation in raw materials, nutrient stability, effect of processing, storage condition and storage time. Measured value should be within the tolerances around the declared value throughout the entire shelf life of foodstuff. Regardless of how nutrient declarations are derived, food business operators should act in good faith to ensure a high degree of accuracy of nutrient labelling. There are different tolerances for vitamins and minerals for foods other than food supplements. These tolerances include the uncertainty of measurement. The EU guidance document is not binding. Tolerances are dependent on laboratories and methods of analysis. The co-operation between member states' control authorities and laboratories should be improved in order to find the best way to apply tolerances.

Kristin Salupuu presented the experiences of the NordCoLa network. The network has studied quality issues related to labelling, how differently calculated values can still be acceptable and how much the nutrient label can deviate from the true values – if there are any such values. The aim of the NordCoLa nutrient label calculation pilot exercise was to compare results of the recipe calculators from different countries using identical recipe information. The methods and results are presented in this report in detail in Chapter 3. The conclusions of the pilot exercise were that there were differences between the calculated and analysed values and further evaluation of both data is needed. Salupuu stated that the person calculating the nutrient label information needs good knowledge of FCDBs, the type of food, raw ingredients, food processes and experience of producing nutrient labels. The quality of FCDBs is crucial to avoid misleading nutrient information on food packages.

The last presentation of the seminar, held by Timo Kettunen, posed a question of what could happen if ingredient and nutrient information were accompanied with artificial intelligence. Bono Health is an application with evidence-based artificial intelligence (AI) for health, wellness, fitness and sustainability. According to Kettunen, nutrient labelling is not regarded as a very dynamic way of presenting information since it cannot be changed after it has been printed. Traditional nutrient label information does not necessarily say anything to a consumer with insufficient knowledge of nutrition. AI could help consumers understand which products are beneficial, healthy or suitable for specific target groups with the help of a QR code, which could provide more data than the package label as it is. The Bono app allows an account to be created which could help to recognise food products that are suitable for different consumers with food allergies or specific diets, among other things. The AI makes also it possible to combine different databases with carbon footprint data, special diet data and allergen data, and of course nutrient label information. Whether AI will become a permanent part of consumers' lives remains to be seen.

6. Discussion

The primary objectives of the two Nordic projects described in this report were to evaluate the needs, synergies and critical points of the Nordic FCDBs in relation to the composition data to be used to implement the new European nutrient labelling legislation. The secondary objective was to ensure there was food composition data of good quality in the Nordic countries for food producers and other users of the data for nutrient labelling purposes. In addition, the possibilities of using available international package label databases (e.g. the Mintel GNPD and GS1) to support the updating of national food composition databases were also evaluated.

6.1 Missing or outdated food composition data

The evaluation steps of the NordCoLa project carried out via a questionnaire and the pilot calculation exercise showed that there are gaps in both the coverage of food codes of the FCDBs as well as in the nutrient values of the databases, i.e. more attention should be paid to the missing information in the databases.

Missing ingredients that affect the nutrient label calculation out-comes are especially those industrial ingredients that do not appear in the Nordic FCDBs. Collaboration with the food industry would play an important role in the updating of FCDBs. Sharing information with the national food composition database organisations would improve the quality of food labels on the market. In some Nordic countries, collaboration with some companies is already at a good level.

The evaluation also showed that the databases may contain outdated or missing nutrient data, which should be urgently replaced with updated information. This was particularly seen with the values of data on monosaccharides. This data is the basis for calculating the nutrient value of sugars for nutrient labels. Due to the limited resources available for nutrient analyses, this updating work should be prioritised and could benefit from joint Nordic efforts in updating the sugar values of the databases. This project also showed that it is important to define the components to be analysed, e.g. total sugars vs. individual mono- and disaccharides, since this may affect the results. The results analysed and the values in the food composition databases may have been obtained by very different methods and the figures may even contain different compounds.

6.2 Calculation procedures and tools for nutrient label data

The Nordic countries have several tools available for the calculation of nutrient value information for food labels. However, these tools are not harmonised. The food producers in different countries have access to different procedures, if the nutrient information is based on calculated values. In addition, the guidance for calculating nutrient label information varies in different Nordic countries, e.g. the yield and retention factors used in the calculation process are not included in all tools, and the user guides make a note about this in some countries. Despite the fact that there have been joint efforts to harmonise the calculation procedures of dishes in Sweden and Norway, and even though some countries follow the EuroFIR procedures, the process may also depend on the tool the food producer chooses to use. In Denmark, the tool does not include yield and retention factors, but the starting point is that the food producer would have the necessary information based on their own evaluations of water or fat losses during the relevant processing. Thus, the results of the nutrient label calculations may vary between countries, even if the product were the same. This was also seen in the calculation exercise of this project (Chapter 4).

6.3 Tolerances of nutrient label information

One finding of this project was that tolerances for the nutrient value information on food labels are large (EC, 2012). Tolerances are needed since the composition of raw ingredients varies on the market, which has an effect on the variation of the nutrient composition of the food. The tolerances are provided per nutrient and include analysis uncertainties. The tolerances are the same for all foods and differ only based on the nutrient content of the product. Part of the tolerances are presented as a percentage, but tolerance for the salt content of the product, for example, is presented in grams per wet weight of the product, i.e. ± 0.375 g/100 g, if the salt content is below 1.25 g/100 g or more in the product. In the pilot calculation – the analysis exercise of this project – it was found that in some cases the tolerances are so wide that even very large differences in labelling information would end up within the limits of tolerance. This was found to be particularly relevant to labelled salt content. This situation seems to abolish the idea of reformulation of foods and informing consumers about the nutrient content of foods. One improvement might be to modify the tolerances in a way that they would be more food group-sensitive and narrower for certain food groups compared to others. More information about the nutrient value ranges of foods is needed.

6.4 Data mining of commercial food label data

The possibilities of using commercial food label data in updating national FCDBs were evaluated during these two projects. It showed that for defining trends and new product types on the food markets, commercial food label databases are very useful. Food labels also contain lots of useful ingredient information to be used in the updating process of national FCDBs. The use of nutrient value data from the food label databases is, on the other hand, not recommended, although sometimes useful in the case of branded foods. This is due to the previously mentioned acceptable tolerances as well as the lack of validation results concerning the accuracy of nutrient label information. Other reasons for not using food label data in large scale updating processes of national FCDBs is the fact that the coverage of the databases in relation to the national food market may be limited (e.g. Mintel GNPD) for achieving average nutrient levels for average food codes, for example. Another challenge experienced in the Nordic countries in terms of accessing nutrient label data through the GS1 organisation is that the food information database in some countries is only possible through contract procedures with the data providers (e.g. in case of GS1 data in Denmark). Today, in Finland, Sweden and Norway GS1 data can be purchased by members of GS1. In Iceland and Estonia, GS1 databases are not yet available.

6.5 Nordic collaboration

Two seminars organised in connection with these two projects were well attended and followed by a total of about 150 participants from 21 organisations, and the streaming of the second seminar was followed by participants from several countries. Information sharing and networking during the seminars were found to be useful. More intensive Nordic collaboration would be helpful for the food composition database personnel in all Nordic countries. In addition, resources for Nordic food analyses on the identified missing ingredients would be important in order to improve the quality of the Nordic food composition databases and nutrient label information.

7. Conclusions

The main conclusions and strategic proposals by the project group are as follows:

- More industrial ingredients need to be analysed and added to the databases, as one of the aims of the food composition databases is to provide companies with nutritional information in order to help them calculate their nutritional declaration correctly. This would also be of help for compilers trying to calculate and mimic industrial products as an alternative way of analysing them, thus saving resources.

