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Interim Category 4 Screening Levels for per- and polyfluoroalkyl substances (PFAS):

perfluorooctanoic acid (PFOA)
perfluorononanoic acid (PFNA)
perfluorohexane sulfonic acid (PFHxS)
and
perfluorooctane sulfonic acid (PFOS)

CL:AIRE

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Foreword by Frank Evans, Chair of SAGTA

Looking back, the original Defra work from 2014 that developed the Category 4 Screening Levels (C4SL) was important in establishing the level at which risk from land contamination was considered to be acceptably low. It also provided a useful scientific framework for making this assessment of risk. I was also impressed by the delivery model used to create the Soil Generic Assessment Criteria in 2010 and in particular the strength that comes from the collective efforts of a group of experts and peers.

This report presents an output from a phase 2 project to develop a further set of C4SL. It is the result of a cross-industry collaboration brought together by seed funding from SAGTA, project management from CL:AIRE and a project team made up of a number of toxicologists and exposure modellers who have given considerable time and expertise. This guidance document would not have been possible without everyone's collaborative working, determination, and enthusiasm. My deepest thanks go to them, and to the members of the Steering Group who have overseen the development of this guidance document.

I would also acknowledge the effort and commitment of Doug Laidler who was the long-standing secretary of SAGTA and who played an important role in initiating and coordinating the project. Sadly, Doug died in the autumn of 2019 and as with so many other matters in his life, was unable to see this work brought to conclusion. May he rest in peace.

Frank Evans
Chair of SAGTA

Acknowledgements

Project Management Team

Simon Firth	Firth Consultants Ltd
Nicola Harries	CL:AIRE

Project Team

Camilla Alexander	White MK Tox & Co Ltd
Laura Aspinall	RSK
Kate Baker	Antea Group UK
Gareth Barns	Geosyntec
Dave Brooks	Sirius
Sarah Bull	TARA Consulting
Lucy Burn	Worley
Catherine Cussell	RSK
Melinda Evans	Soilfix
Natasha Glynn	AtkinsRéalis
Duncan Grew	Worley
George Kowalczyk	GK Toxicology Consulting
James Lymer	
Barry Mitcheson	WSP
Rob Reuter	Wardell Armstrong LLP
Adam Symonds	Worley
Gareth Wills	WSP
Joanna Wilding	Freelance

Steering Group Members and Nominated Contact

AGS	Mike Plimmer
Brookbanks Consulting	Richard Boyle
Defra	Harriet Cooper and Rachel Boulderstone
Environment Agency	Ian Martin and Angela Haslam
EIC	Richard Puttock
HBF	Frances Gregory
MAPAC	David Johnson and Michael Moore
Newport City Council	Steve Manning
NHBC	Steve Moreby
NRW	Matthew Llewhellin
UK Health Security Agency	Sarah Dack and Kerry Foxall
Public Health Wales	Andrew Kibble
SAGTA	Daniel May and Hannah White
SoBRA	Rachel Dewhurst
Welsh Contaminated Land Group	Rachael Davies
Welsh Government	Andrew Williams and Richard Clark
YALPAG	Lucie Watson

CONTENTS

ABBREVIATIONS

ADE	Average Daily Exposure
AIC	Akaike Information Criteria
ATSDR	Agency for Toxic Substances and Disease Registry
BMD	Benchmark Dose
BMDL	Lower Confidence Limit of BMD
C4SL	Category Four Screening Level
CAS	Chemical Abstracts Service
CL:AIRE	Contaminated Land: Applications in Real Environments
CLEA	Contaminated Land Exposure Assessment
COT	Committee on Toxicity
CSAF	Chemical-Specific Adjustment Factor
Defra	Department for Environment, Food and Rural Affairs
DWI	Drinking Water Inspectorate
ECHA	European Chemicals Agency
EFSA	European Food Safety Authority
ELCR	Excess Lifetime Cancer Risk
F1	First-filial generation
FASA	Perfluoroalkane sulfonamide
FSANZ	Food Standards Australia New Zealand
GD	Gestation Day
HBGV	Health-Based Guidance Value
HED	Human Equivalent Dose
HI	Hazard Index
HQ	Hazard Quotient
ITRC	Interstate Technology Regulatory Council
LLTC	Low Levels of Toxicological Concern
$LLTC_{inhal}$	Low Levels of Toxicological Concern - Inhalation
$LLTC_{oral}$	Low Levels of Toxicological Concern - Oral
LOAEL	Lowest Observed Adverse Effect Level
LOD	Limit of Detection
MDI	Mean Daily Intake
MRL	Minimal Risk Level
NOAEL	No Observed Adverse Effect Level
OECD	Organisation for Economic Co-operation and Development
PBPK	Physiologically Based Pharmacokinetic
PFAA	Perfluoroalkyl Acid
PFAS	Per- and Polyfluoroalkyl Substances
PFCA	Perfluoroalkyl Carboxylic Acid / Perfluoroalkyl Carboxylate
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctane Sulfonic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFNA	Perfluorononanoic Acid
PFSA	Perfluoroalkane Sulfonic Acid / Perfluoroalkane Sulfonate
POD	Point of Departure
POS	Public Open Space
POS_{park}	Public Open Space - Park
POS_{resi}	Public Open Space – Residential
PPARα	Peroxisome proliferator-activated receptor-α
SAGTA	Soil and Groundwater Technology Association
SR	Science Report
TDI	Tolerable Daily Intake
TWI	Tolerable Weekly Intake
UF	Uncertainty Factor
UK	United Kingdom
US EPA	United States Environmental Protection Agency
WHO	World Health Organization

1. INTRODUCTION

This report presents interim[1] Category 4 Screening Levels (C4SLs) for four perfluoroalkyl substances: perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonic acid (PFHxS) and perfluorooctane sulfonic acid (PFOS), based on the methodology described in Section 5 of CL:AIRE (2014) "SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination". Section 1.1 provides brief background information on PFAS, while Section 2 summarises the toxicological review from which Low Levels of Toxicological Concern (LLTCs) are identified. Section 3 presents the exposure modelling aspects for the generic land-uses under consideration, while Section 4 presents the C4SLs.

1.1 BRIEF OVERVIEW OF PFAS

Per- and polyfluoroalkyl substances (PFAS) is the collective name for an extensive group of fluorinated substances, including oligomers and polymers (EFSA, 2020). PFAS are human-made substances that do not occur naturally in the environment. The Organisation for Economic Co-operation and Development (OECD, 2021) has identified over 4700.

OECD (2021) and the Interstate Technology Regulatory Council (ITRC, 2022a) have provided a comprehensive classification scheme for PFAS including the naming conventions. PFAS are divided into two primary categories: polymers and non-polymers. Non-polymeric PFAS are further subdivided into two major classes: perfluoroalkyl PFAS and polyfluoroalkyl PFAS. The four PFAS covered by the interim C4SL are all non-polymeric perfluoroalkyl PFAS and, more specifically, perfluoroalkyl acids (PFAAs). PFAAs are further subdivided into perfluoroalkyl carboxylic acids / perfluoroalkyl carboxylates (PFCAs) and perfluoroalkane sulfonic acids / perfluoroalkane sulfonates (PFSAs).

PFCAs and PFSAs are categorised as being either short or long-chain on the basis of the length of the fluorinated carbon chain, although definitions of short and long-chain can vary by jurisdiction (OECD, 2021). The UK Health and Safety Executive (HSE) Regulatory Management Options Analysis (RMOA) for PFAS (HSE, 2023) defines long-chain PFCAs to be those with ≥7 perfluoro carbons and long-chain PFSAs to be those with ≥6 perfluoro carbons.

The presence of carbon-fluorine bonds, one of the strongest chemical bonds in organic chemistry, means that the majority are resistant to environmental degradation (ECHA, 2023). An overview of the fate and transport of PFAS in the environment has been published by ITRC (2022b) and an overview of the uses of PFAS, to assist with identification of sites of concern with regards to land contamination, has been published by CL:AIRE (2023).

The majority of PFAAs are present in the environment in their dissociated anionic form (e.g., octanoate or sulfonate), rather than acid form (ITRC, 2022a).

The interim C4SL covers the following four PFAS, which are all considered long-chain:

<u>Perfluorooctanoic acid (PFOA)</u>

PFOA (CAS No. 335-67-1) is a PFCA with the chemical formula $C_8HF_{15}O_2$.

<u>Perfluorononanoic acid (PFNA)</u>

PFNA (CAS No. 375-95-1) is a PFCA with the chemical formula $C_9HF_{17}O_2$.

<u>Perfluorohexane sulfonic acid (PFHxS)</u>

[1] As discussed later in the report, the European Food Safety Authority (EFSA, 2020) tolerable weekly intake (TWI) for the sum of these four PFAS has been used as the basis of the low level of toxicological concern (LLTC) for derivation of the C4SLs presented herein. The label "interim" has been used throughout this report to reflect the concerns raised by the Committee on Toxicity (COT) (see Section 2.1.2 2b) and the fact that further work by COT and others may result in the need for the LLTC to be updated (including accounting for potential non-threshold behaviour).

PFHxS (CAS No. 355-46-4) is a PFSA with the chemical formula $C_6HF_{13}O_3S$

Perfluorooctane sulfonic acid (PFOS)

PFOS (CAS No. 1763-23-1) is a PFSA with the chemical formula $C_8HF_{17}O_3S$.

The European Food Safety Authority (EFSA) recommended a tolerable weekly intake (TWI) for the sum of these four PFAS on the basis that they made up half of the lower bound exposure to those PFAS with available occurrence dietary data, the remaining contribution being primarily from PFAS with shorter half-lives in the body (EFSA, 2020). In addition, EFSA states that these four PFAS share toxicokinetic properties and show similar accumulation and long half-lives in humans. The United States (US) Agency for Toxic Substances and Disease Registry (ATSDR, 2021) has derived individual intermediate Minimal Risk Levels (MRLs) for oral exposure for these four PFAS.

2. DERIVATION OF LOW LEVEL OF TOXICOLOGICAL CONCERN FOR PFOA, PFNA, PFHxS and PFOS

A framework for evaluating chemical-specific toxicology data for the purposes of LLTC derivation is presented in the form of a flowchart in Figure 2.2 of SP1010 (CL:AIRE, 2014) and reproduced below as Figure 2.1. The remainder of this section demonstrates the application of this framework to PFOA, PFNA, PFHxS and PFOS. A proforma summarising the pertinent information referred to in this section is included as Appendix A.

As indicated in Figure 2.1, the first task is to perform a review of existing health-based guidance values (HBGV) for all routes of exposure, collating information from authoritative bodies, as per the process in SR2 (Environment Agency, 2009a).

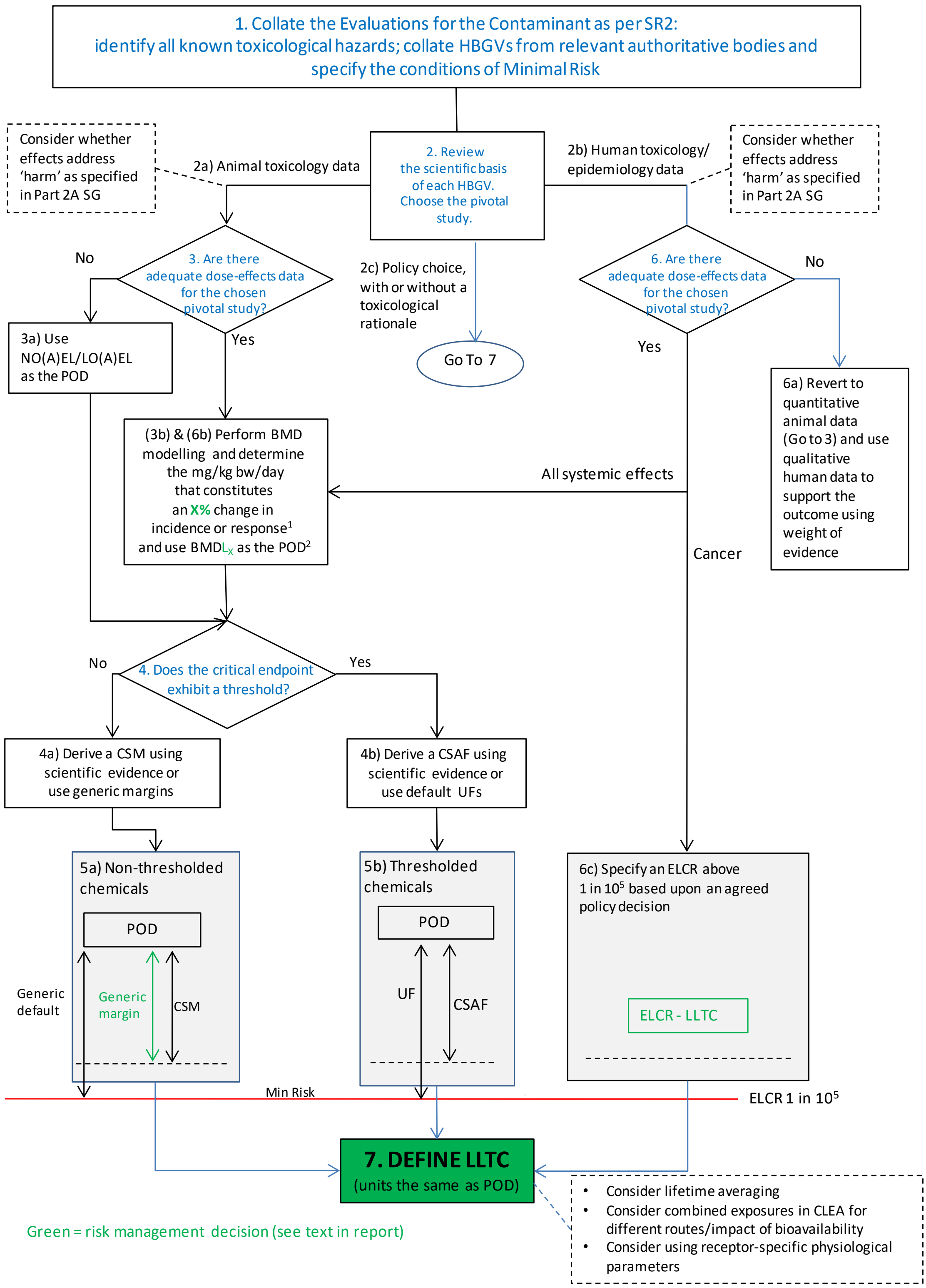

Figure 2.1: A framework for evaluating chemical-specific toxicology data for the purposes of LLTC derivation (reproduced from Figure 2.2 of SP1010 (CL:AIRE, 2014)).

2.1 ORAL ROUTE

2.1.1 FLOWCHART ELEMENT 1: Collate the evaluations for the contaminant as per SR2: identify all known toxicological hazards; collate HBGVs from relevant authoritative bodies and specify the conditions of minimal risk

A review of toxicological hazards and available HBGVs presented by authoritative bodies for the oral route of exposure has been undertaken and is provided in Appendix A. Five authoritative bodies have reviewed toxicological data and derived HBGVs, using either animal or epidemiological data, for one or more of the four PFAS considered by the interim C4SL (FSANZ, 2017, Health Canada 2018a,b, EFSA, 2020, ATSDR, 2021 and US EPA, 2021a,b).

Authoritative body reviews have been published for PFOS (FSANZ, 2017, Health Canada 2018a, EFSA, 2020, ATSDR, 2021 and US EPA, 2021a), PFOA (FSANZ, 2017, Health Canada 2018b, EFSA, 2020, ATSDR, 2021 and US EPA, 2021b), PFHxS (FSANZ, 2017, EFSA, 2020 and ATSDR, 2021) and PFNA (EFSA, 2020 and ATSDR, 2021).

This review indicates that developmental toxicity, hepatotoxicity, endocrine disruption and immunotoxicity are the most sensitive[2] toxicological effects identified by authoritative bodies by the oral route. Note however, that the most sensitive effects in animals following exposure to PFAS vary between species, and it should be noted that not all effects have been studied for the four PFAS considered herein. PFOS and PFOA are currently the most well studied of all PFAS in humans and animals.

2.1.2 FLOWCHART ELEMENT 2: Review the scientific basis of each HBGV. Choose the pivotal study

Three possible options are provided for the type of pivotal study that could be chosen at this point, *i.e.* in the form of: 1) animal toxicology data; 2) human toxicology/epidemiology data; and 3) a policy choice (*i.e.* based on an existing guideline from another regime, with or without a toxicological rationale).

2a) Animal Toxicology Data

No chronic oral studies were identified for any of the four PFAS in the authoritative body reviews.

Overall, for PFOS and PFOA, the sensitive effects identified by authoritative bodies in animals from studies of shorter durations included those in the liver, immune system, and in the developing fetus. For PFNA and PFHxS, the sensitive effects included those in the liver and developing fetus.

Based on all the data available for the four PFAS, the pivotal studies selected by ATSDR for the derivation of the intermediate duration (>14-365 days) Minimal Risk Levels (MRLs) were considered for the derivation of the LLTC (ATSDR, 2021). It should be noted that ATSDR used physiologically-based pharmacokinetic (PBPK) modelling to extrapolate data from animals to humans and to characterise human toxicokinetic variability in the quantitative derivation of the individual MRLs. PBPK models introduce considerable complexity and potential uncertainty, and it has not been within the scope of this project to review the appropriateness of their use.

<u>PFOS</u>

The pivotal study used was a two-generation study in rats (Luebker *et al.*, 2005 cited in ATSDR, 2021) in which male and female Sprague-Dawley rats (35/sex/group) were administered the potassium salt of PFOS at doses of 0, 0.1, 0.4, 1.6 or 3.2 mg kg^{-1} bw day^{-1} by gavage for 42 days prior to and during mating and gestation to gestation day (GD) 9, or through parturition and lactation to lactation day 20. A no observed adverse

[2] In defining minimal/tolerable risk, it is only necessary to focus on the most sensitive of all effects in defining the HBGV. In order to choose a point on the dose-response curve that is higher than minimal/tolerable risk, it is important to note that the dose-responses for the most sensitive effects may overlap with other effects. Therefore, in setting the LLTC, ALL endpoints must be borne in mind. This is an important principle in any of the toxicological evaluations where there are overlapping toxicological effects data, and is an important departure from the principles of evaluation of minimal/tolerable risk as described in SR2.

effect level (NOAEL) of 0.1 mg kg^{-1} bw day^{-1} was derived, based on delayed eye opening and decreased pup weight in first-filial generation (F1) offspring. The NOAEL was converted to a time-weighted average blood serum concentration of 7.43 µg mL^{-1}. PBPK modelling was then used to estimate a NOAEL human equivalent dose (HED) of 0.000515 mg kg^{-1} bw day^{-1}. The NOAEL HED was divided by a total uncertainty factor (UF) of 30 (3 for interspecies variability and 10 for intraspecies variability), and a modifying factor of 10 (for concern that immunotoxicity may be a more sensitive effect of PFOS toxicity than developmental toxicity) to give an intermediate MRL of 0.000002 mg kg^{-1} bw day^{-1} (2 ng kg^{-1} bw day^{-1}).

PFOA

The pivotal study used was a developmental study in mice (Koskela *et al.*, 2016 cited in ATSDR, 2021) in which pregnant C57BL/6/Bk1 mice (10 or 6/group) were administered PFOA at doses of 0 or 0.3 mg kg^{-1} bw day^{-1} in food throughout pregnancy to GD 21. A lowest observed adverse effect level (LOAEL) of 0.3 mg kg^{-1} bw day^{-1} was derived, based on skeletal alterations in F1 adult offspring. The LOAEL was converted to a time-weighted average blood serum concentration of 8.29 µg mL^{-1}, and PBPK modelling was used to estimate a LOAEL HED of 0.000821 mg kg^{-1} bw day^{-1}. The LOAEL HED was divided by a total UF of 300 (3 for interspecies variability and 10 for intraspecies variability, and 10 for use of a LOAEL rather than a NOAEL) to give an intermediate MRL of 0.000003 mg kg^{-1} bw day^{-1} (3 ng kg^{-1} bw day^{-1}).

PFNA

The pivotal study used was a developmental study in mice (Das *et al.*, 2015 cited in ATSDR, 2021) in which timed-pregnant CD-1 mice (8-10/group) were administered PFNA at doses of 0, 1, 3, 5 or 10 mg kg^{-1} bw day^{-1} by gavage on GD1 to GD17. A NOAEL of 1 mg kg^{-1} bw day^{-1} was derived, based on decreased body weight gain, delayed eye opening, preputial separation, and vaginal opening in F1 offspring. The NOAEL was converted to a time-weighted average serum concentration of 6.8 µg mL^{-1} and PBPK modelling was used to estimate a NOAEL HED of 0.001 mg kg^{-1} bw day^{-1}. The NOAEL HED was divided by a total UF of 30 (3 for interspecies variability and 10 for intraspecies variability), and a modifying factor of 10 (for database limitations to account for the small number of studies particularly on immunotoxicity), to give an intermediate MRL of 0.000003 mg kg^{-1} bw day^{-1} (3 ng kg^{-1} bw day^{-1}).

PFHxS

The pivotal study used was a developmental study in rats (Butenhoff *et al.*, 2009 cited in ATSDR, 2021) in which Sprague-Dawley rats (15/sex/group) were administered PFHxS at doses of 0, 0.3, 1, 3 or 10 mg kg^{-1} bw day^{-1} by gavage. Male rats were dosed for a minimum of 42 days (14 days before mating until sacrifice). Female rats were dosed 14 days before cohabitation until sacrifice on postnatal day 21 or GD 25 (rats that did not deliver a litter). A NOAEL of 1 mg kg^{-1} bw day^{-1} was derived, based on thyroid follicular epithelial hypertrophy/hyperplasia in parental male rats. No reproductive or developmental effects were reported in the study. The NOAEL was converted to a time-weighted average blood serum concentration of 73.2 µg mL^{-1} and PBPK modelling was used to estimate a NOAEL HED of 0.0047 mg kg^{-1} bw day^{-1}. The NOAEL HED was divided by a total UF of 30 (3 for interspecies variability and 10 for intraspecies variability), and a modifying factor of 10 (for database limitations to account for the small number of studies particularly on immunotoxicity), to give an intermediate MRL of 0.00002 mg kg^{-1} bw day^{-1} (20 ng kg^{-1} bw day^{-1}).

GO TO FLOWCHART ELEMENT 3

2b) Human Toxicology/Epidemiology Data

Overall, for PFOS and PFOA, the sensitive effects identified by authoritative bodies in humans include those in the liver, cardiovascular system, immune system and in the developing fetus. For PFNA the sensitive effects include those in the liver and developing fetus, and for PFHxS sensitive effects include those in the liver and immune system (ATSDR, 2021).

ATSDR (2021) reported that the available epidemiological studies suggested associations between PFAS exposure and various health outcomes, although noted that cause-and-effect relationships had not been established. They chose not to use epidemiology data in the derivation of MRLs, favouring animal data (see Section 2.1.2 2a).

In their scientific evaluation of risks to human health related to the presence of PFAS in food, EFSA (2020) concluded that, based on available studies in animals and humans, the immune system was the most critical effect and noted that in epidemiological studies the most sensitive effect was a decreased antibody response to vaccines in children. They considered two pivotal epidemiology studies by Grandjean *et al.* (2012) and Abraham *et al.* (2020) as a basis of their tolerable weekly intake (TWI) of 4.4 ng kg^{-1} bw $week^{-1}$ for the sum of PFOS, PFOA, PFHxS and PFNA. These four substances were chosen on the basis that they made up approximately half of the estimated lower bound PFAS exposure (from food) for those PFAS where occurrence data were available. EFSA (2020) noted that the remaining contribution was primarily from perfluorobutanoic acid (PFBA) and perfluorohexanoic acid (PFHxA), which have significantly shorter estimated half-lives in the human body (days rather than years). EFSA assumed equal potencies for the four PFAS, stating that the derivation of relative potency factors was not considered possible.

