



FNS – Cloud

Food Nutrition Security

FoodMagnifier

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Kerstin Paschko, Anna Kolbaum & Oliver Lindtner, BfR



Agenda

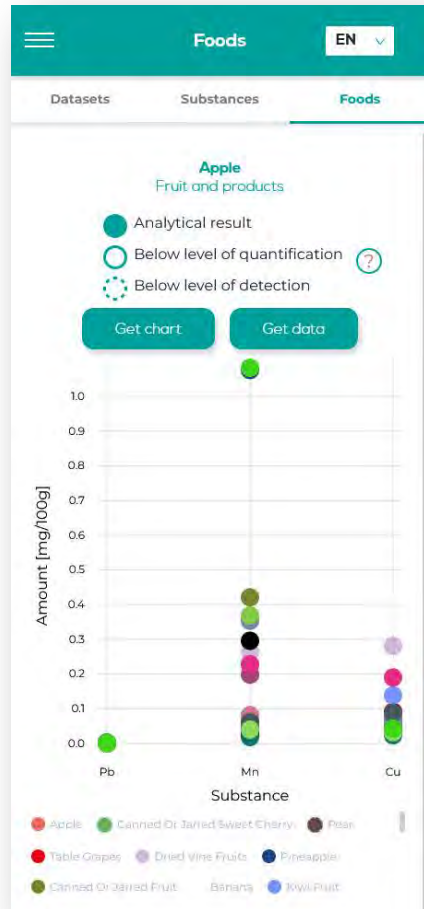


1. Introduction to the What and Why
2. FoodMagnifier: The App
3. Interactive session
4. Time to freely investigate the app
5. Short discussion and feedback

Food Magnifier

Introduction to the What and Why

The What



- Online app designed to inform the interested general public about results of **Total Diet Studies (TDS)** in food.
- Example dataset from the German pilot TDS (TDS-Exposure project)
 - Data **structure** of TDS
 - **Available assessments** to provide background information
 - Different example substances:
 - aluminum, copper, lead, manganese, mercury

TDS-Exposure: <https://www.tds-exposure.eu>

What is a TDS?



Criterion 1

- Representative for the whole population
- Covers 90 % of the foods consumed in one country
- Screening remaining foods for relevance



Criterion 2

- Foods are prepared as consumed



Criterion 3

- Similar foods are pooled together to lower the amount of analyzed samples

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Sample availability from TDS – Example of main food groups and food samples available from the German pilot TDS

FoodEx 2 food group	No. of composite samples
Alcoholic beverages	4
Animal and vegetable fats and oils	3
Coffee, cocoa, tea and infusions	8
Composite dishes	31
Eggs and egg products	2
Fish, seafood, amphibians, reptiles and invertebrates	19
Fruit and fruit products	27
Fruit and vegetable juices and nectars	6
Grains and grain-based products	24
Legumes, nuts, oilseeds and spices	10
Meat and meat products	27
Milk and dairy products	15
Products for non-standard diets, food imitates and food supplements	3
Seasoning, sauces and condiments	17
Starchy roots or tubers and products thereof, sugar plants	7
Sugar, confectionery and water-based sweet desserts	12
Vegetables and vegetable products	26
Water and water-based beverages	5
Sum all	246

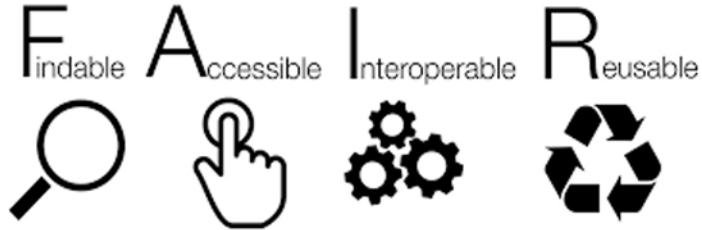
TDS sample name

French fries
 Pan-fried potato
 Potato boiled
 Mashed potato (incl. instant products)
 Potato crisps
 Potato dumplings
 Roesti

TDS data most suitable for communicating information about average substance levels in foods for consumers (and other non-experts)

Kolbaum et al., 2019: <https://doi.org/10.1080/19440049.2019.1668967>

The Why



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**DIRECTIVE (EU) 2019/1024 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 20 June 2019
on open data and the re-use of public sector information**

**Gesetz zur Regelung des Zugangs zu Informationen des Bundes
(Informationsfreiheitsgesetz - IFG)**

IFG

(Freedom of Information Act)

**Gesetz zur Förderung der elektronischen Verwaltung (E-
Government-Gesetz - EGovG)**

EGovG

(E-Government Act - EgovG)