- There is a need for more analyses and continuous compiling work in order to ensure updated FCDBs for users. Opportunities for Nordic collaboration in food analyses should be carefully evaluated.

- Calculating food items according to a standardised method is a good and affordable way of producing values for food composition databases and food labelling purposes. Overall, the calculated values are of good quality in comparison with analysed values, with the exception of protein, sugars and salt. This warrants more attention to take carbohydrates and especially simple sugars into account when planning future national food analysis programmes and collecting more information on salt content, and comparing them with analysed information of food products.

- More information is needed regarding the validity of nutrient labelling at the Nordic and European levels. The acceptable variation in nutrient label information based on the tolerances by the EC legislation is very broad. The tolerances may even threaten meaningful reformulation of food products and reliable consumer information due to uncertainties regarding the labelled nutrient values.

- Nutrient label data is not recommended for use in general for updating nutrient values of foods in the national FCDBs. However, commercial food label databases were found to be partially useful in updating national FCDBs when they have good coverage of the national market.

- Nordic collaboration could be further increased in the fields of analysing nutrient content of missing ingredients in the FCDBs, harmonising nutrient label calculation procedures, and proposing improvements to the European legislation concerning tolerances of nutrient values in labelling.

- Streaming of seminars is recommended for future projects. Seminars organised for the projects were found to be informative and useful by those attending. Streaming seminars could mean a major saving in project expenses, it allows participants from other countries to follow the events, and it would support the efforts to tackle climate change.

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Nordic Summaries

Sammenfatning

Denne rapport beskriver aktiviteterne i to projekter, der blev udført under infrastrukturen i Det Nordiske Fødevareanalysenetværk, nemlig projektet 'Nordic Food Composition Data for Labelling (NordCoLa)' (Nordiske fødevaredata til mærkning (NordCoLa), der blev udført mellem 2018 og 2020, og det foregående projekt 'Fostering the quality and use of Nordic food composition data' (Fremme af kvaliteten og brugen af nordiske fødevaredata), der blev udført under det finske formandskab i 2016.

Det primære formål med NordCoLa-projektet var at evaluere behov, synergier og kritiske punkter i de nordiske fødevaredatabaser (f.eks. manglende fødevareingredienser og huller i næringsværdier) i forhold til de indholdsdata, der skal bruges til at implementere den nye europæiske lovgivning om næringsdeklaration. Dette var for at sikre kvaliteten af fødevaredata i de nordiske lande til fødevareproducenter og andre brugere af næringsdeklaration. De vigtigste mangler blev evalueret og sammenfattet i dette projekt.

Projektet omfattede en analyse, der sammenlignede beregnede og analyserede næringsstofdata for udvalgte nordiske fødevareprøver. Disse oplysninger blev herefter sammenlignet med de accepterede tolerancegrænser, der bruges i EU.

Som en del af projekterne blev der arrangeret to åbne seminarer i Helsinki; det første den 19. oktober 2016 og det andet den 17. april 2019. Seminarerne, der samlede i alt omkring 150 deltagere, omhandlede udfordringer inden for fødevaredata og disses anvendelse til næringsdeklaration og relaterede kvalitetsspørgsmål.

Derudover omfattede projektet undersøgelse af information om næringsdeklation med fokus på at evaluere nytten af Mintel Global New Products database (Mintel GNPD) og GS1 i arbejdet med at opdatere og oparbejde kostundersøgelsesdata.

Netværkets vigtigste konklusioner og strategiske forslag er som følger:

- Der er behov for flere analyser og kontinuerlig indsamling for at sikre opdaterede fødevaredatabaser. Mulighederne for nordisk samarbejde omkring fødevareanalyser bør vurderes omhyggeligt.

- Flere industrielle ingredienser skal analyseres og føjes til fødevaredatabaserne. At inkludere disse data er vigtigt for at gøre fødevaredatabaserne nyttige, især for SMV'er indenfor fødevarebranchen.

- De beregnede værdier er af generelt af god kvalitet sammenlignet med analyserede værdier, undtagen for protein, sukker og salt. Derfor skal der mere opmærksomhed på kulhydrater og især enkle sukkerarter, når fremtidige nationale fødevareanalyseprogrammer planlægges. Det er også nødvendigt at indsamle mere information om saltindholdet og sammenligne det med de analyserede data fra fødevarer.

- Der er ikke lovgivningsmæssigt reguleret hvilke metoder der skal bruges i fødevareanalyse. Dette betyder, at der anvendes forskellige analysemetoder, og at forskellige komponenter bliver målt, hvilket resulterer i variation i næringsstofindhold. Sukkerarter er et eksempel på dette, da forskellige teknikker måler det samlede sukkerindhold eller forskellige sukkerbestanddele separat. Begge tilgange accepteres til deklaration.

- Mere information om gyldigheden af fødevaredeklaration på nordisk og europæisk niveau er nødvendig. For at undgå vildledende forbrugerinformation bør der anvendes fødevareanalyser til at tjekke næringsdeklarationen og til at overvåge bestræbelser på produktændringer.

- Data fra deklarationer fra kommercielle fødevaremærkedatabaser anbefales ikke i almindelighed at bruges til at opdatere næringsværdier for fødevarer i de nationale fødevaredatabaser. Imidlertid viste det sig, at sådanne databaser kunne anvendes til at opdatere dækningen af nationale fødevaredatabaser, hvis de anvendte databaser dækker det meste af det nationale marked.

- Det nordiske samarbejde bør øges yderligere inden for analyse af næringsindhold for manglende ingredienser i fødevaredatabaser, harmonisering af procedurer for fødevaredeklarationsberegning og på at foreslå forbedringer af den Europæiske lovgivning om tolerancer for næringsværdier ved næringsdeklaration.

Yhteenveto

Tämä raportti kuvaa kahden pohjoismaisen verkostoprojektin toimintaa, jotka toteutettiin Pohjoismaisen Elintarvikeanalyysiverkoston (Nordic Food Analysis Network) voimin. 'Nordic Food Composition Data for Labelling (NordCoLa)' -projekti toteutettiin vuosina 2018–2020 ja sitä edeltänyt 'Fostering the quality and use of Nordic food composition data' -projekti toteutettiin Pohjoismaisen ministerineuvoston Suomen puheenjohtajakaudella vuonna 2016.

NordCoLa-hankkeen päätavoite oli arvioida pohjoismaisten elintarvikekoostumustietokantojen tarpeita, synergioita ja kriittisiä tekijöitä (esimerkiksi puutteita koskien elintarvikkeiden ainesosia ja ravintoarvotietoja) suhteessa koostumustietoihin, joita käytetään uuden eurooppalaisen pakkausmerkintälainsäädännön täytäntöönpanossa. Näin pyritään varmistamaan laadukas elintarvikekoostumustieto pakkausmerkintöjen laadintaan niin ruoantuottajille kuin muillekin käyttäjille Pohjoismaissa. Tässä hankkeessa tärkeimmät puutteet arvioitiin ja summattiin.

Tämän projektin osana tehtiin selvitys, jossa verrattiin tiettyjen pohjoismaisten elintarvikkeiden laskennallisia ja analysoituja ravintosisältötietoja. Tietoja verrattiin ravintosisällön merkintätietojen sallittuihin poikkeamiin EU:ssa.

Projektien osana järjestettiin kaksi avointa seminaaria Helsingissä; ensimmäinen 19. lokakuuta 2016 ja toinen 17. huhtikuuta 2019. Seminaareihin osallistui arviolta 150 kuulijaa keskustelemaan elintarvikekoostumustietoihin liittyvistä haasteista, elintarvikekoostumustietojen käytöstä pakkausmerkinnöissä ja niihin liittyvistä laatukysymyksistä.