A decrease in vaccine response in children was selected by EFSA (2020) as the most sensitive effect, and the scientific opinion noted that when antibody titres are diminished, the level of protection from vaccines might be compromised. EFSA concluded that the TWI was also protective against other potential effects (increased blood serum cholesterol, reduced birth weight and increased blood serum enzyme alanine transferase) considered in their previous opinion on PFOS and PFOA in 2018 (EFSA, 2018).

The TWI was based on the epidemiological study with the four long-chain PFAS (PFOS, PFOA, PFHxS and PFNA) due to their long half-lives compared to short-chain PFAS, and the difference in half-lives between rodents and humans (EFSA, 2020). ATSDR (2021) carried out a comparison of elimination half-lives between humans, non-human primates, rats and mice for PFOS, PFOA, PFHxS and PFNA and showed that elimination rates, and therefore half-lives, substantially vary across species and across PFAS, due to the carbon chain length. Half-lives for the four PFAS in humans range from 2.1 years (PFOA) to 35 years (PFHxS), compared to hours and days in rodents, with estimated elimination rates shorter in females compared to males. ATSDR noted that this adds to the uncertainty associated with extrapolation of external dose-response relationships from animals to humans.

Furthermore, some endpoints related to PFAS are associated with the activation of peroxisome proliferator-activated receptor-α (PPAR-α), which exhibit toxicokinetic and mechanistic differences between laboratory animals and humans (ATSDR, 2021). ATSDR concluded that uncertainties regarding the relevance of animal data for developing HBGVs are reduced by using health outcomes reported in epidemiological studies or involving PPAR-α independent mechanisms of action and estimating a POD using serum PFAS concentrations.

EFSA (2020) considered deriving a HBGV based on either animal or human data, but ultimately derived a HBGV based on immune effects in humans. They concluded the effects on the immune system were consistently observed in animals and humans, and the critical serum level, if derived from animal studies, would have corresponded to a lower HBGV than that derived based on epidemiological data, when taking standard uncertainty factors into consideration (EFSA, 2020).

Abraham *et al.* (2020)

The epidemiological study by Abraham *et al.* (2020) was a cohort study of 1-year-old children in Germany (101 children - 21 formula fed with ≤2 week of breastfeeding, and 80 breast fed for >4 months). The study examined associations between blood serum concentrations of PFHxS, PFOS, PFOA and PFNA and antibodies to diphtheria, tetanus, and haemophilus influence type b. The study showed a negative association between

PFAS concentrations (PFHxS, PFOS, PFOA and PFNA) in serum and antibody titres against diphtheria and tetanus following vaccination.

Benchmark dose (BMD) modelling was carried out by EFSA for vaccination response to diphtheria and tetanus and the lowest $BMDL_{10}$ of 17.5 ng mL^{-1} for diphtheria was selected from the individual models. This equates to the serum concentration of the sum of the four PFAS in children estimated to give a 10% decrease in antibody titres. This $BMDL_{10}$ formed the basis of the TWI (EFSA, 2020).

PBPK modelling, assuming 12 months of breastfeeding, was used to estimate a tolerable daily intake (TDI) of 0.63 ng kg^{-1} bw day^{-1} (6.9 ng mL^{-1} in serum) in the mother at 35 years of age i.e., the oral intake for a mother that would give rise to the $BMDL_{10}$ of 17.5 ng mL^{-1} in the blood serum of a breast-fed child. The TDI was converted to the TWI of 4.4 ng kg^{-1} bw $week^{-1}$. EFSA presented the value as a TWI due to the long half-life of the four PFAS considered (EFSA, 2020).

In their evaluation of the study by Abraham *et al.* (2020), EFSA (2020) did not apply any UF to the $BMDL_{10}$ on the basis that (a) the $BMDL_{10}$ was for infants who were expected to be a sensitive population group; and (b) decreased vaccination response was considered a risk factor for disease rather than a disease in itself. They intended the TWI to be compared to exposure data for mothers (rather than infants), concluding that this TWI should prevent mothers reaching a body burden that would result in PFAS levels in breast milk leading to elevated blood serum levels in an infant.

<u>Statement from Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment</u>

In September 2022, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) published a Statement on the EFSA (2020) Opinion (COT, 2022). The COT considered the EFSA Opinion to assess the potential risks to the UK population from PFAS (predominantly through exposure via the diet i.e., breast milk, general diet, drinking water).

The COT had reservations about the choice of the critical study (i.e., Abraham *et al.*, 2020) and the effect selected (i.e., decrease in antibody titres for diphtheria). However, the COT agreed that the critical study was the best available, and that it was not unreasonable that this study was selected by EFSA, and, in the absence of more appropriate studies, its use was understandable. The COT had concerns relating to the data used in the modelling by EFSA, and the BMD modelling itself. The COT agreed, with reservations about the calculations due to the uncertainties, that the use of the sum of the four PFAS was acceptable as a first approximation for exposures of PFAS. The COT also agreed that, qualitatively the appropriate sensitive effect had been selected, but quantitatively questioned the calculations.

In their conclusion, the COT stated they were unable to suggest an alternative TWI at this time, but that there was considerable uncertainty as to the appropriateness of the derivation of the TWI by EFSA and of the biological relevance of the decreased vaccine response on which it is based. The COT stated this therefore complicated interpretation of the possible toxicological relevance of exceedances of the TWI. The COT are now conducting their own toxicological review of PFAS.

<u>Pivotal study selected</u>

The data from the epidemiology study by Abraham *et al.* (2020) on vaccine response in children is considered the pivotal human study from which to derive an interim $LLTC_{oral}$ for PFOS, PFOA, PFNA and PFHxS.

Epidemiological data have been selected for the derivation of the LLTC for the following reasons:

- elimination half-lives of PFAS vary between species, with half-lives in humans generally being much longer than in rodents (ATSDR, 2021; EFSA 2020);

- toxicokinetic and mechanistic differences exist between laboratory animals and humans. Activation of PPAR-α varies between species, with rodents being the most sensitive species and humans being less responsive.

Overall, the use of epidemiological data will decrease the uncertainties associated with toxicokinetic and mechanistic differences that may exist between animals and humans.

GO TO FLOWCHART ELEMENT 6

2c) Policy choice, with or without a toxicological rationale

The UK Drinking Water Inspectorate (DWI, 2021) presents a "pragmatic" threshold level for PFOS and PFOA in drinking water of 0.01 µg L^{-1} above which further monitoring is required. Above the "wholesomeness" concentration of 0.1 µg L^{-1} measures should be taken to reduce concentrations below this concentration as soon as possible. These guidance values are equivalent to oral intakes of 0.29 ng kg^{-1} bw day^{-1} and 2.9 ng kg^{-1} bw day^{-1}, respectively, for a 70 kg adult drinking 2 L of water per day.

These guidance values are not drinking water standards and so are not considered a suitable basis for derivation of the LLTC.

GO TO FLOWCHART ELEMENT 7

2.1.3 FLOWCHART ELEMENT 3/6: Are there adequate dose-effects data for the chosen pivotal study to perform BMD modelling – animal/human data?

Yes	No	Not applicable
X (human data)	X (animal data)	

Both animal toxicology data (see Section 2.1.2 2a) and human epidemiological data (see Section 2.1.2 2b) are available for the four PFAS. BMD modelling has been carried out on the human data.

GO TO FLOWCHART ELEMENT 3a/b or 6a/b/c

2.1.4 FLOWCHART ELEMENT 3a: Use NOAEL/LOAEL as POD

Not applicable – human data selected for derivation of the LLTC.

2.1.5 FLOWCHART ELEMENT 3b/6b: Perform BMD modelling – epidemiological data

Quantitative epidemiological data are available from the epidemiology study by Abraham *et al.* (2020) that EFSA (2020) used to carry out BMD modelling for the sum of PFOS, PFOA, PFNA and PFHxS in children's blood serum.

EFSA used their own web-tool for BMD analysis, which used the R-package PROAST, version 69.0, for the underlying calculations. The dose-response models used to fit the data included Null, Full, Exp model 3, Exp model 4, Hill model 3, Hill model 4, Inverse Exponential and Log-Normal Family. The lowest $BMDL_{10}$ from the individual models for diphtheria and tetanus was selected. Diphtheria had the lowest $BMDL_{10}$. Model averaging was not used because BMDLs obtained with model averaging were below the observed range of the blood serum levels of the four PFAS in the study (EFSA, 2020).

The BMD_{10} and the corresponding $BMDL_{10}$ were calculated associated with a benchmark response of a 10% change in mean response compared to controls. EFSA used a critical effect size of 10%, instead of the default 5%, due to the large variation in the response. The lowest BMD_{10} and $BMDL_{10}$ from the individual models for diphtheria are presented in Table 2.1.

Table 2.1: BMD_{10} and $BMDL_{10}$ calculations from the best fitting single models for antibody titres against diphtheria (see EFSA 2020 Appendix K and Section 3.4.3).

Model	AIC*	BMD_{10} (ng mL^{-1})	$BMDL_{10}$ (ng mL^{-1})	p value
EXP (model 3)	285.24	31.6	**17.5**	0.01
HILL (model 3)	285.24	31.5	17.6	0.01
INVEXP (model 3)	284.80	36.2	23.1	0.01
LOGN (model 3)	284.96	35.2	21.1	0.01

* AIC = Akaike Information Criteria. This is used for evaluating how well a model fits the data. Smaller AIC values indicate a better fit of data.

EFSA selected the lowest $BMDL_{10}$ of 17.5 ng mL^{-1} as the basis of the TWI, which equated to the serum concentration of the sum of the four PFAS in children at 1 year of age that was estimated to give a 10% decrease in antibody titres for diphtheria. This $BMDL_{10}$ of 17.5 ng mL^{-1} was used by EFSA (2020) to estimate the daily intake by mothers that would result in this serum concentration in 1-year-old breast-fed children.

EFSA (2020) used PBPK modelling, assuming 12 months of breastfeeding (based on WHO recommendations), to calculate the critical breast milk and corresponding serum levels in a mother at 35 years of age, that would result in a blood serum level of 17.5 ng mL^{-1} in a 1-year-old child. It was estimated that this serum concentration corresponded to a daily dietary intake by the mother of 0.63 ng kg^{-1} bw day^{-1} (6.9 ng mL^{-1} in serum) of the four PFAS.

For the purposes of deriving an LLTC, the maternal intake of 0.63 ng kg^{-1} bw day^{-1} (i.e. 0.00063 µg kg^{-1} bw day^{-1}), derived from the $BMDL_{10}$ and PBPK modelling is proposed as the point of departure (POD), based on decreased vaccine response in children. Note that the C4SL framework (CL:AIRE, 2014) recommends that a BMD is used for deriving the LLTC (where possible) rather than the BMDL. However, EFSA do not present the maternal daily intake that would correspond to the BMD_{10} of 31.6 ng mL^{-1} and PBPK modelling is not within the scope of the C4SL project.

GO TO FLOWCHART ELEMENT 4a/b

2.1.6 FLOWCHART ELEMENT 4: Does the critical endpoint exhibit a threshold?

Yes	No	Not applicable
X		

2.1.7 FLOWCHART ELEMENT 4a: Define a suitable chemical-specific margin

Not applicable – threshold chemicals.

GO TO FLOWCHART ELEMENT 5a

2.1.8 FLOWCHART ELEMENT 4b: Derive a chemical-specific assessment factor using scientific evidence

EFSA did not apply any UF to the $BMDL_{10}$ on the basis that (a) the $BMDL_{10}$ is for infants who are expected to be a sensitive population group; and (b) decreased vaccination response is considered a risk factor for disease rather than a disease in itself (EFSA, 2020). This approach has also been adopted for the interim $LLTC_{oral}$.

GO TO FLOWCHART ELEMENT 5b

2.1.9 FLOWCHART ELEMENT 5a: Calculate the LLTC for thresholded chemicals

For thresholded chemicals, the POD is divided by the UF:

POD/ UF = LLTC (units as per POD)

Therefore, for this evaluation:

POD = 0.00063 µg kg^{-1} bw day^{-1}

UF = 1 (i.e. no UF applied)

Interim $LLTC_{oral}$ = POD/UF = 0.00063/1 = 0.00063 µg kg^{-1} bw day^{-1}

GO TO FLOWCHART ELEMENT 7

2.1.10 FLOWCHART ELEMENT 7: Assess $LLTC_{oral}$ for PFAS

Based on an epidemiological evaluation of decreased vaccine response in German children (Abraham *et al.,* 2020), an interim $LLTC_{oral}$ of **0.00063 µg kg^{-1} bw day^{-1}** is proposed for the derivation of the C4SLs for PFOS, PFOA, PFNA and PFHxS. This is based on BMD modelling to derive a $BMDL_{10}$ of 17.5 ng mL^{-1} for the sum of the four PFAS in the serum of a 1-year-old breast-fed child, and subsequent PBPK modelling by EFSA to derive a TDI for the mother that would give rise to this $BMDL_{10}$ concentration (EFSA, 2020).

Whilst it would have been preferable to base the LLTC on the BMD_{10} (rather than the $BMDL_{10}$), EFSA did not present the equivalent maternal intake that would lead to the BMD blood serum concentration and thus the LLTC has been based on the $BMDL_{10}$. As such, the interim $LLTC_{oral}$ could be considered to represent tolerable risk rather than low risk. Overall, this LLTC is considered to be a pragmatic level for setting an interim C4SL, which is suitably protective of all health effects in the general population based on current knowledge of the health effects associated with PFOS, PFOA, PFNA and PFHxS.

This LLTC value:

a) Is the maternal dose predicted to result in a $BMDL_{10}$ blood serum concentration of the four PFAS combined in a 1-year-old breast-fed child of 17.5 ng mL^{-1} and is considered to present tolerable risk of reduced vaccine response

b) Is assumed to be protective of all receptor age groups

c) Is based on current knowledge and sufficiently protective for an interim C4SL

d) Has considered the COT opinion on the EFSA TWI and its derivation

e) Should be used with a hazard index approach for risk assessment, following derivation of the C4SLs (see Section 4.2).

f) Is lower than the individual MRLs derived for PFOS, PFOA, PFNA and PFHxS (even when allowing for additional UFs to account for short-term studies). As noted in Section 2.1.2 2a these were based on developmental and thyroid effects rather than immunological effects.

2.2 INHALATION ROUTE

2.2.1 FLOWCHART ELEMENT 1: Collate the evaluations for the contaminant as per SR2: identify all known toxicological hazards; collate HBGVs from relevant authoritative bodies and specify the conditions of minimal risk

Only ATSDR evaluated data from inhalation studies (ATSDR, 2021), with the reviews by FSANZ (2017), Health Canada (2018a,b), EFSA (2020) and US EPA (2021a,b) being focused on risks associated with PFAS in food or drinking water, and therefore the risks associated with oral exposure only.

In a review of the toxicological data for PFAS, ATSDR (2021) concluded that most of the animal data were from oral studies, with considerably less data available from inhalation studies. Moreover, the database of toxicological data (either animal or human) was not considered adequate for the derivation of HBGVs (i.e., MRLs). Inhalation data were located for PFOA and PFNA, but the studies examined were concluded to have a limited number of endpoints and were not adequate for identifying the most sensitive targets of toxicity or establishing dose-response relationships; no inhalation data were located for either PFOS or PFHxS (ATSDR, 2021).

ATSDR (2021) supports the conclusion that there are insufficient inhalation data on which to derive an inhalation LLTC for PFAS.

In the absence of suitable inhalation toxicity data and in accordance with SR2 (Environment Agency, 2009a), inhalation exposure will be compared against the interim $LLTC_{oral}$ for the purposes of the derivation of the C4SL.

2.3 DERMAL ROUTE

No dermal HBGVs have been identified in authoritative body reports.

In a review of the toxicological data for PFAS, ATSDR (2021) concluded that most of the animal data were from oral studies, with considerably less data available from dermal studies. No studies were located regarding dermal effects in humans, and animal studies have not reported dermal effects following nose-only exposure to PFOA or following oral exposure to PFOA or PFOS. Dermal exposure to PFOA has resulted in skin damage in rats and rabbits (ATSDR, 2021).

In the absence of suitable dermal toxicity data and in accordance with SR2 (Environment Agency, 2009a), dermal exposure will be compared against the interim $LLTC_{oral}$ for the purposes of the derivation of the C4SL.

2.4 MEAN DAILY INTAKE

The interim $LLTC_{oral}$ recommended for derivation of the C4SLs for the four PFAS is based on threshold effects. As such, in accordance with the C4SL SP1010 framework (CL:AIRE, 2014) and SR2 (Environment Agency, 2009a), the Mean Daily Intake (MDI) from non-soil sources is to be included in the exposure modelling for comparison with the oral LLTC.

Available oral and inhalation MDI data have been collated and reviewed and used to derive estimated adult MDIs for the oral and inhalation pathways (see Appendix B). The derived MDIs are summarised in Table 2.2 below.

The oral MDIs are based on the sum of adult mean dietary and drinking water intakes. Mean dietary intakes have been estimated from the UK National Diet and Nutrition Survey for the period 2008 to 2011 as reported in Table A5 of Annex A of EFSA (2020). EFSA reported lower and upper bound estimates, the former using values of zero for measured concentrations below limit of detection/quantification, and the upper using the limit of detection/quantification where concentrations were reported as less than these values. Based on the available information EFSA considered the lower bound estimates to be more realistic than the upper bound estimates. The lower bound estimates have been used as the basis of the oral MDIs for the C4SL.

The mean drinking water intakes have been derived by multiplying the mean concentrations in drinking water reported by EFSA (2020) for Europe (from Table A4 of Annex A) by an assumed adult drinking water consumption rate of 2 L day^{-1}. Again, lower and upper bound mean concentrations are reported and the lower bound concentrations have been used for the calculations.

The inhalation MDIs are based on measured concentrations in indoor and outdoor air from four studies:

- Chaemfa *et al.* (2010) who measured concentrations of PFOS and PFOA in outdoor air at 22 locations across England in 2006/2007;
- Barber *et al*. (2007) who measured concentrations of various PFAS (including PFOS, PFOA, PFHxS and PFNA) in outdoor air at two locations (Hazelrigg and Manchester) in 2005/2006;
- Goosey and Harrad (2012) who measured concentrations of various PFAS (including PFOS, PFOA and PFHxS) in indoor air in 20 homes and outdoor air at 10 locations in Birmingham in 2009; and
- Winkens *et al*. (2017) who measured concentrations of various PFAS (including PFOS, PFOA, PFNA and PFHxS) in indoor air in 57 homes in Kuopio, Eastern Finland during 2014/15.

A best estimate of background exposure concentration in air has been selected from these studies for each PFAS (giving priority to UK and indoor air) and multiplied by an assumed adult respiration rate of 20 m^3 day^{-1} to derive the inhalation MDIs for derivation of the C4SL.

As explained in Section 3, C4SLs have been derived for each individual PFAS using the interim $LLTC_{oral}$ for the sum of all four PFAS combined. As explained in Section 4.2 it is proposed that a hazard index approach is then used with the derived C4SL for assessing risk. Given that the LLTC applies to the sum of all four PFAS, it is considered appropriate to sum the MDIs for the four PFAS for use in the CLEA model. As shown in Table 2.2, the summed adult MDIs are 0.0515 µg day^{-1} for oral exposure and 0.00200 µg day^{-1} for inhalation exposure.

Note that the oral MDI is equivalent to an intake of 0.000736 µg kg^{-1} bw day^{-1} for a 70 kg adult, which is greater than the oral LLTC. As such, in accordance with the C4SL SP1010 framework (CL:AIRE, 2014) and SR2 (Environment Agency, 2009a), the C4SLs will be based on the soil concentrations at which total exposure equals 50% of the LLTC.

Table 2.2: Adult mean daily intake values.

PFAS	Oral adult MDI (µg day^{-1})	Inhalation adult MDI (µg day^{-1})
PFOA	0.0128	0.00104
PFOS	0.0279	0.000760
PFHxS	0.00827	0.000140
PFNA	0.00250	0.0000612
Sum of PFOS, PFOA, PFNA and PFHxS **(values used for CLEA modelling)**	**0.0515**	**0.00200**

3. EXPOSURE MODELLING FOR PFOA, PFNA, PFHxS and PFOS

As described in the C4SL SP1010 report (CL:AIRE, 2014), the CLEA model has been used deterministically to derive C4SLs for the following six land-uses for a sandy loam soil type:

- Residential with consumption of homegrown produce;
- Residential without consumption of homegrown produce;
- Allotments;
- Commercial;
- Public open space (POS):
  - The scenario of open space close to housing that includes tracking back of soil (POS_{resi}); and
  - A park-type scenario where the park is considered to be at a sufficient distance from the home that there is negligible tracking back of soil (POS_{park}).

Individual C4SLs have been derived for each of the four PFAS, i.e. PFOS, PFOA, PFNA and PFHxS using the same interim $LLTC_{oral}$ derived above. This LLTC is for the sum of the four PFAS combined and assumes equipotency between them. As described in Section 4.2 below, the C4SLs should be used with a hazard index approach when comparing with measured concentrations at a site.

3.1 CLEA PARAMETER INPUTS

CLEA derives an estimate of average daily exposure (ADE) for each exposure pathway. ADEs are then summed for some or all exposure pathways for comparison with the LLTCs. The pathways considered in the summation are dependent on the critical toxicological effects that the LLTC is based on. CLEA uses iteration to find the soil concentrations at which the summed ADEs equal the respective LLTC values and these are termed 'assessment criteria'. As described in the CLEA SR2 and SR3 documents (Environment Agency, 2009a,b), the assessment criteria are normally integrated by CLEA to determine an overall assessment criterion where the critical toxicological effects via both routes of exposure are systemic. Where the critical toxicological effect is localised for either the oral or inhalation routes of exposure, the assessment criteria are not integrated and the lowest of the two criteria is chosen as the overall assessment criterion.

The interim $LLTC_{oral}$ is based upon an epidemiological evaluation of decreased vaccine response in children (Abraham *et al.*, 2020) which is a threshold systemic effect.

Insufficient toxicological data were identified in order to derive an $LLTC_{inhal,}$ therefore the C4SLs have been calculated by adding systemic inhalation exposure to exposure from all other routes. Total systemic exposure was then evaluated against the $LLTC_{oral}$ (i.e., using simple route-to-route extrapolation).

CLEA requires a number of contaminant and non-contaminant specific parameter values for modelling exposure. The description of these parameters is provided within the C4SL SP1010 report (CL:AIRE, 2014) and the SR3 report (Environment Agency, 2009b). Contaminant-specific parameter values used for the four modelled PFAS are shown in Tables 3.1 to 3.4.

The majority of PFAAs are present in the environment in their dissociated anionic forms which are involatile. Johansson *et al.* (2017) conducted a series of laboratory experiments to assess the volatilisation of PFOA from water and how this was affected by pH. They found that volatilisation was negligible at pH >2.5 and concluded that volatilisation of any structural isomer of PFOA from water will be negligible at environmentally-relevant conditions. The low volatility of anionic forms is confirmed by Barton *et al.* (2009) who showed that the vapour pressure of solid ammonium perfluorooctanoate was three orders of magnitude less than that of PFOA (i.e. the acid form).

On this basis it is assumed that exposure via vapour migration and inhalation from the four PFAS considered will be negligible and so the vapour inhalation pathways have not been modelled.

The exclusion of the vapour migration pathways and the fact that soil-to-plant concentrations factors have been based on empirical data rather than modelled (see below) means that many of the physico-chemical properties normally required for organic contaminants are redundant (i.e. not required).

Table 3.1: Contaminant-specific parameter values used for derivation of C4SLs for PFOA.

