National Institute for Public Health
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PFAS concentrations in **food and drinking water** in the Netherlands compared with **other European countries**

A literature review

RIVM letter report 2026-0053
J. Stam | J. Hartmann | P.E. Boon

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Colophon

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Synopsis

PFAS concentrations in food and drinking water in the Netherlands compared with other European countries

A literature review

The National Institute for Public Health and the Environment (RIVM) compared PFAS concentrations in food and drinking water in the Netherlands with those in other European countries. The idea was that lower concentrations in other countries might provide solutions for reducing exposure in the Netherlands. However, the results do not show this. They therefore give no reason to pursue further research in this direction.

For food, RIVM examined concentrations in fish, seafood, fruit, vegetables, eggs and meat. For other product groups, insufficient data were available. Concentrations in areas with higher levels of PFAS contamination, known as hotspots, were assessed separately to avoid distorting the comparison between countries.

The results suggest that PFAS concentrations in food in the Netherlands are similar to or lower than those in other European countries. Only in fish and seafood from the Western Scheldt (a hotspot) and in eggs from backyard chickens are the concentrations of several PFAS higher in the Netherlands than in other countries. This does not apply to fish and shellfish outside hotspots or to commercial eggs. For drinking water, the results were compared with those from a small number of countries. In those countries, the concentrations PFAS in drinking water appear to be roughly the same as in drinking water in the Netherlands.

This research provides an initial impression. The research was conducted using information from studies published since 2017. For drinking water, a European network (ENDWARE) was also consulted. The data on PFAS concentrations were collected in different ways, making them difficult to compare. To draw more reliable conclusions, it is important that European countries collect data on PFAS concentrations in food and drinking water in the same way and cover a wider range of food products. Work on this is already underway.

This study is part of the PFAS research programme, which aims to improve understanding of the sources of PFAS to reduce exposure. Exposure through food and drinking water in the Netherlands is above the health-based limit value. This continues to require attention.

Keywords: PFAS, food, drinking water, the Netherlands, Europe

Publiekssamenvatting

PFAS-concentraties in voedsel en drinkwater in Nederland vergeleken met andere Europese landen

Een literatuuronderzoek

Het RIVM heeft concentraties PFAS in voedsel en drinkwater in Nederland vergeleken met de concentraties in andere Europese landen. Het idee was dat eventuele lagere concentraties in de andere landen oplossingen zouden kunnen geven om de blootstelling in Nederland te verminderen. Maar de resultaten laten dat niet zien. Ze geven dan ook geen aanleiding om dit verder te onderzoeken.

Voor voedsel is gekeken naar concentraties PFAS in vis, schaal- en schelpdieren, fruit, groente, eieren, en vlees. Over andere productgroepen waren er niet genoeg gegevens. De concentraties in gebieden met een hogere PFAS-vervuiling, zogeheten hotspots, zijn apart beoordeeld om de vergelijking tussen landen niet te verstoren.

De resultaten geven de indruk dat de concentraties PFAS in voedsel in Nederland hetzelfde zijn als in andere Europese landen of lager. Alleen in vis en schaal- en schelpdieren uit de Westerschelde, een hotspot, en in eieren van hobbykippen zijn de concentraties van een aantal PFAS hoger in Nederland dan in andere landen. Dat geldt niet voor vis en schaal- en schelpdieren buiten hotspots en voor commerciële eieren. Voor drinkwater zijn de resultaten vergeleken met een klein aantal landen. In deze landen lijkt de concentratie PFAS in drinkwater ongeveer hetzelfde te zijn als in het drinkwater in Nederland.

Dit onderzoek geeft een eerste indruk. Het onderzoek is gedaan met informatie uit studies die sinds 2017 zijn verschenen. Over drinkwater is ook een Europees netwerk bevraagd (ENDWARE). De concentraties zijn hierin op verschillende manieren verzameld, waardoor ze moeilijk zijn te vergelijken. Om betrouwbare conclusies te kunnen trekken is het belangrijk dat Europese landen concentraties PFAS in voedsel en drinkwater op dezelfde manier gaan verzamelen en voor meer voedselproducten. Hier wordt al aan gewerkt.

Dit onderzoek valt onder het PFAS-onderzoeksprogramma, dat inzicht wil krijgen in bronnen van PFAS om de blootstelling te verminderen. De blootstelling via voedsel en drinkwater ligt in Nederland boven de gezondheidskundige grenswaarde. Dat blijft om aandacht vragen.

Kernwoorden: PFAS, voedsel, drinkwater, Nederland, Europa

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1 Introduction

Per- and polyfluoroalkyl substances (PFAS) form a large and diverse group of synthetic chemicals that have been widely used in industrial processes and in consumer products such as non-stick cookware, water-repellent clothing, stain-resistant fabrics and fire extinguishing foams. Their widespread use is due to their ability to repel water, oils and dirt, as well as their effectiveness as surfactants. PFAS usually consist of fully or partly fluorinated carbon chains with carbon–fluorine bonds and a functional group such as a carboxylic or sulfonic acid. These strong bonds make PFAS highly resistant to heat and to chemical or biological breakdown, so they persist in the environment on a global scale (1,2).

There is increasing concern about PFAS, because epidemiological and toxicological studies link the exposure to various PFAS to adverse health effects, including effects on the liver, lipid metabolism, immune function, thyroid hormone regulation, reproduction and development, and carcinogenic effects (3). In 2020, the European Food Safety Authority (EFSA) set a group tolerable weekly intake (TWI) of 4.4 nanogram/kilogram body weight for the sum of four PFAS (perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA) and perfluorohexane sulfonic acid (PFHxS)), the so-called EFSA-4. This TWI is based on reduced vaccine antibody responses in children (4), and is used by RIVM as the starting point for PFAS risk assessments. Because humans can also be exposed to other PFAS besides the EFSA-4, which may have similar health effects, RIVM uses this TWI in combination with the relative potency factor (RPF) approach (4-6). This approach allows the inclusion of more PFAS in the risk assessment and takes into account differences in their potency to cause health effects.

For the general European population, food and drinking water contribute most to total PFAS exposure, although other sources, such as consumer products, house dust and indoor and outdoor air, may also play a role (4,7-10). RIVM concluded in 2023 that the exposure to PFAS through food and drinking water in the Netherlands already exceeds the TWI (5).

The goal of the present study was to compare dietary exposure to PFAS in the Netherlands with that in other European countries. Indications of differences in exposure to PFAS between countries or regions could prompt further investigation into underlying causes and options to reduce exposure. To get an impression of differences in dietary exposure between countries, PFAS concentrations in different food products and in drinking water were examined. This approach was selected, because PFAS concentrations in food and drinking water are important drivers of exposure.

This research was conducted as part of the PFAS research programme (2023–2026), which aims to gain insight into the sources contributing to the exposure to PFAS in the Netherlands with the strategic goal of reducing the overall exposure to PFAS in the Netherlands (11).

2 Methods

The inventory of concentrations of PFAS in food and drinking water in Europe was based on a literature search. For this, information from both scientific and grey literature was derived. For drinking water, additional data were collected through a call for information issued via the European Network of Drinking Water Regulators (ENDWARE). The sections in this chapter describe the strategies used to identify relevant literature on PFAS in food and drinking water in Europe.

Only studies on PFAS concentrations in food and drinking water published after the EFSA opinion (on 17-09-2020) were considered (4).The EFSA opinion was used as a starting point to capture the most recent concentration data.

2.1 Literature search strategy

2.1.1 PFAS in food in Europe

For PFAS concentrations in food, a literature search was conducted using the terms 'PFAS' in combination with 'food', 'Europe' and 'human studies' (see Appendix 1 for details for the full search string). The search was performed in PubMed, Embase, Scopus, and Web of Science Core Collection (WoS CC).[1] The search was performed on 17-11-2025 and yielded after deduplication 447 results in PubMed, 385 in Embase, 559 in Scopus, and 422 in WoS CC. After removing duplicates between databases, 878 unique results remained. Screening abstracts identified 109 relevant papers. After reviewing the full texts, 29 papers with information on PFAS-concentrations in food remained (see Figure 1).

To identify additional sources beyond scientific papers, grey literature was also searched on Google using individual European country names and terms such as 'PFAS in food'.[2] This search resulted in 28 additional sources, including reports and other documents such as presentation slides from national research institutes and agencies, and some scientific studies not found in the initial database search (see Figure 1).

All 57 relevant scientific papers, reports and other documents fulfilled the following criteria:

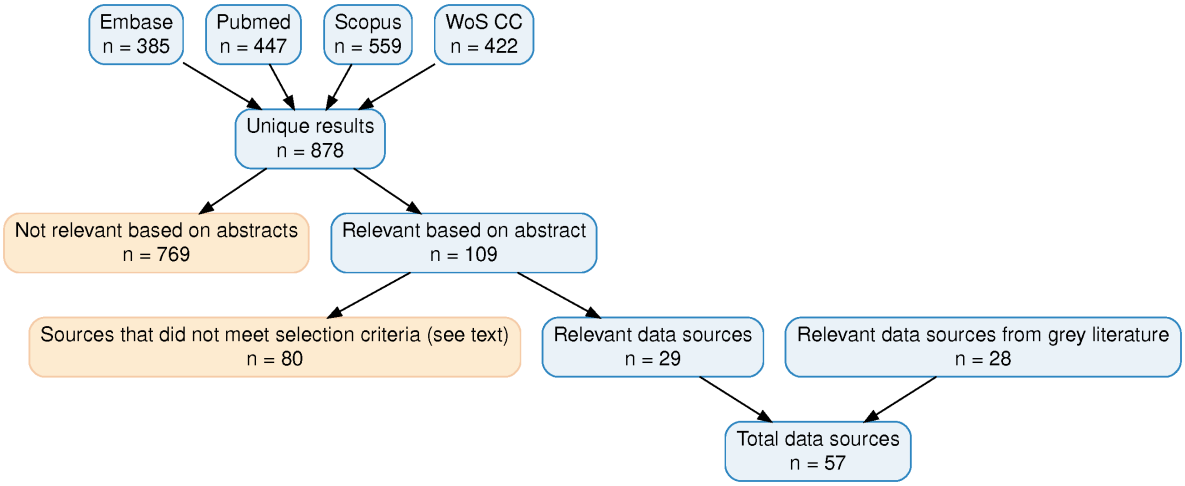
- At least one PFAS was measured in food (see Box 1).
- Analysed foods were available on the European market (not necessarily also produced in Europe).
- Full text was available in English, Dutch or German.
- Food samples were collected from 2017 onwards if reported. This year was selected on practical availability of studies and because EFSA included occurrence data between 2000 and 2016 (4).
- Concentrations were reported quantitatively (e.g. in tables), and the following was at least reported:

[1] Including WOS Science Citation Index Expanded, WOS Social Sciences Citation Index, WOS Emerging Sources Citation Index and WOS Arts & Humanities Citation Index

[2] Countries included in the search were Albania, Armenia, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Montenegro, the Netherlands, Norway, Poland, Romania, Serbia, Slovenia, Slovakia, Spain, Sweden, Switzerland, United Kingdom and Ukraine.

- Concentration per PFAS for each individual sample, or
- Mean concentration per PFAS or a median concentration together with a minimum and maximum value (only a median value was not considered sufficient).

Figure 1 Overview of literature search for PFAS concentration in food.



WoS CC: Web of Science Core Collection

Box 1: Measured versus reported
A scientific paper, report or other document was included if the measure of at least one PFAS in food was reported. The reported concentration of PFAS was not required to be above the limit of detection (LOD) or limit of quantification (LOQ). Studies that reported to have measured PFAS but only reported concentrations below LOD or LOQ were still included in the analysis.

2.1.2 PFAS in drinking water in Europe

For the collection of concentration data on PFAS in drinking water in Europe, the same search strategy was applied as for food, with 'food' replaced by 'drinking water'. This search yielded 13 scientific articles. In addition to the search in scientific and grey literature as described in the previous section, a call for concentration data for drinking water was issued through ENDWARE to ensure comprehensive data collection, to which 14 countries responded.

Similar inclusion criteria were applied as in the previous section, except that no studies from the scientific or grey literature were included for countries that submitted concentrations through ENDWARE (with national coverage). After applying these criteria, nine studies from the literature search and ENDWARE data from eight countries remained for analysis.

2.2 Data extraction

To ensure consistency, all relevant scientific papers/reports and other relevant documents considered are referred to as 'data sources' in this report. The data extracted from these data sources are called 'datasets'.

After extraction, the relevant datasets with PFAS concentrations in food were organized in 12 food groups, including:

1. Fish & seafood
2. Fruit, vegetables & mushrooms
3. Cereals, bread & oils
4. Eggs
5. Meat
6. Milk & dairy products
7. Composite foods (dishes composed of multiple food types)
8. Baby foods
9. Sauces
10. Confectionery
11. Alcoholic beverages
12. Non-alcoholic beverages

These food groups were defined based on the presentation of the concentration data in the included datasets.[3] The datasets for drinking water were organized separately from those for food.

2.2.1 Extraction of PFAS names

Some PFAS were reported using different names. To allow optimal comparison and to avoid confusion, Appendix 2 lists the PFAS nomenclature used in this study and the PFAS that were also grouped under these PFAS for both the food and drinking water datasets.

2.2.2 Extraction of concentration data for food

The following information about concentrations in food were extracted: country; region (if applicable); publication date; food collection date; first author; study paper purpose; number of samples; PFAS measured; mean, minimum and maximum concentrations of individual PFAS (µg/kg, fresh or dry weight); analytical method; limit of detection (LOD); and limit of quantification (LOQ).

Since not all concentration data were reported in the same way, the following assumptions were used during the extraction:

1. Individual PFAS concentrations were extracted as mean, minimum and maximum value because these values were reported in most data sources. If only summary data were reported, these data were directly extracted. If individual sample data was reported, mean, minimum and maximum values were calculated based on the individual data.
   When concentrations were reported for several subtypes of a food within a food group (e.g. different vegetables, different locations, or different fish organs), mean, minimum and maximum concentrations per PFAS and food group were calculated.[4]
   If only mean concentrations were reported, this value was considered to be also the minimum and maximum value. In case

[3] Some studies reported PFAS concentrations only for broad food groups, such as "cereals, bread and oils." Therefore, the datasets with the broadest level of food-group reporting were used to classify the data.
[4] For example, if a dataset contained PFOA concentrations in yellow string-bean (0.22 µg/kg wet weight (ww)), broad bean (0.22 µg/kg ww) and split peas (0.034 µg/kg ww), the mean, minimum and maximum values for PFOA for that dataset for the food group "Fruit, vegetables & mushrooms" were 0.158, 0.034 and 0.22 µg/kg ww, respectively.

foods had been sampled from a hotspot, these data were labelled as such (see Box 2).
2. For one data source, some concentrations were expressed as fresh weight and others as dry weight for foods of the same food group. These data were extracted as two separate datasets, because converting the concentrations into the other unit was not possible (12).
3. When a data source reported left-censored data (<LOD or <LOQ), these data were extracted assuming them to be equal to 0 (lower bound (LB) scenario). If the data source reported that a PFAS could not be detected without stating that the value was <LOD or <LOQ or a similar statement, these PFAS were not included in the analysis.
4. When no exact date of sample collection was reported, but it was clear that the samples were not collected before a certain year (for example, because the paper cites methods from that year that were essential for the sample preparation), this year was used as sample collection date.
5. If only median, minimum and maximum values were reported, mean values were calculated using:

$$\bar{x} = \frac{a + 2m + b}{4}$$

where a = minimum value, b = maximum value and m = median value (13).
6. If only a range of number of samples was reported, the highest number was extracted.
7. In case of multiple replicate concentrations, such as duplicate results, only the original result was extracted.
8. If multiple food samples were pooled to generate one mixed sample for analysis, this mixed sample was counted as one sample.
9. Some datasets reported individual values for branched and linear forms of PFAS (e.g. PFOS), in those cases, the total concentrations for the different forms of the PFAS were used.
10. For PFAS concentrations in fish, data came from edible fish parts such as muscle and/or liver samples. If several organs were sampled, the mean of the concentrations was taken.