Lisäksi hankkeessa arvioitiin kahden kaupallisen pakkausmerkintätietokannan, Mintel GNPD:n (the Mintel Global New Products' Database) ja GS1:n (the Global Language of Business), hyödyllisyyttä elintarvikekoostumustietokantojen kokoamisessa ja päivittämisessä.

Verkoston johtopäätökset ja strategiset ehdotukset ovat seuraavat:

- Sen varmistamiseksi, että käyttäjillä on saatavilla ajantasaiset elintarvikkeiden ravintosisältötiedot, tarvitaan lisää elintarvikeanalyysejä ja jatkuvaa koostumustietokantojen ylläpitotyötä. Mahdollisuuksia elintarvikeanalyysien toteuttamiseksi pohjoismaisena yhteistyönä tulisi huolella arvioida.

- Elintarvikkeiden sisältämiä teollisia ainesosia tulee analysoida aiempaa enemmän ja täydentää niiden koostumustiedot tietokantoihin. Tiedot ovat tärkeitä, jotta tietokannat pysyvät käyttökelpoisina, etenkin pienten ja keskisuurten elintarvikealan yritysten toimintaa ajatellen.

- Laskennallisesti tuotetut ravintosisältötiedot havaittiin pääosin riittävän täsmällisiksi verrattaessa analysoituihin tietoihin, lukuun ottamatta proteiini-, sokeri- ja suolatietoja. Tämän takia jatkossa tulee kiinnittää huomiota erityisesti hiilihydraatti- ja etenkin yksinkertaisten sokereiden tietojen varmistamiseen, kun tulevaisuudessa suunnitellaan kansainvälisiä elintarvikeanalyysiohjelmia. Elintarvikkeiden sisältämän ilmoitetun ja analysoidun suolan määrän vertailuja tarvitaan myös lisää.

- Elintarvikeanalyyseihin käytettyihin menetelmiin ei liity lainsäädäntöä. Tästä seuraa, että käytössä on erilaisia menetelmiä ja jopa erilaisia ainesosia saatetaan mitata. Tämä aiheuttaa vaihtelua ravintoainesisältötiedoissa. Tästä esimerkkinä ovat sokerit, sillä eri menetelmillä voidaan mitata joko kokonaissokerin määrää tai eri sokerikomponenttien määriä erikseen. Kummatkin tavat ovat sallittuja pakkausmerkintöjen laadinnassa.

- Ravintosisällön laskeminen standardoituja menetelmiä noudattaen on hyvä ja edullinen tapa täydentää ravintosisältötietoja koostumustietokantoihin ja laatia elintarvikkeiden ravintosisältömerkintöjä, jos tietokantojen raaka-aineiden tiedot perustuvat analysoituihin ravintosisältötietoihin.

- Ravintosisältömerkintöjen täsmäävyydestä Pohjoismaissa ja Euroopassa tarvitaan lisää tietoa. Ravintosisältömerkintöjen sallitut poikkeamat Euroopan komission lainsäädäntöön perustuvassa ohjeistuksessa ovat hyvin suuria. Sallitut ravintosisältömerkintöjen poikkeamat ja tästä seuraava merkintöjen epävarmuus saattavat jopa uhata elintarvikkeiden muokkauksen (reformulaatio) merkitystä ja kuluttajatiedon luotettavuutta.

- Pakkausten ravintosisältömerkintöjen tietoja, esimerkiksi kaupallisten pakkausmerkintätietokantojen sisältämiä ravintosisältötietoja, ei suositella yleisesti käytettäväksi kansallisten elintarvikkeiden koostumustietokantojen ravintoarvotietojen päivittämisessä. Verkosto totesi kuitenkin, että pakkausmerkintätietokannat voivat olla hyödyllisiä päivitettäessä tietokantojen elintarvikevalikoiman kattavuutta, ts. tietokannan sisältämien elintarvikkeiden luetteloa, mikäli käytetyt tietokannat ovat kansallisen elintarviketarjonnan suhteen edustavia.

- Pohjoismaista yhteistyötä tulisi edelleen tiivistää elintarvikkeiden koostumustietokannoista puuttuvien ainesosien koostumuksen analysoimiseksi, ravintosisältömerkintöihin liittyvien laskentatapojen yhdenmukaistamiseksi ja Euroopan lainsäädäntöön perustuvien pakkausmerkinnöissä sallittuja ravintosisältötietojen poikkeamien tarkentamiseksi.

Samantekt

Þessi skýrsla greinir frá niðurstöðum tveggja verkefna sem byggðust á samstarfi innan norræna efnagreininganetsins (e. Nordic Food Analysis Network). Verkefnin fjölluðu um gögn um næringarefni fyrir næringargildismerkingar, NordCoLa-verkefnið unnið á árunum 2018 til 2020, og verkefni um gæði og notkun norrænna gagna um um næringarefnainnihald matvæla, sem var unnið undir formennsku Finnlands í Norrænu ráðherranefndinni 2016.

Aðalmarkmið NordCoLa-verkefnisins var að greina þarfir, samlegð og útbótaatriði fyrir norrænu næringargagnagrunnana (svo sem vöntun á fæðutegundum og eyður fyrir næringarefni) með tilliti til gagna sem verða notuð vegna evrópsku löggjafarinnar um merkingar matvæla. Tilgangurinn var að tryggja gæði gagna um næringarefni á Norðurlöndunum fyrir framleiðendur matvæla og notendur merkinganna. Greining var gerð á mikilvægustu eyðunum og yfirlit var tekið saman í verkefninu.

Í verkefninu var gerður samanburður á reiknuðum gildum út frá uppskrift og gildum sem fengust með efnagreiningum á sýnum af völdum norrænum matvælum. Niðurstöðurnar voru síðan bornar saman við ásættanleg frávik hjá Evrópusambandinu.

Innan verkefnanna voru haldin tvö opin málþing í Helsinki; það fyrra 19. október 2016 og það seinna 17. apríl 2019. Samtals mættu um 150 þátttakendur á námskeiðin til að kynna sér áskoranir í sambandi við gögn um næringarefnainnihald matvæla og notkun þeirra við merkingar matvæla og skyld viðfangsefni.

Að auki voru merkingar matvæla kannaðar til að varpa ljósi á mögulega notkun alþjóðlegs gagnagrunns frá Mintel fyrir nýjar afurðir (Mintel GNPD) og GS1 fyrir uppfærslu upplýsinga í gagnagrunnum um næringarefni í matvælum.

Aðalniðurstöður og mikilvægar tillögur samstarfsverkefnanna eru þessar:

- Þörf er á meiri efnagreiningum og samfelldri vinnu við uppfærslur til að tryggja uppfærða næringargagnagrunna fyrir notendur. Möguleika á norrænni samvinnu við matvælaefnagreiningar ætti að athuga gaumgæfilega.

- Fleiri iðnaðarhráefni þarf að efnagreina og bæta í næringarefnagagnagrunna. Mikilvægt er að afla slíkra upplýsinga til að gagnagrunnarnir nýtist sem best, sérstaklega fyrir lítil og meðalstór fyrirtæki í matvælageiranum.

- Reiknuðu gildin eru almennt af góðum gæðum borið saman við niðurstöður mælinga, en sykurtegundir, prótein og salt eru undantekningar. Þetta gefur tilefni til að beina athyglinni að kolvetnum og sérstaklega sykurtegundunum þegar lögð eru drög að efnagreiningum á landsvísu. Einnig er þörf á að taka saman upplýsingar um saltinnihald og bera það saman við mæliniðurstöður fyrir matvæli.