Parameter	Units	Value	Source/Justification
Air-water partition coefficient (Kaw)	dimensionless	NR	Not required as vapour inhalation pathways not modelled
Diffusion coefficient in air	$m^2\ s^{-1}$	NR	
Diffusion coefficient in water	$m^2\ s^{-1}$	NR	
Relative molecular mass	$g\ mol^{-1}$	414.07	CompTox Chemistry Dashboard, Williams *et al.*, 2017
Vapour pressure	Pa	NR	Not required as vapour inhalation pathways not modelled
Water solubility	$mg\ L^{-1}$	4141	Median experimental value listed in CompTox Chemistry Dashboard, Williams *et al.*, 2017
Log K_{oc}	Log $cm^3\ g^{-1}$	NR	Not required as vapour inhalation pathways not modelled and empirical soil-to-plant concentration factors used
Log K_{ow}	dimensionless	NR	Not required as empirical soil-to-plant concentration factors used
Dermal absorption fraction	dimensionless	0.1	CLEA SR3, Environment Agency, 2009b
Soil-to-plant concentration factor (green vegetables)	$mg\ g^{-1}$ FW plant over $mg\ g^{-1}$ DW soil	0.0871	A review of empirically-derived soil-to-plant concentration factors in literature was undertaken (see Appendix C). Geomean of data is presented. Limited data (one data point) available for tree fruit and no data available for shrub fruit so not modelled. See discussion below.
Soil-to-plant concentration factor (root vegetables)		0.0532	
Soil-to-plant concentration factor (tuber vegetables)		0.00223	
Soil-to-plant concentration factor (herbaceous fruit)		0.0214	
Soil-to-plant concentration factor (shrub fruit)		Not modelled	
Soil-to-plant concentration factor (tree fruit)		Not modelled	
Soil-to-dust transport factor	$g\ g^{-1}$ DW	0.5	Default value from CLEA SR3, Environment Agency, 2009b
Sub-surface soil to indoor air correction factor	dimensionless	1	Environment Agency, 2009b
Relative bioavailability soil	-	1	Conservative assumption made that bioavailability of PFAS in soil and dust is the same as bioavailability of PFAS in epidemiological study used to derive the LLTC
Relative bioavailability dust	-	1	

Table 3.2: Contaminant-specific parameter values used for derivation of C4SLs for PFOS.

Parameter	Units	Value	Source/Justification
Air-water partition coefficient (Kaw)	dimensionless	NR	Not required as vapour inhalation pathways not modelled
Diffusion coefficient in air	$m^2\ s^{-1}$	NR	
Diffusion coefficient in water	$m^2\ s^{-1}$	NR	
Relative molecular mass	$g\ mol^{-1}$	500.13	CompTox Chemistry Dashboard, Williams *et al.*, 2017
Vapour pressure	Pa	NR	Not required as vapour inhalation pathways not modelled
Water solubility	$mg\ L^{-1}$	570	Experimental value listed in CompTox Chemistry Dashboard, Williams *et al.*, 2017
Log K_{oc}	Log $cm^3\ g^{-1}$	NR	Not required as vapour inhalation pathways not modelled and empirical soil-to-plant concentration factors used
Log K_{ow}	dimensionless	NR	Not required as empirical soil-to-plant concentration factors used
Dermal absorption fraction	dimensionless	0.1	CLEA SR3, Environment Agency, 2009b
Soil-to-plant concentration factor (green vegetables)	$mg\ g^{-1}$ FW plant over $mg\ g^{-1}$ DW soil	0.0359	A review of empirically-derived soil-to-plant concentration factors in literature was undertaken (see Appendix C). Geomean of data is presented. Limited data (one data point) available for tree fruit and no data available for shrub fruit so not modelled. See discussion below.
Soil-to-plant concentration factor (root vegetables)		0.0404	
Soil-to-plant concentration factor (tuber vegetables)		0.000906	
Soil-to-plant concentration factor (herbaceous fruit)		0.0104	
Soil-to-plant concentration factor (shrub fruit)		Not modelled	
Soil-to-plant concentration factor (tree fruit)		Not modelled	
Soil-to-dust transport factor	$g\ g^{-1}$ DW	0.5	Default value from CLEA SR3, Environment Agency, 2009b
Sub-surface soil to indoor air correction factor	dimensionless	1	Environment Agency, 2009b
Relative bioavailability soil	-	1	Conservative assumption made that bioavailability of PFAS in soil and dust is the same as bioavailability of PFAS in epidemiological study used to derive the LLTC
Relative bioavailability dust	-	1	

Table 3.3: Contaminant-specific parameter values used for derivation of C4SLs for PFHxS.

Parameter	Units	Value	Source/Justification
Air-water partition coefficient (Kaw)	dimensionless	NR	Not required as vapour inhalation pathways not modelled
Diffusion coefficient in air	$m^2\ s^{-1}$	NR	
Diffusion coefficient in water	$m^2\ s^{-1}$	NR	
Relative molecular mass	$g\ mol^{-1}$	400.11	CompTox Chemistry Dashboard, Williams *et al.*, 2017
Vapour pressure	Pa	NR	Not required as vapour inhalation pathways not modelled
Water solubility	$mg\ L^{-1}$	243	Experimental value listed in CompTox Chemistry Dashboard, Williams *et al.*, 2017
Log K_{oc}	Log $cm^3\ g^{-1}$	NR	Not required as vapour inhalation pathways not modelled and empirical soil-to-plant concentration factors used
Log K_{ow}	dimensionless	NR	Not required as empirical soil-to-plant concentration factors used
Dermal absorption fraction	dimensionless	0.1	CLEA SR3, Environment Agency, 2009b
Soil-to-plant concentration factor (green vegetables)	$mg\ g^{-1}$ FW plant over $mg\ g^{-1}$ DW soil	0.0667	A review of empirically-derived soil-to-plant concentration factors in literature was undertaken (see Appendix C). Geomean of data is presented. No data available for shrub or tree fruit so not modelled. See discussion below.
Soil-to-plant concentration factor (root vegetables)		0.0751	
Soil-to-plant concentration factor (tuber vegetables)		0.00223	
Soil-to-plant concentration factor (herbaceous fruit)		0.00598	
Soil-to-plant concentration factor (shrub fruit)		Not modelled	
Soil-to-plant concentration factor (tree fruit)		Not modelled	
Soil-to-dust transport factor	$g\ g^{-1}$ DW	0.5	Default value from CLEA SR3, Environment Agency, 2009b
Sub-surface soil to indoor air correction factor	dimensionless	1	Environment Agency, 2009b
Relative bioavailability soil	-	1	Conservative assumption made that bioavailability of PFAS in soil and dust is the same as bioavailability of PFAS in epidemiological study used to derive the LLTC
Relative bioavailability dust	-	1	

Table 3.4: Contaminant-specific parameter values used for derivation of C4SLs for PFNA.

Parameter	Units	Value	Source/Justification
Air-water partition coefficient (Kaw)	dimensionless	NR	Not required as vapour inhalation pathways not modelled
Diffusion coefficient in air	$m^2\ s^{-1}$	NR	
Diffusion coefficient in water	$m^2\ s^{-1}$	NR	
Relative molecular mass	$g\ mol^{-1}$	464.078	CompTox Chemistry Dashboard, Williams *et al.*, 2017
Vapour pressure	Pa	NR	Not required as vapour inhalation pathways not modelled
Water solubility	$mg\ L^{-1}$	1299	Experimental value listed in CompTox Chemistry Dashboard, Williams *et al.*, 2017
Log K_{oc}	Log $cm^3\ g^{-1}$	NR	Not required as vapour inhalation pathways not modelled and empirical soil-to-plant concentration factors used
Log K_{ow}	dimensionless	NR	Not required as empirical soil-to-plant concentration factors used
Dermal absorption fraction	dimensionless	0.1	CLEA SR3, Environment Agency, 2009b
Soil-to-plant concentration factor (green vegetables)	$mg\ g^{-1}$ FW plant over $mg\ g^{-1}$ DW soil	0.0597	A review of empirically-derived soil-to-plant concentration factors in literature was undertaken (see Appendix C). Geomean of data is presented. No data available for shrub or tree fruit so not modelled. See discussion below.
Soil-to-plant concentration factor (root vegetables)		0.108	
Soil-to-plant concentration factor (tuber vegetables)		0.00223	
Soil-to-plant concentration factor (herbaceous fruit)		0.00752	
Soil-to-plant concentration factor (shrub fruit)		Not modelled	
Soil-to-plant concentration factor (tree fruit)		Not modelled	
Soil-to-dust transport factor	$g\ g^{-1}$ DW	0.5	Default value from CLEA SR3, Environment Agency, 2009b
Sub-surface soil to indoor air correction factor	dimensionless	1	Environment Agency, 2009b
Relative bioavailability soil	-	1	Conservative assumption made that bioavailability of PFAS in soil and dust is the same as bioavailability of PFAS in epidemiological study used to derive the LLTC
Relative bioavailability dust	-	1	

The key contaminant-specific parameter values used for derivation of the C4SLs for the four PFAS are discussed below.

Soil-to-dust transport factor

The soil-to-dust transport factor should be contaminant specific but where contaminant-specific data are not available, the SR3 report (Environment Agency, 2009b) recommends a default value of 0.5, meaning that the concentration of contaminant in respirable dust is assumed to be 50% of the concentration of contaminant in outdoor soil. This default value has been assumed for the four PFAS modelled.

Soil-to-plant concentration factors

Soil-to-plant concentration factors have been estimated from empirically-derived literature values for green vegetables, root vegetables, tuber vegetables and herb fruit (see Appendix C)[3]. The geomean of the empirically-derived values has been used as the soil-to-plant concentration factor for these plant types. No empirical data were found for shrub or tree fruit with the exception of a single data point for tree fruit (plum) for PFOS and PFOA. As such, soil-to-plant concentration factors have not been derived for these fruit types and exposure from these plant types has not been modelled (i.e. is assumed to be zero).

Based on the empirically-derived soil-to-plant concentrations factors and CLEA model input parameters (Environment Agency, 2009b), CLEA predicts the greatest exposure to each of the four PFAS from ingestion of green and root vegetables for both the residential and allotments scenarios (via the consumption of homegrown produce pathways). Therefore, in accordance with the "top two" approach, 90^{th} percentile consumption rates have been used for these two produce types and mean consumption rates have been used for the remaining produce types.

Dermal Absorption Factor

According to ATSDR (2021), the available data suggests that absorption of PFOA and PFOS through the skin is limited and of minimal concern as an exposure route. However, ATSDR do not present a dermal absorption factor and so the proposed CLEA default value of 0.1 (Environment Agency, 2009b) has been selected for the derivation of the C4SLs.

Relative bioavailability

There are no data available on the relative bioavailability of PFAS in soil (i.e. ratio of bioavailability of PFAS in soil to that in the epidemiological study used to derive the $LLTC_{oral}$). On this basis it is considered appropriately conservative to assume a relative bioavailability of 100% for the derivation of C4SLs.

[3] Due to the amphiphilic nature of PFAS (i.e. having both hydrophobic and hydrophilic regions) the plant uptake models for organic substances (such as Trapp (2002) and Trapp *et al.* (2007)) cannot be used to calculate soil-to-plant concentration factors (Van Holderbeke *et al*., 2020) and so empirically-derived values must be used.

4. INTERIM C4SLs FOR PFOA, PFNA, PFHxS and PFOS

4.1 INTERIM C4SLS

The interim C4SLs for PFOA, PFOS, PFHxS and PFNA are presented in Table 4.1 below. Due to the exclusion of the vapour pathways and the use of empirical soil-to-plant concentration factors, the interim C4SLs are not dependent on soil organic matter. As discussed in Section 4.2 the interim C4SLs should be used in a Hazard Index approach when comparing with measured soil concentrations to assess risk.

Table 4.1: Interim C4SLs for PFOA, PFOS, PFHxS and PFNA.

Land-use	Interim C4SLs ($mg.kg^{-1}$) (see notes below)			
	PFOA	PFOS	PFHxS	PFNA
Residential with consumption of homegrown produce	0.0076	0.013	0.0081	0.0073
Residential without consumption of homegrown produce	0.041	0.041	0.041	0.041
Allotments	0.0014	0.0027	0.0015	0.0013
Commercial	0.60	0.60	0.60	0.60
Public Open Space (residential)	0.079	0.079	0.079	0.079
Public Open Space (park)	0.17	0.17	0.17	0.17

N.B. These C4SLs are to be used with a Hazard Index approach (see Section 4.2). These C4SLs are based on chronic risk only. For further discussion of acute risks and other factors that should be considered when using these C4SL see Section 4.2 below.

4.2 HAZARD INDEX APPROACH

The interim C4SLs given in Table 4.1 are the soil concentrations at which the predicted ADE of each individual PFAS equals the $LLTC_{oral}$. However, the $LLTC_{oral}$ is the tolerable daily intake for the sum of the four PFAS combined and therefore when comparing these C4SLs to measured soil concentrations a hazard index approach must be used to ensure that total exposure from all four PFAS does not exceed the $LLTC_{oral}$.

The hazard index approach requires that a hazard quotient (HQ) is first calculated for each of the four PFAS for each soil sample. The hazard quotient is the ratio of the measured soil concentration to the relevant C4SL. The hazard index (HI) for the soil sample is then the sum of the hazard quotients for the four PFAS:

$$HI = HQ_{PFOA} + HQ_{PFOS} + HQ_{PFHxS} + HQ_{PFNA}$$

The risk is considered acceptable (subject to consideration of uncertainties) provided that the hazard quotient for each individual PFAS and the hazard index do not exceed 1. A hazard quotient or index of greater than 1 (again, subject to consideration of uncertainties) signifies that further assessment or consideration of the risk is required.

For example, an assessor wishes to compare the measured concentrations in a soil sample with the allotments C4SL. The soil sample has 0.001 $mg\ kg^{-1}$ PFOA, 0.002 $mg\ kg^{-1}$ PFOS, 0.001 $mg\ kg^{-1}$ PFHxS and 0.001 $mg\ kg^{-1}$ PFNA. Based on the C4SL for the allotments land-use in Table 4.1, the calculated HQs are 0.71 (0.001/0.0014), 0.74 (0.002/0.0027), 0.67 (0.001/0.0015) and 0.77 (0.001/0.0013), respectively and the HI is 2.89 (0.71 + 0.74 +.0.67 + 0.77). This exceeds 1 and therefore further assessment or consideration of the risks would be required, even though none of the individual C4SL values are exceeded.

4.3 PATHWAY CONTRIBUTIONS TO EXPOSURE

The relative contribution of each exposure pathway contributing to the C4SLs for PFOA, PFOS, PFHxS and PFNA are shown for each land-use in Tables 4.2 to 4.5, respectively.

Table 4.2: Relative contributions of exposure pathways to overall exposure for PFOA.

Exposure pathway	Relative contribution to total exposure (%)					
	Residential		Allotments	Commercial	POS_{resi}	POS_{park}
	With home grown produce	Without home grown produce				
Direct soil & dust ingestion	8.97	47.76	0.44	42.66	46.76	45.49
Sum of consumption of homegrown produce and attached soil	40.61	0.00	49.34	0.00	0.00	0.00
Dermal contact (indoor)	0.17	0.89	0.00	2.84	1.42	0.00
Dermal contact (outdoor)	0.23	1.24	0.22	4.20	1.66	4.50
Inhalation of dust (indoor)	0.02	0.11	0.00	0.29	0.16	0.00
Inhalation of dust (outdoor)	0.00	0.00	0.00	0.00	0.00	0.01
Inhalation of vapour (indoor)	0.00	0.00	0.00	0.00	0.00	0.00
Inhalation of vapour (outdoor)	0.00	0.00	0.00	0.00	0.00	0.00
Oral background	47.99	47.99	47.99	48.13	48.10	47.99
Inhalation background	2.01	2.01	2.01	1.87	1.90	2.01

Table 4.3: Relative contributions of exposure pathways to overall exposure for PFOS.

Exposure pathway	Relative contribution to total exposure (%)					
	Residential		Allotments	Commercial	POS_{resi}	POS_{park}
	With home grown produce	Without home grown produce				
Direct soil & dust ingestion	14.77	47.76	0.85	42.66	46.76	45.49
Sum of consumption of homegrown produce and attached soil	34.54	0.00	48.73	0.00	0.00	0.00
Dermal contact (indoor)	0.28	0.89	0.00	2.84	1.42	0.00
Dermal contact (outdoor)	0.38	1.24	0.42	4.20	1.66	4.50
Inhalation of dust (indoor)	0.03	0.11	0.00	0.29	0.16	0.00

Exposure pathway	Relative contribution to total exposure (%)					
	Residential		Allotments	Commercial	POS_{resi}	POS_{park}
	With home grown produce	Without home grown produce				
Inhalation of dust (outdoor)	0.00	0.00	0.00	0.00	0.00	0.01
Inhalation of vapour (indoor)	0.00	0.00	0.00	0.00	0.00	0.00
Inhalation of vapour (outdoor)	0.00	0.00	0.00	0.00	0.00	0.00
Oral background	47.99	47.99	47.99	48.13	48.10	47.99
Inhalation background	2.01	2.01	2.01	1.87	1.90	2.01

Table 4.4: Relative contributions of exposure pathways to overall exposure for PFHxS.

Exposure pathway	Relative contribution to total exposure (%)					
	Residential		Allotments	Commercial	POS_{resi}	POS_{park}
	With home grown produce	Without home grown produce				
Direct soil & dust ingestion	9.55	47.76	0.48	42.66	46.76	45.49
Sum of consumption of homegrown produce and attached soil	40.00	0.00	49.28	0.00	0.00	0.00
Dermal contact (indoor)	0.18	0.89	0.00	2.84	1.42	0.00
Dermal contact (outdoor)	0.25	1.24	0.24	4.20	1.66	4.50
Inhalation of dust (indoor)	0.02	0.11	0.00	0.29	0.16	0.00
Inhalation of dust (outdoor)	0.00	0.00	0.00	0.00	0.00	0.01
Inhalation of vapour (indoor)	0.00	0.00	0.00	0.00	0.00	0.00
Inhalation of vapour (outdoor)	0.00	0.00	0.00	0.00	0.00	0.00
Oral background	47.99	47.99	47.99	48.13	48.10	47.99
Inhalation background	2.01	2.01	2.01	1.87	1.90	2.01

Table 4.5: Relative contributions of exposure pathways to overall exposure for PFNA.

Exposure pathway	Relative contribution to total exposure (%)					
	Residential		Allotments	Commercial	POS_{resi}	POS_{park}
	With home grown produce	Without home grown produce				
Direct soil & dust ingestion	8.60	47.76	0.42	42.66	46.76	45.49
Sum of consumption of homegrown produce and attached soil	41.00	0.00	49.37	0.00	0.00	0.00
Dermal contact (indoor)	0.16	0.89	0.00	2.84	1.42	0.00
Dermal contact (outdoor)	0.22	1.24	0.21	4.20	1.66	4.50
Inhalation of dust (indoor)	0.02	0.11	0.00	0.29	0.16	0.00
Inhalation of dust (outdoor)	0.00	0.00	0.00	0.00	0.00	0.01
Inhalation of vapour (indoor)	0.00	0.00	0.00	0.00	0.00	0.00
Inhalation of vapour (outdoor)	0.00	0.00	0.00	0.00	0.00	0.00
Oral background	47.99	47.99	47.99	48.13	48.10	47.99
Inhalation background	2.01	2.01	2.01	1.87	1.90	2.01

Based on the information in Tables 4.2 to 4.5, the principal risk driving pathways for each land-use are expected to be:

- Residential with homegrown produce: Consumption of homegrown produce for all four PFAS;
- Residential without homegrown produce: Ingestion of soil and soil derived dust for all four PFAS;
- Allotments: Consumption of homegrown produce for all four PFAS;
- Commercial: Ingestion of soil and soil derived dust for all four PFAS;
- POS_{resi}: Ingestion of soil and soil derived dust for all four PFAS;
- POS_{park}: Ingestion of soil and soil derived dust for all four PFAS.

As noted in Section 2.4 background exposure from non-soil sources accounts for 50% of total exposure for all land-uses.

4.4 OTHER CONSIDERATIONS

Other considerations that were relevant when setting the C4SLs for PFOA, PFOS, PFHxS and PFNA include the following:

- Background intake from non-soil sources (food, water and air) of the four PFAS combined compares to the oral LLTC as follows:
  - Dividing the adult oral MDI of 0.0515 µg day^{-1} by an adult body weight of 70 kg results in an estimated background exposure of 0.000736 µg kg^{-1} bw day^{-1}. This exceeds the oral LLTC of 0.00063 µg kg^{-1} bw day^{-1} and therefore the 50% rule is applied in CLEA, whereby background exposure from non-soil sources is effectively capped at 50% of the $LLTC_{oral}$.
  - Dividing the adult inhalation MDI of 0.00200 µg day^{-1} by an adult body weight of 70 kg results in an estimated background exposure of

0.000029 µg kg^{-1} bw day^{-1}, which is approximately 5% of the $LLTC_{oral}$, in the absence of an $LLTC_{inhal}$.

- C4SLs have been derived on the basis of chronic exposure and risks to human health, and do not explicitly account for acute risks (e.g. due to one-off ingestion of a significant amount of soil by a young child). It is noted here that the C4SLs derived for POS_{resi} and POS_{park} are significantly higher than values for the residential (with consumption of homegrown produce) and allotments land-uses, where consumption of homegrown produce is the principal risk driving pathway in deriving the C4SL. Therefore, further consideration of the possibility of acute risk due to ingestion of soil with concentrations equal to the POS_{resi} and POS_{park} C4SLs may be necessary. The reader is referred to the Society of Brownfield Risk Assessment (SoBRA) “Development of Acute Generic Assessment Criteria for Assessing Risks to Human Health from Contaminants in Soil” (SoBRA, 2020) for further guidance on this.
- Typical reported commercial laboratory limits of detection (LODs) for PFOA, PFOS, PFHxS and PFNA in soils range from 0.1 to 1 µg kg^{-1}. This range in LODs is below the C4SLs presented in Table 4.1 but only slightly below the C4SLs for the allotments land-use.
- The C4SLs have been derived for four PFAS: PFOA, PFOS, PFHxS and PFNA. According to EFSA (2020) these four PFAS make up half of the lower bound dietary exposure based on European data. For sites with PFAS impacted soil, there may be many other PFAS substances present and the assessor will have to consider whether these other PFAS could significantly contribute to risk to human health for the land-use being assessed.

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APPENDIX A
HUMAN TOXICOLOGICAL DATA
SHEET FOR PFOA, PFOS, PFHxS & PFNA

Human Toxicological Data Sheet for C4SL derivation: Reference checklist for sources of authoritative information

Chemical: **Perfluorooctane sulfonate (PFOS), Perfluorooctanoic acid (PFOA), Perfluorohexane sulfonate (PFHxS) & Perfluorononanoic acid (PFNA)**

Human Health Hazard Profile - References

Authoritative bodies	Website	Checked (Y/N)	References
Environment Agency	hhttps://www.gov.uk/government/organisations/environment-agency	Y	None
Foods Standards Agency	http://www.food.gov.uk/	Y	None
Public Health England	https://www.gov.uk/government/organisations/public-health-england	Y	None
Committee on Carcinogenicity	https://www.gov.uk/government/groups/committee-on-carcinogenicity-of-chemicals-in-food-consumer-products-and-the-environment-coc	Y	No statements, position papers or reports.
Committee on Mutagenicity	https://www.gov.uk/government/organisations/committee-on-mutagenicity-of-chemicals-in-food-consumer-products-and-the-environment	Y	No statements, position papers or reports.
Committee on Toxicity	http://cot.food.gov.uk/	Y	COT, 2022. Statement on the EFSA Opinion on the risks to human health related to the presence of perfluoroalkyl substances in food. COT Statement 04/22. October 2022.
ECHA REACH - is there a dossier?	http://echa.europa.eu/information-on-chemicals	Y	None
EFSA - is there an opinion?	http://www.efsa.europa.eu/	Y	European Food Safety Authority (EFSA), 2020. Scientific opinion: Risk to human health related to the presence of perfluoroalkyl substances in food. EFSA Panel on Contaminants in the Food Chain (EFSA CONTAM Panel). EFSA Journal 2020;18(9):6223
JECFA	http://www.fao.org/food/food-safety-quality/scientific-advice/jecfa/en/?	Y	None
WHO	http://www.who.int/en/	Y	None
WHO IPCS	http://www.who.int/ipcs/en/	Y	None
WHO EHC	http://www.who.int/ipcs/publications/ehc/en/	Y	None
RIVM	https://www.rivm.nl/en	Y	RIVM (2018). Mixture exposure to PFAS: A Relative Potency Factor approach. RIVM Report 2018-0070. Does not provide HBGVs.
US ATSDR	http://www.atsdr.cdc.gov/	Y	Agency for Toxic Substances and Diseases Registry (ATSDR), 2021. Toxicological Profile for Perfluoroalkyls. Released May 2021. Last Updated March 2020
US EPA	http://www.epa.gov/	Y	USEPA, 2021. Proposed Approaches to the Derivation of a Draft Maximum Contaminant Level Goal for Perfluorooctane Sulfonic Acid (PFOS) (CASRN 1763-23-1) in Drinking Water. External Peer Review Draft. EPA Document No. 822D21002, 16 November 2021 USEPA, 2021. Proposed Approaches to the Derivation of a Draft Maximum Contaminant Level Goal for Perfluorooctanoic Acid (PFOA) (CASRN 335-67-1) in Drinking Water. External Peer Review Draft. EPA Document No. 822D21001. 16 November 2021
US National Toxicology Program	https://ntp.niehs.nih.gov/	Y	None
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Risk Assessment Information System	http://rais.ornl.gov	N	
Other scientific reviews	**Check for key reviews on pubmed**		
California Environmental Protection Agency, Office of Environmental Health Hazard Assessment	https://oehha.ca.gov/	N	
Texas Commission on Environmental Quality	https://www.tceq.texas.gov/	N	
EC Scientific Committee on Occupational Exposure Limits	http://ec.europa.eu/social/main.jsp?catId=148&intPageId=684&langId=en	N	

NB. These weblinks were checked in April 2023, and may be subject to change at source.