Box 2: Hotspot
A hotspot is a location where PFAS concentrations in the environment are higher than normal background levels, due to e.g. the emission of PFAS by industry or firefighting training.

2.2.3 *Extraction of concentration data for drinking water*

The data extraction for drinking water followed the same approach as described for food (see previous section). The same information was extracted where available, with the difference that PFAS concentrations were reported in µg/L or ng/L.

Assumptions 1, 3, 4 and 6 in the previous section were also applied to the drinking water data. Assumption 2 was not relevant, as well as assumption 5, because none of the drinking water data sources reported only median, minimum and maximum values without a mean concentration.

One of the datasets for the Netherlands reported mean concentrations for two drinking water types: drinking water made from surface water and drinking water made from groundwater. To allow comparison with the other datasets, an overall mean concentration for drinking water was calculated by combining these two means using the following weighting: 0.6 × mean of drinking water from groundwater + 0.4 × mean in drinking water of surface water. This weighting reflects the national distribution of groundwater and surface water as drinking water sources in the Netherlands.

2.3 Data cleaning and visualization

For the data cleaning and visualization, Excel and R (version 4.6.0) were used with installed R packages: circlize, ComplexHeatmap, diagramme, DiagrammmeR, DiagrammeRsvg, dplyr, extrafont, ggplot2, grid, magick, purr, readxl, rnaturalearth, rnaturalearthdata, rsvg, scales, sf, stringr, tibble, tidyr and utils.

3 Results

3.1 Included datasets and measured PFAS for food

The selected 57 data sources (see Figure 1 in section 2.1.1) yielded 140 datasets for PFAS concentrations in food from 25 European countries (see Figures 2 and 3, Table 3A in Appendix 3, and Appendix 4). Some data sources reported PFAS concentrations for several food groups or several European countries resulting in more than one data source. The number of datasets ranged from one for four countries (Iceland, Ireland, Slovakia and United Kingdom) to 30 for the Netherlands. Appendices 4 and 5 provide the number of datasets and their geographic distribution for each food group, respectively.

The 57 data sources were published in 2020 (n=1), 2021 (n=2), 2022 (n=11), 2023 (n=12), 2024 (n=17) and 2025 (n=14). The datasets derived from other data sources than scientific papers came from (networks of) national agencies and non-profit organizations (see Table 3A in Appendix 3, and Appendix 5). One included dataset was cited in another scientific paper but was counted as a single dataset.

Many data sources reported on PFAS concentrations in foods that were sampled during more than one year (see Table 3A in Appendix 3). Food was sampled between 2017 and 2025, with the highest number of samples collected in 2022. Still sampling dates were not known for every data set. Overall, the number of datasets was highest for the food group "Fish & seafood' (n=31) followed by "Cereals, bread & oils" (n=23) and "Eggs" (n=22). The food group with the lowest number of datasets was "Sauces" (n=2) followed by "Composite foods" and "Confectionery" (n=3 each). Of these datasets, four for "Fish & seafood", four for "Fruit, vegetables & mushrooms", two for "Eggs", and one each for "Cereals, Bread & Oils", "Meat" and "Non-alcoholic beverages" contained PFAS concentrations from a known PFAS hotspot.

The PFAS that were measured in food varied across datasets. Measurement of a PFAS does not mean that its concentration was also reported (see Box 1). In total, 42 PFAS were measured (in at least 2 datasets) (see Figure 4). The 15 most frequently measured PFAS were PFOS (n = 104), PFOA (n = 94), PFNA (n = 93), PFHxS (n = 90), perfluorodecanoic acid (PFDA; n = 79), perfluorododecanoic acid (PFDoDA; n = 72), perfluoroundecanoic acid (PFUnDA; n = 71), perfluoroheptanoic acid (PFHpA; n = 69), perfluorobutanesulfonic acid (PFBS; n = 69), perfluorohexanoic acid (PFHxA; n = 66), perfluorotetradecanoic acid (PFTeDA; n = 60), perfluorotridecanoic acid (PFTrDA; n = 57), perfluoroheptanesulfonic acid (PFHpS; n = 55), perfluoropentanoic acid (PFPeA; n = 54) and perfluorodecanesulfonic acid (PFDS; n = 52). As expected, the EFSA-4 (PFOS, PFOA, PFHxS and PFNA) were among the most frequently measured PFAS. PFAS that were reported in food are provided in Appendix 4.

Figure 2 Flow diagram of the selection of datasets for the different food groups for inclusion in the Europe charts, bar chart and heatmaps.

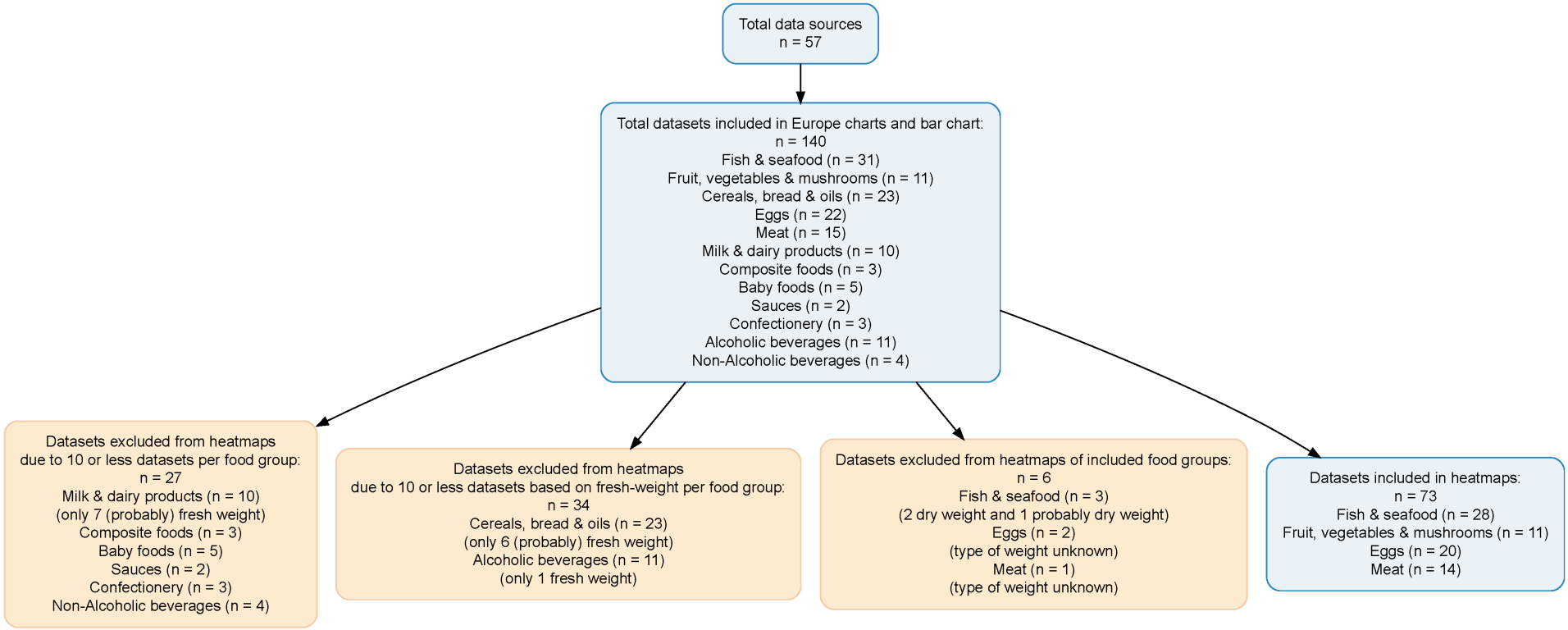
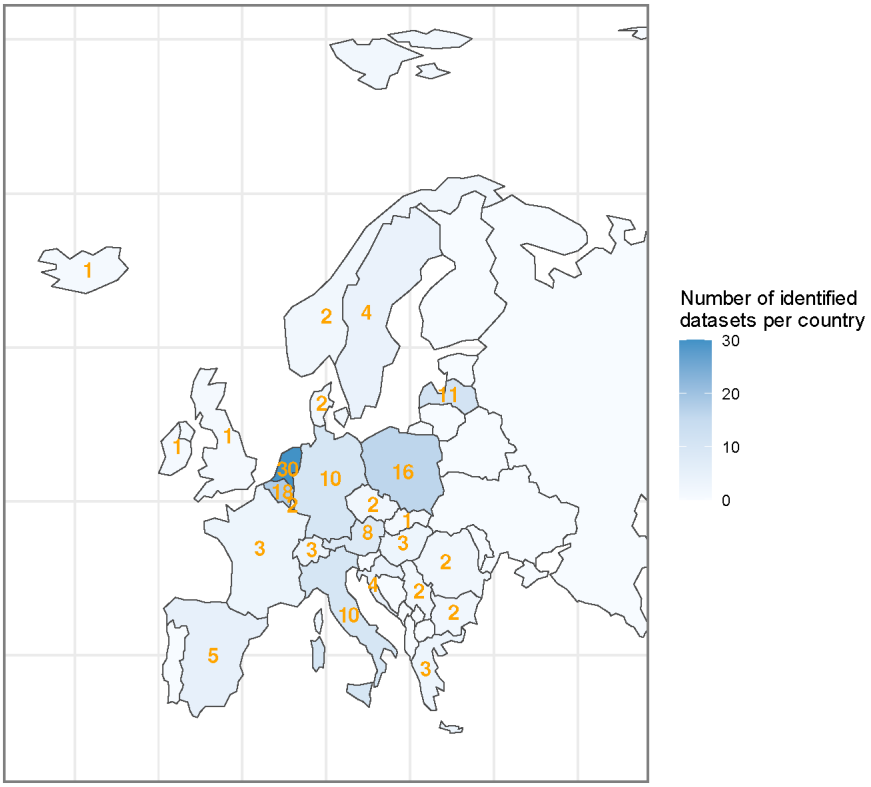


Figure 3 Number of datasets across food groups per country.[a,b,c]



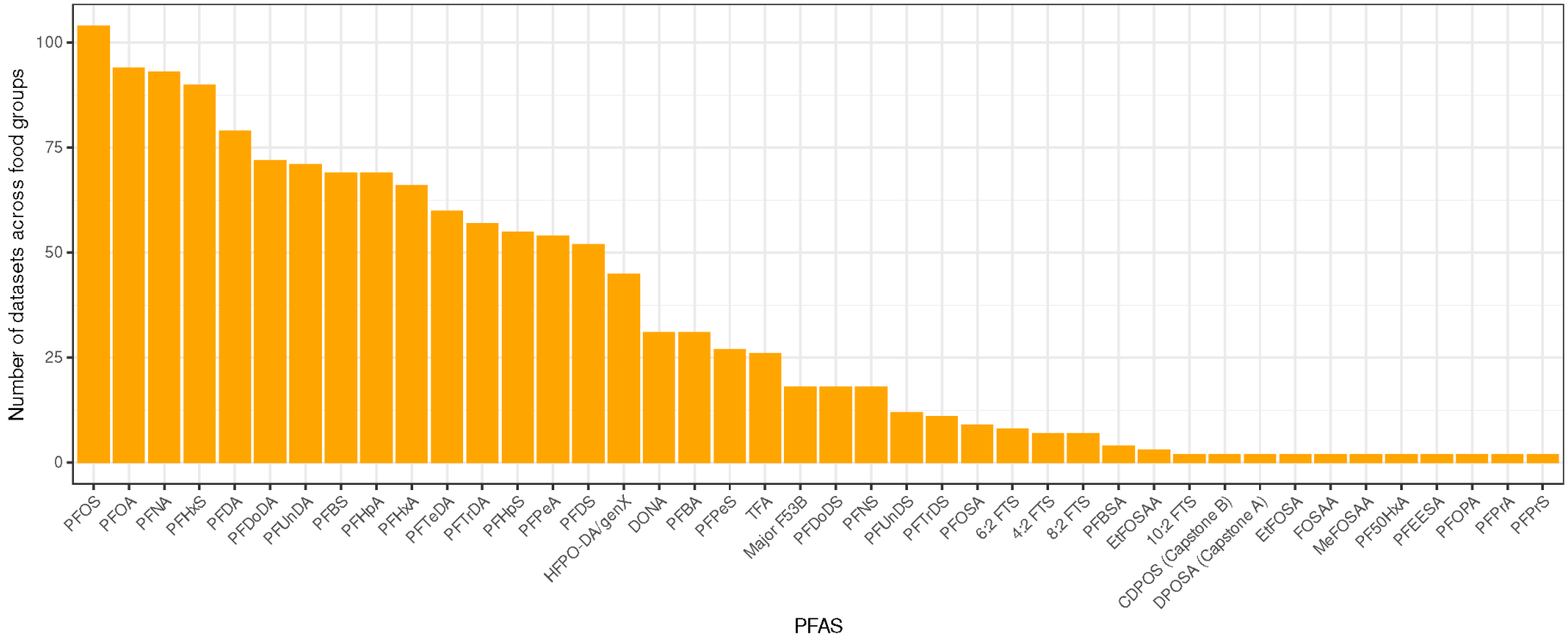
PFAS: per- and polyfluoroalkyl substances
[a] Information per food group is provided in Appendix 5.
[b] Number of datasets was 140, with one dataset covering seven European countries.
[c] For the countries in white, no information on PFAS in food was included.

LODs and LOQs for the same food group per PFAS differed between datasets. As shown in Table 1, LODs and LOQs spanned roughly five orders of magnitude.

Table 1 Overview of minimum and maximum limit of detection (LOD) and limit of quantification (LOQ) per food group. All limit values are in µg/kg.