**German Federal Government's
Open Data Strategy**



Main food group	MEAL food pool	MEAL-Lebensmittelpool	Sampling year	Subsamples (n)	Agriculture production [conventional, organic, nonspecific]	Season [season 1, season 2, no seasonality]	Region [north, south, east, west, no regionality]	Module-specific stratification	Substance	Internal standard	Method [name of the method used in the analysis]
Grains and grain-based products	Amaranth	Amaranth	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Biscuits	Plätzchen, Kekse	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Biscuits with cocoa filling	Doppelkekse mit Kakaofüllung	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Bread dumpling, Bohemian dumpling	Semmelknödel, böhmische Knödel	2017	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Breakfast cereals	Frühstückscerealien, verarbeitet	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Buckwheat	Buchweizen	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cereal cracker, puffed	Mischgetreidewaffel, gepufft	2016	15	organic	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cereal cracker, puffed	Mischgetreidewaffel, gepufft	2016	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	west		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	north		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Chia seeds	Chia-Samen	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokobrotchen, Milchbrotchen	2017	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokobrotchen, Milchbrotchen	2017	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokobrotchen, Milchbrotchen	2017	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokobrotchen, Milchbrotchen	2017	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cornflakes	Frühstückscerealien, verarbeitet	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Cream cake	Käsekuchen	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Crispbread	Käsekuchen	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Durum pasta	Durum pasta	2017	15	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Durum pasta	Durum pasta	2017	15	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Egg pasta	Teigwaren, mit Hühnerrei (z. B. Eiernudeln)	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Egg pasta	Teigwaren, mit Hühnerrei (z. B. Eiernudeln)	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Fruit cake	Käsekuchen	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Fruit cake	Käsekuchen	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Fruit cake	Käsekuchen	2018	15	nonspecific	no seasonality	west		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Fruit cake	Käsekuchen	2018	15	nonspecific	no seasonality	north		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Gingerbread and	Käsekuchen	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	west		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	north		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	west		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Lye pretzel, soft	Käsekuchen	2018	15	nonspecific	no seasonality	north		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Millet	Millet	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Muesli with chocolate	Schoko-Müsli	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Muesli with chocolate	Schoko-Müsli	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Muesli with dried fruits	Früchte-Müsli	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Muesli with dried fruits	Früchte-Müsli	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Muesli, mixed	Müsli, gemischt	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS
Grains and grain-based products	Muesli, mixed	Müsli, gemischt	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Niobium (Nb)	ICP-MS

Target audience ?

- Non-(TDS)experts (e.g. risk managers)
- Interested consumers

http://www.bfr-meal-sites/en/amsite_index/research/0007-37-00020-0001-0002-0001-00003-0002-0004-0004-0009-0001-0030



VEGETABLES Tomato

LEGUMES	Beans	8	2.49	1.3-39.4	0.0020	0.001-0.002	0.001	0.0003-0.002	0.004	0.004	0.009	0.001-0.030
	Peanuts	5	16.7	1.3-39.4	0.0060	0.004-0.10	0.010	0.002-0.014	0.008	0.008	0.019	0.005-0.031
	Peas	1	2.95	2.95	0.0010	0.001	0.001	0.004	0.004	0.018	0.018	0.005-0.031
	Mean		7.34		0.0030	0.004	0.004	0.005	0.005	0.015	0.015	0.005-0.031

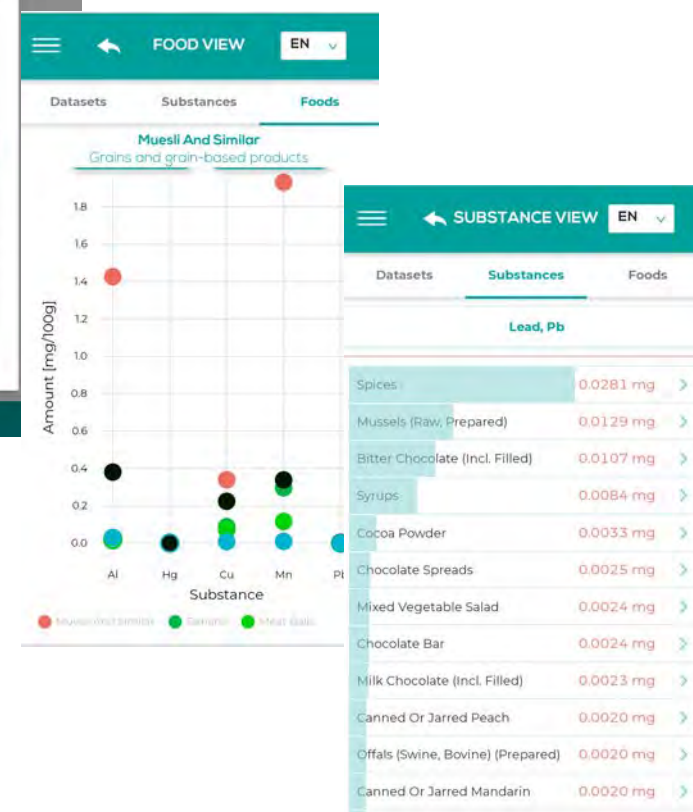
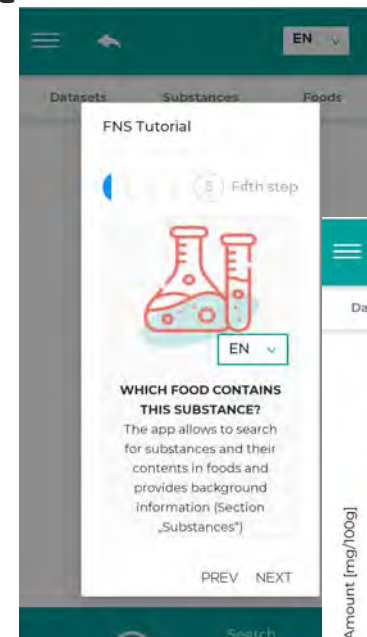
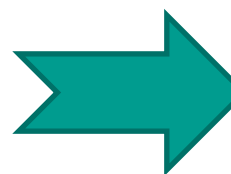
nd Innovation programme (H2020-