Human Toxicological Data Sheet for C4SL derivation: Toxicological Evidence, HBGVs, MDIs and LLTC derivation

Chemical: **Perfluorooctane sulfonate (PFOS), Perfluorooctanoic acid (PFOA), Perfluorohexane sulfonate (PFHxS) & Perfluorononanoic acid (PFNA)**

I) Human Health Hazard Profile - Toxicological Evidence

Most sensitive health effects:

Sensitive endpoints	Other information	Source of evidence
Developmental toxicity	Decreased body weight (PFOS, PFOA, PFNA) and skeletal alterations (PFOA) in offspring of exposed rats/mice	Leubker et al. 2005, Lau et al. 2006, Koskela et al. 2016, Das et al. 2015
Hepatotoxicity	Hepatocellular hypertrophy in rats (PFOS & PFOA)	Butenhoff et al. 2012, Perkins et al. 2004
Endocrine toxicity	Thyroid follicular epithelial hypertrophy /hyperplasia in rats (PFHxS) and altered thyroid hormone levels in monkeys (PFOS)	Cheever et al 1990
Immunotoxicity	Decreased antibody response to vaccines	Grandjean et al. 2012, Abraham et al. 2020

II) Health Based Guidance Values (HBGVs) from Authoritative Bodies (in descending order of magnitude)

A) Oral route

Authoritative body (date) and HBGV type	Chemical	HBGV value	Unit	UF used	PoD	POD value	Unit	Endpoint	Pivotal data used & Comments	Full Reference
Food Standards Australia New Zealand (FSANZ) 2017 ***Tolerable Daily Intake***	**PFOS**	0.02	µg/kg bw/day	30	$NOAEL_{HED}$	0.0006	mg/kg bw/day	Decreased parental and offspring body weight gain, decreased pup viability, developmental delays	FSANZ derived tolerable daily intakes (TDIs) from four different animal studies: • subchronic toxicity study in monkeys (Seacat et al. 2002) • chronic toxicity and carcinogenicity study in rats (Butenhoff et al. 2012/Thomford 2002) • developmental toxicity in rats (Thibodeaux et al. 2003/Lau et al. 2003) • two-generation reproductive toxicity in rats (Luebker et al. 2005) In all four studies PFOS concentrations in serum were measured for each dose group. FSANZ derived no observed adverse effect levels (NOAELs) for each study as mg/kg bw/day which were converted to a serum concentration in µg/ml and used PBPK modelling to convert this to a NOAEL human equivalent dose (NOAEL HED) in mg/kg bw/day. This approach was adopted due to the differences in estimated half-lives for PFOS between humans (4.1 to 8.67 years) and animals (37 days for mouse, 48 days for rat and 121 days for monkey). The HEDs were divided by a UF of 30 (3 for interspecies and 10 for intraspecies variability) to derive the candidate TDIs. The lowest TDI was derived from a two-generation study in Sprague-Dawley rats (Luebker et al. 2005). In this study, 35 rats/sex/group were administered PFOS potassium salt (0.0, 0.1, 0.4, 1.6 or 3.2 mg/kg bw/day) by oral gavage for 42 days prior to mating and during the mating period. Parental male animals were sacrificed at the end of the cohabitation period, while females continued to be treated for a further 42 days through the gestation, parturition and lactation periods (i.e. 84 days total). A parental and offspring NOAEL of 0.1 mg/kg bw/day was determined based on decreased parental body weight and reduced food consumption and reduced pup viability, reduced put weight and developmental delays, respectively. This was converted to an average serum concentration of 7.14 µg/mL and PBPK modelling was used to estimate a HED (to give this serum concentration) of 0.0006 mg/kg bw/day. The NOAEL HED was divided by an UF of 30 (3 for interspecies and 10 for intraspecies variability) to give a TDI of 0.02 µg/kg bw/day.	Food Standards Australia New Zealand (FSANZ, 2017). Hazard assessment report – Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA), Perfluorohexane Sulfonate (PFHxS)
	PFOA	0.16	µg/kg bw/day	30	$NOAEL_{HED}$	0.0049	mg/kg bw/day	Foetal toxicity	FSANZ derived TDIs from three different animal studies: • chronic toxicity study in monkeys (Butenhoff et al. 2002) • subchronic toxicity study in rats (Perkins et al. 2004) • reproductive and developmental toxicity in the mouse (Lau et al. 2006) In all three studies PFOA concentrations in serum were measured for each dose group. FSANZ derived NOAELs for each study as mg/kg bw/day which were converted to a serum concentration in µg/ml and used PBPK modelling to convert this to a NOAEL HED in mg/kg bw/day. The NOAEL HEDs were divided by a UF of 30 (3 for interspecies and 10 for intraspecies variability) to derive the candidate TDIs. The lowest TDI was derived from the reproductive and developmental study in mice (Lau et al. 2006). In this study, groups of between 17 to 42 timed-pregnant female CD-1 mice were administered ammonium perfluorooctanoate (equivalent to 0, 1, 3, 5, 10, 20 or 40 mg PFOA/kg bw) by oral gavage from gestation day (GD) 1 to 17 inclusive. A maternal NOAEL of 10 mg/kg bw/day was determined based on decreased body weight gain and an offspring NOAEL of 1 mg/kg bw/day based on decreased body weight gain. These were converted to average serum concentrations of 197 µg/mL and 35.1 µg/mL, respectively and PBPK modelling was used to estimate NOAEL HEDs (to give these serum concentrations) of 0.0276 mg/kg bw/day for maternal toxicity and 0.0049 mg/kg bw/day for offspring toxicity. These NOAEL HEDs were divided by UFs of 30 to derive the TDIs of 0.92 µg/kg bw/day for maternal toxicity and 0.16 µg/kg bw/day for offspring toxicity.	
	PFHxS	not derived							FSANZ considered there to be insufficient information to derive a TDI for PFHxS but considered that the TDI for PFOS was likely to also be protective of PFHxS and so recommended that the combined dose of PFOS and PFHxS is compared with the TDO for PFOS to assess risk	
Health Canada 2018 ***Tolerable daily intake***	**PFOS**	0.06	µg/kg bw/day	25	$NOAEL_{HED}$	0.0015	mg/kg bw/day	Hepatocellular hypertrophy	Health Canada derived TDIs from two different animal studies: • subchronic toxicity study in monkeys (Seacat et al. 2002) • chronic toxicity and carcinogenicity study in rats (Butenhoff et al. 2012) In the subchronic toxicity study (Seacat et al. 2012), Cynomolgus monkeys (6/sex/group; 4/sex at the low dose) received the potassium salt of PFOS (0, 0.03, 0.15 or 0.75 mg/kg bw/day) orally in a capsule by intragastric intubation for 26 weeks. Two monkeys/sex/group in the control, mid and high dose groups were monitored for one year after the end of the dosing period for delayed or reversible effects. A NOAEL of 0.03 mg/kg bw/day was determined based on altered thyroid hormone levels. This was converted to a NOAEL human equivalent (HEQ) of 0.0075 mg/kg bw/day by PBPK modelling (by dividing by a dose-specific toxicokinetic portion of the interspecies uncertainty factor (AK UF) of 4). The NOAEL HEQ was divided by a UF of 75 (10 for intraspecies and 2.5 for interspecies variability, and 3 for use of sub-chronic study) to give a candidate TDI of 0.0001 mg/kg bw/day (0.1 µg/kg bw/day). In the chronic toxicity study (Butenhoff et al. 2012), Sprague Dawley rats (60 – 70/sex/group) were administered PFOS potassium salt (0, 0.5, 2, 5 or 20 ppm) in the feed for up to 104 weeks (equivalent to 0, 0.024, 0.098, 0.242 and 0.984 mg/kg bw per day for males; 0, 0.029, 0.120, 0.299 and 1.251 mg/kg bw per day for females). An additional recovery group (40/sex/group) was fed 20 ppm for the first 52 weeks after which the animals were fed control diet until study termination. Five rats/sex/group were sacrificed at weeks 4 and 14, and 10 rats/sex/group in the control and high dose groups were sacrificed after 52 weeks. Remaining animals were scheduled to be terminated after 104 weeks of treatment, however, due to reduced numbers (as a result of mortality) in the females fed 2 ppm, this group was necropsied after 103 weeks. A NOAEL of 0.021 mg/kg bw/day was determined based on hepatocellular hypertrophy. This was converted to a NOAEL HEQ of 0.0015 mg/kg bw/day by PBPK modelling (by dividing by a dose-specific AK UF of 14). The NOAEL HEQ was divided by a UF of 25 (10 for intraspecies and 2.5 for interspecies variability) to give a candidate TDI of 0.00006 mg/kg bw/day (0.06 µg/kg bw/day). This was lower than the alternative TDI based on the Seacat study and so was adopted as the TDI.	Health Canada (2018). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document — Perfluorooctane Sulfonate (PFOS). Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. (Catalogue No. H144-13/9-2018E-PDF).

	PFOA	0.02	µg/kg bw/day	25	$BMDL_{10\ HED}$	0.000521	mg/kg bw/day	Hepatocellular hypertrophy	Health Canada used subchronic toxicity study in rats (Perkins et al., 2004) as the basis of the TDI. In this study groups of 55 male rats (15/dose/duration) were exposed to PFOA (0, 0.06, 0.64, 1.94 or 6.5 mg/kg bw/day) in food for 4, 7 or 13 weeks. Each dose had a recovery group that was observed for 8 additional weeks after cessation of exposure at week 13 (10/dose). A 95% lower confidence limit of the benchmark dose (BMDL10) of 0.05 mg/kg bw/day for hepatocellular hypertrophy was derived using benchmark dose modelling, which was converted to a HED of 0.000521 mg/kg bw/day using PBPK modelling (by dividing by a dose-specific AK UF of 96). The BMDL HED was divided by a UF of 25 (2.5 for interspecies and 10 for intraspecies variability) to give a TDI of 0.000021 mg/kg bw/day (0.02 µg/kg/day).	Health Canada (2018). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document — Perfluorooctanoic Acid (PFOA). Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario. (Catalogue No. H144-13/8-2018E-PDF).
European Food Safety Authority (EFSA) 2020 ***Tolerable daily intake***	**Sum of PFOS, PFOA, PFHxS and PFNA**	0.00063	µg/kg bw/day	1	$BMDL_{10}$	0.00063	µg/kg bw/day	Decreased antibody response to the diphtheria vaccine	EFSA used epidemiology studies by Grandjean et al., 2012 and Abraham et al., 2020 as a basis of their tolerable weekly intake (TWI) for the sum of PFOS, PFOA, PFHxS and PFNA. These four congeners were chosen on the basis that they made up approximately half of the estimated lower bound exposure (from food) to those PFASs for which occurrence data were available. EFSA noted that the remaining contribution was primarily from PFBA and PFHxA, which have significantly shorter half-lives in the human body (days rather than years). EFSA considered decreased antibody response to vaccines to be the critical effect and noted this to be a valid basis for determining the TWI as there were a number of studies suggesting that serum levels of PFOS and PFOA are associated with increased propensity for infection. The two critical studies were used as the basis of the TWI were: • A study of 5 to 7 year old children in the Faroe Islands (587 children aged 5 years, of which 464 included in follow-up monitoring at age 7 years). This study showed an association between PFAS concentrations in their blood serum and antibody titres against diphtheria following vaccination (Grandjean et al., 2012); and • A study of 1 year old children (101 children - 21 formula fed and 80 breast fed) in Germany which showed an association between PFAS concentrations in their blood serum and antibody titres against haemophilus influenzae type b, diphtheria and tetanus following vaccination (Abraham et al., 2020). A NOAEC of 27 ng/mL was determined from Faroe Islands study (Grandjean et al., 2012) based on decreased antibody titres against diphtheria following vaccination. BMD modelling was carried out but EFSA concluded that the BMD modelling was not valid as it gave wide intervals on the confidence limits for the BMD and a BMDL10 estimate that was significantly below the estimated NOAEC of 27 ng/mL (for sum of PFOS, PFOA, PFHxS and PFNA concentration in blood serum). A BMDL10 of 17.5 ng/mL was determined from the German study (Abraham et al. 2020), which equates to the blood serum concentration in children estimated to give a 10% decrease in antibody titres for diptheria. This BMDL10 formed the basis of the TWI. PBPK modelling was used to estimate a TDI of 0.63 ng/kg bw/day (6.9 ng/mL in serum) i.e. the oral intake for a mother that would give rise to the BMDL10 concentration in the blood serum of a breast fed child. This was converted to the TWI of of 4.4 ng/kg bw/week. EFSA did not apply a UF on the basis that (a) the BMDL10 is for infants which are expected to be a sensitive population group; and (b) decreased vaccination response is considered a risk factor for disease rather than a disease in itself. EFSA intended the TWI to be compared to exposure data for mothers (rather than infants) for risk characterisation purposes.	European Food Safety Authority (EFSA), 2020. Scientific opinion: Risk to human health related to the presence of perfluoroalkyl substances in food. EFSA Panel on Contaminants in the Food Chain (EFSA CONTAM Panel). EFSA Journal 2020;18(9):6223
ATSDR 2021 ***Minimal Risk Level - Intermediate Duration***	**PFOS**	0.002	µg/kg bw/day	300	$NOAEL_{HED}$	0.000515	mg/kg bw/day	Developmental effects - delayed eye opening and decreased pup weight	ATSDR derived intermediate minimal risk levels (MRLs) from various studies. The lowest MRL was derived from a two-generation study in Sprague-Dawley rats (Luebker et al., 2005). In this study, 35 rats/sex/group were administered PFOS potassium salt (0.0, 0.1, 0.4, 1.6 or 3.2 mg/kg bw/day) by oral gavage for 42 days prior to mating and during the mating period. Parental male animals were sacrificed at the end of the cohabitation period, while females continued to be treated for a further 42 days through the gestation, parturition and lactation periods (i.e. 84 days total). An offspring NOAEL of 0.1 mg/kg bw/day was determined based delayed eye opening and decreased pup weight. This was converted to an average serum concentration of 7.43 µg/mL and PBPK modelling was used to estimate a HED (to give this serum concentration) of 0.000515 mg/kg bw/day. This NOAEL HED was divided by a UF of 30 (3 for interspecies and 10 for intraspecies variability) and a modifying factor of 10 for concern that immunotoxicity may be a more sensitive endpoint of PFOS toxicity than developmental toxicity to give a MRL of 0.000002 mg/kg bw/day (0.002 µg/kg bw/day). No chronic MRL was determined for PFOS. Although adequate data are available for intermediate-duration exposure, ATSDR does not extrapolate across exposure duration.	Agency for Toxic Substances and Diseases Registry (ATSDR), 2021. Toxicological Profile for Perfluoroalkyls. Released May 2021. Last Updated March 2020
	PFOA	0.003	µg/kg bw/day	300	$LOAEL_{HED}$	0.000821	mg/kg bw/day	Developmental effects - skeletal alterations	ATSDR derived intermediate MRLs from various studies. The lowest MRL was derived from a developmental toxicity study in mice (Koskela et al., 2016). In this study, pregnant C57BL/6/Bk1 mice were administered PFOA (0 or 0.3 mg/kg bw/day; 10 or 6/group, respectively) in food throughout pregnancy to GD 21. A lowest observed adverse effect level (LOAEL) of 0.3 mg/kg bw/day was determined based on based on skeletal alterations in adult offspring. This was converted to a blood serum concentration of 8.29 µg/mL and PBPK modelling was used to estimate a LOAEL HED of 0.000821 mg/kg bw/day. This LOAEL HED was divided by a UF of 300 (3 for interspecies and 10 for intraspecies variability, and 10 for use of a LOAEL rather than a NOAEL) to give a MRL of 0.000003 mg/kg bw/day (0.003 µg/kg bw/day). No chronic MRL was determined for PFOA. Although adequate data are available for intermediate-duration exposure, ATSDR does not extrapolate across exposure duration.	
	PFHxS	0.02	µg/kg bw/day	300	$NOAEL_{HED}$	0.0047	mg/kg bw/day	Thyroid follicular epithelial hypertrophy /hyperplasia	ATSDR derived an intermediate MRL from a developmental toxicity study in rats (Butenhoff et al., 2009). In this study, Sprague-Dawley rats (15/sex/group) were administered PFHxS (0, 0.3, 1, 3 or 10 mg/kg bw/day) by gavage. Male rats were dosed 14 days before cohabitation and continued until 1 day before sacrifice (a minimum of 42 days). Females were dosed 14 days before cohabitation and continued until 1 day before sacrifice on post natal day 21 or gestation day 25 (rats that did not deliver a litter). A NOAEL of 1 mg/kg bw/day was determined based on thyroid follicular epithelial hypertrophy/hyperplasia in F0 male rats. This was converted to a blood serum cnventration of 73.22 µg/mL and PBPK modelling was used to estimate a NOAEL HED of 0.0047 mg/kg bw/day. This NOAEL HED was divided by a UF of 30 (3 for interspecies and 10 for intraspecies variability) and a modifying factor of 10 for database limitations to account for the small number of studies particularly on immunotoxicity to give a MRL of 0.00002 mg/kg bw/day (0.02 µg/kg bw/day). No chronic duration studies were identified for PFHxS. Although adequate data are available for intermediate-duration exposure, ATSDR does not extrapolate across exposure duration.	
	PFNA	0.003	µg/kg bw/day	300	$NOAEL_{HED}$	0.001	mg/kg bw/day	Decreased body weight and developmental effects - delayed eye opening, preputial separation, and vaginal opening	ATSDR derived intermediate MRLs from various studies. The lowest MRL was derived from a developmental study in mice (Das et al., 2015). In this study timed-pregnant CD-1 mice (8-10/group) were administered PFNA (0, 1, 3, 5 or 10 mg/kg bw/day) in deionized water via gavage on GD 1 to 17. On GD 17, selected mice from each group were sacrificed for maternal and fetal examination, while the remaining mice were allowed to give birth. Pups were observed for postnatal survival up to post natal day 24 as well as growth and development up to post natal day 287. A NOAEL of 1 mg/kg bw/day was determined based on decreased body weight gain and delayed eye opening, preputial separation and vaginal opening. This was converted to a blood serum concentration of 6.8 µg/mL and PBPK modelling was used to estimate a NOAEL HED of 0.001 mg/kg bw/day. This NOAEL HED was divided by a UF of 30 (3 for interspecies and 10 for intraspecies variability) and a modifying factor of 10 for database limitations to account for the small number of studies particularly on immunotoxicity to give a MRL of 0.000003 mg/kg bw/day (0.003 µg/kg bw/day). No chronic-duration studies were identified for PFNA. Although adequate data are available for intermediate-duration exposure, ATSDR does not extrapolate across exposure duration.	

USEPA 2021 (Draft) ***Reference Dose***	**PFOS**	0.0000079	µg/kg bw/day	10	$BMDL_5$	7.91E-08	mg/kg bw/day	Decreased anti-diptheria antibody concentration	USEPA derived intermediate RfDs from various epidemiological studies assessing immune and developmental effects. The lowest RfD was derived from an epidemiology study (Granjean et al, 2012) based on decreased serum anti-diphtheria antibody concentration in children - see EFSA above for details. BMD modelling was used to determine a BMDL5 blood serum concentration (i.e. BMDL for a 5% reduction in antibody concentration) of 0.54 ng/mL. PBPK modelling to then used estimate a BMDL5 HED of 7.91 x 10-8 mg/kg bw/day which is the oral intake in children that would result in the BMDL5 serum concentration. This BMDL5 HED was divided by a UF of 10 to account for human variability to give a RfD of 7.91 x 10-9 mg/kg bw/day (7.91 x 10-6 µg/kg bw/day). Note- the BMDL5 of 0.54 ng/mL is significantly lower than the NOAEC of 0.27 ng/mL for the sum of PFOS, PFOA, PFHxS and PFNA reported by EFSA for this study	USEPA, 2021. Proposed Approaches to the Derivation of a Draft Maximum Contaminant Level Goal for Perfluorooctane Sulfonic Acid (PFOS) (CASRN 1763-23-1) in Drinking Water. External Peer Review Draft. EPA Document No. 822D21002, 16 November 2021
	PFOA	0.0000015	µg/kg bw/day	10	$BMDL_5$	1.49E-08	mg/kg bw/day	Decreased anti-tetanus antibody concentration	USEPA derived intermediate RfDs from various epidemiological studies assessing immune and developmental effects. The lowest RfD was derived from an epidemiology study (Granjean et al, 2012) based on decreased serum anti-tetanus antibody concentration in children - see EFSA above for details. BMD modelling was used to determine a BMDL5 blood serum concentration (i.e. BMDL for a 5% reduction in antibody concentration) of 0.17 ng/mL. PBPK modelling was used to estimate a BMDL5 HED of 1.49 x 10-8 mg/kg bw/day which is the oral intake in children that would result in the BMDL5 serum concentration. This BMDL5 HED was divided by a UF of 10 to account for human variability to give a RfD of 1.49 x 10-9 mg/kg bw/day (1.49 x 10-6 µg/kg bw/day). Note- the BMDL5 of 0.17 ng/mL is significantly lower than the NOAEC of 0.27 ng/mL for the sum of PFOS, PFOA, PFHxS and PFNA reported by EFSA for this study albeit based on decreased antibody titres against diptheria.	USEPA, 2021. Proposed Approaches to the Derivation of a Draft Maximum Contaminant Level Goal for Perfluorooctanoic Acid (PFOA) (CASRN 335-67-1) in Drinking Water. External Peer Review Draft. EPA Document No. 822D21001. 16 November 2021

COT/COC Opinion

In 2006 COT derived TDIs for PFOS and PFOA of 0.3 µg/kg bw/day and 3 µg/kg bw/day, respectively. In 2009 COT revised the PFOA TDI to 1.5 µg/kg bw/day. In 2022 COT produced a statement on the EFSA (2020) TWI for the sum of PFOS, PFOA, PFHxS and PFNA of 4.4 ng/kg bw/week. COT stated "Whilst the COT is unable to suggest an alternative TWI at this time, there are strong caveats when comparing the exposure estimates with the TWI established by EFSA. There is considerable uncertainty as to the appropriateness of the derivation of the TWI, and of the biological significance of the response on which it is based, which complicates interpretation of the possible toxicological significance of exceedances". The COT agreed that, on the basis of the information reviewed by EFSA, qualitatively the appropriate health endpoint had been selected but quantitatively, questioned the calculations (including the BMD modelling).