Food group	**LOD (min – max)**	**LOQ (min – max)**
Fish & seafood	0.00002 – 1.5	0 - 4
Fruit, vegetables & mushrooms	0.00005 – 0.09	0.0001 – 0.5
Cereals, bread & oils	0.00005 – 0.1	0.0001 - 10
Eggs	0 – 0.55	0.0001 – 2.5
Meat	0.00002 – 0.00005	0.0001 – 1
Milk & dairy products	0.00002 – 0.11	0.0001 – 1
Composite foods	0.00005 – 0.12	0.0001 – 1
Baby foods	Not applicable	0.001 - 1
Sauces	0.00005 – 0.12	0.0001 – 1
Confectionery	0.00005 – 0.13	0.0001 – 1
Alcoholic beverages	Not applicable	0.008 – 10
Non-alcoholic beverages	0.00005 – 0.13	0.0001 – 0.9

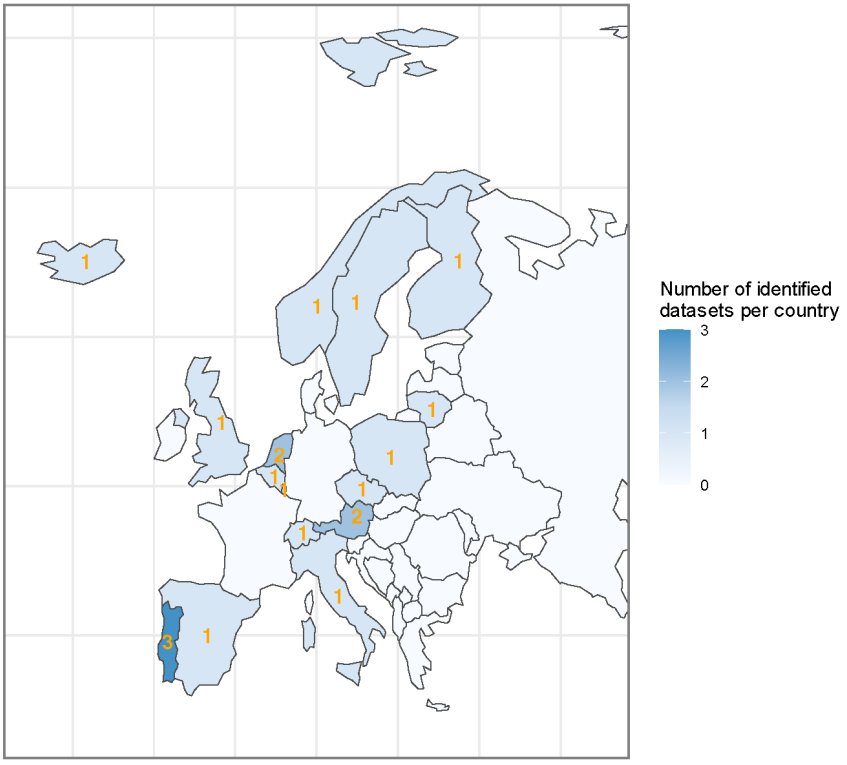
Figure 4 Number of datasets across food groups in which a specific PFAS was measured. PFAS are presented in descending order of overall frequency. Only PFAS measured in at least two datasets are shown. See Appendix 4 for the full list of PFAS measured in food.



3.2 Included datasets and measured PFAS for drinking water

In total 20 datasets were included for drinking water which were derived from 18 data sources from 16 European countries (see Figure 5, Table 3B in Appendix 3, and Appendix 4). Figure 5 shows the geographic distribution of the included drinking water datasets in Europe. For most countries, one dataset was available. For Portugal, one data source provided summary data for three different years, which were analysed as three separate datasets (14). For the Netherlands and Austria, two datasets were available (see Table 3B in Appendix 3) (5,15-17). For the Netherlands, the dataset from Schepens et al (2023) provides the most recent overview of PFAS concentrations in Dutch drinking water (monitoring data from 2022) (5). The dataset from Poland contained data obtained from a suspected hotspot.

Figure 5 Number of datasets for drinking water per country.[a,b]



PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 20.
[b] For the countries in white, no information on PFAS in drinking water could be included.

Eleven of the 18 data sources were published in 2021 (n=1), 2022 (n=1), 2023 (n=2), 2024 (n=3) and 2025 (n=4). The other seven data sources were obtained via ENDWARE and were not published. It is noted that Denmark, France, Hungary and Germany also responded to the call for data via ENDWARE. However, their submissions could not be included in the analysis. The French report was only available in French. Hungary and Germany could not provide quantitative PFAS concentrations with national coverage.[5] For Denmark, data could in principle be retrieved from a public

[5] This was not possible for Germany due to the sovereignty of the 16 federal states and that national reporting is scheduled for 2027.

database, but access required payment of a fee, which fell outside the scope of this study.

Of the 20 datasets, 15 contained information on individual PFAS concentrations (see Table 3B in Appendix 3). All concentrations were collected between 2017 and 2026. Figure 6 shows that the ranking of the most frequently measured PFAS were similar as for food with minor differences. In drinking water, PFOA ranked the highest, and PFBS ranked at the same height as PFNA and PFHxS (see Figures 4 and 6). The PFAS that were reported in drinking water are provided in Appendix 4.

The recast of the European Drinking Water Directive (DWD) 020/2184 (EU DWD) has impacted the available monitoring data. This recast introduced specific parametric values for PFAS in drinking water (500 ng/L for total PFAS and 100 ng/L for the sum of 20 specified PFAS) and obliges Member States to systematically monitor and manage PFAS in public water supplies.[6] Most of the datasets (10/16) included the 20 PFAS specified by the European DWD.

3.3 Comparison individual PFAS concentrations between the Netherlands and other European countries

Sections 3.1 and 3.2 described the datasets for food and drinking water extracted from the included data sources and the measured PFAS in these datasets. The current section focuses on the reported measured PFAS concentrations in the different food groups and in drinking water, aiming to compare these data between the Netherlands and other European countries.

For this, five heatmaps were prepared for the individual PFAS concentrations per food group with more than 10 datasets expressed in µg/kg fresh weight and for drinking water (see Box 3). Each heatmap displays the 15 most frequently reported PFAS for either food or drinking water (see Figures 4 and 6, respectively). Concentration data for the remaining PFAS are presented in Appendix 4. The comparisons for food between the datasets for the Netherlands and other European countries were based on the concentrations expressed per kg fresh weight. Datasets that reported PFAS concentrations exclusively on a dry weight basis, or did not specify this at all, were excluded from the heatmaps (the so-called heatmap criteria). The selection of datasets for inclusion in the heatmaps is presented in Figure 2 in section 3.1.

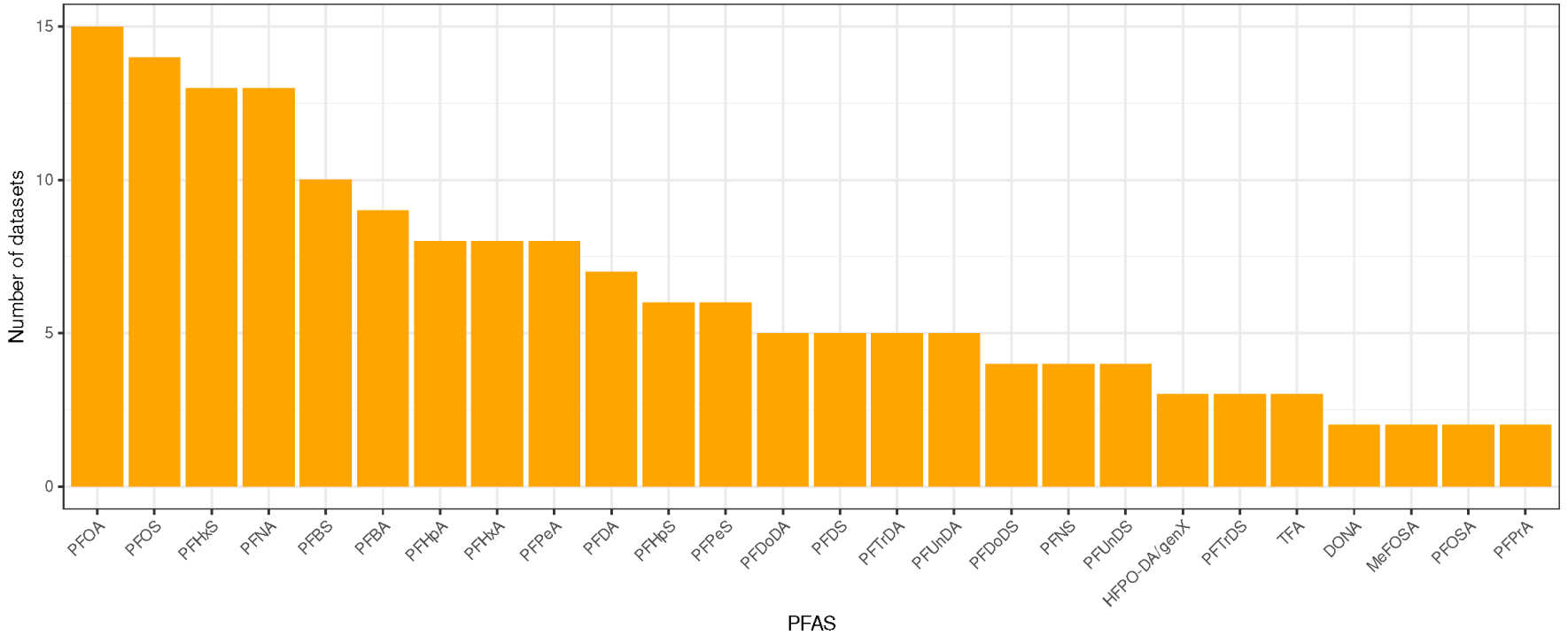
Box 3: Heatmap
A heatmap shows a matrix in which colours represent value intensity. The method simplifies complex datasets into an interpretable visual format, aiding in the detection of trends and relationships that might not be immediately obvious from the raw data.

3.3.1 Comparison for food

For four food groups, heatmaps were prepared: "Fish & seafood" (n=28), "Fruit, vegetables & mushrooms" (n=11), "Eggs" (n=20) and "Meat" (n=15) (see Figure 2 in section 3.1).

[6] PFBS, PFHxA, PFBA, PFPeA, PFPeS, PFHxS, PFHpA, PFOA, PFHpS, PFOS, PFDS, PFDoDA, PFUnDA, PFNA, PFDA, PFTrDA, PFNS, PFUnDS, PFDoDS, and PFTrDS

Figure 6 Number of drinking water datasets in which a specific PFAS was measured. PFAS are presented in descending order of overall frequency. Only PFAS measured in at least two datasets are shown. See Appendix 4 for the full list of PFAS measured in drinking water.



3.3.1.1 Fish & seafood

For the food group "Fish & seafood", the heatmap in Figure 7 was based on 28 datasets covering eleven European countries and the Danube River, among which were four Dutch datasets. Four datasets were from hotspots, one around the Danube River, one in Norway, one in Italy and one in the Netherlands.

For most of the 15 PFAS, the highest concentrations were reported for "Fish & seafood" sampled in Norway in 2018-2019 at a hotspot near a former paper factory in the Lake Tyrifjorden region (18). Mean PFOS concentrations at this location ranged from 39 to 52 µg/kg, with an overall mean of 45.6 µg/kg. "Fish & seafood" sampled in the Western Scheldt, a Dutch hotspot, had a mean PFOS concentration of 6.1 µg/kg (range 0.07-35.3 µg/kg) (18).

Looking at the non-hotspots, the Dutch PFAS concentrations in "Fish & seafood' did not deviate notably from other European non-hotspot datasets, and where it did, the PFAS concentrations were lower than those in other European studies.

3.3.1.2 Fruit, vegetables & mushrooms

Figure 8 presents the heatmap for "Fruit, vegetables & mushrooms" based on 11 datasets (see Figure 2 in section 3.1) covering seven European countries, including four Dutch datasets of which two were from hotspots. The highest concentrations were reported for a dataset from a hotspot, although the highest PFOS concentrations were found in a study from the United Kingdom and the highest PFNA concentrations in a study from Poland (19-22).

Regarding the Dutch datasets, data from Schepens et al. (2023) showed the highest PFHpS concentration at 9.52^{e-06} µg/kg, although still a low number (5).

Overall, PFAS concentrations in "Fruit, vegetables & mushrooms" were substantially lower than in "Fish & seafood" and differences between datasets from the Netherlands and other European countries were also much smaller.

3.3.1.3 Eggs

The heatmap for "Eggs" was based on 20 datasets (see Figure 2 in section 3.1) covering eleven European countries, including four Dutch datasets of which one contained PFAS concentrations in eggs from backyard chickens (see Figure 9). Eggs from backyard chickens are known to contain more PFAS than commercial eggs (23).