Implementation of the open data strategy

Contents lists available at ScienceDirect

Environment International

Main food group	MEAL food pool	MEAL-Lebensmittelpool	Sampling year	Subsamples (n)	Agriculture production (conventional, organic, non-specific)	Season (season 1, season 2, no seasonality)	Region (north, south, east, west, no regionality)	Module-specific stratification	Substance	Internal standard	Method (name of the method used in the analysis)
Grains and grain-based products	Amaranth	Amaranth	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Biscuits	Ritzchen, Kekse	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Biscuits with cocoa filling	Doppelkisse mit Kakao-Füllung	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Bread, dumping, Bohemian dumping	Semmelknödel, böhmische Knödel	2017	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Breakfast cereals	Frühstückszerealien, verarbeitet	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Buckwheat	Buchweizen	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cereal cracker, puffed	Mischgetreide-Waffel, gepufft	2016	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cereal cracker, puffed	Mischgetreide-Waffel, gepufft	2016	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	west		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cheese cake	Käsekuchen	2018	15	nonspecific	no seasonality	north		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Chia seeds	Chia-Samen	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokolibrötchen, Milchbrötchen	2017	15	nonspecific	no seasonality	east		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokolibrötchen, Milchbrötchen	2017	15	nonspecific	no seasonality	south		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokolibrötchen, Milchbrötchen	2017	15	nonspecific	no seasonality	west		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Chocolate roll, milk roll	Schokolibrötchen, Milchbrötchen	2017	15	nonspecific	no seasonality	north		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Confectionery	Confitures	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Corn flakes	Cornt flakes	2017	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Cream cake	Crems- und Sahnentorten	2017	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Crispbread	Knickbrot	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Durum pasta	Teigwaren, elfrei (z. B. Hartweizengrieß)	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Durum pasta	Teigwaren, elfrei (z. B. Hartweizengrieß)	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Egg pasta	Teigwaren, mit Eihühners (z. B. Eiernudeln)	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Egg pasta	Teigwaren, mit Eihühners (z. B. Eiernudeln)	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Fruit cake	Kuchen mit Obst (z. B. Apfelkuchen)	2018	15	nonspecific	no seasonality	east		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Fruit cake	Kuchen mit Obst (z. B. Apfelkuchen)	2018	15	nonspecific	no seasonality	south		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Fruit cake	Kuchen mit Obst (z. B. Apfelkuchen)	2018	15	nonspecific	no seasonality	west		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Fruit cake	Kuchen mit Obst (z. B. Apfelkuchen)	2018	15	nonspecific	no seasonality	north		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Gingerbread and gingerbread products	Lebkuchen, Pralinen, Pfefferkuchen	2016	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Live pretzel, soft	Laugengebäck	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Live pretzel, soft	Laugengebäck	2017	15	conventional	no seasonality	east		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Live pretzel, soft	Laugengebäck	2017	15	conventional	no seasonality	south		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Live pretzel, soft	Laugengebäck	2017	15	conventional	no seasonality	west		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Live pretzel, soft	Laugengebäck	2017	15	conventional	no seasonality	north		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Millet	Hirse	2019	20	nonspecific	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Muesli with chocolate	Schoko-Müslis	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Muesli with chocolate	Schoko-Müslis	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Muesli with dried fruits	Frucht-Müslis	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Muesli with dried fruits	Frucht-Müslis	2017	15	conventional	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS
Grains and grain-based products	Muesli, mixed	Müslis, gemischt	2017	15	organic	no seasonality	no regionality		Cadmium (Cd)	Nickel (Ni)	CP-MS

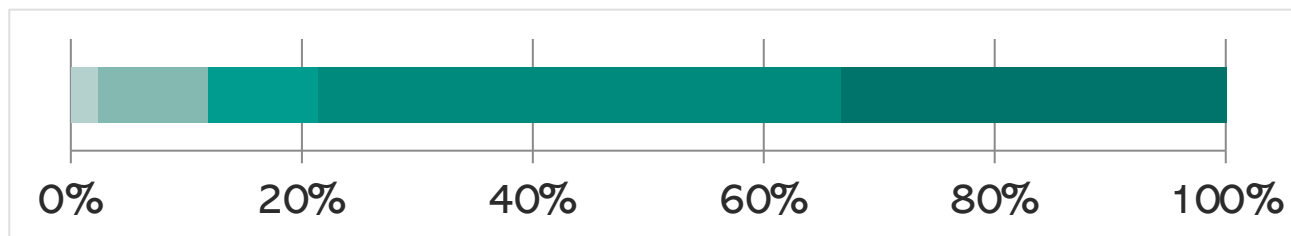


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Positive feedback from potential users