Current UK oral HCV

Authoritative body (date) and HBGV type	Chemical	HBGV value	Unit	UF used	PoD	POD value	Unit	Endpoint	Pivotal data used & Comments	Full Reference
None										

B) Inhalation Route

Authoratative body (date) and HBGV type	Chemical	Converted HBGVinh	Unit	HBGVinh	Unit	UF used	POD	POD value	Unit	Endpoint	Pivotal Study used & Comments	Full Reference
No inahalation HBGVs from authoritative bodies identified. ATSDR (2021) state that there is inadequate inhalation studies to derive inhalation MRLs.												

COT/COC Opinion

No statements, position papers or reports found.

Current UK inhalation HCV

Authoratative body (date) and HBGV type	Chemical	HBGV value	Unit	UF used	PoD	POD value	Unit	Endpoint	Pivotal data used & Comments	Full Reference
None										

C) Dermal Route

Authoratative body (date) and HBGV type	Chemical	HBGV value	Unit	UF used	POD	POD value	Unit	Endpoint	Pivotal Study used & Comments	Full Reference
No inahalation HBGVs from authoritative bodies identified										

III) Current UK (WHO) regulatory values

	Value	Units	Refs
UK drinking water standard	0.01 - 1	µg/L	In 2021 the UK Drinking Water Inspectorate derived a range of guidance values for PFOS and PFOA in drinking water based on their review of available authoritative toxicological reviews at the time (including US EPA (2021), Health Canada (2018), FSANZ (2017) and EFSA (2020). The DWI derived four tiers of assessment. Tier 1 is where concentrations of PFOS and PFOA are both no greater than 0.01 µg/L and no further action is required. Tier 2 is where concentrations exceed 0.01 µg/L which would prompt the need for further monitoring but not necessarily risk mitigation. Tier 3 is where concentrations exceed 0.1 µg/L and measures should be put in place to reduce concentrations to below 0.1 µg/L as soon as is practicable. Tier 4 is where concentrations exceed 1 µg/L and action muct be taken to reduce exposure from drinking water within 7 days.
WHO drinking water standard	N/A		
UK air quality standard	N/A		
WHO air quality standard	N/A		

IV) Mean Daily Intakes from Other Sources (e.g. Diet)

	Pathways	Units	Adults	Children	Refs
Food (average)	Oral				
Food (average)	Oral				
Water	Oral				
Air	Inhalation				
Smoking	Inhalation				

V) LLTC derivation

A) ORAL

Choice of Pivotal Data	Chemical	Dosing vehicle	Doses	Units	Species	Study Type	Comments
Abraham et al. 2020	Sum of PFOS, PFOA, PFHxS & PFNA	N/A	N/A		Human	Epidemiological study of 101 one-year old children in Germany investigating relation between PFAS concentrations in their blood serum and antibody response to vaccination	LLTC is based on the EFSA (2020) derived TDI of 0.63 µg/kg bw/day for the sum of PFOS, PFOA, PFHxS and PFNA derived from the epidemiology study by Abraham et al. 2020. EFSA derived a BMDL10 of 17.5 ng/mL (for sum of the four PFAS congeners concentration in blood serum) from this study. This was the BMDL blood serum concentration in children estimated to give a 10% decrease in antibody titres for diptheria. EFSA used PBPK modelling to estimate the oral intake for a mother that would give rise to this BMDL10 concentration in the blood serum of a breast fed child. This was estimated to be 0.63 µg/kg bw/day for the sum of the four PFASs. Note that the PBPK modelling was only conducted for PFOS and PFOA but EFSA assumed that uptake of PFHxS and PFNA would be similar.

Selection of POD

Published POD for ORAL LLTC: non-threshold (carcinogenic) effects			
Study			
Are dose response data of adequate quality to derive a BMD			
Type of PoD			
Value selected			mg/kg bw/day

Note the TD0.05 is the dose that causes an 5% increase in tumours hence is equivalent to a BMD5

Derived POD for ORAL LLTC: threshold (non-carcinogenic) effects		
Study	Abraham et al. 2020, BMD modelling by EFSA 2020	
Are dose response data of adequate	Yes	
Type of PoD	BMDL10	
Value derived	0.000631	µg/kg bw/day

Note that the lowest BMD10 calculated by EFSA (page 351) is 31.5 ng/mL but we don't know how this would convert to a maternal dose

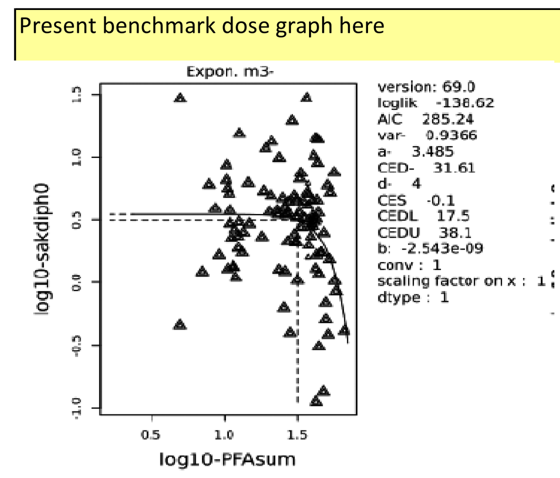
BMD Modelling (if answered 'Yes' to question above - see worksheet BMD modelling pivotal study)

Software used: EFSA web-tool for BMD analysis, which uses the R-package PROAST v69.0, for the underlying calculations

		BMD1	BMD5	BMD10	BMD15
BMD modelling (value) (µg/kg bw/day)					
		BMDL1	BMDL5	BMDL10	BMDL15
BMD modelling (value) (µg/kg bw/day)				0.000631	

Comments: EFSA calculated a BMDL10 of 17.5 ng/mL and then used PBPK modelling to estimate the maternal dose that would lead to this serum concentration in a breast fed child. This was estimated to be 0.000631 µg/kg bw/day

Present benchmark dose graph here



BMDL-BMDU from single models

	BMDL[(a)]	BMD[(a)]	BMDU[(a)]	p value
EXP (m3-)	**17.5**	31.6	38.1	0.01
HILL (m3-)	17.6	31.5	38.0	0.01
INVEXP (m3-)	23.1	36.2	46.5	0.01
LOGN (m3-)	21.1	35.2	46.6	0.01

(a): ng/mL; P value calculated with likelihood ratio test.

Addressing uncertainty

Thresholded effects?	Yes
If yes - use generic UF of 100 or (if data allow) calculate CSAF	
If no : see below for non-thresholded effects	
If animal data are used as POD (NO(A)EL or BMD) use generic margin of 5000 or (if data allows) calculate CSM	5,000
If human data are used to derive a BMD use the margin that relates to a notional risk of 1 in 50000 based on the BMR (using the table opposite). The same margin can also be applied to a NO(A)EL, but not to a LO(A)EL.	
ELCR =	1 in 100,000

BMR	Margin	Corresponding ELCR estimate
0.50%	250	1 in 50000
1%	500	1 in 50000
5%	2500	1 in 50000
10%	5000	1 in 50000

Chemical Specific Adjustment Factor/Chemical Specific Margin to account for uncertainties in the data			
		Range	Selected value
Intraspecies		1 - 10	1
Interspecies		1 - 10	1

Oral LLTC calculation:

	Value	Units	Justification
LLTC (Thresholded chemical)	0.000631	µg/kg bw/day	Based on EFSA derived TDI. This is the maternal dose of the sum of PFOS, PFOA, PFHxS and PFNA estimated to result in a blood serum concentration in a 1 yr old breast fed child of 17.5 ng/mL which is the estimated BMDL10 for reduction in antibody titres from vaccination for diptheria.

Sub-chronic to chronic		1-10	1
Database deficiencies		1-3	1
Quality of study		1 - 10	1
Use of LOAEL as POD		1-10	1
Other		1 - 10	1
Total CSAF/CSM			1

LLTC (Non-thresholded chemical)		µg/kg bw/day	

Delete as appropriate

Sensitive Receptor	Child is the sensitive receptor (due to potential for effect on efficacy of vaccine for diptheria and tetanus). However, the LLTC is the maternal dose that is protective of breast fed child and so should be compared with estimated exposure for female adult receptors (not children).

Is the LLTC based on systemic or localised toxicological effects?	Systemic
Lifetime averaging to be applied in CLEA (Yes/No)	No

b) INHALATION

Choice of Pivotal Data		Dosing vehicle	Doses	Units	Species	Study Type	Comments
Insufficient data to derive							

Selection of POD

Published POD for INHALATION LLTC: non-threshold (carcinogenic) effects			
Study			
Are dose response data of adequate quality to derive a BMD			
Type of PoD			
Value selected			mg/kg bw/day

Derived POD for INHALATION LLTC: threshold (non-carcinogenic) effects		
Study		
Are dose response data of adequate quality to derive a		
Type of PoD		
Value selected		mg/kg bw/day

BMD Modelling (if answered 'Yes' to question above - see worksheet BMD modelling pivotal study)

Software used US EPA BMDS 2.7

		BMD1	BMD5	BMD10	BMD15
BMD modelling (value) (mg/m3)					
		BMDL1	BMDL5	BMDL10	BMDL15
BMD modelling (value) (mg/m3)					

Comments:

Thresholded effects?	No
If yes - use generic UF of 100 or (if data allow) calculate CSAF	
If no : see below for non-thresholded effects	
If animal data are used as POD (NO(A)EL or BDM) use generic margin of 5000 or (if data allows) calculate CSM	5000
If human data are used to derive a BMD use the margin that relates to a notional risk of 1 in 50000 based on the BMR (using the table opposite). The same margin can also be applied to a NO(A)EL, but not to a LO(A)EL.	
ELCR =	1 in 50000

BMR	Margin	Corresponding ELCR estimate
0.50%	250	1 in 50000
1%	500	1 in 50000
5%	2500	1 in 50000
10%	5000	1 in 50000

Chemical Specific Adjustment Factor/Chemical Specific Margin to account for uncertainties in the data			
		Range	Selected value
Intraspecies		1 - 10	1
Interspecies		1 - 10	1
Sub-chronic to chronic		1-10	1
Database deficiencies		1-3	1
Quality of study		1 - 10	1
Use of LOAEL as POD		1-10	1

Inhalation LLTC calculation:

	Value	Units	Justification
LLTC (Non-Thresholded chemical) using BMC10		µg/kg bw/day	
LLTC (Thresholded chemical) using NOAEL		µg/kg bw/day	

Delete as appropriate

Sensitive Receptor		

Other		1 - 10	1
Total CSAF/CSM			1

Is the LLTC based on systemic or localised toxicological effects?	

APPENDIX B
MEAN DAILY INTAKE DATA
SHEETS FOR PFOA, PFOS, PFHxS & PFNA

Substance: **PFOA**

MDI Oral			**Recommended adult oral MDI**	**Units**	**Justification:** Dietary plus drinking water intake for PFOA. Dietary intake is the lower bound mean dietary intake for PFOA from UK NDNS survey (2008-2011) (0.0102 ug day-1) as reported by EFSA (2022). Drinking water intake is the EFSA (2022) reported lower bound concentration of PFOA in drinking water in Europe (0.0013 ug L-1) multiplied by an assumed adult drinking water consumption rate of 2 L day-1)		
			0.0128	ug day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
DWI	2022	Drinking water supply - Raw water	0.01	µg L-1	Reported mean concentration in 2601 samples of raw water from Public Water supplies in England in 2022. Maximum concentration of 6.28 ug/L reported. Note these are of untreated water and likely to be greater than concentrations in tap water. Also, DWI state that the mean is not an accurate representation of the average concentration in the raw water samples (due to consideration of non detects).	DWI, 2022. Indicative raw water hazard sampling data - Drinking Water 2022 Public supplies England	https://dwi-content.s3.eu-west-2.amazonaws.com/wp-content/uploads/2023/07/20160815/Raw-water-targeted-sample-data-England-2022.pdf
Atkinson et al	2008	Drinking water supply - Raw/treated water	<0.011 to 0.370	µg L-1	Samples obtained from raw and treated water suppliews from 20 sites. Four samples obtained per site, approximately quaterly through 2007. 5 sites were selected as background and 15 as high risk for PFAS such as near airfields, or known incidents (such as Buncefield). PFOA generally below method detection limit (MDL) of 0.024 µg L-1 in 5 background sites other than first sample event where concentrations were up to 0.370 µg L-1. Concentrations ranged from <0.024 µg L-1 to 0.263 µg L-1 at high risk sites. (Note maximum at background site > maximum at high risk sites)	ATKINSON C., BLAKE S., HALL T., KANDA R., RUMSBY P., 2008. Survey of the prevalence of perfluorooctane sulphonate (PFOS), perfluorooctanoic acid (PFOA) and related compounds in drinking water and their sources. Report No. Defra 7585. Swindon: WRc plc.	https://dwi-content.s3.eu-west-2.amazonaws.com/wp-content/uploads/2020/10/27110929/DWI70_2_212PFOS.pdf
EFSA	2020	Drinking water	0.0013 to 0.0032	µg L-1	Lower bound (LB) and upper bound (UB) estimates of mean concentration in drinking water (tap, well, bottled) in 452 samples from EU. LB is mean concentration assuming 0 for no detects. UB is mean concentrationm assuming detection limit for non detects	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
Harrad et al	2019	Tap water samples	<0.00004 to 0.00176	µg L-1	Analysed tap water samples from mains supply in homes (n=34) and offices (n=32) from across the counties of Dublin, Galway, and Limerick. PFOA was detected in 83% of samples with a range from <0.04 – 1.76 ng L-1	HARRAD S., WEMKEN N., DRAGE D.S., ABDALLAH M.A., COGGINS A.M., 2019. Perfluoroalkyl substances in drinking water, indoor air and dust from Ireland: Implications for human exposure. ENVIRONMENTAL SCIENCE & TECHNOLOGY, 53, 13449 – 13457.	https://pubs.acs.org/doi/abs/10.1021/acs.est.9b04604
FSA	2009	Food	0.7	µg day-1	From a 2007 survey, FSA estimated mean dietary intake of 10 (upper bound) ng kg(bw)-1 day-1 for average adult consumers from the whole diet in the UK. Multiplying by 70kg equates to an MDI of 0.7 µg day-1	FSA (Food Standards Agency). (2009). Fluorinated chemicals in food. Food Surveillance Information Sheet. (05/09).	
EFSA (Europe data)	2020	Food and drinking water	0.0126 - 0.293	µg day-1	EFSA reviewed PFAS analytical data (n= 11,528) in foodstuffs and drinking water, which had been collected from 16 countries including the UK over the period 2010 – 2018. They derived lower and upper bound (LB and UB) median dietary intakes of PFOA of 0.18 and 4.18 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.0126 to 0.293 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
EFSA (UK data)	2020	Food	0.0102 - 0.254	µg day-1	EFSA report NDNS survey analytical data for dietary intake of PFAS for the period 2008 - 2011 in the UK (n = 1266 adults). Reported lower and upper bound (LB and UB) mean adult dietary intakes of PFOA in UK are 0.145 and 3.63 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.0102 to 0.254 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223

MDI Inhalation			**Recommended adult inhalation MDI**	**Units**	**Justification:** Based on mean indoor air concentration in 20 homes in Birmingham (0.052 ng m-3) multiplied by an assumed adult respiration rate of 20 m3 day-1		
			0.00104	µg day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
Chaemfa et al	2010	Ambient Air	0.29 - 0.292	ng m-3	Measured concentrations of PFOA in ambient air using passive samplers at 22 locations across England in 2006/2007. Concentrations ranged from <4.2 – 4154 pg m-3 and were less than the method detection limit of 4.2 pg m-3 in 8 of 20 locations. The lower and upper bound mean concentrations (using values of zero and the detection limit, respectively for non detects) were 290 and 292 pg m-3, respectively.	Chaemfa C, Barber JL, Huber S, Breivik K and Kones KC. (2010). Screening for PFOS and PFOA in European air using passive samplers. J. Environ. Monit. 12: 1100-1109	https://pubs.rsc.org/en/content/articlelanding/2010/em/b921628f
Winkens et al	2017	Indoor air	0.0214	ng m-3	Measured concentrations of PFAS in ambient air using sorbent impregnated polyurethane (SIP) foam disks in children's bedrooms of 57 private households in the area of Kuopio, Eastern Finland during 2014/15. Concentrations of PFOA ranged from <4.68 – 102.45 pg m-3 and were below the detection limit of 4.68 pg m-3 in four locations. Arithmetic mean concentrations of branched and linear PFOA were <0.2 and 21.2 pg/m3, respectively (sum of mean concentrations = 21.4 pg/m3).	Winkens K, Koponen J, Schuster J, Shoeib M, Vestergren R, Berger U, Karvonen AM, Pekkanen J, Kiviranta H and Cousins IT. (2017). Perfluoroalkyl acids and their precursors in indoor air sampled in children's bedrooms. Environmental Pollution. 222: 423-432	https://www.sciencedirect.com/science/article/pii/S0269749116312337#mmc1
Goosey and Harrad	2012	Outdoor air	0.0035	ng m-3	Measured PFOA concentrations at 10 outdoor locations in Birmingham, UK in 2009. Concentrations ranged from <1.9 – 20 pg m-3 and were below the detection limit of 1 pg m-3 in three locations. Mean concentration was 3.5 pg m-3	Goosey E and Harrad S. (2012). Perfluoroalkyl substances in UK indoor and outdoor air: spatial and seasonal variation, and implications for human exposure. Environment International. 45: 86-90	https://pubmed.ncbi.nlm.nih.gov/22580294/
Goosey and Harrad	2012	Indoor air	0.052	ng m-3	Measured PFOA concentrations inside 20 homes in Birmingham, UK in 2009. Mean concentration of PFOA was 52 pg m-3	Goosey E and Harrad S. (2012). Perfluoroalkyl substances in UK indoor and outdoor air: spatial and seasonal variation, and implications for human exposure. Environment International. 45: 86-90	https://pubmed.ncbi.nlm.nih.gov/22580294/
Barber et al	2007	Ambient Air	0.101 - 0.341	ng m-3	Measured PFOA in outdoor air at two locations in the UK (Hazelrigg and Manchester) in November 2005 to February 2006. Samples were obtained using high volume samplers (500-1800 m3) sampled over 3 to 14 days. The arithmetic mean concentrations of PFOA in the air were 101 and 341 pg m-3 at Hazelrigg and Manchester, respectively.	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a
Barber et al	2007	Indoor air	0.0044	ng m-3	Mean concentration in four indoor air samples collected from Tromso, Norway	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a

Substance: **PFOS**

MDI Oral			Recommended adult oral MDI	Units	Justification: Dietary plus drinking water intake for PFOS. Dietary intake is the lower bound mean dietary intake for PFOS from UK NDNS survey (2008-2011) (0.0267 ug day-1) as reported by EFSA (2022). Drinking water intake is the EFSA (2022) reported lower bound concentration of PFOS in drinking water in Europe (0.00061 ug L-1) multiplied by an assumed adult drinking water consumption rate of 2 L day-1)		
			0.0279	ug day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
DWI	2022	Drinking water supply - Raw water	0.35	µg L-1	Reported mean concentration in 3080 samples of raw water from Public Water supplies in England in 2022. Maximum concentration of 28.577 ug/L reported. Note these are of untreated water and likely to be greater than concentrations in tap water. Also, DWI state that the mean is not an accurate representation of the average concentration in the raw water samples (due to consideration of non detects)	DWI, 2022. Indicative raw water hazard sampling data - Drinking Water 2022 Public supplies England	https://dwi-content.s3.eu-west-2.amazonaws.com/wp-content/uploads/2023/07/20160815/Raw-water-targeted-sample-data-England-2022.pdf
Atkinson et al	2008	Drinking water supply - Raw/treated water	<0.011 to 0.208	µg L-1	Samples obtained from raw and treated water supplies from 20 sites in UK. Four samples obtained per site , approximately quaterly through 2007. 5 sites were selected as background and 15 as high risk for PFAS such as near airfields, or known incidents (such as Buncefield). PFOS below method detection limit (MDL) of 0.011 µg L-1 in 5 background sites, and ranged from <0.011 µg L-1 to 0.208 µg L-1 at high risk sites	ATKINSON C., BLAKE S., HALL T., KANDA R., RUMSBY P., 2008. Survey of the prevalence of perfluorooctane sulphonate (PFOS), perfluorooctanoic acid (PFOA) and related compounds in drinking water and their sources. Report No. Defra 7585. Swindon: WRc plc.	https://dwi-content.s3.eu-west-2.amazonaws.com/wp-content/uploads/2020/10/27110929/DWI70_2_212PFOS.pdf
EFSA	2020	Drinking water	0.00061 to 0.0027	µg L-1	Lower bound (LB) and upper bound (UB) estimates of mean concentration in drinking water (tap, well, bottled) in 451 samples from EU. LB is mean concentration assuming 0 for no detects. UB is mean concentration assuming detection limit for non detects	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
Harrad et al	2019	Tap water samples	<0.00015 to 0.00076	µg L-1	Analysed tap water samples from mains supply in homes (n=34) and offices (n=32) from across the counties of Dublin, Galway, and Limerick. PFOS was detected in 6% of samples with a range from <0.15 – 0.76 ng L-1	HARRAD S., WEMKEN N., DRAGE D.S., ABDALLAH M.A., COGGINS A.M., 2019. Perfluoroalkyl substances in drinking water, indoor air and dust from Ireland: Implications for human exposure. ENVIRONMENTAL SCIENCE & TECHNOLOGY, 53, 13449 – 13457.	https://pubs.acs.org/doi/abs/10.1021/acs.est.9b04604
FSA	2009	Food	0.07 - 0.7	µg day-1	From a 2007 survey, FSA estimated mean dietary intake of 1 (lower bound) to 10 (upper bound) ng kg(bw)-1 day-1 for average adult consumers from the whole diet in the UK. Multiplying by 70kg equates to an MDI of 0.07 to 0.7 µg day-1	FSA (Food Standards Agency). (2009). Fluorinated chemicals in food. Food Surveillance Information Sheet. (05/09).	
EFSA (Europe data)	2020	Food and drinking water	0.0406 - 0.313	µg day-1	EFSA reviewed PFAS analytical data (n= 11,528) in foodstuffs and drinking water, which had been collected from 16 countries including the UK over the period 2010 – 2018. They derived lower and upper bound (LB and UB) median dietrary intakes of PFOS of 0.58 and 4.47 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.0406 to 0.313 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
EFSA (UK data)	2020	Food	0.0267 - 0.267	µg day-1	EFSA report NDNS survey analytical data for dietary intake of PFAS for the period 2008 - 2011 in the UK (n = 1266 adults). Reported lower and upper bound (LB and UB) mean adult dietrary intakes of PFOS in UK are 0.382 and 3.82 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.0267 to 0.267 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223