- Engin löggjöf mælir fyrir um hvaða aðferðir skuli nota við matvælaefnagreiningar. Því eru mismunandi aðferðir notaðar og jafnvel mismunandi efnisþættir mældir. Þetta leiðir til breytileika í niðurstöðum fyrir næringarefni. Sykurtegundir eru dæmi um þetta þar sem mismunandi aðferðir meta heildarmagn sykurtegunda eða hverja sykurtegund sérstaklega. Báðar aðferðirnar eru viðurkenndar fyrir umbúðamerkingar.

- Útreikningar á efnum í matvælum með stöðluðum aðferðum er góð og hagkvæm leið til að útvega gildi fyrir næringarefnagagnagrunna og merkingar matvæla, svo framarlega sem gæði gagnanna eru fullnægjandi og byggt er á efnagreiningum.

- Ásættanlegur breytileiki í næringargildismerkingum er verulegur samkvæmt löggjöf Evrópusambandsins. Breytileikinn getur jafnvel sett í uppnám skynsamlegar endurbætur á samsetningu matvara og áreiðanlegar upplýsingar til neytenda vegna óvissu í merktu næringargildi.

- Þörf er á meiri upplýsingum um það hversu traustar næringargildismerkingar eru á Norðurlöndunum og í Evrópu. Til að fyrirbyggja villandi upplýsingar til neytenda, ætti að nota efnamælingar til að sannreyna næringargildismerkingar á umbúðum matvæla og til að fylgjast með þeim breytingum sem verða á samsetningu matvæla.

- Ekki er mælt með að uppfæra opinbera næringarefnagagnagrunna með gögnum sem eru tekin af umbúðum matvæla. Hins vegar eru slík gögn að hluta til gagnleg til að uppfæra val fæðutegunda í opinberum gagnagrunnum ef gögnin spanna viðkomandi innanlandsmarkað.

- Efla ætti norrænt samstarf á sviði næringarefnamælinga þegar um eyður er að ræða í gagnagrunnunum, samræma ætti næringargildisútreikninga og leggja ætti til endurbætur á evrópskri löggjöf varðandi leyfileg frávik fyrir næringargildismerkingar.

Sammendrag

Denne rapporten beskriver to prosjekter som ble utført av Nordic Food Analysis Network som er en del av prosjektet "Nordic Food Composition Data for Labelling (NordCoLa)" som ble gjennomført mellom 2018 og 2020, og det foregående prosjektet kalt "Fostering the quality and use of Nordic food composition data», og gjennomført under det finske presidentskapet i 2016.

Det primære målet med NordCoLa-prosjektet var å evaluere behov, synergier og kritiske punkter i de nordiske matvaredatabasene (f.eks. manglende data om ingredienser og næringsstoffverdier) opp mot matvaredata som skal brukes til å implementere ny europeisk lovgivning om merking av næringsstoffer. Dette for å sikre at matvaredata av god kvalitet i de nordiske landene er tilgjengelige for matprodusenter og andre brukere av merking av næringsstoffer. De viktigste manglene ble evaluert og oppsummert i dette prosjektet.

Som en del av prosjektet ble det gjennomført en sammenligningsstudie mellom beregnede og analysert næringsstoffverdier i noen utvalgte matvarer. Matvarerprøver ble analysert og sammenlignet med næringsstoffverdier beregnet utfra alle de medvirkende landenes matvaretabeller. Resultatene ble deretter sammenlignet med de akseptable toleransegrensene i bruk i EU.

I 2016 og 2019 ble det arrangert åpne seminarer i Helsinki. Seminarene samlet til sammen rundt 150 deltakere for å høre om utfordringer innen kompilering og bruk av matvaredata og bruken av verdiene i merking av matvarer og relaterte kvalitetsspørsmål.

I tillegg inkluderte prosjektet en studie for å evaluere nytten av Mintel Global New Products 'database (Mintel GNPD) og GS1 i arbeidet med å oppdatere og sammenstille informasjon for bruk i databaser for inntak av matvarer.

Nettverkets viktigste konklusjoner og strategiske forslag er som følger:

- Det er behov for flere analyser og kontinuerlig kompileringsarbeid for å sikre oppdaterte matvaredatabaser for brukerne. Mulighetene for nordisk samarbeid i analyser av matvarer bør vurderes nøye.

- Flere industriingredienser må analyseres og inkluderes i matvaredatabasene. Innhenting av slik informasjon er viktig for å holde databasene relevante, spesielt for små og mellomstore bedrifter i matvarebransjen.

- De beregnede verdiene er generelt av god kvalitet sammenlignet med analyserte verdier, med unntak av protein, sukker og salt. Karbohydrater og spesielt enkle sukkerarter bør prioriteres når fremtidige nasjonale analyser av matvarer planlegges. Det er også nødvendig å samle mer informasjon om saltinnhold og sammenligne den med analysert informasjon om matvarer.

- Det er ingen lovgivning knyttet til metodene som brukes i analyser av matvarer. Dette betyr at forskjellige metoder blir brukt, og i noen tilfeller blir ulike komponenter målt, noe som resulterer i variasjon i næringsinnholdet i matvarer basert på metodikk. Sukkerarter er et eksempel på det, siden

forskjellige teknikker måler det totale sukkerinnholdet eller forskjellige sukkerkomponenter hver for seg. Begge tilnærminger aksepteres for merking av næringsstoffinnhold i matvarer.

- Beregning av sammensatte matvarer etter standardisert metode er en god og rimelig måte å produsere verdier for matvaredatabaser og for merking av matvarer, dersom datakvaliteten i matvaredatabasene er basert på analyse-verdier.

- Den akseptable variasjonen i næringsdeklarasjoner basert på EU-lovgivningens toleransegrenser er veldig stor. For store toleransegrenser kan undergrave meningsfylt reformulering av matvarer og pålitelig forbrukerinformasjon på grunn av usikkerhet rundt de deklarerte næringsstoffverdiene i merkingen av matvarer.

- Det er nødvendig med mer informasjon om validiteten av merking av næringsstoffer på nordisk og europeisk nivå. For å unngå feilaktig forbrukerinformasjon bør man gjennomføre matvareanalyser for å sjekke validiteten til merking og reformulering av matvarer.

- Det anbefales ikke å bruke næringsdeklarasjonsdata fra kommersielle databaser for å oppdatere næringsverdiene til matvarer i de nasjonale matvaredatabasene. Imidlertid kan kommersielle databaser være delvis nyttige til å få oversikt over utvalget og dekningen av matvarer i nasjonale matvaredatabaser, dersom de kommersielle databasene som benyttes dekker det meste av det nasjonale markedet.

- Det nordiske samarbeidet bør intensiveres ytterligere innenfor næringsstoffanalyser av ingredienser som mangler i matvaredatabasene og for harmonisering av beregningsmetoder for næringsdeklarasjoner. I tillegg kan det nordiske samarbeidet foreslå forbedringer av europeisk lovgivning om toleransegrenser for næringsstoffverdier i merking av matvarer.

Sammanfattning

Denna rapport beskriver aktiviteterna från två projekt som genomfördes av det nordiska nätverket för livsmedelsanalyser: *Fostering the quality and use of Nordic food composition data* som genomfördes under Finlands ordförandeskap 2016 och som följdes av *Nordic Food Composition Data for Labelling (NordCoLa)* mellan 2018 och 2020.

Huvudsyftet med NordCoLa-projektet var att utvärdera behov, synergieffekter och kritiska punkter kring livsmedelsdata i de nordiska livsmedelsdatabaserna (t.ex. avsaknad av livsmedelsingredienser och näringsvärden). Detta för att kunna implementera den nya europeiska lagstiftningen gällande näringsvärdesdeklarationer på produktetiketter. Detta gjordes som ett led i att säkerställa kvalitén på data i de nordiska livsmedelsdatabaserna så att dessa kan användas av livsmedelsproducenter och andra berörda för att ta fram näringsvärdesdeklarationer. De viktigaste bristerna identifierades, utvärderades och sammanfattades av detta projekt.