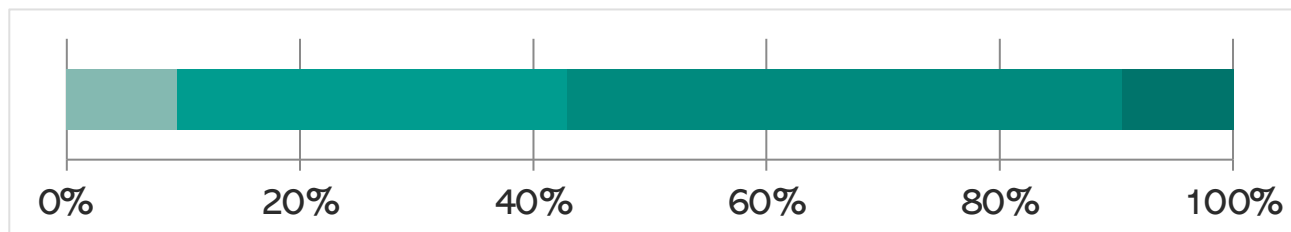
The app **could help me to better assess the occurrence of unwanted substances in food.**

strongly disagree disagree neutral agree strongly agree



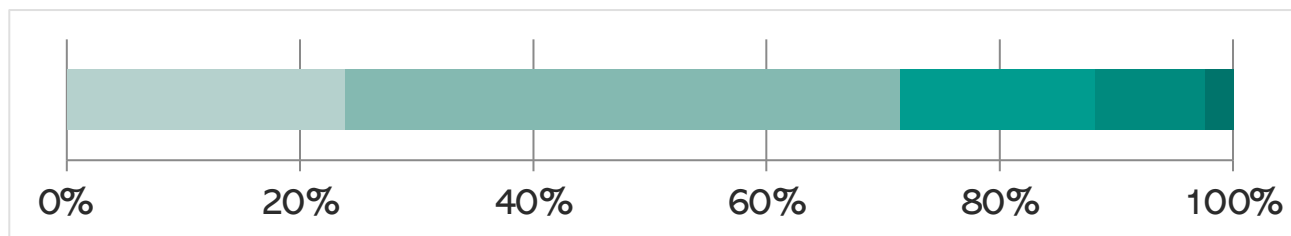
“Information about substances but also comparison of foods is very useful.”

I **felt confident** using the app.



“Very well designed and informative app. Good structure and overview.”

The app was **unnecessarily complex.**



“After a short orientation, it definitely offers added value.”

Usability test; Germany; N=42

Positive feedback from potential users



May 2023:
Visit of the Federation of German Consumer Organisations (Verbraucherzentrale Bundesverband e.V.) to the MEAL Study Centre at BfR

- Interest in the results from the BfR MEAL Study (German TDS) for their work
- Introduction to the FoodMagnifier app



Food
Magnifier

- ➔ **Very useful**
- ➔ **Good to get an overview**
- ➔ **Shortens research time to find relevant data and literature**



The App

FoodMagnifier

is a tool designed to present:

- content data of contaminants, residues or nutrients in foods
- background knowledge about:
 - substance description
 - exposure data
 - health-based guidance and toxicological reference values
 - contribution of food groups to dietary exposure
 - links for further reading



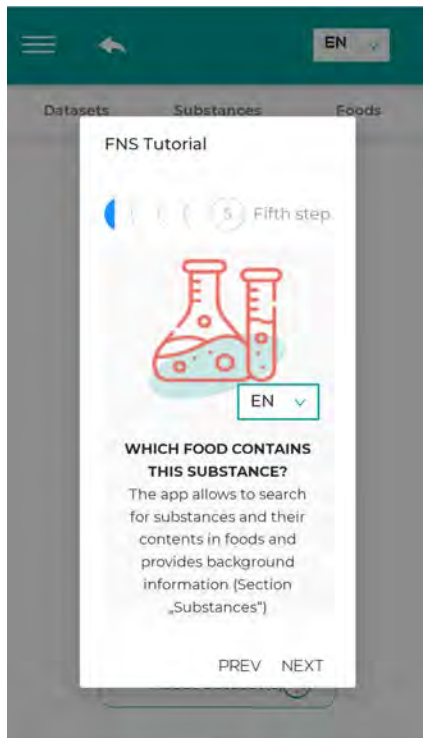
What options are there?



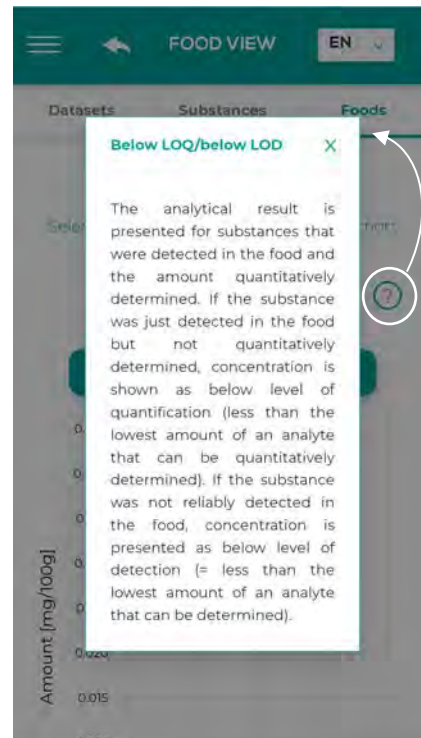
- **Search Foods** - allows users to search for a specific food
- **Search Substance** - allows users to search for a specific substance in foods
- Get **context** about substances
- **Tutorial** – informs the user what the app can do, where the data comes from and what the app doesn't do
- **About datasets** – description of the sources of data

Support functions

Tutorial (in app)