Overall, two Belgian datasets reported the highest PFAS concentrations for most PFAS in "Eggs" (20,24). These two datasets were based on PFAS in eggs from backyard chickens sampled in a hotspot near 3M in Zwijndrecht, Belgium. Maximum PFOS concentrations in these eggs reached 571 µg/kg. For eggs from backyard chickens in the Netherlands, maximum PFOS concentrations reached 17 µg/kg (25). The same Dutch study found the highest concentration for PFHpS (0.02 µg/kg). The Dutch eggs from backyard chickens were not sampled at locations within

Figure 7 Overview of individual PFAS concentrations (µg/kg wet weight) in "Fish & seafood" per dataset. The value in each cell is the mean PFAS concentration; the range in parentheses is the minimum–maximum reported value. Colour intensity reflects the mean concentration of the individual PFAS. Datasets (rows) are ordered in alphabetic order of the countries. Rows representing datasets from known hotspots are boxed in black. Grey cells without values indicate that the PFAS was not detected in that dataset. For all datasets, the lower bound scenario was reported, meaning that below the limit of detection or limit of quantification were considered zero, respectively. Abbreviations: AGES: Austrian Agency for Health and Food Safety GmbH; EEB: European Environmental Bureau; NVWA: Netherlands Food and Consumer Product Safety Authority

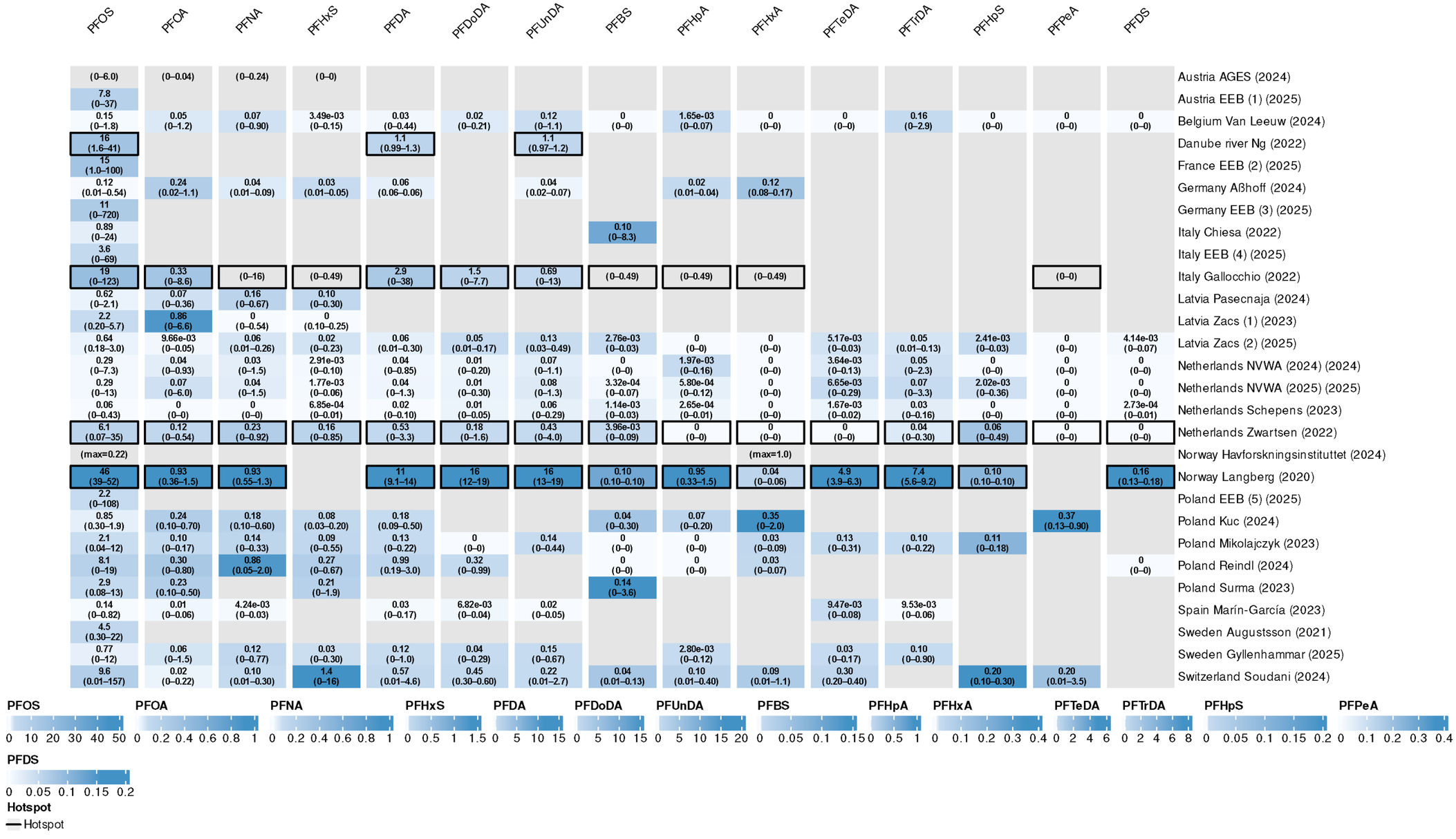


Figure 8 Overview of individual PFAS concentrations (µg/kg wet weight) in "Fruit, vegetables & mushrooms" per dataset. The value in each cell is the mean PFAS concentration; the range in parentheses is the minimum–maximum reported value. Colour intensity reflects the mean concentration of the individual PFAS. Datasets (rows) are ordered based on alphabetic order of the countries. Rows representing datasets from known hotspots are boxed in black. Grey cells without values indicate that the PFAS was not detected in that dataset. For all datasets, the lower bound scenario was reported, meaning that concentrations below the limit of detection or limit of quantification were considered zero, respectively. Abbreviations: AGES: Austrian Agency for Health and Food Safety GmbH; Jersey I&E: Department for Infrastructure and Environment within the Government of Jersey

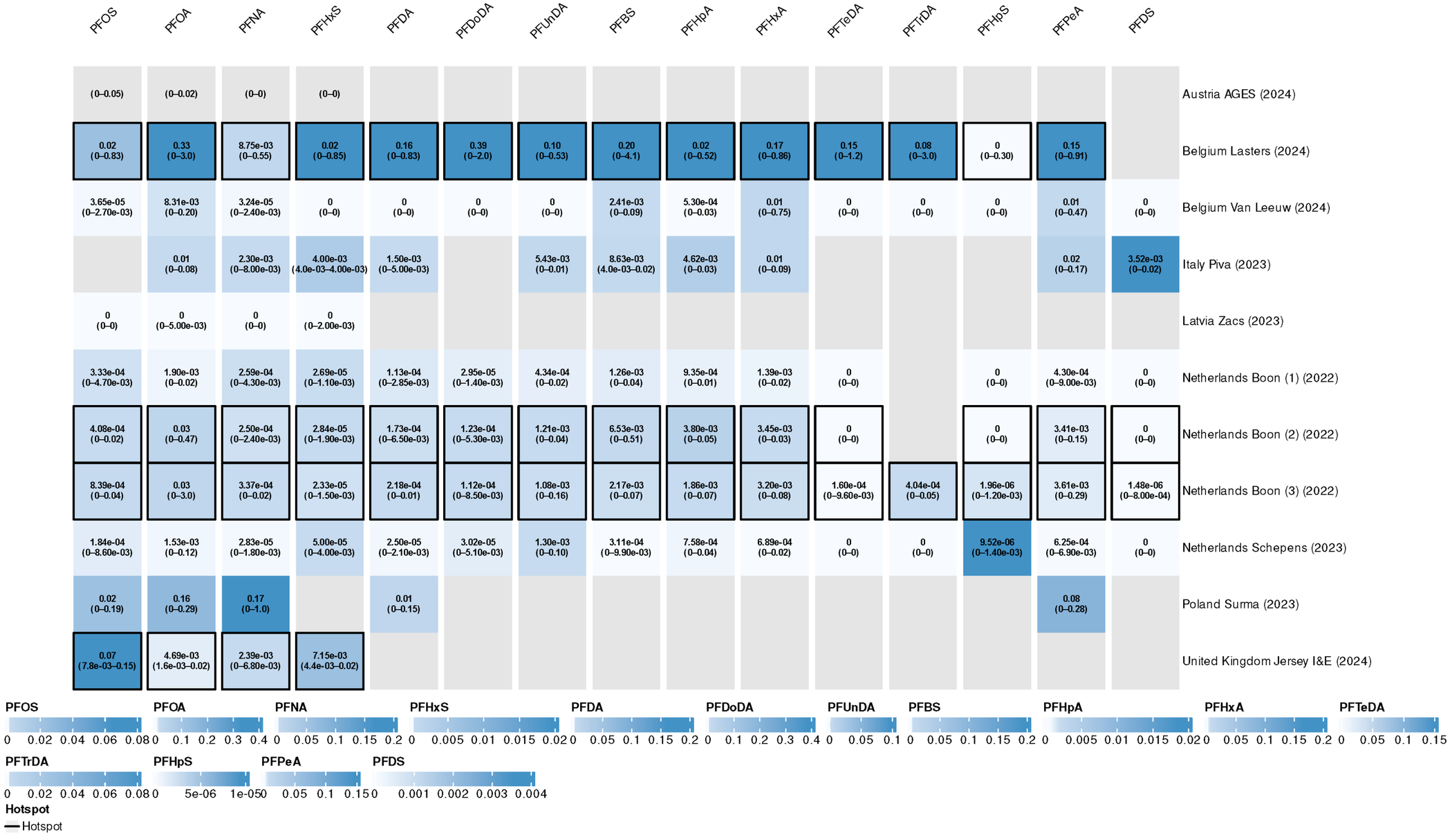
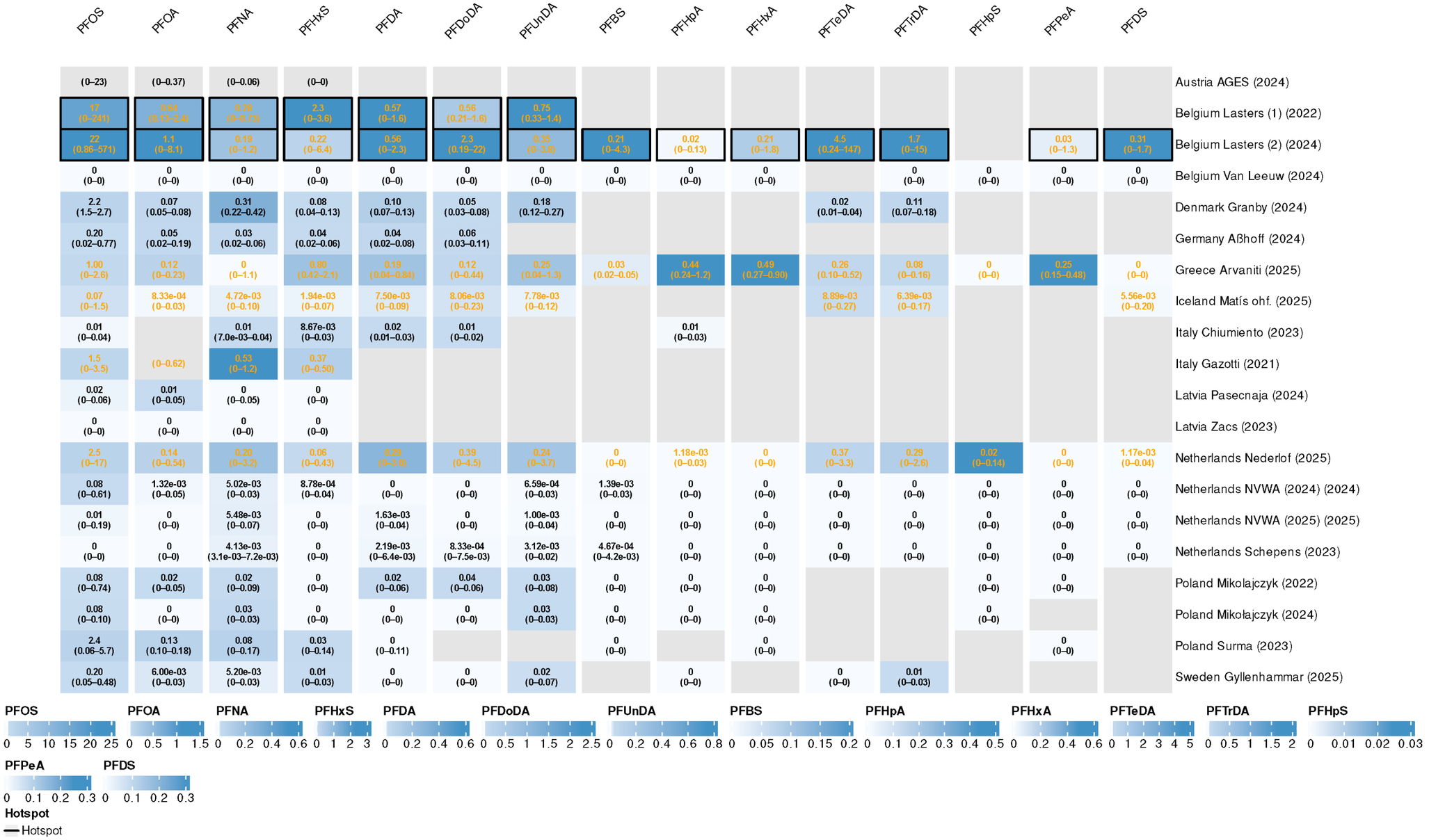


Figure 9 Overview of individual PFAS concentrations (µg/kg wet weight) in Eggs" per dataset. The value in each cell is the mean PFAS concentration; the range in parentheses is the minimum–maximum reported value. Colour intensity reflects the mean concentration of the individual PFAS. Datasets (rows) are ordered based on alphabetic order of the countries. Rows representing datasets from known hotspots are boxed in black. Rows representing datasets of eggs from backyard chickens are depicted in orange. Grey cells without values indicate that the PFAS was not detected in that dataset. For all datasets, the lower bound scenario was reported, meaning that concentrations below the limit of detection or limit of quantification were considered zero, respectively. Abbreviations: AGES: Austrian Agency for Health and Food Safety GmbH; NVWA: Netherlands Food and Consumer Product Safety Authority



the vicinity of a known source of PFAS contamination, but at random locations across the Netherlands.

For the commercial eggs, the PFAS concentrations in Dutch datasets do not deviate substantially from those in datasets from other European countries.

3.3.1.4 Meat

Figure 10 presents the heatmap for "Meat", based on 14 datasets (see Figure 2 in section 3.1) covering nine European countries, including three Dutch datasets. None of the datasets included meat sampled in known hotspots. Within this food group, an Italian dataset (Apennine Mountains) dominated the upper end of the concentration range for most PFAS. This location was not identified as a hotspot (26). The concentrations in this dataset were the average concentrations for liver and muscle samples of wild boars.

Overall, the PFAS concentrations in meat from the Netherlands were in general relatively low compared with the concentrations reported in the datasets from other European countries.

3.3.2 Comparison for drinking water

For drinking water, 13 of the 20 datasets in Table 3B in Appendix 3 could be considered, covering 11 European countries, including the Netherlands. Five datasets could not be considered because they only reported aggregated concentrations for the 20 PFAS specified in the European DWD, including datasets from Finland (mean 0.479 ng/L, 2023–2026), Portugal (0.3–563 ng/L, 2023–2026) and Lithuania (all measurements <LOD, 2021).[7] Two datasets could not be considered because they did not report mean concentrations according to the LB scenario (27,28). Also, data from one of the 13 remaining datasets (Poland) were obtained from a suspected hotspot.

Figure 11 presents the heatmap of PFAS concentrations in drinking water. Between the Dutch concentrations reported in 2017 – 2021 (17) and 2022 (5), several Dutch drinking water companies several Dutch drinking water companies intensified and optimized their existing treatment processes to maximize PFAS removal, for example by more frequent regeneration of activated carbon filters and optimizing the blending of water from different sources. This is reflected by systematically lower mean PFAS concentrations in the more recent dataset. For PFOA and PFOS, the recent concentrations fell within the mid-range of concentrations reported for the other European countries, and concentrations for short-chain PFAS, such as PFBS, PFHxS, perfluorobutanoic acid (PFBA) and PFPeA, were comparable to or only slightly higher than those in countries like Austria, Belgium and Luxembourg. PFNA, PFDA, PFHxA, PFHpA, perfluoropentanesulfonic acid (PFPeS), PFDoDA, PFDS and PFTeDA were generally reported at lower concentrations in Dutch drinking water and were broadly comparable to those for Austria, Belgium, Norway, Sweden and Switzerland.

[7] A comparable assessment for the Netherlands was not possible, as the 2025 monitoring data for the 20 PFAS from the European DWD were only available from seven of 10 drinking water companies, with concentrations ranging from 0.2 to 25 ng/L.