Projektet inkluderade en övning där beräknad och analyserad näringsinformation på ett antal utvalda nordiska livsmedelsprover jämfördes. Denna information jämfördes i sin tur med de näringsvärden som deklarerades på produktetiketten och de tillåtna avvikelser för näringsvärden som används inom EU.

Som en del av projekten organiserades två öppna seminarium i Helsingfors; den första den 19 oktober 2016 och den andra den 17 april 2019. Seminarierna lockade tillsammans runt 150 deltagare som samlades för att ta del av de utmaningar som finns inom området för livsmedelsdata och dess användning inom livsmedelsmärkning och relaterade kvalitetsfrågor.

Därutöver inkluderade projektet en undersökande del för att utvärdera användbarheten av Mintel Global New Products 'databas (Mintel GNPD) och GS1 när det gäller arbetet med att uppdatera och sammanställa produktinformation som används i livsmedelsdatabaser.

Nätverkets huvudsakliga slutsatser och strategiska förslag är följande:

- Det finns ett behov av fler analyser och ett kontinuerligt arbete för att säkerställa att livsmedelsdatabaserna är uppdaterade och användarvänliga. Möjligheterna för ett nordiskt samarbete när det gäller livsmedelsanalyser bör värderas högt.

- Fler ingredienser som används inom livsmedelsindustrin behöver analyseras och läggas till livsmedelsdatabaserna. Detta är särskilt viktigt för att små och medelstora företag i livsmedelsbranschen skall kunna använda och dra nytta av data.

- De beräknade värdena är överlag av god kvalitet när man jämför med de analyserade värdena, med undantag för protein, socker och salt. Kolhydrater och särskilt enkla sockerarter behöver därför tas i beaktande när man planerar för framtida nationella livsmedelsanalyser. Det behöver också samlas in mer produktinformation vad gäller saltinnehåll och denna

information behöver jämföras med analyserade värden.

- Det finns ingen lagstiftning som reglerar vilka metoder som ska användas när man utför analyser på livsmedel. Detta innebär att det idag används olika metoder och att de komponenter som mäts kan skilja sig åt, vilket resulterar i att näringsinnehållet som deklareras på produktetiketten kan variera beroende på vilken metod som har använts. Sockerarter är ett exempel på det, där en teknik mäter det totala sockerinnehållet och en annan mäter de olika sockerkomponenterna separat.

- Att beräkna livsmedel enligt en standardiserad metod är ett bra och prisvärt sätt att ta fram värden på, både för livsmedelsdatabaser och för livsmedelsmärkning, om den data som hämtas från livsmedelsdatabasen är analyserad.

- Ytterligare information behövs vad gäller validiteten av näringsvärdesdeklarationer på nordisk och europeisk nivå. Livsmedelsanalyser bör användas som ett sätt för att kontrollera validiteten på näringsdeklarationer, unvika vilseledande konsumentinformation och följa produktutvecklingen.

- Utifrån EU-lagstiftningen är variationen stor när det kommer till hur mycket näringsvärden får avvika ifrån det faktiska värdet. De nuvarande toleransnivåerna kan till och med hota betydelsefulla produktförändringar och tillförlitligheten till produktinformationen som en följd av den osäkerhet som finns kring de deklarerade näringsvärdena.

- Kommersiella produktdatabaser rekommenderas inte att användas för att uppdatera näringsvärden i nationella livsmedelsdatabaser. De visade sig dock vara delvis användbara när det gällde att uppdatera livsmedelsdatabasernas täckning, d.v.s. se över om de nationella livsmedelsdatabaserna innehåller livsmedel som täcker större delen av den nationella marknaden.

- Sammanfattningsvis bör det nordiska samarbetet intensifieras ytterligare när det gäller att analysera näringsinnehåll i ingredienser som saknas i livsmedelsdatabaserna, för att harmonisera beräkningsprocessen när man tar fram näringsvärdesdeklarationen och för att ta fram förslag till förbättringar gällande den europeiska lagstiftningen av tillåtna avvikelser för näringsvärden som deklareras på produktetiketten.

Kommenteeritud kokkuvõte

Selles aruandes kajastatakse kahte projekti, mille tegevused viidi läbi Põhjamaade toiduanalüüsi võrgustiku infrastruktuuri kaudu. Kirjeldatakse projekti „Põhjamaade toidu koostise andmed pakendiandmete märgistamiseks (NordCoLa)" elluviimist aastatel 2018–2020 ja sellele eelnenud projekti "Põhjamaade toidu koostise andmete kvaliteedi ja kasutamise edendamine", mis viidi läbi Soome eesistumise ajal aastal 2016.

NordCoLa projekti põhieesmärgiks oli hinnata Põhjamaade toidu koostise andmebaaside (TKA) vajadusi, sünergiat ja kriitilisi punkte (nt toidu koostisosade ja toitainete väärtuste puudujäägid) seoses toidu koostise andmetega, mida kasutatakse Euroopa uute toitumisalase teabe märgistamist käsitlevate õigusaktide rakendamiseks. Eesmärk oli tagada kindlustunnet Põhjamaade toidutootjatele ja teistele kasutajatele toitude koostise andmete kvaliteedi osas, mida kasutatakse toidukaupade toitumisalase teabe märgistamise eesmärgil. Selle projekti käigus hinnati ja tehti kokkuvõtteid kõige olulisematest puudujääkidest.

See projekt sisaldas harjutust, kus võrreldi omavahel valitud Põhjamaade toiduproovide arvutatud ja analüüsitud toitainelist teavet. Seejärel võrreldi seda teavet Euroopa Liidus kasutatavate vastuvõetavate lubatud hälvete piirmääradega.

Projektide raames korraldati Helsingis kaks avatud seminari; esimene neist toimus 19. oktoobril 2016 ja teine 17. aprillil 2019. Seminaridel oli kokku umbes 150 osalejat, kes soovisid teada saada, millised väljakutsed esinevad toidu koostise andmete valdkonnas ning nende kasutamisel toidu märgistamisel ja millised on nendega seotud kvaliteedi küsimused.

Projekt hõlmas lisaks uurimistööd toitumisalase teabe kohta, et hinnata Minteli globaalsete uute toodete andmebaasi (Mintel GNPD) ja GS1 kasulikkust toidu koostise andmebaasides kasutatava teabe uuendamise ja koostamise töös.

Võrgustiku peamised järeldused ja strateegilised ettepanekud on järgmised:

- Kasutajate jaoks ajakohastatud TKA-de tagamiseks on vaja teostada rohkem analüüse ja teha pidevat toiduprofiilide koostamistööd. Tuleks põhjalikult hinnata Põhjamaade koostöövõimalusi toiduanalüüside osas.

- TKA-desse tuleks rohkem lisada tööstuslikke tooraineid ja neid ka analüüsida. Sellise teabe hankimine on oluline andmebaaside kasulikkuse säilitamiseks, eriti toiduainetööstuses tegutsevate väikeettevõtete jaoks.

- Arvutatud toitainete väärtused, välja arvatud valk, suhkrud ja sool, on võrreldes analüüsitud toitainete väärtustega üldiselt hea kvaliteediga. Tulevaste riiklike toiduanalüüsi programmide kavandamisel on vaja suuremat tähelepanu pöörata süsivesikute ning eriti lihtsuhkrute väärtuste leidmisele. Samuti on vaja koguda rohkem teavet toodete soolasisalduse kohta ja võrrelda seda analüüsitud tulemustega.