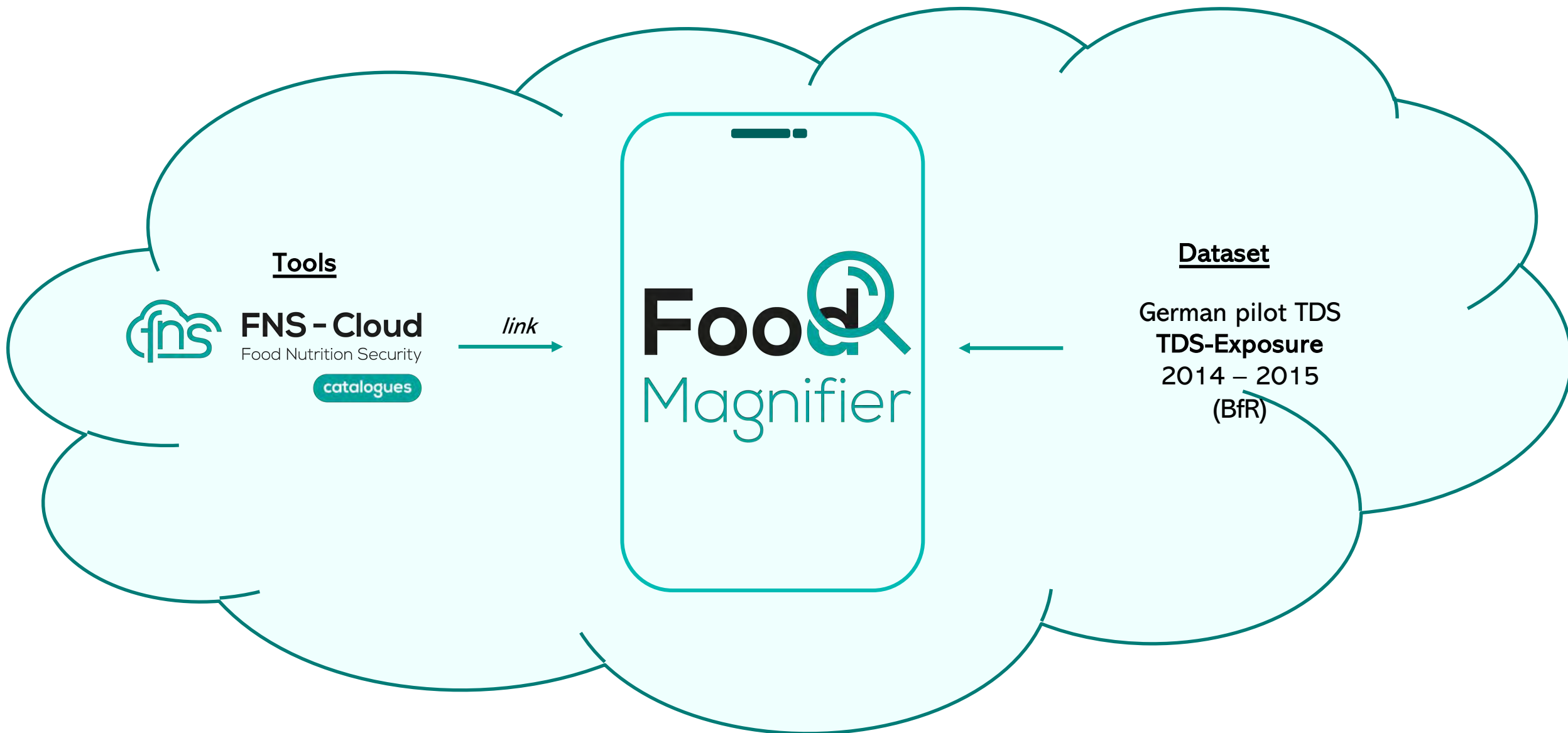


Question marks (in app)