Figure 10 Overview of individual PFAS concentrations (µg/kg wet weight) in "Meat" per dataset. The value in each cell is the mean PFAS concentration; the range in parentheses is the minimum–maximum reported value. Colour intensity reflects the mean concentration of the individual PFAS. Datasets (rows) are ordered in alphabetic order of the countries. Rows representing datasets from known hotspots are boxed in black. Grey cells without values indicate that the PFAS was not detected in that dataset. For all datasets, the lower bound scenario was reported, meaning that concentrations below the limit of detection or limit of quantification were considered zero, respectively. Abbreviations: AGES: Austrian Agency for Health and Food Safety GmbH; NVWA: Netherlands Food and Consumer Product Safety Authority

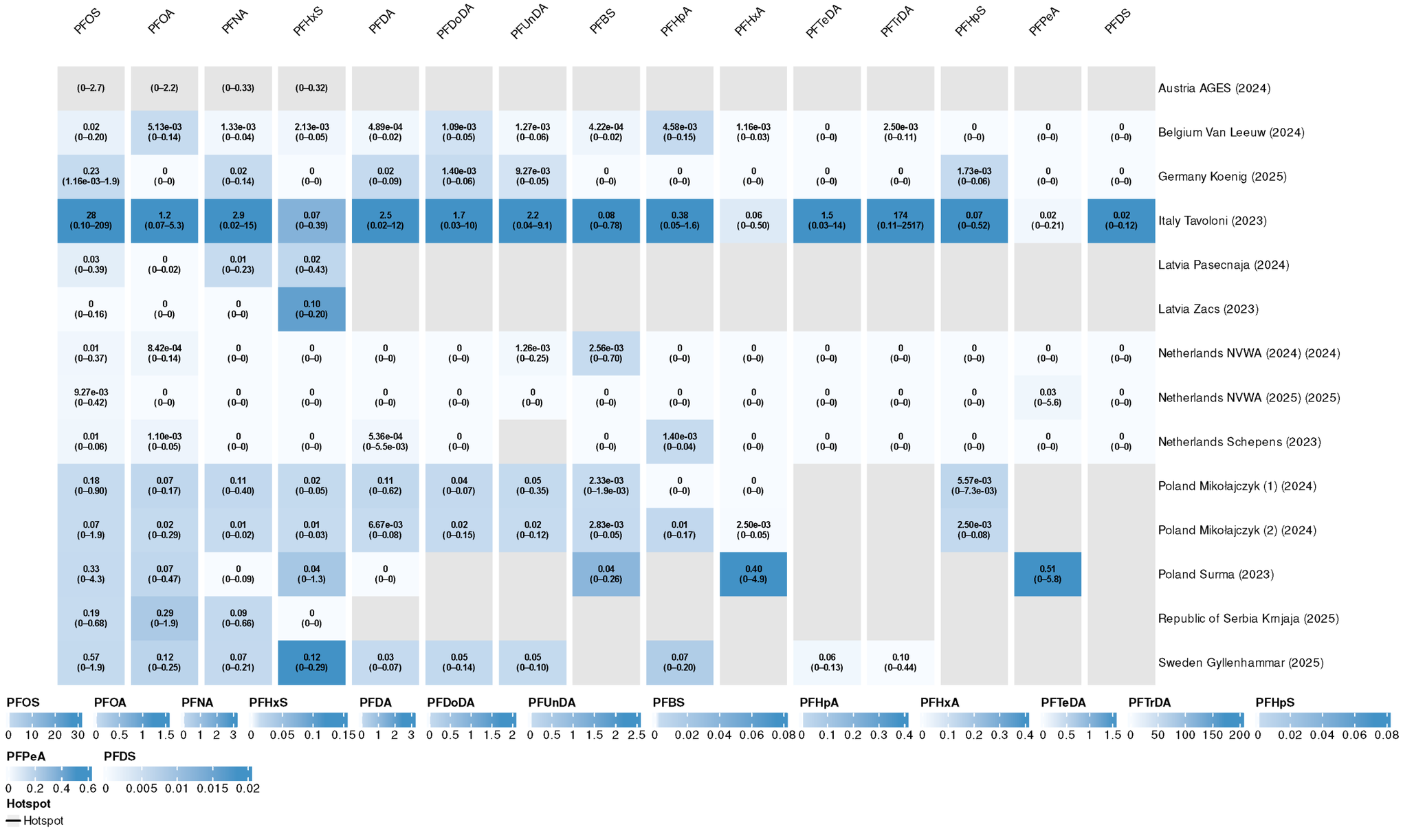
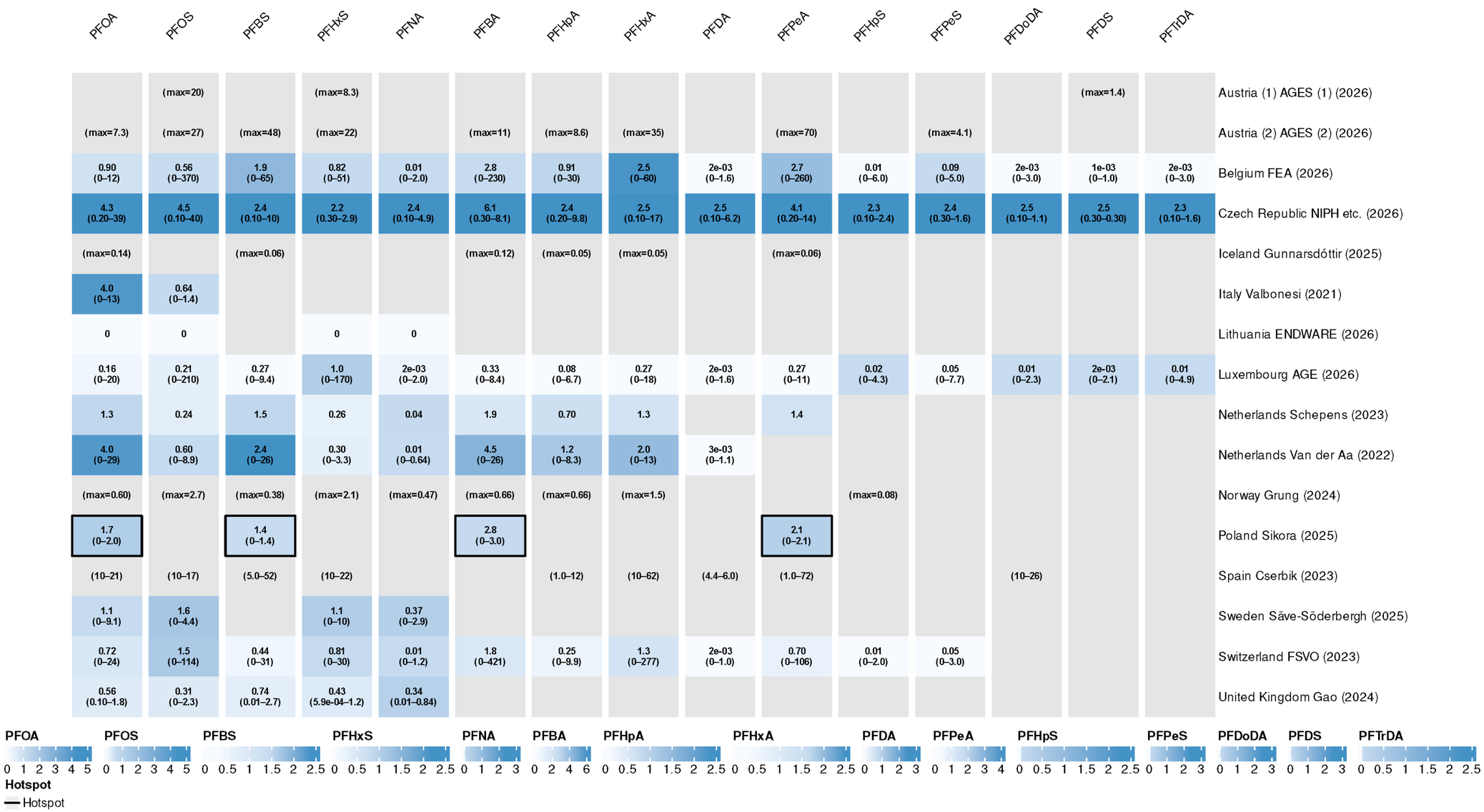


Figure 11 Overview of individual PFAS concentrations (ng/L) in "Drinking water" per dataset. The value in each cell is the mean PFAS concentration; the range in parentheses is the minimum–maximum reported value. Colour intensity reflects the mean concentration of the individual PFAS. Datasets (rows) are ordered in alphabetic order of the countries. Rows representing datasets from known hotspots are boxed in black. Grey cells without values indicate that the PFAS was not detected in that dataset. For all datasets, the lower bound scenario was reported, meaning that concentrations below the limit of detection or limit of quantification were considered zero, respectively. For the Dutch dataset of Schepens et al. (2023), an overall mean for drinking water made from groundwater and from surface water was derived using the following weighting: 0.6 × mean of drinking water from groundwater + 0.4 × mean of drinking water from surface water, reflecting the national distribution in drinking water sources in the Netherlands (5). Abbreviations: AGES: Austrian Agency for Health and Food Safety GmbH distribution of drinking water sources



Overall, the most recent PFAS concentrations in Dutch drinking water were in general comparable to those observed in other European countries.

4 Discussion

This report provides an initial, tentative comparison between the PFAS concentrations in food and drinking water from the Netherlands and other European countries. The results are tentative, because the data sources were not designed to produce representative and comparable concentration data of PFAS in food and drinking water. As a result, the comparisons are hampered by several uncertainties, the most important of which are:

1. Incompleteness of the datasets. Not all relevant European data sources could be included, mainly due to language barriers, and in some cases because key methodological details such as which PFAS were measured or which food products (e.g. edible or inedible fish species) were not reported. Because the extent and nature of this missing or incomplete information differed between countries, robust comparisons across European countries are therefore limited.
2. Representativity of the datasets. Not all datasets were representative for the food or drinking water available in that country for the general population.
3. Differences in reported LODs and LOQs. The level of these limits influenced the PFAS concentrations reported as <LOD or <LOQ: the higher the LOD or LOQ, the higher the number of concentrations reported as <LOD or <LOQ is expected to be. This was especially true for those datasets with a substantial number of reported concentrations as <LOD and <LOQ like for "Fruit, vegetables & mushrooms" and less for "Fish & seafood'.
4. Heterogeneity of the food groups. The food groups included in this study were necessarily broad. For example, it is well established that different fish species can accumulate PFAS at differing degrees, and some datasets contained more different fish species or products than others (29). The choice of tissue (e.g. fillet vs liver) is also critical for PFAS concentrations in this food group (29), yet this information was not consistently reported. Similar issues arose for meat: for instance, wild boar liver is known to accumulate much higher PFAS concentrations than wild boar muscle (26). This is consistent with other research that states that PFAS concentrations in liver are higher than in muscle (30).
5. PFAS included in the comparison between datasets and countries. This comparison was based on the 15 most frequently reported PFAS.
6. Differences in number of samples per dataset (see Appendix 3). Larger sample sizes increase the likelihood of detecting PFAS and of capturing higher maximum concentrations.
7. Differences between drinking water made from groundwater- and from surface water. It is known that drinking water made from groundwater generally contains lower PFAS concentrations than drinking water made from surface water. However, information on the relative contributions of groundwater and surface water to the drinking water supply was not reported for all non-Dutch datasets included in this study. Consequently, this distinction

could not be accounted for in the cross-country comparison, which may affect the interpretation of differences in PFAS concentrations in drinking water.

Despite these uncertainties, comparing PFAS concentrations in food and drinking water between the Netherlands and other European countries is a more robust way to examine PFAS in Europe than comparing exposure estimates. In the latter case, differences in food consumption patterns and the method used to calculate the exposure, including models applied, the mapping of concentration data to consumption data and the approach used to sum exposure across PFAS, would further increase the uncertainty of the comparison.

Concentrations of PFAS in food from hotspots were, as expected, higher than their counterparts sampled at non-hotspots. For example, concentrations of most PFAS were highest in eggs from backyard chickens from Belgium that were sampled at a hotspot (see Figure 9 in section 3.3.1) (20). However, also eggs from backyard chickens from non-hotspots can contain high concentrations of PFAS. It is known that these eggs contain more PFAS than commercial eggs (25).

An important source of uncertainty concerns concentrations reported as <LOD or <LOQ. In such cases, it is unclear whether the PFAS is present at a concentration <LOD or <LOQ, or not at all. To address this uncertainty, it is common practise in risk assessments to substitute these values with zero in a so-called lower-bound scenario and with LOD or LOQ in a so-called upper bound (UB) scenario. The resulting LB and UB concentrations thus provide lower and upper limits of the 'actual' concentrations. In the present study, we used the LB concentrations for the comparison (see sections 2.2.1 and 2.2.1). The LB concentrations are likely to underestimate the true PFAS concentrations in different food groups and drinking water, because it cannot be excluded that a PFAS reported as <LOD or <LOQ was present. However, assuming that all such PFAS are present at the LOD and LOQ, as in an UB scenario, would substantially overestimate the concentrations. Moreover, RIVM concluded in 2023 that, given all the uncertainties, LB exposure to PFAS exposure through food and drinking water in the Netherlands was closer to the 'real' exposure than UB exposure (5). We therefore selected the LB concentrations for the comparison. Furthermore, these concentrations are based on the quantified concentrations and are thus less dependent on the level of the LODs and LOQs than the UB concentrations (see Table 3A in Appendix 3).

A report commissioned by the European Commission (EC) was published in January 2026 that compiled European PFAS concentrations in food and drinking water (Section 2.4.2.2, "Developing environmental concentration") (31). For food, the report relied on EFSA concentration data for the EFSA-4 and extrapolated these to estimate the exposure to the sum of the 20 PFAS specified in the European DWD, introducing extensive uncertainty. In contrast, the present study uses no extrapolation and explicitly documents data coverage and gaps. For drinking water, we did not consider the three data sources that were included in the EC report (Table C2), partly because we did not use the NORMAN EMPODAT database (32) as this database does not contain

drinking water data (only monitoring data from drinking water sources, before treatment). Also, data from Denmark and France were not included in the present study, because the submitted information did not meet the inclusion criteria (see section 2.2.2). On the other hand, the present study presents drinking water concentrations of PFAS of 11 countries that were not included in the EC report, including Czechia, Iceland, Lithuania, Luxembourg, the Netherlands, Norway, Poland, Portugal, Spain, Sweden, and Switzerland. In the EC report, PFAS concentrations in food and drinking water were used as input for an economic assessment of the costs of PFAS pollution in Europe, without drawing country-specific conclusions on contamination levels. Therefore, only the methods and data sources can be compared to the present study, not the conclusions. Overall, we consider that the concentration data reported in the present study provide a more realistic picture of PFAS concentrations in food and drinking water in European countries than those reported in the EC report.