- Ühegi õigusaktiga ei ole määratletud toidu analüüsimiseks kasutatavad meetodid. Seetõttu kasutatakse erinevaid meetodeid ja võidakse mõõta isegi erinevaid komponente. Selle tulemuseks on toitainete sisalduse varieerumine. Selliseks näiteks on suhkrud, kuna vastavalt tehnikale võib mõõta kas suhkru üldsisaldust või eri suhkrukomponente üksikult. Mõlemad lähenemisviisid on toidumärgistamisel lubatud.

- Toidutoodete toitainete väärtuste arvutamine standardmeetodi järgi on hea ja taskukohane viis väärtuste leidmiseks toidu koostise andmebaaside ja toidumärgistamise tarbeks.

- Põhjamaade ja Euroopa tasandil on vaja lisateavet pakendiandmete kehtivuse kohta. Euroopa Komisjoni õigusaktidega lubatud pakendiandmete toitainete väärtuste vastuvõetav hälve on väga suur. Lubatud hälvete tõttu võib toidutoodete mõtestatud reformulatsioon ja usaldusväärne tarbijateave olla ohustatud, kuna need põhjustavad märgistatud toitainete väärtuste määramatust.

- Üldiselt ei soovitata kasutada kommerts tooteinfo andmebaase toitumisalase teabe hankimiseks ning toitainete väärtuste ajakohastamiseks riiklikes TKA-des. Siiski leiti, et sellised andmebaasid on osaliselt kasulikud TKA-de toidunimekirjade uuendamiseks, juhul kui need katavad enamuse riigi siseturust.

- Põhjamaade vahelist koostööd tuleks veelgi tugevdada TKA-des toiduainetes puuduvate toitainete sisalduste analüüsimisel, toitumisalase teabe arvutamisprotseduuride ühtlustamisel ja Euroopa õigusaktide parandamise ettepanekute tegemisel toitumisalase teabe lubatud hälvete osas.

Appendices

Appendix 1. Results of step 2 of the nutrient label calculation exercise – nutrient labelling values compared with the calculated nutrient values (%) per tool used.

Appendix 2. Vitamin fortification (average and range) of different food groups based on the Mintel GNPD (2016).

Appendix 3. Mineral fortification (average and range) of different food groups based on the Mintel GNPD (2016).

Appendix 4. Search conditions and terms used when searching for Finnish products containing salt in the Mintel GNPD (2016).

Appendix 5. Labelling salt content on food packaging (Finland).

Appendix 6. The average weight/volume ranges of different supplement units according to the Mintel GNPD (2016).

Appendix 7. Agenda for the How to Foster Innovative Use of Food Information seminar held on 19 October 2016.

Appendix 8. Agenda for the Nordic Food Composition Data for Labelling and Public Health seminar held on 17 April 2019.

Appendix 9. Participating organisations in the two seminars held in Finland in 2016 and 2019.

Appendix 10. Evaluation of the two seminars based on the evaluation forms.

Appendix 1. Results of step 2 of the nutrient label calculation exercise – nutrient labelling values compared with calculated nutrient values (%)

SAMPLE 1	Nutrient labelling/Calculated value (%)							
Nutrient	Calculation tool*							
	Finland I	Finland II	Sweden	Estonia	Norway I	Norway II	Norway III	Denmark
Energy (kJ)	114	156	108	102	124	129	99	91
Total fat (g)	106	135	108	105	100	96	73	81
Saturated fat (g)	94	123	90	100	100	75	75	90
Carbohydrates (g)	163	170	110	102	132	182	118	90
Sugars (g)	101	206	107	107	400	320	267	89
Protein (g)	108	163	73	103	138	118	106	100
Salt (g)	106	120	118	100	150	100	108	100

** For details of the tools used see Table 5 in section 3.3.2*

SAMPLE 2	Nutrient labelling/Calculated value (%)							
Nutrient	Calculation tool							
	Finland I	Finland II	Sweden	Estonia	Norway I	Norway II	Norway III	Denmark
Energy (kJ)	100	101	100	58	103	103	99	100
Total fat (g)	112	111	108	87	107	107	105	107
Saturated fat (g)	88	88	85	67	87	87	87	77
Carbohydrates (g)	75	76	82	36	97	97	94	82
Sugars (g)	73	101	100	75	100	100	150	94
Protein (g)	93	93	92	40	98	98	92	93
Salt (g)	100	105	102	533	107	107	88	107

SAMPLE 3	Nutrient labelling/Calculated value (%)							
Nutrient	Calculation tool							
	Finland I	Finland II	Sweden*	Estonia	Norway I	Norway II	Norway III	Denmark
Energy (kJ)	102	123	100	95	117	105	116	88
Total fat (g)	97	112	100	75	120	113	120	64
Saturated fat (g)	85	108	100	65	130	98	130	39
Carbohydrates (g)	110	123	100	110	120	103	96	93
Sugars (g)	97	109	100	100	86	75	86	75
Protein (g)	95	132	100	94	107	102	156	102
Salt (g)	115	118	100	150	150	120	111	100

** Sample 3 was not a food product on the market and thus nutrient labelling values are theoretical and the same as calculated with the Swedish calculator.*

SAMPLE 4	Nutrient labelling/Calculated value (%)							
Nutrient	Calculation tool							
	Finland I	Finland II	Sweden	Estonia	Norway I	Norway II	Norway III	Denmark
Energy (kJ)	100	100	86	93	101	102	102	106
Total fat (g)	114	114	93	129	105	104	104	128
Saturated fat (g)*	-	-	-	-	-	-	-	-
Carbohydrates (g)	117	116	101	90	124	128	130	110
Sugars (g)	55	56	93	54	55	55	48	35
Protein (g)	107	107	85	102	100	100	95	118
Salt (g)	39	40	21	48	40	40	44	40

Appendix 2. Vitamin fortification (average and range) of different food groups based on the Mintel GNPD (2016)

Food group (n)		Vit A (ug/ 100g)	Vit B1 (mg/ 100g)	Vit B2 (mg/ 100g)	Vit B3 (mg/ 100g)	Vit B5 (mg/ 100g)	Vit B6 (mg/ 100g)	Vit B7 (mg/ 100g)	Vit B9 (ug/ 100g)	Vit B12 (ug/ 100g)	Vit C (mg/ 100g)	Vit D (ug/ 100g)	Vit E (mg/ 100g)	Vit K (ug/ 100g)
White milk (12)	average			0.2						0.5		1.5		
	range			-						0.4–0.9		1–2		
Powdered milk (2)	average	67		1.3						5.9		10		
	range	4–130		1.2–1.4						5.5–6.2		-		
Berry soup (10)	average										33			
	range										24–40			
Sour milk (5)	average			0.2						0.4		1		
	range			-						-		-		
Yoghurt (46)	average						0.4			0.7		1		
	range						0.2–0.9			0.5–1.1		0.5–1.5		
Curd (4)	average											1.25		
	range											-		
Viili (6)	average											1		
	range											-		
Spr. marga-rines (6)	average	400										15	9.5	
	range	400–420										10–20		
Plantbased drinks (15)	average			0.2					30	0.4		0.75	1.8	
	range									0.3–0.6				
Fermented soy products (12)	average			0.2						0.38		0.75	1,8	
	range													
Baby formula (< 1 yr) (3)	average	74	0.3	0.13	0.57	0.6	0.07	2.4	16	0.23	11.8	1	0.9	6
	range	70–78	0.1–0.8	0.12–0.14	0.54–0.6	0.4–0.7	0.06–0.08	2.1–2.9	14–18	0.22–0.25	11.5–12		0.88–1	5.4–7
Baby food (> 6 mths) (12)	average	291	0.7		3.6	1.5	0.25	19	43	0.5	40	6.6	3.6	2
	range	57–410	0.2–1		0.8–6.5	0.5–2.2	0.1–0.4	3.4–30	25–65	0.2–1.1	6–89	1.1–10	0.9–7.8	