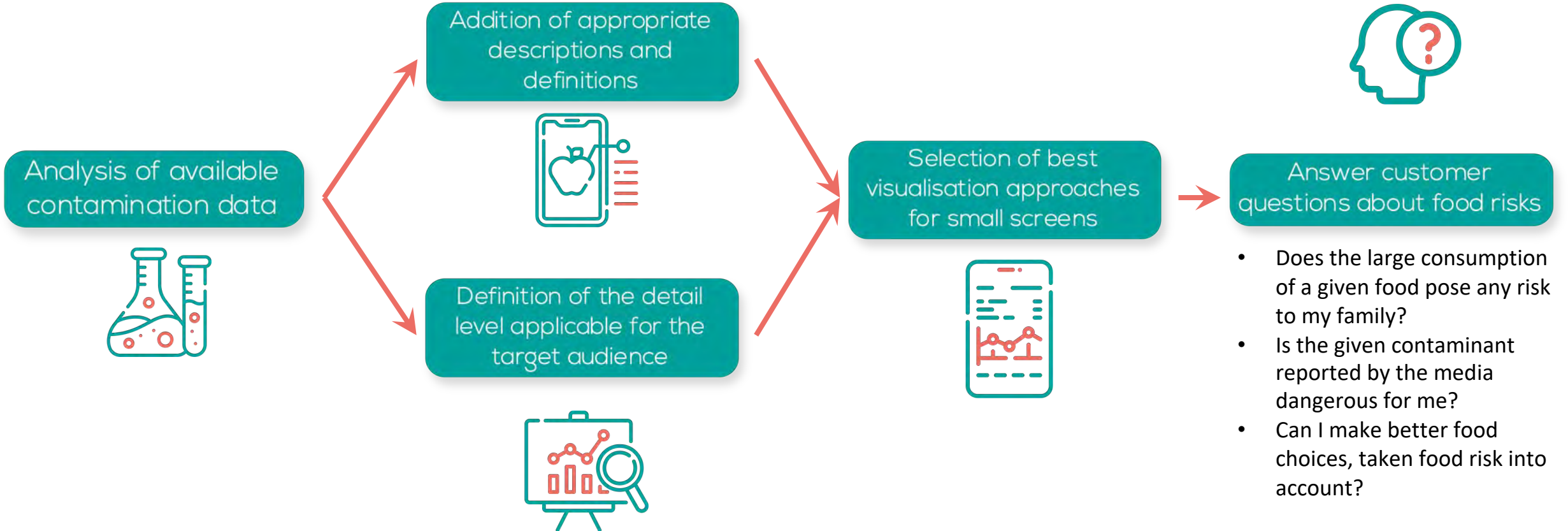


Interactive tutorial (online with a link in the app)



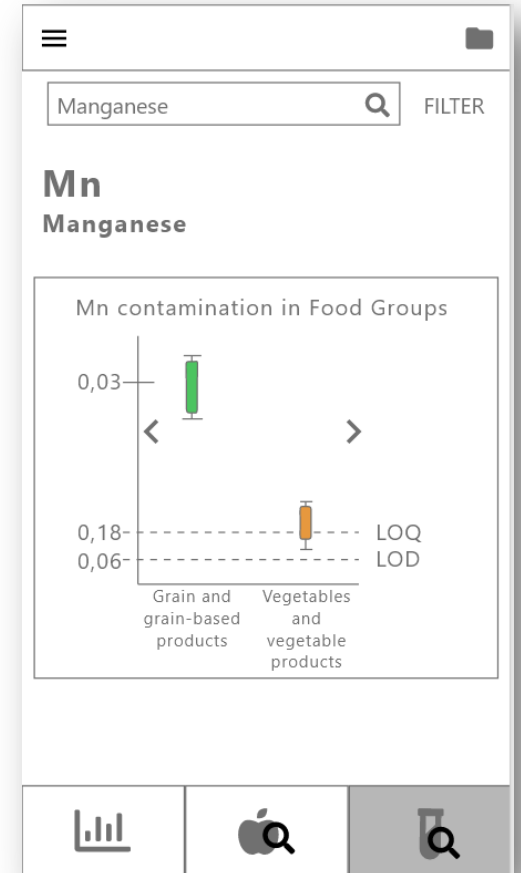
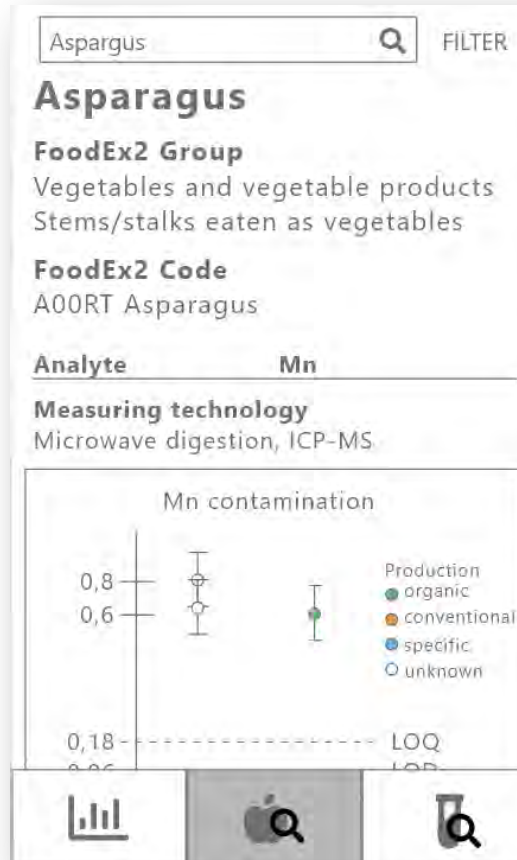
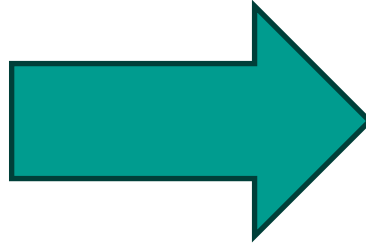
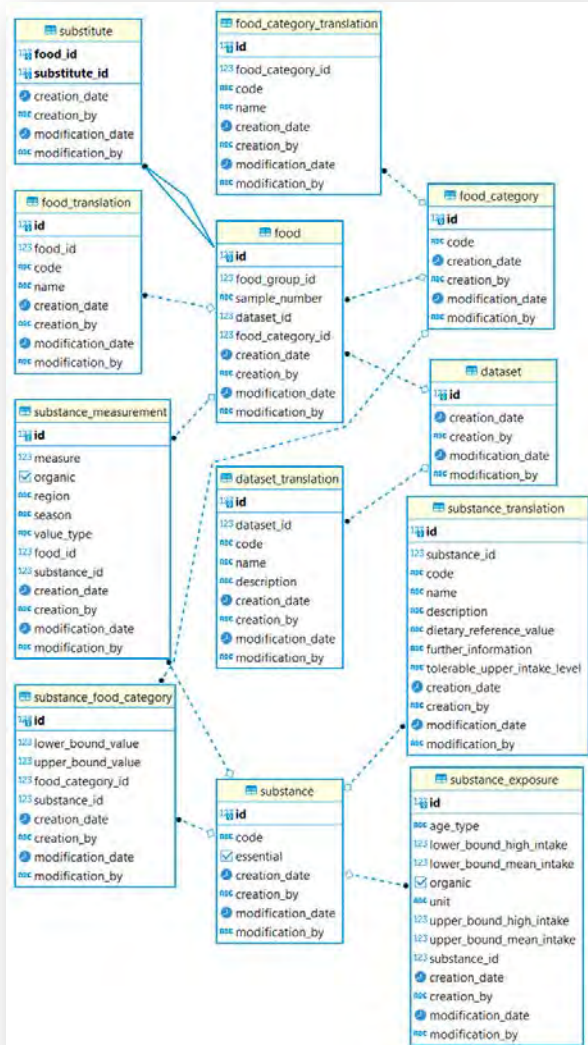