5 Conclusion

The present study examined differences in PFAS concentrations in food and drinking water from the Netherlands with those from other European countries (see chapter 1). The study showed clearly that PFAS is present in food and drinking water in all included European countries. Based on the available information, PFAS concentrations in foods available on the Dutch market are similar to or lower than those in other European countries. For drinking water, available information suggests that concentrations of PFAS in Dutch drinking water are roughly the same as in other European countries. The results of this study therefore give do reason to pursue further research into the underlying causes of differences in PFAS concentrations between the Netherlands and other European countries, and, subsequently, the exposure to PFAS. However, it remains advisable to reduce the exposure to PFAS, as exposure through food and drinking water in the Netherlands is already above the tolerable weekly intake of PFAS.

It is emphasized that this study provides only an initial, tentative comparison of PFAS concentrations in food and drinking water between the Netherlands and other European countries. The methodological differences between datasets for foods (e.g. variable LOD and LOQ, sample sizes, food grouping and incomplete reporting) and for drinking water highlight the need for a more harmonized concentration data collection and detailed, standardised reporting before more reliable conclusions can be drawn.

An EU regulatory framework to support this is already in place. Commission Recommendation (EU) 2022/1431 requests EU Member States to produce representative and comparable concentration data for a wide range of PFAS in relevant foods, using harmonised sampling and analytical methods. For drinking water, implementation of the PFAS parametric values under the EU Drinking Water Directive (from 12 January 2026) will result in generating more comparable concentration data across Europe. Together these changes will contribute to the generation of more comparable concentration data in food and drinking water across Europe, enabling in time more robust between-country comparisons. When these data become available, a renewed comparison would be advisable. Data on PFAS concentrations in food generated under Commission Recommendation (EU) 2022/1431 are sent to EFSA and may, in time, be used by this authority for an updated PFAS risk assessment.

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Appendix 1 Initial search strategy for relevant scientific literature

https://www.rivm.nl/bibliotheek/rapporten/2026-0053-Appendix1.pdf

Appendix 2 Overview of combined PFAS names

Used PFAS name…	Included also…
DONA	ADONA, NADONA[a]
EtFOSAA	N-EtFOSAA
EtFOSA	N-EtFOSA
EtFOSE	N-EtFOSE
Major F53B	9Cl-PF3ONS
MeFOSA	N-MeFOSA
MeFOSAA	N-MeFOSAA
MeFOSE	N-MeFOSE
Minor F53B	11Cl-PF3OUdS
PFBSA	FBSA
PFDA	PFDeA
PFDoDA	PFDoA
PFDoDS	PFDoS
PFHxS	PFHS
PFHxSA	FHxSA
PFNS	ipPFNS
PFOSA	FOSA
PFPrA	PFPA
PFTeDA	PFTeA, PFTA
PFTrDA	PFTrA
PFTrDS	PFTrDS, PFTrS
PFUnDA	PFUDA, PFUnA
PFUnDS	PFUdS, PFUnS

[a] One data source reported separate concentrations for ADONA and NADONA (30). In this case these separate concentrations were summed up.

Appendix 3 Overview of data sources and datasets considered for PFAS concentrations in food and drinking water.

Table 3A Overview of data sources and datasets considered for PFAS concentrations in food ordered by increasing publication year, sample collection year and number of samples.

Data source[a]	Country	Sample collection year	Publication year	Number of samples	Food group	Number of datasets	Analytical limits (µg/kg)	
							LOD	LOQ
(33)	Norway	2018-2019	2020	158 – 233[b]	Fish & seafood	1	-	0.1 - 2
(34)	Sweden	2017-2018	2021	>180	Fish & seafood	1	0.02 – 0.2	-
(35)	Italy	2018-2019	2021	208	Eggs	1	0.1	0.25
36)	Poland	Unknown	2022	45	Eggs	1	-	0.005 – 0.163
(37)	Italy	Unknown	2022	176	Fish & seafood	1	0.015 – 0.03	0.05 – 0.1
(38)	Poland	2017	2022	89	Cereals, bread & oils	1	0.013 – 0.022	0.043 – 0.072
(39)	Italy	2017	2022	107	Fish & seafood	1	-	0.1- 0.5
(24)	Belgium	2018	2022	70	Eggs	1	-	0.08 – 2.5
(40)	Germany	2018	2022	≥74	Fish & seafood	1	-	0 – 0.67
41)	Danube river	2019	2022	11	Fish & seafood	1	0.5 – 1.5	-
(42)	Czechia	2020	2022	31	Non-alcoholic beverages	1	-	0.025 – 0.25
(18)	Netherlands	2021	2022	23[c]	Fish & seafood	1	-	0.03 -4
(43)	Netherlands	2021	2022	78[d]	Fruit, vegetables & mushrooms	2	0.00025 – 0.0125	0.0005 – 0.015[e]
				109			0.00025 – 0.0125	0.0005 – 0.015
(44)	Netherlands	2021	2022	78	Fruit, vegetables & mushrooms	1	0.00025 – 0.0125	0.0005 – 0.015[e]
				618[c]	Fruit, vegetables & mushrooms	1	0.000125 – 0.0125	0.00025 – 0.015
(45)	Italy	Unknown	2023	41	Fruit, vegetables & mushrooms	1	-	0.05 – 0.5
(46)	Poland	Unknown	2023	63	Fish & seafood	1	-	0.01 – 0.12
(47)	Italy	Unknown	2023	65	Eggs	1	-	0.05 – 0.1
(22)	Poland	Unknown	2023	95[f]	Fish & seafood	4	0.003 – 0.009	0.013 – 0.028
					Eggs			
					Meat			

Data source[a]	Country	Sample collection year	Publication year	Number of samples	Food group	Number of datasets	Analytical limits (µg/kg)	
							LOD	LOQ
					Fruit, vegetables & mushrooms			
(12)	Spain	>2018	2023	14-21	Fish & seafood	2	-	0.011 – 0.208
				14			-	0.011 – 0.208
(48)	Italy	2018-2020	2023	57	Eggs	1	0.005 – 0.036	0.05
(26)	Italy	2019-2020	2023	26	Meat	1	-	0.01 – 0.2
(49)	Spain	2020-2021	2023	Unknown	Non-alcoholic beverages	1	-	-
(5)	Netherlands	2021	2023	48	Fish & seafood	10	0.00005 – 0.09	0.0001 – 0.18
				189	Fruit, vegetables & mushrooms			
				64	Cereals, bread & oils			
				9	Eggs			
				45	Meat			
				8	Milk & dairy products			
				3	Composite foods			
				9	Sauces			
				10	Confectionery			
				13	Non-alcoholic beverages			
(50)	Latvia	2022	2023	19	Fish & seafood	6	0.00002 – 0.00005	0.001 – 0.3
				30	Fruit, vegetables & mushrooms			
				22	Cereals, bread & oils			
				8	Eggs			
				19	Meat			
				21	Milk, & dairy products			
(51)	Poland	2022	2023	42	Baby foods	1	-	0.001 – 0.005
(52)	Poland	>2022	2023	73	Milk & dairy products	1	-	0.001 – 0.004
(53)	Germany	Unknown	2024	33	Fish & seafood	3	0.0015 – 0.048	0.0044 – 0.0192
				56	Eggs		0.0015 – 0.048	0.0044 – 0.0192
				10	Milk & dairy products		0.0003 – 0.097	0.001 – 0.0096
(54)	Poland	2017-2019	2024	180	Fish & seafood	1	-	0.01 – 0.03
(55)	Poland	2017-2023	2024	52	Fish & seafood	1	-	0.3 – 0.5
(56)	Latvia	2018-2022	2024	96	Baby foods	1	-	0.001

Data source[a]	Country	Sample collection year	Publication year	Number of samples	Food group	Number of datasets	Analytical limits (µg/kg)	
							LOD	LOQ
(21)	Belgium	2019, 2021	2024	178	Fruit, vegetables & mushrooms	1	-	0.012 – 0.166
				19	Cereals, bread & oils	1	-	0.008 – 0.152
(20)	Belgium	2019, 2021 & 2022	2024	92	Eggs	1	-	0.021 – 0.483
(57)	Denmark	2021-2022	2024	120	Eggs	1	0.01 – 0.02	-
(58)	Latvia	2021-2023	2024	15	Fish & seafood	3	-	0.01
				20	Eggs			
				23	Meat			
(59)	Belgium	2022	2024	43	Fish & seafood	11	-	0.015 - 1
				71	Fruit, vegetables & mushrooms		-	0.002 – 0.05
				35	Cereals, bread & oils		-	0.015 – 0.1
				9	Eggs		-	0.1 - 1
				45	Meat		-	0.015 - 1
				17	Milk & dairy products		-	0.008 – 1
				14	Composite foods		-	0.015 - 1
				10	Baby foods		-	0.002 - 1
				5	Sauces		-	0.015 - 1
				3	Confectionery		-	0.015 - 1
				13	Alcoholic beverages		-	0.008 – 0.5
(60)	Poland	≥2022	2024	25	Eggs	2	-	0.003 – 0.048
				20	Meat		-	0.001 – 0.016
(61)	Poland	2022-2023	2024	120	Meat	1	-	0.001 – 0.016
(19)	United Kingdom	2023	2024	8	Fruit, vegetables & mushrooms	1	0.001	-
(62)	Belgium	2023	2024	16	Non-alcoholic beverages	1	-	0.03 – 0.9
(3)	Austria	2023-2025	2024	≥13	Fish & seafood	5	-	-
				5	Fruit, vegetables & mushrooms			
				≥9	Eggs			
				4	Meat			
				40	Milk & dairy products			
(63)	Norway	2024	2024	313	Fish & seafood	1	0.01 - 1	0.2 - 2

Data source[a]	Country	Sample collection year	Publication year	Number of samples	Food group	Number of datasets	Analytical limits (µg/kg)	
							LOD	LOQ
(64)	Switzerland	2022-2024	2024	218	Fish & seafood	1	0.001 – 0.02	0.007 – 0.05
(65)	Netherlands	2024	2024	157	Fish & seafood	6	0.0125 – 0.1[g]	0.001 – 1.8
				4	Cereals, bread & oils			
				41	Eggs			
				285	Meat			
				19	Milk & dairy products			
				79	Baby foods			
(66)	Austria	Unknown	2025	3	Cereals, bread & oils	16	-	10
	Belgium			5				
	Bulgaria			4				
	Czechia			6				
	France			7				
	Germany			3				
	Greece			3				
	Hungary			3				
	Ireland			4				
	Italy			3				
	Luxembourg			6				
	Poland			2				
	Romania			2				
	Spain			4				
	Switzerland			8				
	Netherlands			3				
(67)	Iceland	Unknown	2025	36	Eggs	1	-	0.03 – 0.1
(68)	Germany	Unknown	2025	43	Meat	2	-	0.0098 – 0.198
				163	Milk & dairy products		-	0.0012 – 0.0991
(69)	Austria	2019-2022	2025	73	Fish & seafood	5	-	-
	France	2017-2020		68			-	1 - 2
	Germany	2019-2023		546			0.019 - 1	-
	Italy	2019-2022		258			-	-

Data source[a]	Country	Sample collection year	Publication year	Number of samples	Food group	Number of datasets	Analytical limits (µg/kg)	
							LOD	LOQ
	Poland	2022		296			-	-
(70)	Denmark	2021	2025	4	Meat	1	-	-
(71)	Austria	2021	2025	16	Alcoholic beverages	10	-	10[h]
	Belgium			2				
	Germany			1				
	Spain			2				
	France			5				
	Greece			1				
	Croatia			2				
	Hungary			2				
	Italy			3				
	Luxembourg			3				
(72)	Latvia	2022	2025	502	Fish & seafood	1	-	0.01
(73)	Sweden	2022-2023	2025	56	Fish & seafood	3	-	0.02 – 0.05
				7	Eggs			
				31	Meat			
(74)	Greece	2023	2025	75	Eggs	1	0 – 0.55	0.003 – 1.7
(75)	Croatia	2024	2025	Unknown	Fish & seafood	2	-	-
					Eggs			
(25)	Netherlands	2024	2025	60[c]	Eggs	1	0.005 – 0.025	0.01 0.1
(76)	Serbia	2024-2025	2025	15	Meat	1	-	0.1
(77)	Netherlands	2025	2025	211	Fish & seafood	8	0 – 2.075[g]	0.001 - 2
				2	Cereals, bread & oils			
				73	Eggs			
				508	Meat			
				44	Milk & dairy products			
				20	Composite foods			
				54	Baby foods			
				4	Confectionery			
(78)	Switzerland	2025	2025	276	Milk & dairy products	1	-	-

LOD: limit of detection; LOQ: limit of quantification; PFAS: per- and polyfluoroalkyl substances
[a] Data sources representing scientific articles are highlighted in grey.
[b] The exact number of samples was not reported in this data source and was therefore based on the information of a minimum and a maximum number of samples that was extracted.
[c] Data source reported mixed samples composed of multiple food samples of the same food type; the number of mixed samples was used as the sample count.
[d] Same dataset as the first dataset of the next data source. Therefore, only included once in total number of datasets.
[e] Within this range, LOQs for all PFAS measured in the data source are represented, with the exception of PFOS for which no LOQ was reported.
[f] Number of samples represents the total number of samples for four datasets.
[g] LOD's were only available for some samples and PFAS.
[h] µg/L.

Table 3B Overview of data sources considered for PFAS concentrations in drinking water ordered by increasing publication year, sample collection year and number of samples.

Data source[a]	Country	Sample collection year	Publication year[b]	Number of samples	Analytical limits (ng/L)[c]	
					LOD	LOQ
(79)	Luxembourg	2020–2026	–	2708	0.2 – 100	-
(80)	Lithuania	2021	–	20	-	-
(81)	Belgium (Flanders)	2021–2024	–	1584	-	0.001 – 50
(14)	Portugal[d]	2023	–	256	-	0.3 - 5
(82)	Finland	2023–2026	–	456	1.5 - 5	-
(28)	Czechia	2024	–	Unknown	-	0.1 – 0.3
(14)	Portugal[d]	2024	–	749	-	0.3 - 5
(14)	Portugal[d]	2025	–	1676	-	0.3 - 5
(83)	Italy	2018–2019	2021	72	-	0.07 – 0.08
(17)	Netherlands	2017–2021	2022	703	-	0.5 – 300[f]
(49)	Spain	2020–2021	2023	53	-	1.0 – 50
(5)	Netherlands	2022	2023	777	-	0.1 - 25
(84)	Switzerland[e]	2023	2023	564	-	1 – 5[h]
(27)	United Kingdom	2019–2020	2024	41	0.00016 – 0.014	-
(85)	Norway	2021–2022	2024	71	-	0.04 – 0.2
(15)	Austria	2023	2024	315	-	-
(86)	Sweden	2014–2020	2025	200	-	0.001 - 10
(87)	Poland[g]	2024	2025	18	10	-
(88)	Iceland	2024	2025	21	0.01 – 0.25	-
(16)	Austria	2024	2025	343	-	-

ENDWARE: European Network of Drinking Water Regulators; LOD: limit of detection; LOQ: limit of quantification PFAS: per- and polyfluoroalkyl substances

[a] Data sources obtained via ENDWARE are shown in italics; data sources providing individual PFAS concentrations are highlighted in grey.