MDI Inhalation			Recommended adult inhalation MDI	Units	Justification: Based on mean indoor air concentration in 20 homes in Birmingham (0.038 ng m-3) multiplied by an assumed adult respiration rate of 20 m3 day-1		
			0.00076	µg day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
Chaemfa et al	2010	Ambient Air	0.0057 - 0.006	ng m-3	Measured concentrations of PFOS in ambient air using passive samplers at 22 locations across England in 2006/2007. Concentrations ranged from <0.6 – 110.8 pg m-3 and were less than the method detection limit of 6 pg m-3 in 13 of 20 locations. The lower and upper bound mean concentrations (using values of zero and the detection limit, respectively for non detects) were 5.7 and 6.0 pg m-3, respectively	Chaemfa C, Barber JL, Huber S, Breivik K and Kones KC. (2010). Screening for PFOS and PFOA in European air using passive samplers. J. Environ. Monit. 12: 1100-1109	https://pubs.rsc.org/en/content/articlelanding/2010/em/b921628f
Winkens et al	2017	Indoor air	0.00207	ng m-3	Measured concentrations of PFAS in ambient air using sorbent impregnated polyurethane (SIP) foam disks in children's bedrooms of 57 private households in the area of Kuopio, Eastern Finland during 2014/15. Concentrations of PFOS ranged from <0.69 – 7.97 pg m-3 and were below the detection limit of 0.69 pg m-3 at one location. Arithmetic mean concentrations of branched and linear PFOA were 0.74 and 1.33 pg/m3, respectively (sum of mean concentrations = 2.07 pg/m3)	Winkens K, Koponen J, Schuster J, Shoeib M, Vestergren R, Berger U, Karvonen AM, Pekkanen J, Kiviranta H and Cousins IT. (2017). Perfluoroalkyl acids and their precursors in indoor air sampled in children's bedrooms. Environmental Pollution. 222: 423-432	https://www.sciencedirect.com/science/article/pii/S0269749116312337#mmc1
Goosey and Harrad	2012	Outdoor air	0.0023	ng m-3	Measured PFOS concentrations at 10 outdoor locations in Birmingham, UK in 2009. Concentrations ranged from <1 – 6.1 pg m-3 and were below the detection limit of 1 pg m-3 in three locations. Mean concentration was 2.3 pg m-3	Goosey E and Harrad S. (2012). Perfluoroalkyl substances in UK indoor and outdoor air: spatial and seasonal variation, and implications for human exposure. Environment International. 45: 86-90	https://pubmed.ncbi.nlm.nih.gov/22580294/
Goosey and Harrad	2012	Indoor air	0.038	ng m-3	Measured PFOS concentrations inside 20 homes in Birmingham, UK in 2009. Mean concentration of PFOS was 38 pg m-3	Goosey E and Harrad S. (2012). Perfluoroalkyl substances in UK indoor and outdoor air: spatial and seasonal variation, and implications for human exposure. Environment International. 45: 86-90	https://pubmed.ncbi.nlm.nih.gov/22580294/
Barber et al	2007	Ambient Air	0.0016 - 0.0071	ng m-3	Measured PFOS in outdoor air at two locations in the UK (Hazelrigg and Manchester) in November 2005 to February 2006. Samples were obtained using high volume samplers (500-1800 m3) sampled over 3 to 14 days. The arithmetic mean concentrations of PFOS in the air were 1.6 and 7.1 pg m-3 at Hazelrigg and Manchester, respectively.	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a
Barber et al	2007	Indoor air	<0.0474	ng m-3	Mean concentration in four indoor air samples collected from Tromso, Norway	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a

Substance: **PFHxS**

MDI Oral			**Recommended adult oral MDI**	**Units**	**Justification:** Dietary plus drinking water intake for PFHxS. Dietary intake is the lower bound mean dietary intake for PFHxS from UK NDNS survey (2008-2011) (0.00467 ug day-1) as reported by EFSA (2022). Drinking water intake is the EFSA (2022) reported lower bound concentration of PFHxS in drinking water in Europe (0.0018 ug L-1) multiplied by an assumed adult drinking water consumption rate of 2 L day-1)		
			0.00827	ug day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
EFSA	2020	Drinking water	0.0018 to 0.0037	µg L-1	Lower bound (LB) and upper bound (UB) estimates of mean concentration in drinking water (tap, well, bottled) in 449 samples from EU. LB is mean concentration assuming 0 for no detects. UB is mean concentrationm assuming detection limit for non detects	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
EFSA (Europe data)	2020	Food and drinking water	0.0056 - 0.242	µg day-1	EFSA reviewed PFAS analytical data (n= 11,528) in foodstuffs and drinking water, which had been collected from 16 countries including the UK over the period 2010 – 2018. They derived lower and upper bound (LB and UB) median dietary intakes of PFHxS of 0.08 and 3.45 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.0056 to 0.242 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
EFSA (UK data)	2020	Food	0.00467 - 0.216	µg day-1	EFSA report NDNS survey analytical data for dietary intake of PFAS for the period 2008 - 2011 in the UK (n = 1266 adults). Reported lower and upper bound (LB and UB) mean adult dietrary intakes of PFOS in UK are 0.0665 and 3.08 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.00467 to 0.216 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223

MDI Inhalation			**Recommended adult inhalation MDI**	**Units**	**Justification:** Based on mean concentration in ambient air in Birmingham (0.007 ng m-3) multiplied by an assumed adult respiration rate of 20 m3 day-1		
			0.000140	µg day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
Goosey and Harrad	2012	Outdoor air	0.007	ng m-3	Measured PFHxS concentrations at 10 outdoor locations in Birmingham, UK in 2009. Concentrations ranged from <1.1 – 30 pg m-3 and were below the detection limit of 1.1 pg m-3 in five locations. Mean concentration was 7.0 pg m-3	Goosey E and Harrad S. (2012). Perfluoroalkyl substances in UK indoor and outdoor air: spatial and seasonal variation, and implications for human exposure. Environment International. 45: 86-90	https://pubmed.ncbi.nlm.nih.gov/22580294/
Winkens et al	2017	Indoor air	<0.00077	ng m-3	Measured concentrations of PFAS in ambient air using sorbent impregnated polyurethane (SIP) foam disks in children's bedrooms of 57 private households in the area of Kuopio, Eastern Finland during 2014/15. Concentrations of PFHxS ranged from <0.77 – 1.91 pg m-3 and were below the detection limit of 0.77 pg m-3 in 48 locations. Arithmetic mean concentrations not reported. Median concentration reported to be below the method detection limit of 0.77 pg m-3.	Winkens K, Koponen J, Schuster J, Shoeib M, Vestergren R, Berger U, Karvonen AM, Pekkanen J, Kiviranta H and Cousins IT. (2017). Perfluoroalkyl acids and their precursors in indoor air sampled in children's bedrooms. Environmental Pollution. 222: 423-432	https://www.sciencedirect.com/science/article/pii/S0269749116312337#mmc1
Barber et al	2007	Ambient Air	0.0009 - <0.0266	ng m-3	Measured PFHxS in outdoor air at two locations in the UK (Hazelrigg and Manchester) in November 2005 to February 2006. Samples were obtained using high volume samplers (500-1800 m3) sampled over 3 to 14 days. The arithmetic mean concentrations of PFNA in the air were 0.9 and <26.6 pg m-3 at Hazelrigg and Manchester, respectively.	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a
Barber et al	2007	Indoor air	0.0027	ng m-3	Mean concentration in four indoor air samples collected from Tromso, Norway	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a

Substance: **PFNA**

MDI Oral			**Recommended adult oral MDI**	**Units**	**Justification:** Dietary plus drinking water intake for PFNA. Dietary intake is the lower bound mean dietary intake for PFNA from UK NDNS survey (2008-2011) (0.00234 ug day-1) as reported by EFSA (2022). Drinking water intake is the EFSA (2022) reported lower bound concentration of PFNA in drinking water in Europe (0.000082 ug L-1) multiplied by an assumed adult drinking water consumption rate of 2 L day-1)		
			0.00250	ug day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
EFSA	2020	Drinking water	0.000082 to 0.0022	µg L-1	Lower bound (LB) and upper bound (UB) estimates of mean concentration in drinking water (tap, well, bottled) in 449 samples from EU. LB is mean concentration assuming 0 for no detects. UB is mean concentrationm assuming detection limit for non detects	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
Harrad et al	2019	Tap water samples	<0.00005 to 0.00042	µg L-1	Analysed tap water samples from mains supply in homes (n=34) and offices (n=32) from across the counties of Dublin, Galway, and Limerick. PFNA was detected in 27% of samples with a range from <0.05 – 0.42 ng L-1	HARRAD S., WEMKEN N., DRAGE D.S., ABDALLAH M.A., COGGINS A.M., 2019. Perfluoroalkyl substances in drinking water, indoor air and dust from Ireland: Implications for human exposure. ENVIRONMENTAL SCIENCE & TECHNOLOGY, 53, 13449 – 13457.	https://pubs.acs.org/doi/abs/10.1021/acs.est.9b04604
EFSA (Europe data)	2020	Food and drinking water	0.0028 - 0.258	µg day-1	EFSA reviewed PFAS analytical data (n= 11,528) in foodstuffs and drinking water, which had been collected from 16 countries including the UK over the period 2010 – 2018. They derived lower and upper bound (LB and UB) median dietrary intakes of PFNA of 0.04 and 3.68 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.0028 to 0.258 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223
EFSA (UK data)	2020	Food	0.00234 - 0.227	µg day-1	EFSA report NDNS survey analytical data for dietary intake of PFAS for the period 2008 - 2011 in the UK (n = 1266 adults). Reported lower and upper bound (LB and UB) mean adult dietrary intakes of PFNA in UK are 0.0234 and 3.24 ng kg(bw)-1 day-1, respectively. Multiplying by 70kg equates to an MDI of 0.00164 to 0.227 µg day-1.	EFSA. 2020. Risk to human health related to the presence of perfluoroalkyl substances in food, EFSA Journal, 18 (9), 6223	https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2020.6223

MDI Inhalation			**Recommended adult inhalation MDI**	**Units**	**Justification:** Based on mean concentration in indoor air in Finnish homes (0.00306 ng m-3) multiplied by an assumed adult respiration rate of 20 m3 day-1		
			0.0000612	µg day-1			
Organisation/Source	**Date**	**Media**	**Value**	**Units**	**Description**	**Reference**	**Web link**
Barber et al	2007	Ambient Air	0.00004 - 0.001	ng m-3	Measured PFNA in outdoor air at two locations in the UK (Hazelrigg and Manchester) in November 2005 to February 2006. Samples were obtained using high volume samplers (500-1800 m3) sampled over 3 to 14 days. The arithmetic mean concentrations of PFHxS in the air were 0.04 and 1 pg m-3 at Hazelrigg and Manchester, respectively.	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a
Barber et al	2007	Indoor air	<0.0041	ng m-3	Mean concentration in four indoor air samples collected from Tromso, Norway	Barber JL, Berger U, Chaemfa C, Huber S, Jahnke A, Temme C and Jones KC. (2007). Analysis of per- and polyfluorinated alkyl substances in air samples from Northwest Europe. J. Environ. Monit. 9: 530-541	https://pubs.rsc.org/en/content/articlelanding/2007/EM/b701417a
Winkens et al	2017	Indoor air	0.00306	ng m-3	Measured concentrations of PFAS in ambient air using sorbent impregnated polyurethane (SIP) foam disks in children's bedrooms of 57 private households in the area of Kuopio, Eastern Finland during 2014/15. Concentrations of PFNA ranged from 0.95 – 16.5 pg m-3 and were above the detection limit of 0.57 pg m-3 in all 57 locations. Arithmetic mean concentration = 3.06 pg m-3.	Winkens K, Koponen J, Schuster J, Shoeib M, Vestergren R, Berger U, Karvonen AM, Pekkanen J, Kiviranta H and Cousins IT. (2017). Perfluoroalkyl acids and their precursors in indoor air sampled in children's bedrooms. Environmental Pollution. 222: 423-432	https://www.sciencedirect.com/science/article/pii/S0269749116312337#mmc1

APPENDIX C
SOIL-TO-PLANT EMPIRICAL DATA SHEETS FOR PFOA, PFOS, PFHxS & PFNA

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg kg^{-1} DW)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	7.1	3.1 as SOC	Onion shoot	Green vegetable	1	0.00116	Not reported	-	Not reported	0.32	0.096	0.0307	0.0307	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.19	3.2 as SOC	Onion shoot	Green vegetable	1	0.00093	Not reported	-	Not reported	0.26	0.096	0.0250	0.0250	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.21	3.3 as SOC	Onion shoot	Green vegetable	1	0.00229	Not reported	-	Not reported	0.29	0.096	0.0278	0.0278	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.96	3.4 as SOC	Onion shoot	Green vegetable	1	0.00214	Not reported	-	Not reported	0.57	0.096	0.0547	0.0547	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.3	3.1 as SOC	Onion shoot	Green vegetable	1	0.00169	Not reported	-	Not reported	1.2	0.096	0.115	0.115	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.93	3.5 as SOC	Onion shoot	Green vegetable	1	0.00278	Not reported	-	Not reported	1.52	0.096	0.146	0.146	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64	3.1 as SOC	Onion shoot	Green vegetable	1	0.00319	Not reported	-	Not reported	1.88	0.096	0.180	0.180	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Cabbage, greens, shepherd purse, spinach	Green vegetable	1	0.00433	0.00279	0.096	0.000268	Not reported	-	0.0619	0.0619	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'leafy vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Broccoli	Green vegetable	1	0.0011	0.0013	0.08	0.000104	Not reported	-	0.0945	0.0945	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'flower vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.22	1.07	Chinese cabbage	Green vegetable	1	0.0023	0.00192	0.105	0.0002016	Not reported	-	0.0877	0.0877	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.55	1.76	Chinese cabbage	Green vegetable	1	0.00149	0.00229	0.105	0.00024045	Not reported	-	0.161	0.161	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.06	1.56 as TOC	Cabbage	Green vegetable	1	0.00054	0.00053	0.105	0.00005565	Not reported	-	0.1031	0.1031	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.44	1.48 as TOC	Cabbage	Green vegetable	1	0.00034	0.00012	0.105	0.0000126	Not reported	-	0.0371	0.0371	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.49	1.38 as TOC	Cabbage	Green vegetable	1	0.00044	0.00031	0.105	0.00003255	Not reported	-	0.0740	0.0740	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.64	2.88 as TOC	Cabbage	Green vegetable	1	0.00108	0.00009	0.105	0.00000945	Not reported	-	0.0088	0.0088	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.07	2.56 as TOC	Cabbage	Green vegetable	1	0.001	0.00056	0.105	0.0000588	Not reported	-	0.0588	0.0588	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.02	2.14 as TOC	Cabbage	Green vegetable	1	0.00072	0.00041	0.105	0.00004305	Not reported	-	0.0598	0.0598	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.14	3.37 as TOC	Cabbage	Green vegetable	1	0.00084	0.00028	0.105	0.0000294	Not reported	-	0.0350	0.0350	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.57	2.23 as TOC	Cabbage	Green vegetable	1	0.00082	0.00051	0.105	0.00005355	Not reported	-	0.0653	0.0653	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.12	2.48 as TOC	Cabbage	Green vegetable	1	0.00071	0.00013	0.105	0.00001365	Not reported	-	0.0192	0.0192	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	8.23	1.11 as TOC	Cabbage	Green vegetable	1	0.00029	0.00032	0.105	0.0000336	Not reported	-	0.1159	0.1159	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.52	1.45 as TOC	Cabbage	Green vegetable	1	0.00034	0.00025	0.105	0.00002625	Not reported	-	0.0772	0.0772	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.86	0.8 as TOC	Cabbage	Green vegetable	1	0.00047	0.00012	0.105	0.0000126	Not reported	-	0.0268	0.0268	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	GREDELJ A., NICOLETTO C., VALSECCHI S., FERRARIO C., POLESELLO S., LAVA R., ZANON F., BARAUSSE A., PALMERI L., GUIDOLIN L., BONATO M., 2020. Uptake and translocation of perfluoroalkyl acids (PFAA) in red chicory (*Cichorium intybus* L.) under various treatments with pre-contaminated soil and irrigation water. SCIENCE OF THE TOTAL ENVIRONMENT, 708, art. 134766.	Pot greenhouse	Legnaro, Italy	Loam agricultural soil	7.8	2.46	Red chicory	Green vegetable	1	0.09525	0.13849	-	Not reported	1.5	0.08	0.120	0.120	Mean	Soils sieved to 10 mm, dried and spiked with 100 or 200 ng/g and and irrigation water spiked with 1, 10 or 80 µ/l plus controls. Total of 12 treatments. Only data for the control irrigation water test is included, to prevent interference of results between uptake of PFAS into plants by soil and water. 5 replication plants, transplanted as seedlings. Composite samples from 3 plants and 3 soils analysed. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	GREDELJ A., NICOLETTO C., VALSECCHI S., FERRARIO C., POLESELLO S., LAVA R., ZANON F., BARAUSSE A., PALMERI L., GUIDOLIN L., BONATO M., 2020. Uptake and translocation of perfluoroalkyl acids (PFAA) in red chicory (*Cichorium intybus* L.) under various treatments with pre-contaminated soil and irrigation water. SCIENCE OF THE TOTAL ENVIRONMENT, 708, art. 134766.	Pot greenhouse	Legnaro, Italy	Loam agricultural soil	7.8	2.46	Red chicory	Green vegetable	1	0.18836	0.32731	-	Not reported	2.3	0.08	0.184	0.184	Mean	Soils sieved to 10 mm, dried and spiked with 100 or 200 ng/g and and irrigation water spiked with 1, 10 or 80 µ/l plus controls. Total of 12 treatments. Only data for the control irrigation water test is included, to prevent interference of results between uptake of PFAS into plants by soil and water. 5 replication plants, transplanted as seedlings. Composite samples from 3 plants and 3 soils analysed. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	White cabbage	Green vegetable	6	0.000804	0.000476	-	-	0.592	0.105	0.0622	0.0622	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Parsley	Green vegetable	6	0.000324	0.00005	-	-	0.154	0.113	0.0174	0.0174	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Lettuce	Green vegetable	6	0.000222	0.000056	-	-	0.252	0.04	0.0101	0.0101	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	1.042	-	-	0.00792	-	-	0.00760	0.00760	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	5.095	-	-	0.0618	-	-	0.0121	0.0121	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	10.143	-	-	0.0457	-	-	0.00451	0.00451	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JüRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	0.0978	-	-	0.00511	-	-	0.0522	0.0522	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JüRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	1.116	-	-	0.1084	-	-	0.0971	0.0971	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JüRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	4.937	-	-	0.5525	-	-	0.112	0.112	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JüRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	9.99	-	-	0.8198	-	-	0.0821	0.0821	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Alfalfa	Green vegetable	1	0.107	Not reported	-	Not reported	10.17	0.113	1.15	1.15	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Alfalfa	Green vegetable	1	0.074333333	Not reported	-	Not reported	0.61	0.113	0.0689	0.0689	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Alfalfa	Green vegetable	1	0.185	Not reported	-	Not reported	0.152	0.113	0.0172	0.0172	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Soil outdoor	Shougang, China	Open field soil	7.51 (average)	1.01% as TOC (average)	Spinach	Green vegetable	16	Not reported	All raw data provided	-	Not reported	1.58	0.063	0.0995	0.0995	Mean	7 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.

2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese cabbage	Green vegetable	1	0.08333	0.67898	0.105	0.0712929	Not reported	-	0.856	0.856	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese cabbage	Green vegetable	1	0.00198	0.00939	0.105	0.00098595	Not reported	-	0.498	0.498	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese chives	Green vegetable	1	0.09508	0.88594	0.079	0.06998926	Not reported	-	0.736	0.736	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese chives	Green vegetable	1	0.00209	0.01242	0.079	0.00098118	Not reported	-	0.469	0.469	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Lettuce	Green vegetable	1	0.08781	1.03827	0.04	0.0415308	Not reported	-	0.473	0.473	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Lettuce	Green vegetable	1	0.00259	0.01026	0.04	0.0004104	Not reported	-	0.158	0.158	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Celery	Green vegetable	1	0.08181	0.07544	0.079	0.00595976	Not reported	-	0.0728	0.0728	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Cauliflower	Green vegetable	1	0.08793	0.08608	0.076	0.00654208	Not reported	-	0.0744	0.0744	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Cauliflower	Green vegetable	1	0.00222	0.00169	0.076	0.00012844	Not reported	-	0.0579	0.0579	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	2.5	0.04	0.100	0.100	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	1.9	0.04	0.0760	0.0760	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Head lettuce cultivar	Green vegetable	1	0.19	Not reported	-	-	6.6	0.04	0.264	0.264	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	6.4	0.04	0.256	0.256	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	3.4	0.04	0.136	0.136	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.

2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	5.2	0.04	0.208	0.208	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	2.5	0.04	0.100	0.100	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.19	Not reported	-	-	3.1	0.04	0.124	0.124	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	2.9	0.04	0.116	0.116	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	1.3	0.04	0.0520	0.0520	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	2.3	0.04	0.0920	0.0920	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	2.0	0.04	0.0800	0.0800	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	1.7	0.04	0.0680	0.0680	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	2.1	0.04	0.0840	0.0840	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	1.2	0.04	0.0480	0.0480	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	1.8	0.04	0.0720	0.0720	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	1.9	0.04	0.0760	0.0760	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.19	Not reported	-	-	2.5	0.04	0.100	0.100	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.

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2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Head lettuce cultivar	Green vegetable	1	0.19	Not reported	-	-	5.2	0.04	0.208	0.208	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.99	Not reported	-	-	4.0	0.04	0.160	0.160	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.99	Not reported	-	-	3.3	0.04	0.132	0.132	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
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2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.99	Not reported	-	-	6.0	0.04	0.240	0.240	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Romaine cultivar	Green vegetable	1	0.99	Not reported	-	-	2.1	0.04	0.0840	0.0840	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
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2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	1.6	0.04	0.0640	0.0640	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.

2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	2.1	0.04	0.0840	0.0840	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	2.3	0.04	0.0920	0.0920	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	2.0	0.04	0.0800	0.0800	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	2.5	0.04	0.100	0.100	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	1.8	0.04	0.0720	0.0720	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	1.9	0.04	0.0760	0.0760	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	1.8	0.04	0.0720	0.0720	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Loose leaf cultivar	Green vegetable	1	0.99	Not reported	-	-	2.4	0.04	0.0960	0.0960	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Head lettuce cultivar	Green vegetable	1	0.99	Not reported	-	-	3.3	0.04	0.132	0.132	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2018	XIANG, L., CHEN, L., YU, L., YU, P., ZHAO, H., MO, C., LI, Y., LI, H., CAI, Q., ZHOU, D., WONG, M., 2018. Genotypic variation and mechanism in uptake and translocation of perfluorooctanoic acid (PFOA) in lettuce (*Lactuca sativa* L.) cultivars grown in PFOA-polluted soils. SCIENCE OF THE TOTAL ENVIRONMENT, 636, 999-1008.	Pot greenhouse	Guangzhou, China	University experimental field	Not reported	3.29%	Lettuce - Head lettuce cultivar	Green vegetable	1	0.99	Not reported	-	-	1.9	0.04	0.0760	0.0760	Composite	Soil from a university experimental field, air-dried and sieved to 2 mm. Soils dosed with 2 concentrations. Seedlings germinated and then transplanted - 4 per pot. 4 replicates per cultivar and dose concentration. Samples were homogenised before analysis. Soil to plant concentrations reported as dry weightd, soil to plant concentration factor converted to kg plant FW per kg soil DW using Tabl 7,1, SR3.
2017	NAVARRO, I., DE LA TORRE, A., SANZ, P., PORCEL, M.A., PRO, J., CARBONELL, G., DE LOS ÁNGELES MARTÍNEZ, M., 2017. Uptake of perfluoroalkyl substances and halogenated flame retardants by crop plants grown in biosolids-amended soils. ENVIRONMENTAL RESEARCH, 152, 199-206.	Pot	Spain	Field soil amended with biosolids (anaerobically digested thermal drying sludge).	7.5	3.0% as SOC	Spinach	Green vegetable	1	0.19	2.37	0.063	0.14931	Not reported	-	0.786	0.786	Mean	Soil amended with 2 types of biosolid. 24 pots per test, 8 replicates plus controls. Crops grown in climate controlled room. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Lettuce	Green vegetable	3	0.557	1.151	0.04	0.04604	Not reported		0.0827	0.0827	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Lettuce	Green vegetable	3	0.633	0.907	0.04	0.03628	Not reported		0.0573	0.0573	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Alfalfa	Green vegetable	4	0.4168	1.3115	-	-	3.15	0.113	0.356	0.356	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (15 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Lettuce	Green vegetable	4	0.4168	0.4936	-	-	1.18	0.04	0.0472	0.0472	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (15 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Mung bean	Green vegetable	4	0.4168	3.5009	-	-	8.40	0.178	1.50	1.50	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (15 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam	7.6	1.51% as SOC	Celery	Green vegetable	1	0.00015	0.00258	0.079	0.00020382	Not reported		1.36	1.36	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Celery	Green vegetable	1	0.07852	0.0554	0.079	0.0043766	Not reported		0.0557	0.0557	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Celery	Green vegetable	1	0.01491	0.00199	0.079	0.00015721	Not reported		0.0105	0.0105	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Sugar snap pea	Green vegetable	1	0.07852	0.00265	0.178	0.0004717	Not reported		0.00601	0.00601	Mean	Soil collected from a field and sieved to 6.3 mm. 2 seeds planted and thinned to 1 per plant per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam with biosolid amendment (10% by mass)	6.1	2.24% as SOC	Lettuce	Green vegetable	1	0.07852	0.19791	-	-	2.52	0.04	0.101	0.101	Mean	Industrial' soil - silt loam plus composted biosolids (10% by mass). Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Lettuce	Green vegetable	1	0.01491	0.02001	-	-	1.34	0.04	0.0536	0.0536	Mean	Municipal' soil - silt loam from field where biosolids were applied for 20 years. Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00116	Not reported	-	Not reported	0.25	0.097	0.0243	0.0243	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00093	Not reported	-	Not reported	0.68	0.097	0.0660	0.0660	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00229	Not reported	-	Not reported	0.54	0.097	0.0524	0.0524	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00214	Not reported	-	Not reported	1.06	0.097	0.103	0.103	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00169	Not reported	-	Not reported	0.8	0.097	0.0776	0.0776	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00278	Not reported	-	Not reported	1.03	0.097	0.100	0.100	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00319	Not reported	-	Not reported	1.82	0.097	0.177	0.177	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Carrot, radish	Root vegetable	1	0.0023	0.00131	0.103	0.000135	Not reported	-	0.0587	0.0587	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'root vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	ABRIL C., SANTOS J.L., MARTIN J., APARICIO I., ALONSO E., 2020. Uptake and translocation of multiresidue industrial and household contaminants in radish grown under controlled conditions. CHEMOSPHERE, 268 art. 128823	Pot greenhouse	Growth chamber, Seville, Spain	Composted sewage sludge-amended agricultural soil (5:95 w/w)	8.75		Radish	Root vegetable	6	0.715	0.382	-	-	0.534	0.138	0.0737	0.0737	Mean	Soil/sludge sieved to <2 mm. Soil spiked with 500 ng/g dry weight. Radish seeds planted in spiked soil, 5 per pot then thinned to 1 plant. Soil and crop samples homogenised before anaylsis. Edible part reported as 'bulb'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	1.146	-	-	0.0427	-	-	0.0373	0.0373	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	5.044	-	-	0.219	-	-	0.0434	0.0434	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	9.735	-	-	0.4524	-	-	0.0465	0.0465	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.