Story of the development

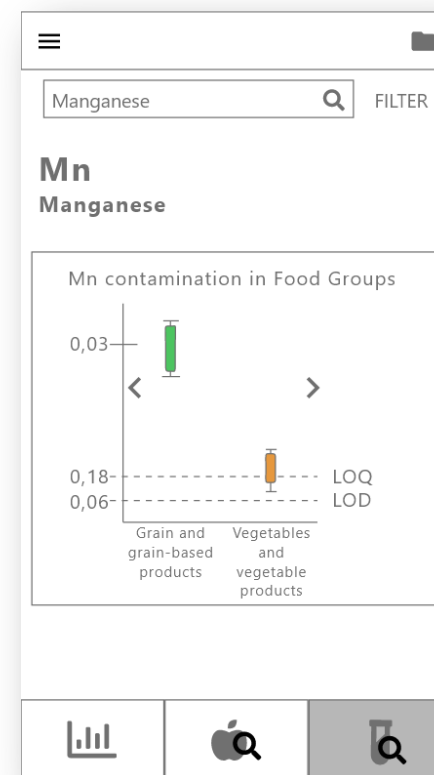
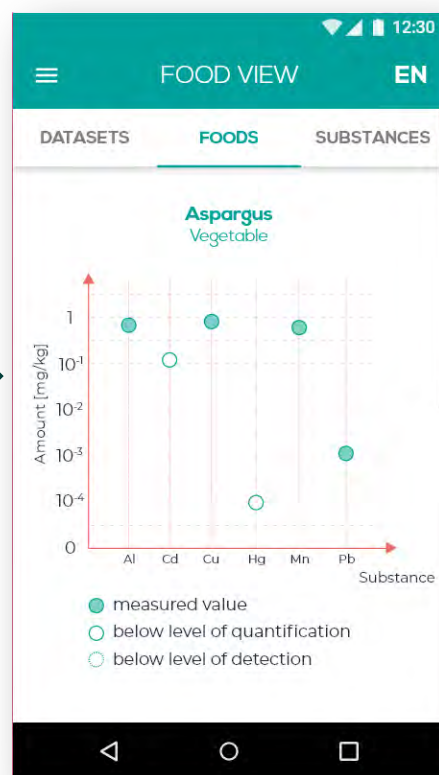
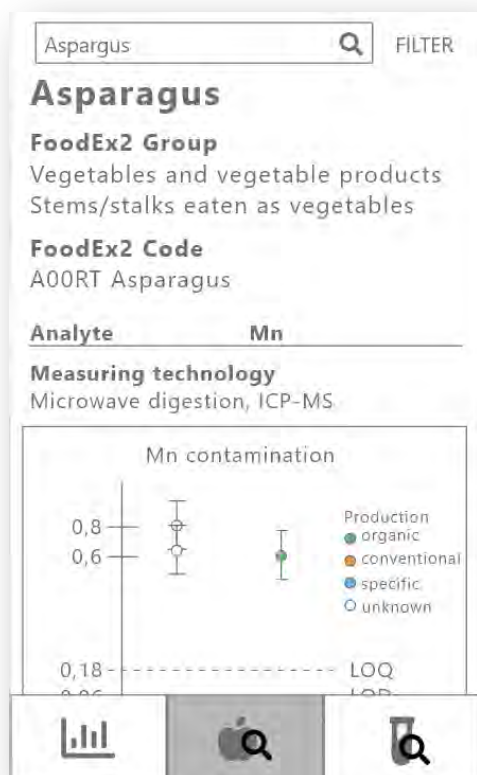


Additionally: answer research questions around risk communication.