Appendix 3. Mineral fortification (average and range) of different food groups based on the Mintel GNPD (2016)

Food group (n)		F (ug/ 100g)	Fe (mg/ 100g)	Ca (mg/ 100g)	Cl (mg/ 100g)	Cu (ug/ 100g)	I (ug/ 100g)	K (mg/ 100g)	Mg (mg/ 100g)	Mn (ug/ 100g)	Na (mg/ 100g)	P (mg/ 100g)	Se (ug/ 100g)	Zn (mg/ 100g)
White milk (12)	average			133			16.6							
	range													
Powdered milk (2)	average		0.3	1200				1550	110					
	range							1500–1600	100–120					
Berry soup (10)	average													3
	range													
Sour milk (5)	average			112			14							
	range			100–120										
Yoghurt (46)	average			115										
	range			85–130										
Curd (4)	average			210										
	range			180–240										
Viili (6)	average			103										
	range			95–120										
Spr. margarines (6)	average						30							
	range						24–36							
Plantbased drinks (15)	average			120										
	range			120–200										
Fermented soy products (12)	average			114										
	range			96–120										
Baby formula (< 1 yr) (3)	average		0.8	68	47	50	13	75	5.8	9	24	43	2.1	0.6
	range	<50	0.5–1	50–80	42–53	40–60	12–14	67–80	5.2–6.2	5.4–15	18–31	32–50	1.7–2.5	0.5–0.8
Baby food (> 6 mths) (12)	average		6.9	380			52		58		110	414		2
	range		1.1–10	67–680			16–100		27–80		25–180	365–430		0.5–4.4

Appendix 4. Search conditions and terms used when searching for Finnish products containing salt in the Mintel GNPD (2016)

	Time period			
Search conditions	1/2001–12/2007	1/2008–12/2011	1/2012–12/2014	1/2015–3/2017
The number of Finnish foods that contain salt as an ingredi-ent	3,602	2,606	2,011	1,270
The number of all Finnish food products	9,078	6,523	4,485	2,652
Finnish food products that con-tain salt as an ingredient out of all Finnish food products (%)	39.7	39.9	44.8	47.9
The number of Finnish food products with a claim of low/no/reduced sodium	121	111	80	57

Appendix 5. Labelling salt content on food packaging (Finland)[*]

Salt content (%)	Food product	Salt content (%)
Reduced salt content (25% less salt than average)		Strongly salted/contains a lot of salt
no more than 1.1	Cheese	over 1.4
no more than 1.5	Sausages	over 2.0
no more than 1.7	Other processed meat (cold cuts)	over 2.2
no more than 1.5	Processed fish products	over 2.0
no more than 0.8	Bread	over 1.1
no more than 1.1	Crisp breads and similar	over 1.4
no more than 1.1	Breakfast cereals (muesli, cereal)	over 1.4
no more than 0.9	Meals & meal centres (ready meals)	over 1.2
no more than 1.1	Snack products with added salt	over 1.4

[*] *Decree (1010/2014) of the Finnish Ministry of Agriculture and Forestry, 2014*

Appendix 6. Average weight/volume ranges of different supplement units according to the Mintel GNPD (2016)

	Weight/volume range (g/ml)											
	Fat suppl	Herbal suppl	Prob/ Preb	Mineral suppl	Q10	Vitamin mineral suppl	Vitamin suppl	Amino acid	Dietary-prep	Enzyme	Fibre	Sporsnutr
Capsule (g)	0.5–1.6	0.2–0.8	0.2–0.6	0.4–1.2	0.5–0.7	0.3–2	0.3–0.6	0.2	0.9	0.5–0.9		
Effervescent tablet (g)				6		4-4.5	4-5.9					
Powder (g)		0.4–50	12–30	2.2–3		0.4–5	4–10	16	2.6–4.5		10	
Lozenge (g)		1.2–1.7		0.6		0.4–1.5	0.2					
Fluid (ml)	4–10	1–250	10–20	0.1		15–30	0.15–0.3			50		
Softgel (g)	0.8–2.5											
Tablet (g)		0.3–1.4	0.4–0.8	0.2–2.5		0.4–4.5	0.1–1.8					0.9
Tablet, chewable (g)			0.4–0.8	1.2		0.5–2.1	0.2–0.8					

Appendix 7. Agenda for the How to Foster Innovative Use of Food Information seminar held on 19 October 2016

Venue: Finnish Food Safety Authority Evira, Mustialankatu 3, 00790 Helsinki, Finland

12.00 – 12.30 Light lunch in the lobby of the Conference Room

12.30 – 15.00 Opening of the seminar

Ministerial Advisor, Adjunct Professor Sirpa Sarlio-Lähteenkorva &

Head of Researcher Unit, Professor Janne Nieminen, Evira

Session 1: Ensuring fit for purpose and quality food information for users

- **Critical and innovative aspects in compiling, managing and publishing food composition databases (FCDBs)** *Nutrition Officer, Dr Ruth Charrondiere, FAO*

- **The role of analysed food composition information in Nordic FCDBs** *Project leader for the Swedish FDB, Hanna Sara Strandler, NFA*

- **Other sources of food information to improve FCDBs – Case Mintel** *Account Director, Anders Mogensen, Mintel*

- **Nordic FCDBs – from lessons learned to future perspectives** (Panel discussion)

15.00 – 15.20 Coffee break in the lobby of the Conference Room Kalevi

Session 2: Fostering innovative use of food information

- **Improvements in food information needed for better risk-benefit assessments** *Senior risk and benefit assessor Irene Mattisson, NFA*

- **Documenting products – calculators for food service and SMEs** *Senior Adviser Tue Christensen, DTU*

- **Expectations of sensor technology and wearable device development towards food information**

    - **Case: Miils Meal planning software** *The founder of Rategia Oy Katja Ratamäki*

    - **Case: Speech-enabled Software Technology for Meal Tracking** *Dr Hannes Heikinheimo, Chief Chief Technologies Oy*

- **Final discussion** *moderated by Senior Researcher Adjunct Professor Liisa Valsta, THL*

17.00 End of the seminar

Appendix 8. Agenda for the Nordic Food Composition Data for Labelling and Public Health seminar held on 17 April 2019

Venue: Finnish Institute for Health and Welfare (THL), Mannerheimintie 166, Helsinki, Finland

9.00 – 9.15 **Opening of the seminar** *Sirpa Sarlio, Ministry of Social Affairs and Health, FI*

Session 1: Food labelling incentivising healthier food preferences

- **Experiences of the Nordic Nyckelhål labelling** *Veronica Öhrvik, Statens Livsmedelsverket, SE*
- **Two decades of the Finnish Heart Symbol** *Anna Kara, Finnish Heart Foundation, FI*
- **Food labelling as a tool of public health policy – the NutriScore scheme** *Chantal Julia, University of Paris, FR, video presentation*
- **Discussion**

10.45 – 11.15 **Coffee break in the lobby**

Session 2: Food composition data and nutrient labelling – boundaries and uncertainties

- **Legislative boundaries and tolerances in nutrient labelling**

Anne Haikonen, Ministry of Agriculture and Forestry, FI

- **Uncertainties of calculated nutrient labels – the NordCoLa experience** *Kristin Salupuu, National Institute for Health Development, EE*
- **Ingredient and nutrient label information and artificial intelligence**