2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Carrot	Root vegetable	1	0.06	Not reported	-	Not reported	3.76	0.097	0.365	0.365	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Carrot	Root vegetable	1	0.080333333	Not reported	-	Not reported	0.1	0.097	0.00970	0.00970	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Carrot	Root vegetable	1	0.201	Not reported	-	Not reported	0.196	0.097	0.0190	0.0190	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Radish	Root vegetable	1	0.1115	Not reported	-	Not reported	18.26	0.138	2.52	2.52	Mean	Soils dosed and 20 seeds planted in soil. 2 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Radish	Root vegetable	1	0.066	Not reported	-	Not reported	0.54	0.138	0.0745	0.0745	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Radish	Root vegetable	1	0.189	Not reported	-	Not reported	0.24	0.138	0.0331	0.0331	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Green onion	Root vegetable	6	0.000841	0.000809	-	-	0.962	0.097	0.0933	0.0933	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Soil outdoor	Shougang, China	Open field soil	7.51 (average)	1.01% as TOC (average)	Carrot	Root vegetable	2	Not reported	All raw data provided	-	Not reported	0.15	0.0516	0.0076	0.00764	Mean	7 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Soil outdoor	Shougang, China	Open field soil	7.51 (average)	1.01% as TOC (average)	Radish	Root vegetable	2	Not reported	All raw data provided	-	Not reported	0.54	0.138	0.074	0.0741	Mean	7 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Radish	Root vegetable	1	0.0689	0.09534	0.138	0.01315692	Not reported	-	0.191	0.191	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Radish	Root vegetable	1	0.00207	0.00136	0.138	0.00018768	Not reported	-	0.0907	0.0907	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Carrot	Root vegetable	1	0.09126	0.05164	0.097	0.00500908	Not reported	-	0.0549	0.0549	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Carrot	Root vegetable	1	0.00282	0.00089	0.097	0.00008633	Not reported	-	0.0306	0.0306	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Welsh onion	Root vegetable	1	0.11937	0.01697	0.097	0.00164609	Not reported	-	0.0138	0.0138	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Welsh onion	Root vegetable	1	0.00155	0.00154	0.097	0.00014938	Not reported	-	0.0964	0.0964	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Chantenay carrot (peeled)	Root vegetable	3	0.524	0.143	0.097	0.013871	Not reported		0.0265	0.0265	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Chantenay carrot (peeled)	Root vegetable	3	0.553	0.154	0.097	0.014938	Not reported		0.0270	0.0270	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Nantessa carrot (peeled)	Root vegetable	3	0.439	0.141	0.097	0.013677	Not reported		0.0312	0.0312	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Nantessa carrot (peeled)	Root vegetable	3	0.427	0.148	0.097	0.014356	Not reported		0.0336	0.0336	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	5.7	53% as TOC	Chantenay carrot (peeled)	Root vegetable	3	0.414	0.147	0.097	0.014259	Not reported		0.0344	0.0344	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	6.7	53% as TOC	Chantenay carrot (peeled)	Root vegetable	3	0.327	0.096	0.097	0.009312	Not reported		0.0285	0.0285	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	7.7	53% as TOC	Nantessa carrot (peeled)	Root vegetable	3	0.599	0.033	0.097	0.003201	Not reported		0.00534	0.00534	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	8.7	53% as TOC	Nantessa carrot (peeled)	Root vegetable	3	0.518	0.049	0.097	0.004753	Not reported		0.00918	0.00918	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Radish	Root vegetable	4	0.4168	1.2503	-	-	3.00	0.138	0.414	0.414	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (5 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Radish	Root vegetable	1	0.07852	0.06689	0.138	0.00923082	Not reported	-	0.118	0.118	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Radish	Root vegetable	1	0.01491	0.00811	0.138	0.00111918	Not reported	-	0.0751	0.0751	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Carrot (peeled)	Root vegetable	1	0.681	Not reported	-	0.0313	Not reported	-	0.0500	0.0500	Mean	Soil collected from a field and sieved to 6.3 mm. 2 seeds planted and thinned to 1 per plant per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Carrot (peeled)	Root vegetable	1	0.676	Not reported	-	0.0308	Not reported	-	0.0500	0.0500	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seedlings planted - 30 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as μg g^{-1}, converted to mg kg^{-1}.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Potato (peeled)	Tuber vegetable	1	0.276	Not reported	-	0.0029	Not reported	-	0.0100	0.0100	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seed potatoes planted directly - 3 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as µg g^{-1}, converted to mg kg^{-1}. Soil to plant concentration factor reported as <0.01 in the reference paper so calculated here.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Potato (peeled)	Tuber vegetable	1	0.795	Not reported	-	0.0077	Not reported	-	0.0100	0.0100	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seed potatoes planted directly - 3 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as µg g^{-1}, converted to mg kg^{-1}. Soil to plant concentration factor reported as <0.01 in the reference paper so calculated here.
2009	STAHL, T., HEYN, J., THIELE, H., HUTHER, J., FAILING, K., GEORGII, S., BRUNN, H., 2009. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plants. ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 57, 289 - 298.	Pot	Germany	Loess diluted with quartz sand	7.0	Not reported	Potato (peeled)	Tuber vegetable	1	10	Not reported	-	0.007	Not reported	-	0.000700	0.000700	Mean	Soil crushed and sieved to 3 mm, then dried. 1 control and 5 spike concentrations. 6 replicates. Homogenised crop samples analysed, peels tested separately. Soil and crop concentrations reported as µg g^{-1}, converted to mg kg^{-1}.
2009	STAHL, T., HEYN, J., THIELE, H., HUTHER, J., FAILING, K., GEORGII, S., BRUNN, H., 2009. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plants. ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 57, 289 - 298.	Pot	Germany	Loess diluted with quartz sand	7.0	Not reported	Potato (peeled)	Tuber vegetable	1	25	Not reported	-	0.019	Not reported	-	0.000760	0.000760	Mean	Soil crushed and sieved to 3 mm, then dried. 1 control and 5 spike concentrations. 6 replicates. Homogenised crop samples analysed, peels tested separately. Soil and crop concentrations reported as µg g^{-1}, converted to mg kg^{-1}.
2009	STAHL, T., HEYN, J., THIELE, H., HUTHER, J., FAILING, K., GEORGII, S., BRUNN, H., 2009. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plants. ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 57, 289 - 298.	Pot	Germany	Loess diluted with quartz sand	7.0	Not reported	Potato (peeled)	Tuber vegetable	1	50	Not reported	-	0.052	Not reported	-	0.00104	0.00104	Mean	Soil crushed and sieved to 3 mm, then dried. 1 control and 5 spike concentrations. 6 replicates. Homogenised crop samples analysed, peels tested separately. Soil and crop concentrations reported as µg g^{-1}, converted to mg kg^{-1}.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Pepper	Herbaceous fruit	1	0.00428	Not reported	-	Not reported	0.230	0.058	0.0133	0.0133	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The BAF was estimated from a graph presented in the paper because the mean soil and vegetable PFAS concentrations for peppers were included within a 'fruit vegetables' category which also included beans, soyabeans and broad beans - these are not within the 'herbaceous fruit' category used in CLEA. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Tomato	Herbaceous fruit	1	0.085	Not reported	-	Not reported	0.040	0.053	0.00212	0.00212	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Tomato	Herbaceous fruit	1	0.212	Not reported	-	Not reported	0.008	0.053	0.000424	0.000424	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Pot greenhouse	Shougang, China	Greenhouse	6.93 (average)	1.44% as TOC (average)	Sweet Pepper	Hebaceous fruit	3	Not reported	All raw data provided	-	Not reported	0.63	0.058	0.0365	0.0365	Mean	7 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Pot greenhouse	Shougang, China	Greenhouse	6.93 (average)	1.44% as TOC (average)	Tomato	Hebaceous fruit	5	Not reported	All raw data provided	-	Not reported	1.00	0.053	0.0530	0.0530	Mean	8 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Pot greenhouse	Shougang, China	Greenhouse	6.93 (average)	1.44% as TOC (average)	Courgette	Hebaceous fruit	1	Not reported	All raw data provided	-	Not reported	31.60	0.058	1.83	1.83	Mean	9 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Pot greenhouse	Shougang, China	Greenhouse	6.93 (average)	1.44% as TOC (average)	Aubergine	Hebaceous fruit	5	Not reported	All raw data provided	-	Not reported	3.16	0.058	0.183	0.183	Mean	11 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2020	ZHANG, M., WANG, P., LU, Y., LU, X., ZHANG, A., LIU, Z., ZHANG, Y., KHAN, K., SARVAJAYAKESAVALU, S., 2020. Bioaccumulation and human exposure of perfluoroalkyl acids (PFAAs) in vegetables from the largest vegetable production base of China. ENVIRONMENT INTERNATIIONAL, 135, art 105347.	Pot greenhouse	Shougang, China	Greenhouse	6.93 (average)	1.44% as TOC (average)	Cucumber	Hebaceous fruit	9	Not reported	All raw data provided	-	Not reported	2.00	0.04	0.0800	0.0800	Mean	12 herbaceous fruit, 3 green vegetables and 2 root vegetables studied. 5 edible plant portions collected across a 5x5 m area at each of 18 greenhouse and open field sites across Shougang province. Corresponding soil samples (0-20 cm depth) collected within the root zone of each plant sampled. Soil and plant samples from each site composited. However, the study was focussed on the estimated daily ingestion of vegetables by residents of the area and raw data on soil concentrations and BAFs for the full range of produce and PFAS was not provided in the paper.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pepper	Herbaceous fruit	1	0.13451	0.03929	0.058	0.00227882	-	-	0.0169	0.0169	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pepper	Herbaceous fruit	1	0.00269	0.00228	0.058	0.00013224	-	-	0.0492	0.0492	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pumpkin	Herbaceous fruit	1	0.18064	0.01509	0.058	0.00087522	-	-	0.00485	0.00485	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2017	NAVARRO, I., DE LA TORRE, A., SANZ, P., PORCEL, M.A., PRO, J., CARBONELL, G., DE LOS ÁNGELES MARTÍNEZ, M., 2017. Uptake of perfluoroalkyl substances and halogenated flame retardants by crop plants grown in biosolids-amended soils. ENVIRONMENTAL RESEARCH, 152, 199-206.	Pot	Spain	Field soil amended with biosolids.	7.5	3.0% as SOC	Tomato	Herbaceous fruit	1	0.0012	0.000014	-	Not reported	0.08	0.053	0.00424	0.00424	Mean	Soil amended with 2 types of biosolid. 24 pots per test, 8 replicates plus controls. Crops grown in climate controlled room. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam with biosolid amendment	6.1	2.24% as SOC	Tomato	Herbaceous fruit	1	0.07852	0.00881	-	-	0.11	0.053	0.00583	0.00583	Mean	Industrial' soil - silt loam plus composted biosolids (10% by mass). Soils, sieved to 6.3 mm. 2 seeds per pot, thinned to 1 plant per pot. 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Cucumber	Herbaceous fruit	1	0.406	Not reported	-	0.0113	Not reported	-	0.0300	0.0300	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seedlings planted - 1 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as $\mu g\ g^{-1}$, converted to $mg\ kg^{-1}$. Soil to plant concentration factor reported as <0.01 in the reference paper so calculated here.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Cucumber	Herbaceous fruit	1	0.805	Not reported	-	0.0238	Not reported	-	0.0300	0.0300	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seedlings planted - 1 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as $\mu g\ g^{-1}$, converted to $mg\ kg^{-1}$. Soil to plant concentration factor reported as <0.01 in the reference paper so calculated here.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Plum	Tree fruit	6	0.000141	0.00005	-	-	0.355	0.15	0.0533	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg kg^{-1} DW)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	7.1	3.1 as SOC	Onion shoot	Green vegetable	1	0.00343	Not reported	-	Not reported	0.11	0.096	0.0106	0.0106	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.19	3.2 as SOC	Onion shoot	Green vegetable	1	0.00728	Not reported	-	Not reported	0.08	0.096	0.00768	0.00768	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.21	3.3 as SOC	Onion shoot	Green vegetable	1	0.02091	Not reported	-	Not reported	0.05	0.096	0.00480	0.00480	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.96	3.4 as SOC	Onion shoot	Green vegetable	1	0.01809	Not reported	-	Not reported	0.02	0.096	0.00192	0.00192	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.3	3.1 as SOC	Onion shoot	Green vegetable	1	0.01929	Not reported	-	Not reported	0.06	0.096	0.00576	0.00576	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.93	3.5 as SOC	Onion shoot	Green vegetable	1	0.02706	Not reported	-	Not reported	0.08	0.096	0.00768	0.00768	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64	3.1 as SOC	Onion shoot	Green vegetable	1	0.04807	Not reported	-	Not reported	0.08	0.096	0.00768	0.00768	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Cabbage, greens, shepherd purse, spinach	Green vegetable	1	0.0053	0.00517	0.096	0.000496	Not reported	-	0.0936	0.0936	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'leafy vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Broccoli	Green vegetable	1	0.00244	0.00201	0.08	0.000161	Not reported	-	0.0659	0.0659	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'flower vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.22	1.07	Chinese cabbage	Green vegetable	1	0.0003	0.00096	0.105	0.0001008	Not reported	-	0.336	0.336	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.55	1.76	Chinese cabbage	Green vegetable	1	0.0001	0.00229	0.105	0.00024045	Not reported	-	2.40	2.40	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.06	1.56 as TOC	Cabbage	Green vegetable	1	0.00016	0.00013	0.105	0.00001365	Not reported	-	0.0853	0.0853	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.44	1.48 as TOC	Cabbage	Green vegetable	1	0.00009	0.00016	0.105	0.0000168	Not reported	-	0.1867	0.1867	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.49	1.38 as TOC	Cabbage	Green vegetable	1	0.00017	0.00015	0.105	0.00001575	Not reported	-	0.0926	0.0926	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.64	2.88 as TOC	Cabbage	Green vegetable	1	0.00018	0.00071	0.105	0.00007455	Not reported	-	0.4142	0.4142	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.07	2.56 as TOC	Cabbage	Green vegetable	1	0.0208	0.00056	0.105	0.0000588	Not reported	-	0.0028	0.0028	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.02	2.14 as TOC	Cabbage	Green vegetable	1	0.00021	0.00028	0.105	0.0000294	Not reported	-	0.1400	0.1400	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.14	3.37 as TOC	Cabbage	Green vegetable	1	0.00031	0.00018	0.105	0.0000189	Not reported	-	0.0610	0.0610	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.57	2.23 as TOC	Cabbage	Green vegetable	1	0.00024	0.00033	0.105	0.00003465	Not reported	-	0.1444	0.1444	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.12	2.48 as TOC	Cabbage	Green vegetable	1	0.00104	0.00019	0.105	0.00001995	Not reported	-	0.0192	0.0192	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	8.23	1.11 as TOC	Cabbage	Green vegetable	1	0.00515	0.00032	0.105	0.0000336	Not reported	-	0.0065	0.0065	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.52	1.45 as TOC	Cabbage	Green vegetable	1	0.00039	0.0003	0.105	0.0000315	Not reported	-	0.0808	0.0808	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.86	0.8 as TOC	Cabbage	Green vegetable	1	0.00012	0.00028	0.105	0.0000294	Not reported	-	0.2450	0.2450	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.27	1.32 as TOC	Cabbage	Green vegetable	1	0.00235	0.00026	0.105	0.0000273	Not reported	-	0.0116	0.0116	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	GREDELJ A., NICOLETTO C., VALSECCHI S., FERRARIO C., POLESELLO S., LAVA R., ZANON F., BARAUSSE A., PALMERI L., GUIDOLIN L., BONATO M., 2020. Uptake and translocation of perfluoroalkyl acids (PFAA) in red chicory (*Cichorium intybus* L.) under various treatments with pre-contaminated soil and irrigation water. SCIENCE OF THE TOTAL ENVIRONMENT, 708, art. 134766.	Pot greenhouse	Legnaro, Italy	Loam agricultural soil	7.8	2.46	Red chicory	Green vegetable	1	0.07621	0.15551	-	Not reported	2.0	0.08	0.160	0.160	Mean	Soils sieved to 10 mm, dried and spiked with 100 or 200 ng/g and and irrigation water spiked with 1, 10 or 80 µ/l plus controls. Total of 12 treatments. Only data for the control irrigation water test is included, to prevent interference of results between uptake of PFAS into plants by soil and water. 5 replication plants, transplanted as seedlings. Composite samples from 3 plants and 3 soils analysed. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	GREDELJ A., NICOLETTO C., VALSECCHI S., FERRARIO C., POLESELLO S., LAVA R., ZANON F., BARAUSSE A., PALMERI L., GUIDOLIN L., BONATO M., 2020. Uptake and translocation of perfluoroalkyl acids (PFAA) in red chicory (*Cichorium intybus* L.) under various treatments with pre-contaminated soil and irrigation water. SCIENCE OF THE TOTAL ENVIRONMENT, 708, art. 134766.	Pot greenhouse	Legnaro, Italy	Loam agricultural soil	7.8	2.46	Red chicory	Green vegetable	1	0.17993	0.22464	-	Not reported	1.2	0.08	0.0960	0.0960	Mean	Soils sieved to 10 mm, dried and spiked with 100 or 200 ng/g and and irrigation water spiked with 1, 10 or 80 µ/l plus controls. Total of 12 treatments. Only data for the control irrigation water test is included, to prevent interference of results between uptake of PFAS into plants by soil and water. 5 replication plants, transplanted as seedlings. Composite samples from 3 plants and 3 soils analysed. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	White cabbage	Green vegetable	6	0.001322	0.000115	-	-	0.086	0.105	0.00903	0.00903	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Parsley	Green vegetable	6	0.000134	0.000009	-	-	0.067	0.113	0.00757	0.00757	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Lettuce	Green vegetable	6	0.000304	0.000087	-	-	0.286	0.04	0.0114	0.0114	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	1.036	-	-	0.00152	-	-	0.00147	0.00147	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrationsreported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	5.138	-	-	0.00883	-	-	0.00172	0.00172	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	9.354	-	-	0.00308	-	-	0.000329	0.000329	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	1.008	-	-	0.1342	-	-	0.133	0.133	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentration reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	5.244	-	-	3.337	-	-	0.636	0.636	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	9.834	-	-	6.571	-	-	0.668	0.668	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	LAL M.S., MEGHAHARAJ M., NAIDU R., BAHAR M., 2020. Uptake of perfluorooctane sulfonate (PFOS) by common home-grown vegetable plants and potential risks to human health. ENVIRONMENTAL TECHNOLOGY & INNOVATION, 19, art. 100863.	Pot greenhouse	Australia	Potting mix	6.29	48.31%	Lettuce	Green vegetable	Not reported	Not reported (control)	Not reported	-	Not reported	0.22	0.04	0.00880	0.00880		Soil spiked with 3M Lightwater AFFF to achieve 1 mg/kg and 10 mg/kg PFOS. Seeds germinated in the soil and thinned to 3-4 seedlings per pot. Number of replicates not reported. Soil and crop concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LAL M.S., MEGHAHARAJ M., NAIDU R., BAHAR M., 2020. Uptake of perfluorooctane sulfonate (PFOS) by common home-grown vegetable plants and potential risks to human health. ENVIRONMENTAL TECHNOLOGY & INNOVATION, 19, art. 100863.	Pot greenhouse	Australia	Potting mix	6.29	48.31%	Lettuce	Green vegetable	Not reported	1	Not reported	-	Not reported	0.17	0.04	0.00680	0.00680		Soil spiked with 3M Lightwater AFFF to achieve 1 mg/kg and 10 mg/kg PFOS. Seeds germinated in the soil and thinned to 3-4 seedlings per pot. Number of replicates not reported. Soil and crop concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LAL M.S., MEGHAHARAJ M., NAIDU R., BAHAR M., 2020. Uptake of perfluorooctane sulfonate (PFOS) by common home-grown vegetable plants and potential risks to human health. ENVIRONMENTAL TECHNOLOGY & INNOVATION, 19, art. 100863.	Pot greenhouse	Australia	Potting mix	6.29	48.31%	Lettuce	Green vegetable	Not reported	10	Not reported	-	Not reported	0.29	0.04	0.0116	0.0116		Soil spiked with 3M Lightwater AFFF to achieve 1 mg/kg and 10 mg/kg PFOS. Seeds germinated in the soil and thinned to 3-4 seedlings per pot. Number of replicates not reported. Soil and crop concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Alfalfa	Green vegetable	1	0.132	Not reported	-	Not reported	1.28	0.113	0.145	0.145	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Alfalfa	Green vegetable	1	0.114	Not reported	-	Not reported	0.49	0.113	0.0554	0.0554	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Alfalfa	Green vegetable	1	0.111	Not reported	-	Not reported	0.173	0.113	0.0195	0.0195	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese cabbage	Green vegetable	1	0.00003	0.00017	0.105	0.00001785	Not reported	-	0.595	0.595	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese chives	Green vegetable	1	0.00002	0.00218	0.079	0.00017222	Not reported	-	8.61	8.611	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Celery	Green vegetable	1	0.00006	0.00007	0.079	0.00000553	Not reported	-	0.0922	0.0922	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Cauliflower	Green vegetable	1	0.00002	0.0001	0.076	0.0000076	Not reported	-	0.380	0.380	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2017	NAVARRO, I., DE LA TORRE, A., SANZ, P., PORCEL, M.A., PRO, J., CARBONELL, G., DE LOS ÁNGELES MARTÍNEZ, M., 2017. Uptake of perfluoroalkyl substances and halogenated flame retardants by crop plants grown in biosolids-amended soils. ENVIRONMENTAL RESEARCH, 152, 199-206.	Pot	Spain	Field soil amended with biosolids (anaerobically digested thermal drying sludge).	7.5	3.0% as SOC	Spinach	Green vegetable	1	0.00035	0.00162	0.063	0.00010206	Not reported		0.292	0.292	Mean	Soil amended with 2 types of biosolid. 24 pots per test, 8 replicates plus controls. Crops grown in climate controlled room. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2017	NAVARRO, I., DE LA TORRE, A., SANZ, P., PORCEL, M.A., PRO, J., CARBONELL, G., DE LOS ÁNGELES MARTÍNEZ, M., 2017. Uptake of perfluoroalkyl substances and halogenated flame retardants by crop plants grown in biosolids-amended soils. ENVIRONMENTAL RESEARCH, 152, 199-206.	Pot	Spain	Field soil amended with biosolids (anaerobically digested municipal solid waste compost).	7.5	3.0% as SOC	Spinach	Green vegetable	1	0.00022	0.00099	0.063	0.00006237	Not reported		0.284	0.284	Mean	Soil amended with 2 types of biosolid. 24 pots per test, 8 replicates plus controls. Crops grown in climate controlled room. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Lettuce	Green vegetable	3	0.481	0.053	0.04	0.00212	Not reported		0.00441	0.00441	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Lettuce	Green vegetable	3	0.555	0.101	0.04	0.00404	Not reported		0.00728	0.00728	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Alfalfa	Green vegetable	4	0.1544	0.0629	-	-	0.407	0.113	0.0460	0.0460	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (15 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Lettuce	Green vegetable	4	0.1544	0.0612	-	-	0.396	0.04	0.0158	0.0158	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (15 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Mung bean	Green vegetable	4	0.1544	0.1055	-	-	0.683	0.178	0.122	0.122	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (15 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Celery	Green vegetable	1	0.04966	0.06927	0.079	0.00547233	Not reported		0.110	0.110	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Celery	Green vegetable	1	0.31949	0.01721	0.079	0.00135959	Not reported		0.00426	0.00426	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Sugar snap pea	Green vegetable	1	0.04966	0.00128	0.178	0.00022784	Not reported		0.00459	0.00459	Mean	Soil collected from a field and sieved to 6.3 mm. 2 seeds planted and thinned to 1 per plant per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.