[b] -: Data sources from ENDWARE were not published.

[c] -: analytical limits were not reported.

[d] Portugal provided summary data for three years, analysed as three datasets in this report.

[e] The Principality of Liechtenstein participated with 7 samples.

[f] This large spread is caused by a few samples.

[g] Data source reported that contamination of drinking water with PFAS was expected, pointing towards a potential hotspot (see Box 2).

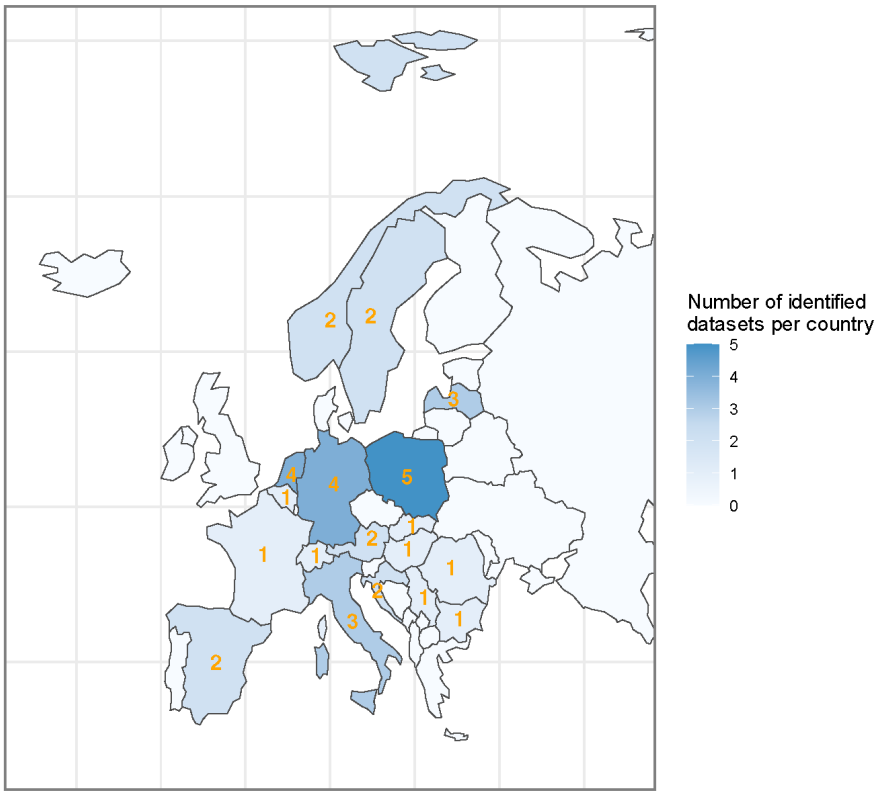
[h] Except for TFA with an LOQ of 200 ng/L.

Appendix 4 Individual PFAS concentrations (mean, minimum and maximum) in food (in µg/kg) and in drinking water (in ng/L)

https://www.rivm.nl/bibliotheek/rapporten/2026-0053-Appendix4.xlsx

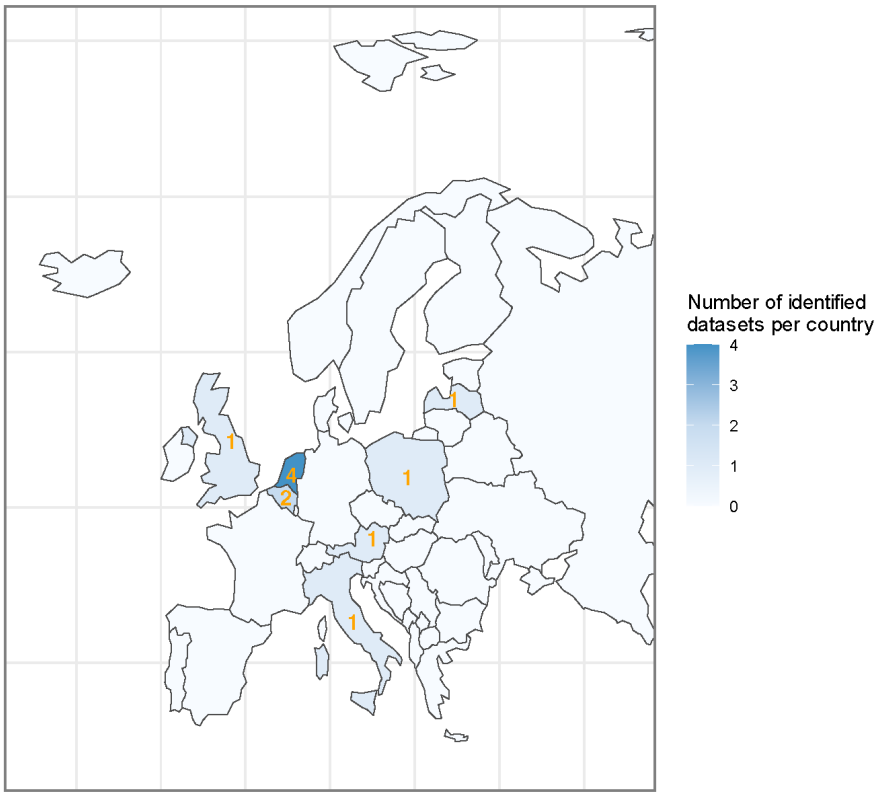
Appendix 5 Additional figures of number of datasets per country and food group

Figure 5A Number of datasets per country for "Fish & seafood".[a,b]



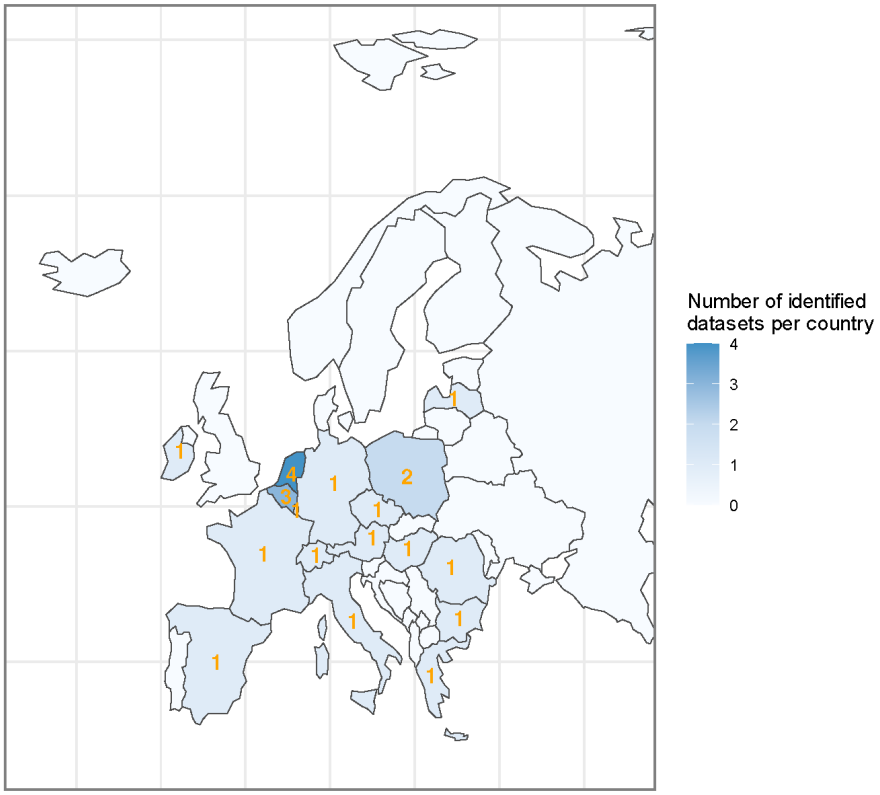
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 31, with one dataset covering seven European countries.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5B Number of datasets per country for "Fruit, vegetables & mushrooms".[a,b]



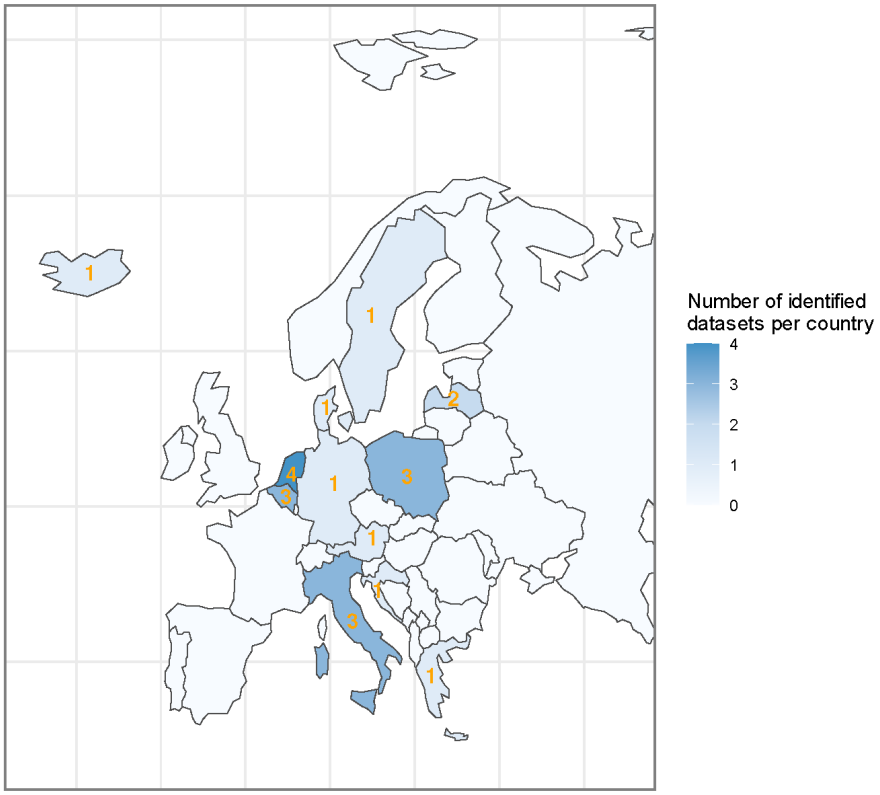
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 11.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5C Number of datasets per country for "Cereals, bread & oils".[a,b]



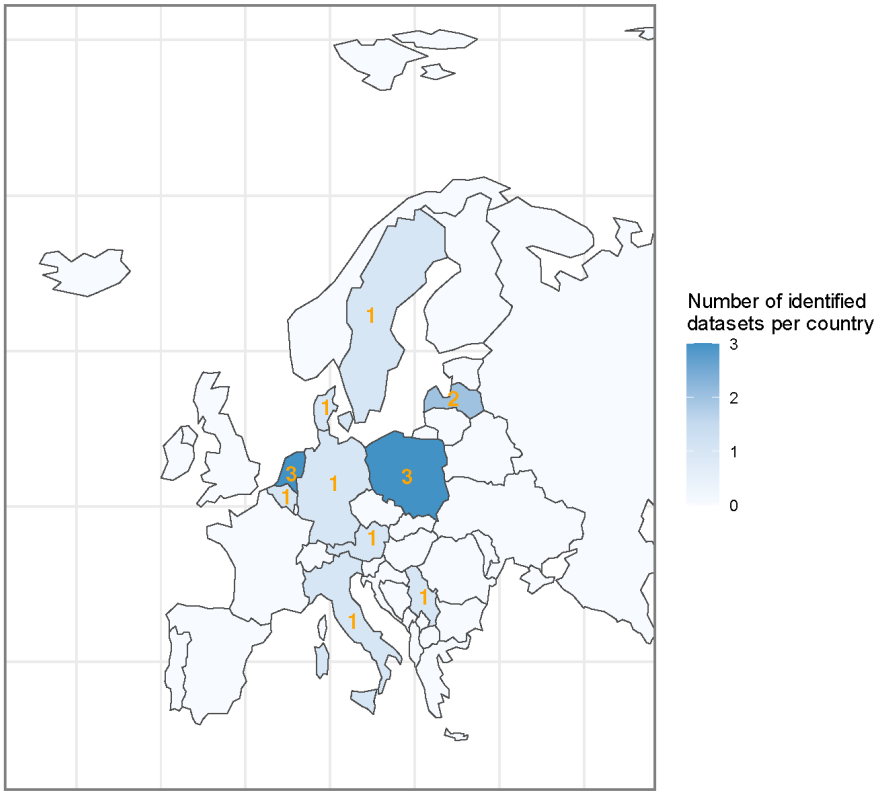
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 23.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5D Number of datasets per country for "Eggs".[a,b]



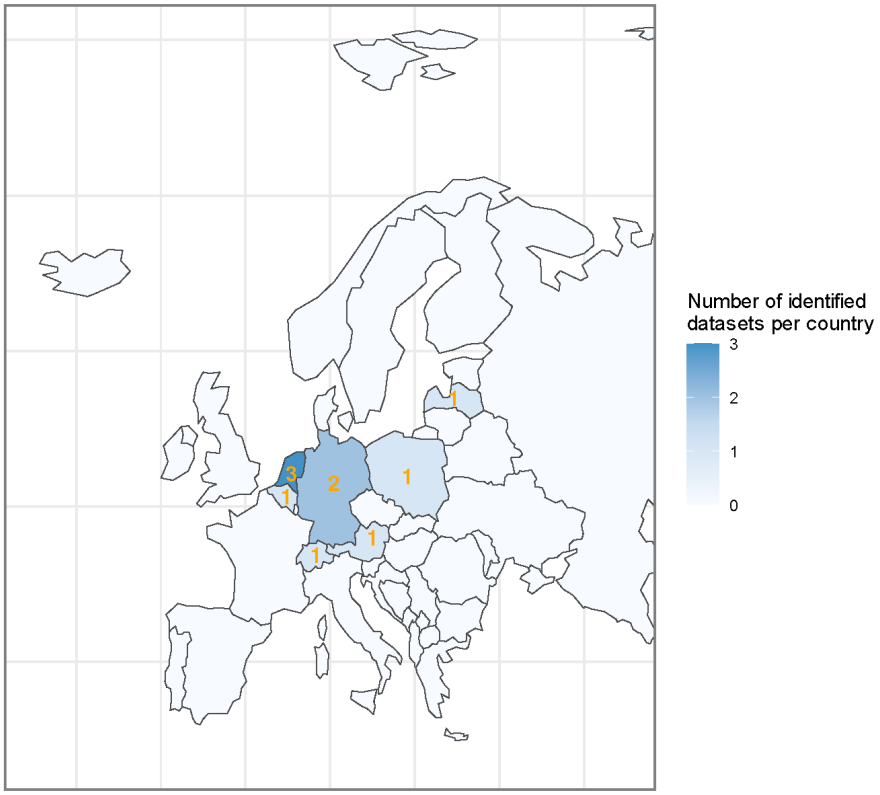
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 22.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5E Number of datasets per country for "Meat".[a,b]