– all you need for the future? *Timo Kettunen, Bono Health Ltd.*

- **Final discussion**

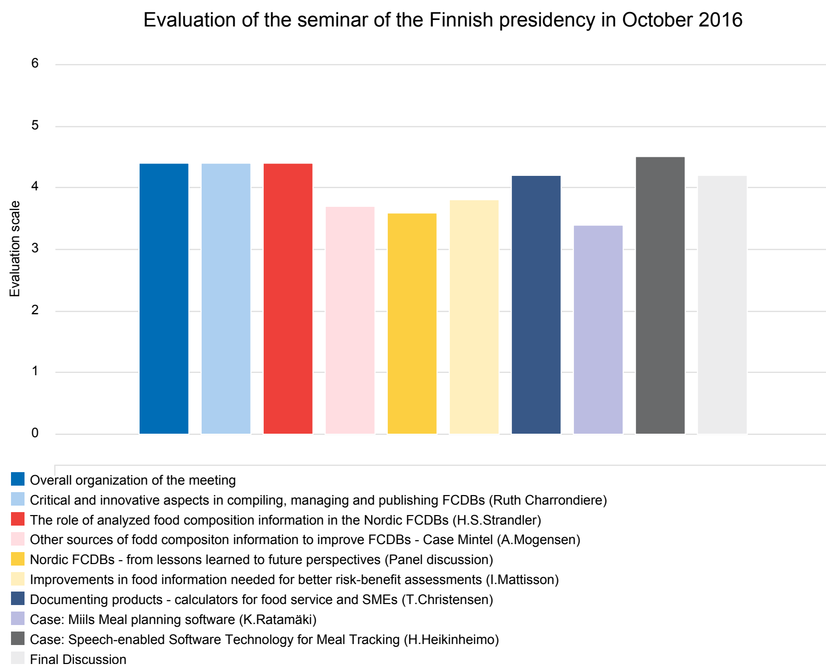
13.00 End of the seminar

Appendix 9. Participating organisations in the two seminars held in Finland in 2016 and 2019

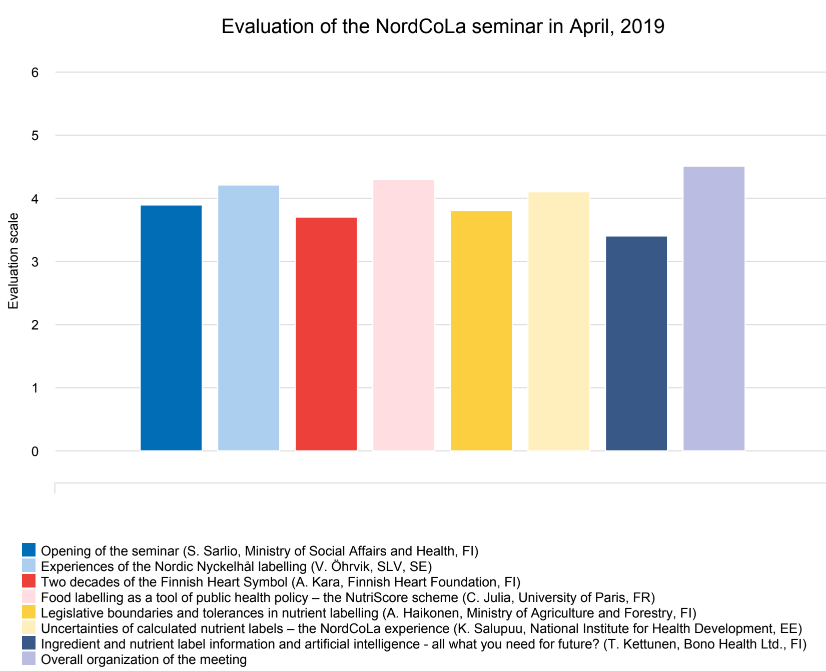
Organisation	Country	2016	2019
National Food Institute, Technical University of Denmark (DTU), www.food.dtu.dk	Denmark	X	X
National Institute for Health Development (TAI), www.tai.ee	Estonia	X	X
Public Health Promotion Unit, Finnish Insti-tute for Health and Welfare (THL), www.thl.fi	Finland	X	X
Finnish Food Authority, www.ruokavirasto.fi	Finland	X	X
Finnish Ministry of Agriculture and Forestry (MMM), www.mmm.fi	Finland	X	X
Finnish Ministry of Social Affairs and Health (STM), www.stm.fi	Finland	X	X
University of Helsinki (HY), www.helsinki.fi	Finland	X	X
Finnish Food and Industries' Federation (ETL), www.etl.fi	Finland	X	X
Natural Resources Institute Finland (LUKE), www.luke.fi	Finland	X	X
Mattilsynet, Norwegian Food Safety Authority (NFSA), www.mattilsynet.no	Norway	X	X
University of Oslo, Norway (UIO), www.uio.no	Norway	X	X
National Food Agency (NFA), www.slv.se	Sweden	X	X
Icelandic Food and Biotech R&D (Matís), www.matis.is	Iceland	X	X
National Nutrition Council (VRN), www.vrn.fi	Finland	X	X
University of Eastern Finland (UEF), www.uef.fi	Finland	X	
Institute for Molecular Medicine Finland (FIMM), www.fimm.fi	Finland	X	
Stockmann Oyj, www.stockmann.fi	Finland	X	
Chief Chief Technologies Oy	Finland	X	

Organisation	Country	2016	2019
Rategia Oy	Finland	X	
Food and Agriculture Organization of the UN (FAO), www.fao.org	Italy	X	
Swedish Ministry of Enterprise and Innova-tion, www.government.se	Sweden	X	
Mintel – Global Market Research & Market Insight, www.mintel.com	United Kingdom	X	
Norwegian Ministry of Health and Care Ser-vices (HOD), www.regjeringen.no	Norway	X	
Bono Health Inc., www.bonoai.com	Finland		X
Finnish Grocery Trade Association (PTY), www.pty.fi	Finland		X
Suomen Sokeri Oy, www.suomensokeri.fi	Finland		X
Valio Oy, www.valio.fi	Finland		X
Oy Gustav Paulig Ab, www.paulig.fi	Finland		X
Suomen Nestlé Oy, www.nestle.fi	Finland		X
Finnish Heart Association, www.sydanliitto.fi	Finland		X
Customs Laboratory, www.tulli.fi	Finland		X
Oy Karl Fazer Ab, www.fazergroup.com	Finland		X
Lidl Suomi Ky, www.lidl.fi	Finland		X
HKScan, www.hkscan.com	Finland		X
Myllyn Paras, www.myllynparas.fi	Finland		X
Dairy Nutrition Council, www.maitojaterveys.fi	Finland		X
Finnish Bread Information, www.leipatiedotus.fi	Finland		X
Cloetta Suomi Oy, www.cloetta.fi	Finland		X
University of Paris 13 (University of Paris North), www.univ-paris13.fr	France		X

Appendix 10. Evaluation of the two seminars based on evaluation forms*



*Evaluation scale used was between 1 (lowest) and 5 (highest).



*Evaluation scale used was between 1 (lowest) and 5 (highest).

Appendix 11. Contact persons, addresses and contact information

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About this publication

Food composition data and labelling

A challenging dialogue

Sanni Aalto, Helena Pastell, Liisa Valsta (editors)

ISBN 978-92-893-6536-9 (PDF)
ISBN 978-92-893-6537-6 (ONLINE)
http://dx.doi.org/10.6027/temanord2020-508

TemaNord 2020:508
ISSN 0908-6692

Disclaimer

This publication was funded by the Nordic Council of Ministers. However, the content does not necessarily reflect the Nordic Council of Ministers' views, opinions, attitudes or recommendations.

Ved Stranden 18
DK-1061 Copenhagen
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