Story of the development



Story of the development



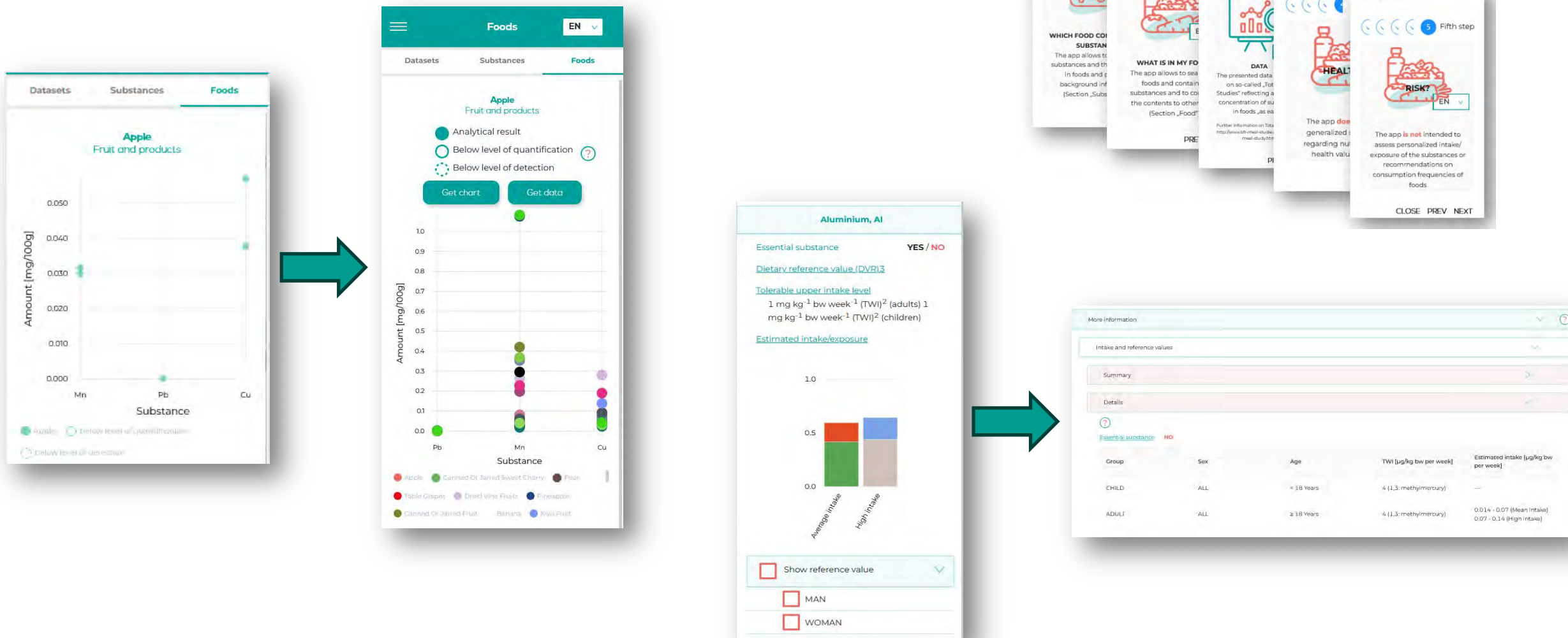
Main contributors to dietary exposure	
Grains and grain-based products	24-28%
Coffee, cocoa, tea and infusions	15-18%
Water and water-based beverages	8-21%
Composite dishes	8-13%
Meat and meat products	6-7%
Fruit and products	6-7%
Confectionery and sweet deserts	4-5%
Potatoes and products	3-4%
Vegetables and products	2-3%
Milk and dairy product	1-2%
Legumes, nuts and oilseeds	1-2%
Juices and nectars	1-2%
Alcoholic beverages	<1%
Seasoning and sauces	<1%

Story of the development

Two **usability tests** were performed:

- In 06.2022 during FNS-Cloud Consortium Meeting – in person with guidance from the presenter, using LimeSurvey to collect results from 10 participants
- In 12.2022 and 01.2023 entirely online, on 42 participants (German consumers, risk managers, risk communication experts) using LimeSurvey to collect results

Story of the development



Summary



- **App tool** for future use by (TDS) data owners from different countries
- The **basic structure** for an online application to present **content data** of substances in **food**
 - **contaminants, residues, toxins or nutrients**
- Provides the possibility to add **background information** on included **substances and related assessments** and/or relevant **literature and links** according to country specific / study specific / communication specific needs to add **context** for the users.

Thanks to



FNS-Cloud Consortium



BfR Department for
Risk Communication



BfR MEAL Study team

Food Magnifier

Interactive session

Please try our app now!



foodmagnifier.eu

Try by yourself - inspiration

Getting back to the fish restaurant:

A friend of Mary (not pregnant) is curious and would like to know if there are any undesirable substances in wine. Therefore he asks Mary to find the following information:

- (1) How much lead, mercury and aluminium (heavy metals) are in wine?
- (2) Regarding lead: is the content high or low compared to other alcoholic beverages?
- (3) What is the toxicological reference value (BMDL) for lead for adults?
- (4) How large is the share of alcoholic beverages on dietary exposure of lead?
- (5) Which foods have the highest lead contents?

Try by yourself - inspiration

Getting back to the fish restaurant:

A friend of Mary (not pregnant) is curious and would like to know if there are any undesirable substances in wine. Therefore he asks Mary to find the following information:

- (1) How much lead, mercury and aluminium (heavy metals) are in wine? **Al: 0.075 mg/ 100 g; Hg: <LOQ; Pb: 0.0018 mg/ 100 g**
- (2) Regarding lead: is the content high or low compared to other alcoholic beverages? **high**
- (3) What is the toxicological reference value (BMDL) for lead for adults? **0.63 µg/kg bw per day**
- (4) How large is the share of alcoholic beverages on dietary exposure of lead? **16.8-18,1%**
- (5) Which foods have the highest lead contents? **Spices, mussels, bitter chocolate**



Discussion and feedback

Please go to Mentimeter now!



or go to **menti.com** and use code: **7936 9605**

Thank you!

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