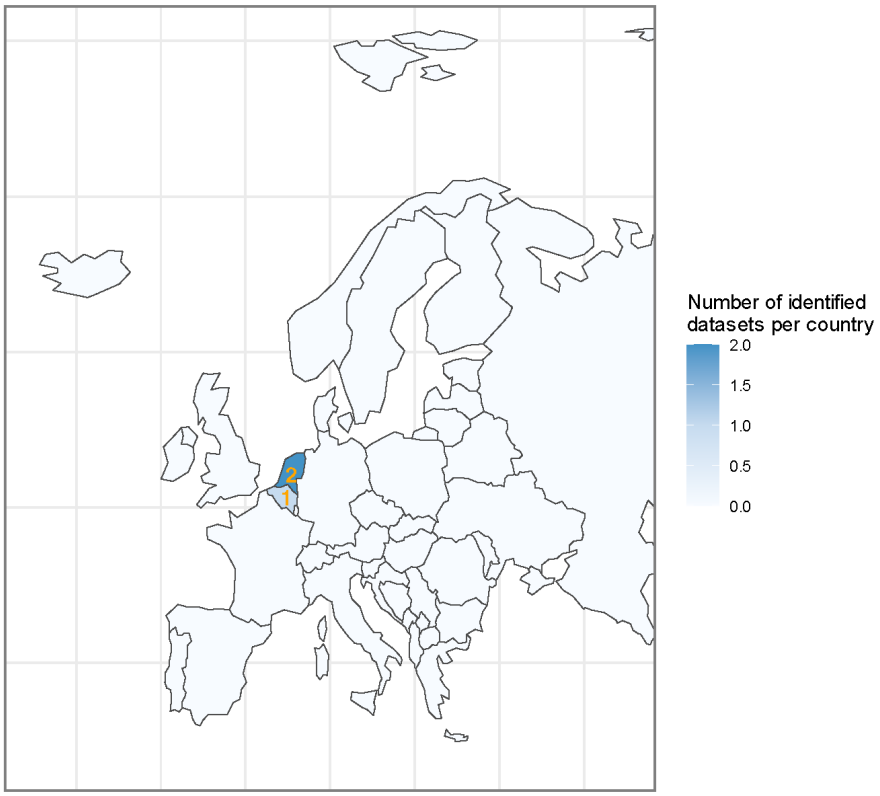
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 15.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5F Number of datasets per country for" Milk & dairy products".[a,b]



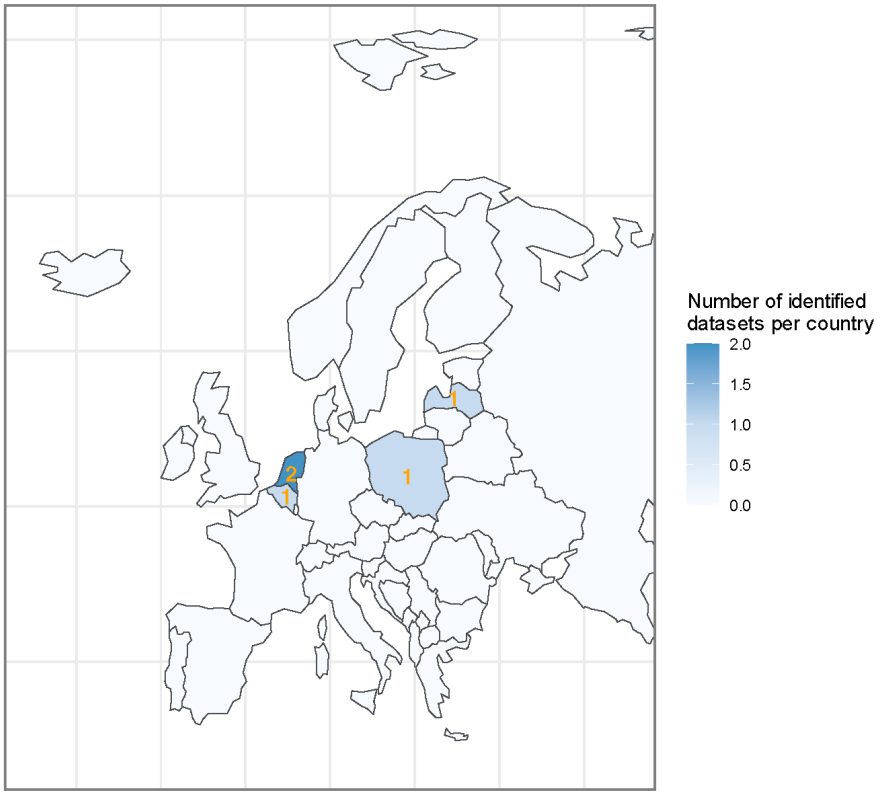
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 10.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5G Number of datasets per country for "Composite foods (dishes composed of multiple food types)".[a,b]



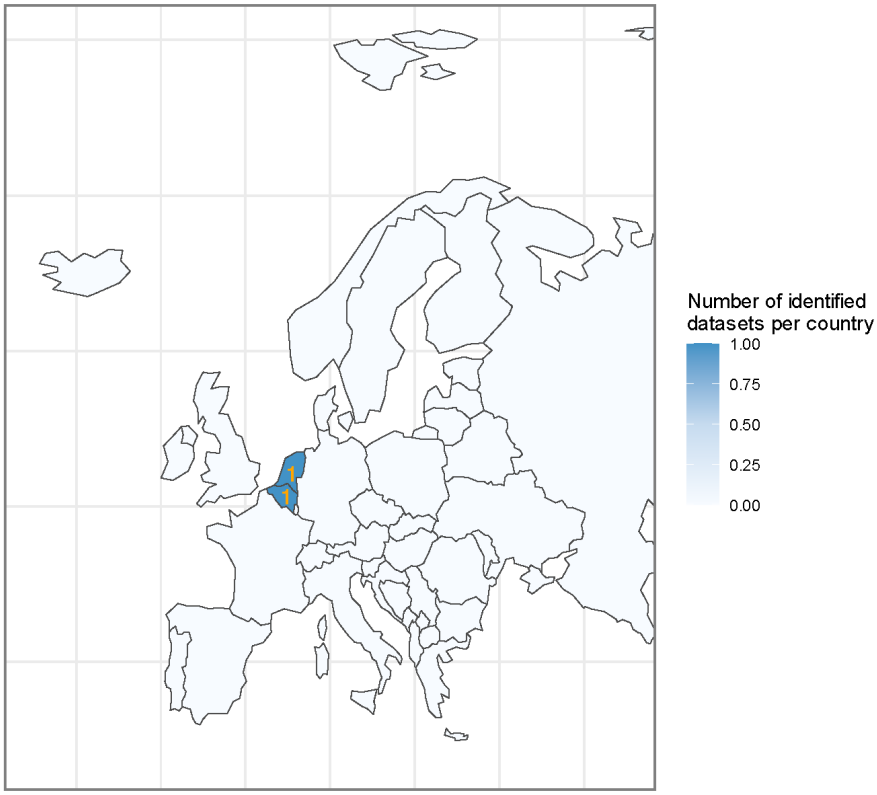
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 3.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5H Number of datasets per country for "Baby foods".[a,b]



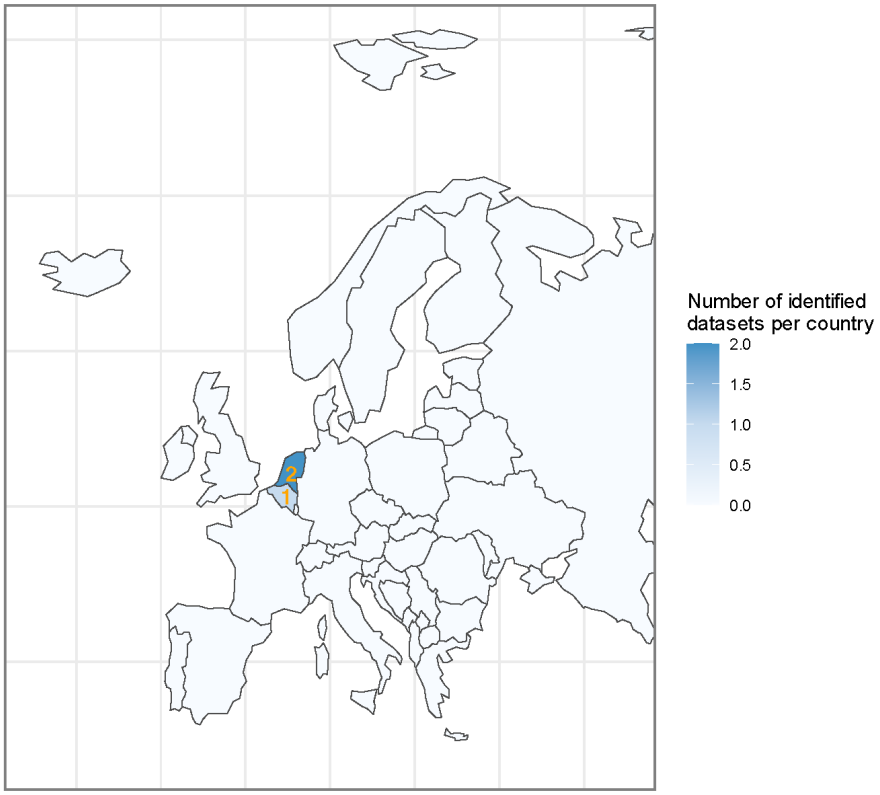
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 5.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5I Number of datasets per country for "Sauces".[a,b]



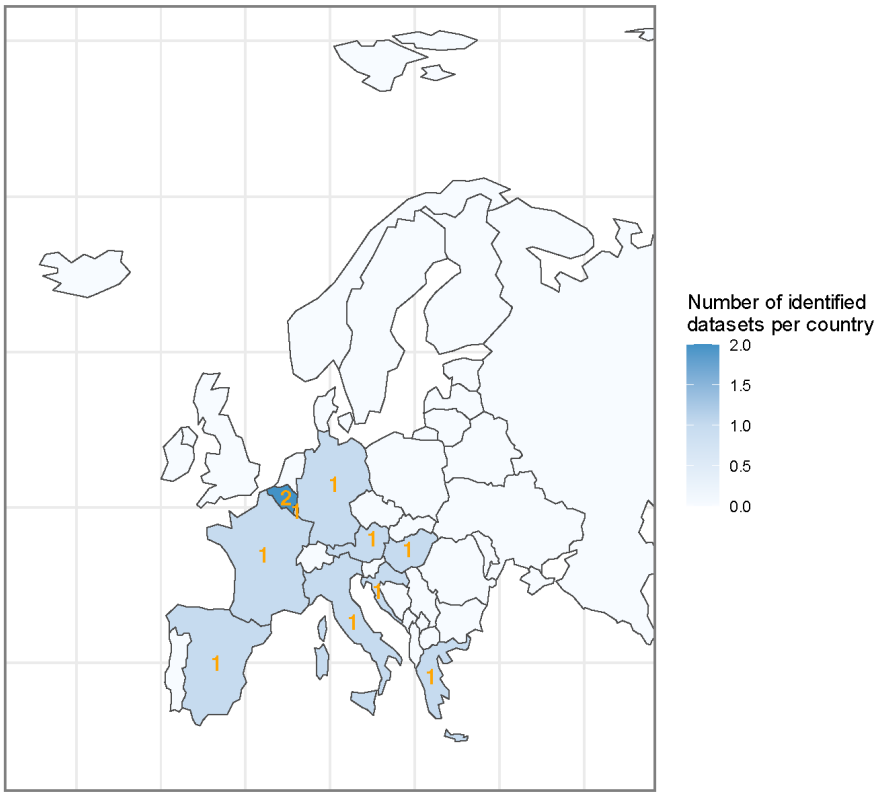
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 2.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5J Number of datasets per country for "confectionery".[a,b]



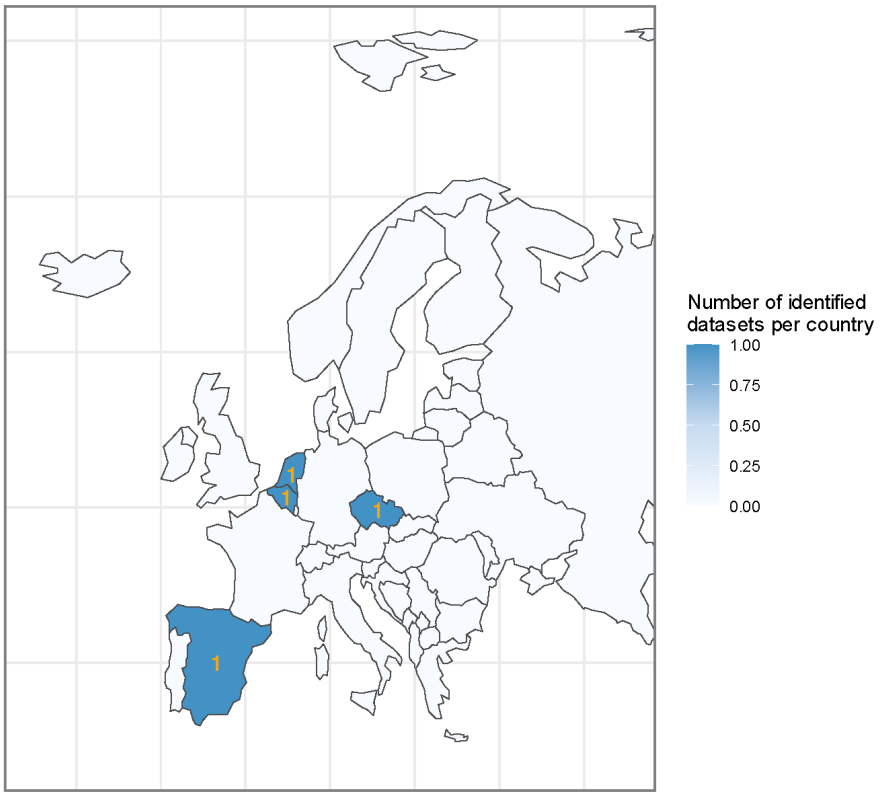
PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 3.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5K Number of identified PFAS datasets per country for "Alcoholic beverages".[a,b]



PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 11.
[b] For the countries in white, no information on PFAS in food could be included.

Figure 5L Number of identified PFAS datasets per country for "Non-alcoholic beverages". [a,b]



PFAS: per- and polyfluoroalkyl substances
[a] Number of datasets was 11.
[b] For the countries in white, no information on PFAS in food could be included.

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