2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam with biosolid amendment (10% by mass)	6.1	2.24% as SOC	Lettuce	Green vegetable	1	0.04966	0.0829	1.669351591	-	1.67	0.04	0.0668	0.0668	Mean	Industrial' soil - silt loam plus composted biosolids (10% by mass). Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Lettuce	Green vegetable	1	0.31949	0.10162	-	-	0.32	0.04	0.0128	0.0128	Mean	Municipal' soil - silt loam from field where biosolids were applied for 20 years. Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Soil outdoor	Mid-west US	Lenzburg silty loam with biosolid applied (x2 normal rate)	Not reported	2.34% as SOC	Lettuce	Green vegetable	1	0.00612	0.00214	-	-	0.35	0.04	0.0140	0.0140	Mean	18 plots fertilised with biosolids at 5 application rates plus a control. 3 replicate plots. Duplicate soil samples collected from each plot. Edible portions per plot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Soil outdoor	Mid-west US	Lenzburg silty loam with biosolid applied (x4 normal rate)	Not reported	3.51% as SOC	Lettuce	Green vegetable	1	0.01391	0.00139	-	-	0.1	0.04	0.00400	0.00400	Mean	19 plots fertilised with biosolids at 5 application rates plus a control. 3 replicate plots. Duplicate soil samples collected from each plot. Edible portions per plot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Lettuce	Green vegetable	1	3.61	Not reported	-	-	2.4	0.04	0.0960	0.0960	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Lettuce	Green vegetable	1	11.1	Not reported	-	-	0.95	0.04	0.0380	0.0380	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Lettuce	Green vegetable	1	50.8	Not reported	-	-	0.83	0.04	0.0332	0.0332	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00343	Not reported	-	Not reported	0.23	0.097	0.0223	0.0223	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00728	Not reported	-	Not reported	0.13	0.097	0.0126	0.0126	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.02091	Not reported	-	Not reported	0.07	0.097	0.00679	0.00679	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.01809	Not reported	-	Not reported	0.03	0.097	0.00291	0.00291	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.01929	Not reported	-	Not reported	0.07	0.097	0.00679	0.00679	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.02706	Not reported	-	Not reported	0.21	0.097	0.0204	0.0204	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.04807	Not reported	-	Not reported	0.37	0.097	0.0359	0.0359	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Carrot, radish	Root vegetable	1	0.00484	0.00486	0.103	0.000501	Not reported	-	0.103	0.103	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'root vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.66	1.89%	Radish	Root vegetable	1	0.00025	0.0002	0.138	0.0000276	Not reported	-	0.110	0.110	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	0.9065	-	-	0.0177	-	-	0.0195	0.0195	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	5.257	-	-	0.0876	-	-	0.0167	0.0167	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	10.581	-	-	0.1694	-	-	0.0160	0.0160	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.

2021	ABRIL C., SANTOS J.L., MARTIN J., APARICIO I., ALONSO E., 2020. Uptake and translocation of multiresidue industrial and household contaminants in radish grown under controlled conditions. CHEMOSPHERE, 268 art. 128823	Pot greenhouse	Growth chamber, Seville, Spain	Composted sewage sludge-amended agricultural soil (5:95 w/w)	8.75	[may be in supplementary data]	Radish	Root vegetable	6	0.708	1.181	-	-	1.668	0.138	0.230	0.230	Mean	Soil/sludge sieved to <2 mm. Soil spiked with 500 ng/g dry weight. Radish seeds planted in spiked soil, 5 per pot then thinned to 1 plant. Soil and crop samples homogenised before anaylsis. Edible part reported as 'bulb'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Carrot	Root vegetable	1	0.081	Not reported	-	Not reported	1.17	0.097	0.113	0.113	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Carrot	Root vegetable	1	0.096	Not reported	-	Not reported	0.17	0.097	0.0165	0.0165	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Carrot	Root vegetable	1	0.111	Not reported	-	Not reported	0.446	0.097	0.0433	0.0433	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Radish	Root vegetable	1	0.132	Not reported	-	Not reported	2.73	0.138	0.377	0.377	Mean	Soils dosed and 20 seeds planted in soil. 2 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Radish	Root vegetable	1	0.099	Not reported	-	Not reported	1.07	0.138	0.148	0.148	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Radish	Root vegetable	1	0.120	Not reported	-	Not reported	0.622	0.138	0.0858	0.0858	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Green onion	Root vegetable	6	0.000236	0.000004	-	-	0.017	0.097	0.00165	0.00165	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LAL M.S., MEGHAHARAJ M., NAIDU R., BAHAR M., 2020. Uptake of perfluorooctane sulfonate (PFOS) by common home-grown vegetable plants and potential risks to human health. ENVIRONMENTAL TECHNOLOGY & INNOVATION, 19, art. 100863.	Pot greenhouse	Australia	Potting mix	6.29	48.31%	Carrot	Root vegetable	Not reported	Not reported (control)	Not reported	-	-	1.34	0.097	0.130	0.130		Soil spiked with 3M Lightwater AFFF to achieve 1 mg/kg and 10 mg/kg PFOS. Seeds germinated in the soil and thinned to 3-4 seedlings per pot. Number of replicates not reported. Soil and crop concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LAL M.S., MEGHAHARAJ M., NAIDU R., BAHAR M., 2020. Uptake of perfluorooctane sulfonate (PFOS) by common home-grown vegetable plants and potential risks to human health. ENVIRONMENTAL TECHNOLOGY & INNOVATION, 19, art. 100863.	Pot greenhouse	Australia	Potting mix	6.29	48.31%	Carrot	Root vegetable	Not reported	1	Not reported	-	-	0.17	0.097	0.0165	0.0165		Soil spiked with 3M Lightwater AFFF to achieve 1 mg/kg and 10 mg/kg PFOS. Seeds germinated in the soil and thinned to 3-4 seedlings per pot. Number of replicates not reported. Soil and crop concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LAL M.S., MEGHAHARAJ M., NAIDU R., BAHAR M., 2020. Uptake of perfluorooctane sulfonate (PFOS) by common home-grown vegetable plants and potential risks to human health. ENVIRONMENTAL TECHNOLOGY & INNOVATION, 19, art. 100863.	Pot greenhouse	Australia	Potting mix	6.29	48.31%	Carrot	Root vegetable	Not reported	10	Not reported	-	-	0.12	0.097	0.0116	0.0116		Soil spiked with 3M Lightwater AFFF to achieve 1 mg/kg and 10 mg/kg PFOS. Seeds germinated in the soil and thinned to 3-4 seedlings per pot. Number of replicates not reported. Soil and crop concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Radish	Root vegetable	1	0.00007	0.00006	0.138	0.00000828	Not reported	-	0.118	0.118	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Welsh onion	Root vegetable	1	0.00006	0.00009	0.097	0.00000873	Not reported	-	0.146	0.146	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Chantenay carrot (peeled)	Root vegetable	3	0.432	0.225	0.097	0.021825	Not reported		0.0505	0.0505	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Chantenay carrot (peeled)	Root vegetable	3	0.402	0.256	0.097	0.024832	Not reported		0.0618	0.0618	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.

2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Nantessa carrot (peeled)	Root vegetable	3	0.324	0.15	0.097	0.01455	Not reported		0.0449	0.0449	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	95:5 mix of a proprietary soil and compost derived from a WWTP	7.2 (soil)	2.3% as TOC (soil)	Nantessa carrot (peeled)	Root vegetable	3	0.298	0.174	0.097	0.016878	Not reported		0.0566	0.0566	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	5.7	53% as TOC	Chantenay carrot (peeled)	Root vegetable	3	0.348	0.064	0.097	0.006208	Not reported		0.0178	0.0178	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	6.7	53% as TOC	Chantenay carrot (peeled)	Root vegetable	3	0.371	0.077	0.097	0.007469	Not reported		0.0201	0.0201	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	7.7	53% as TOC	Nantessa carrot (peeled)	Root vegetable	3	0.401	0.083	0.097	0.008051	Not reported		0.0201	0.0201	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	BIZKARGUENAGA, E., ZABLETA, I., MIJANGOS, L., IPARRAGUIRRE, A., FERNÁNDEZ, L.A., PRIETO, A., ZULOAGA, O., 2016. Uptake of perfluorooctanoic acid, perfluorooctane sulfonate and perfluorooctane sulphonamide by carrot and lettuce from compost amended soil. SCIENCE OF THE TOTAL ENVIRONMENT, 571, 444-451.	Pot greenhouse	Bilbao, Spain	Universal substrate	8.7	53% as TOC	Nantessa carrot (peeled)	Root vegetable	3	0.625	0.064	0.097	0.006208	Not reported		0.0099	0.0099	Mean	Soil , compost and substrate 500 ng/g spike concentrations. Seedlings germinated and then transplanted. Soil and crop samples for each test composited and analysed in triplicate. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Carrot peelings reported similar soil to plnat concentration factors. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2016	WEN, B., WU, Y., ZHANG, H., LIU, Y., HU, X., HUANG, H., ZHANG, S., 2016. The roles of protein and lipid in the accumulation and distribution of perfluorooctane sulfonate (PFOS) and perfluorooctanoate (PFOA) in plants grown in biosolids-amended soils. ENVIRONMENTAL POLLUTION, 216, 682-688.	Pot greenhouse	Dezhou, China	Agricultural soil (mollisol) amended with biosolids.	8.26	1.93% as SOC	Radish	Root vegetable	4	0.1544	0.4032	-	-	2.61	0.138	0.360	0.360	Mean	Biosolids applied in the field for >9 years before the study. Soil air dried and sieved to 2 mm before experiment. Seeds planted into soil and seedlings thinned out (5 per pot). 4 replicates per test plus control. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam	7.6	1.51% as SOC	Radish	Root vegetable	1	0.0004	0.00335	0.138	0.0004623	Not reported	-	1.16	1.16	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Radish	Root vegetable	1	0.04966	0.03486	0.138	0.00481068	Not reported	-	0.0969	0.0969	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Radish	Root vegetable	1	0.31949	0.02103	0.138	0.00290214	Not reported	-	0.00908	0.00908	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Carrot (peeled)	Root vegetable	1	0.01	Not reported	-	0.0005	Not reported	-	0.0500	0.0500	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seedlings planted - 30 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as $\mu g\ g^{-1}$, converted to $mg\ kg^{-1}$.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Carrot (peeled)	Root vegetable	1	0.458	Not reported	-	0.0184	Not reported	-	0.0400	0.0400	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seedlings planted - 30 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as $\mu g\ g^{-1}$, converted to $mg\ kg^{-1}$.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Onion	Root vegetable	1	3.61	Not reported	-	-	0.87	0.097	0.0844	0.0844	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Onion	Root vegetable	1	11.1	Not reported	-	-	2.00	0.097	0.1940	0.1940	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Potato (peeled)	Tuber vegetable	1	0.317	Not reported	-	0.0007	Not reported	-	0.00221	0.00221	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seed potatoes planted directly - 3 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as μg g^{-1}, converted to mg kg^{-1}. Soil to plant concentration factor reported as <0.01 in the reference paper so calculated here.
2009	STAHL, T., HEYN, J., THIELE, H., HUTHER, J., FAILING, K., GEORGII, S., BRUNN, H., 2009. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plants. ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 57, 289 - 298.	Pot	Germany	Loess diluted with quartz sand	7.0	Not reported	Potato (peeled)	Tuber vegetable	1	10	Not reported	-	0.007	Not reported	-	0.000700	0.000700	Mean	Soil crushed and sieved to 3 mm, then dried. 1 control and 5 spike concentrations. 6 replicates. Homogenised crop samples analysed, peels tested separately. Soil and crop concentrations reported as μg g^{-1}, converted to mg kg^{-1}.
2009	STAHL, T., HEYN, J., THIELE, H., HUTHER, J., FAILING, K., GEORGII, S., BRUNN, H., 2009. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plants. ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 57, 289 - 298.	Pot	Germany	Loess diluted with quartz sand	7.0	Not reported	Potato (peeled)	Tuber vegetable	1	25	Not reported	-	0.016	Not reported	-	0.000640	0.000640	Mean	Soil crushed and sieved to 3 mm, then dried. 1 control and 5 spike concentrations. 6 replicates. Homogenised crop samples analysed, peels tested separately. Soil and crop concentrations reported as μg g^{-1}, converted to mg kg^{-1}.
2009	STAHL, T., HEYN, J., THIELE, H., HUTHER, J., FAILING, K., GEORGII, S., BRUNN, H., 2009. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plants. ARCHIVES OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 57, 289 - 298.	Pot	Germany	Loess diluted with quartz sand	7.0	Not reported	Potato (peeled)	Tuber vegetable	1	50	Not reported	-	0.034	Not reported	-	0.000680	0.000680	Mean	Soil crushed and sieved to 3 mm, then dried. 1 control and 5 spike concentrations. 6 replicates. Homogenised crop samples analysed, peels tested separately. Soil and crop concentrations reported as μg g^{-1}, converted to mg kg^{-1}.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Pepper	Herbaceous fruit	1	0.00428	Not reported	-	Not reported	0.891	0.058	0.0517	0.0517	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The BAF was estimated from a graph presented in the paper because the mean soil and vegetable PFAS concentrations for peppers were included within a 'fruit vegetables' category which also included beans, soyabeans and broad beans - these are not within the 'herbaceous fruit' category used in CLEA. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Tomato	Herbaceous fruit	1	0.093	Not reported	-	Not reported	0.030	0.053	0.00159	0.00159	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Tomato	Herbaceous fruit	1	0.114	Not reported	-	Not reported	0.007	0.053	0.000371	0.000371	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pepper	Herbaceous fruit	1	0.00001	0.00062	0.058	0.00003596	-	-	3.596	3.60	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pumpkin	Herbaceous fruit	1	0.00003	0.00009	0.058	0.00000522	-	-	0.174	0.174	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2017	NAVARRO, I., DE LA TORRE, A., SANZ, P., PORCEL, M.A., PRO, J., CARBONELL, G., DE LOS ÁNGELES MARTÍNEZ, M., 2017. Uptake of perfluoroalkyl substances and halogenated flame retardants by crop plants grown in biosolids-amended soils. ENVIRONMENTAL RESEARCH, 152, 199-206.	Pot	Spain	Field soil amended with biosolids.	7.5	3.0% as SOC	Tomato	Herbaceous fruit	1	0.00047	0.00003	-	Not reported	0.06	0.053	0.00318	0.00318	Mean	Soil amended with 2 types of biosolid. 24 pots per test, 8 replicates plus controls. Crops grown in climate controlled room. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2011	LECHNER, M., KNAPP, H., 2011. Carryover of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) from soil to plant and distribution to the different plant compartments studied in cultures of carrots, potatoes, and cucumbers. JOURNAL OF AGRICULTURAL FOOD CHEMISTRY, 59 (20), 11011 - 11018.	Pot greenhouse	Germany	Unspeified soil spiked with contaminated sewage sludge	Not reported	Not reported	Cucumber	Herbaceous fruit	1	0.556	Not reported	-	0.0013	Not reported	-	0.0023	0.00234	Mean	Soil spiked with contaminated sewage sludge, spiked with 2 concentrations, plus a control. Seedlings planted - 1 per tub. Samples were homogenised before analysis. Soil and crop concentrations reported as µg g^{-1}, converted to mg kg^{-1}. Soil to plant concentration factor reported as <0.01 in the reference paper so calculated here.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Tomato	Herbaceous fruit	1	11.1	Not reported	-	-	0.09	0.053	0.00477	0.00477	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.
2006	BEACH, S.A., NEWSTED, J.L., COADY, K., GIESEY, J.P., 2006. Ecotoxicological evaluation of perchlorooctanesulfonate (PFOS). REVIEWS IN ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY, 186, 133 - 174.	Pot	Not reported	Not specified	Not reported	Not reported	Tomato	Herbaceous fruit	1	50.8	Not reported	-	-	0.04	0.053	0.00212	0.00212	Not reported	Data summarised from a paper which could not be accessed: Brignole, AJ, Porch, JR, Krueger, HO, and Van Hoven, RL (2003) PFOS: a toxicity test to determine the effects of the test substance on seedling emergence of seven species of plants. Toxicity to Terrestrial Plants. EPA Docket AR226-1369. Wildlife International, Ltd., Easton, MD.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2020	CHOI G.H., LEE D.Y., BRUCE-VANDERPUIJE P., SONG A.R., LEE H.S., PARK S.W., LEE J.H., MEGSON, KIM J.H., 2020. Environmental and dietary exposure of perfluorooctanoic acid and perfluorooctanesulfonic acid in the Nakdong River, Korea. ENVIRONMENTAL GEOCHEMISTRY AND HEALTH, 43, 347-360.	Soil outdoor	Nakdong delta, Busan, South Korea	Agricultural (not specified)	Not reported	Not reported	Plum	Tree fruit	6	0.000268	<0.000001	-	-	<0.004	0.15	<0.0006	Mean	6 sampling sites. Soil and crops - 3 kg samples collected in triplicate, then composited. Soil collected from near roots of harvest crops. Soil sieved to 2 mm before analysis. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3. Plum produce concentration reported as <0.001 µg kg-1 and therefore PUF <0.004 but included as a worse case in the absence of data for this produce category.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg kg^{-1} DW)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.19	3.2 as SOC	Onion shoot	Green vegetable	1	0.00006	Not reported	-	Not reported	0.36	0.096	0.0346	0.0346	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	6.21	3.3 as SOC	Onion shoot	Green vegetable	1	0.00009	Not reported	-	Not reported	0.11	0.096	0.0106	0.0106	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.93	3.5 as SOC	Onion shoot	Green vegetable	1	0.00007	Not reported	-	Not reported	0.29	0.096	0.0278	0.0278	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64	3.1 as SOC	Onion shoot	Green vegetable	1	0.00016	Not reported	-	Not reported	0.32	0.096	0.0307	0.0307	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Cabbage, greens, shepherd purse, spinach	Green vegetable	1	0.00186	0.00379	0.096	0.000364	Not reported	-	0.196	0.196	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'leafy vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Broccoli	Green vegetable	1	0.00057	0.00119	0.08	0.000095	Not reported	-	0.167	0.167	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'flower vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.22	1.07	Chinese cabbage	Green vegetable	1	0.00004	0.00009	0.105	0.00000945	Not reported	-	0.236	0.236	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.55	1.76	Chinese cabbage	Green vegetable	1	0.00002	0.00002	0.105	0.0000021	Not reported	-	0.105	0.105	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.64	2.88 as TOC	Cabbage	Green vegetable	1	0.00003	0.00001	0.105	0.00000105	Not reported	-	0.0350	0.0350	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	4.07	2.56 as TOC	Cabbage	Green vegetable	1	0.00011	0.00002	0.105	0.0000021	Not reported	-	0.0191	0.0191	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.12	2.48 as TOC	Cabbage	Green vegetable	1	0.00003	0.00001	0.105	0.00000105	Not reported	-	0.0350	0.0350	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	8.23	1.11 as TOC	Cabbage	Green vegetable	1	0.00008	0.00003	0.105	0.00000315	Not reported	-	0.0394	0.0394	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.52	1.45 as TOC	Cabbage	Green vegetable	1	0.00001	0.00003	0.105	0.00000315	Not reported	-	0.3150	0.3150	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	7.86	0.8 as TOC	Cabbage	Green vegetable	1	0.00002	0.00002	0.105	0.0000021	Not reported	-	0.1050	0.1050	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	XU C., SONG X., LIU Z., DING X., CHEN H., DING D. 2021. Occurrence, source apportionment, plant bioaccumulation and human exposure of legacy and emerging per- and polyfluoroalkyl substances in soil and plant leaves near a landfill in China. SCIENCE OF THE TOTAL ENVIRONMENT 776, 1 July 2021, 145731.	Soil outdoor	Hangzhou, Zhejiang Province, China	Agricultural (not specified)	5.27	1.32 as TOC	Cabbage	Green vegetable	1	0.00005	0.00001	0.105	0.00000105	Not reported	-	0.0210	0.0210	Composite	Paired agricultural soil samples (uppermost 20cm) and leaves of cabbage taken from within 5km of a domestic landfill site. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Alfalfa	Green vegetable	1	0.063	Not reported	-	Not reported	13.72	0.113	1.550	1.550	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Alfalfa	Green vegetable	1	0.061	Not reported	-	Not reported	2.33	0.113	0.263	0.263	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.5 % as FOC	Alfalfa	Green vegetable	1	0.141	Not reported	-	Not reported	0.312	0.113	0.0353	0.0353	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Celery	Green vegetable	1	0.00138	0.00319	0.079	0.00025201	Not reported		0.183	0.183	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Celery	Green vegetable	1	0.00511	0.00038	0.079	0.00003002	Not reported		0.00587	0.00587	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Sugar snap pea	Green vegetable	1	0.00138	0.00024	0.178	0.00004272	Not reported		0.0310	0.0310	Mean	Soil collected from a field and sieved to 6.3 mm. 2 seeds planted and thinned to 1 per plant per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam with biosolid amendment (10% by mass)	6.1	2.24% as SOC	Lettuce	Green vegetable	1	0.00138	0.01044	-	-	7.56	0.04	0.302	0.302	Mean	Industrial' soil - silt loam plus composted biosolids (10% by mass). Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Lettuce	Green vegetable	1	0.00511	0.00554	-	-	1.08	0.04	0.0432	0.0432	Mean	Municipal' soil - silt loam from field where biosolids were applied for 20 years. Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Soil outdoor	Mid-west US	Lenzburg silty loam with biosolid applied (x4 normal rate)	Not reported	3.51% as SOC	Lettuce	Green vegetable	1	0.00033	0.0005	-	-	1.51	0.04	0.0604	0.0604	Mean	19 plots fertilised with biosolids at 5 application rates plus a control. 3 replicate plots. Duplicate soil samples collected from each plot. Edible portions per plot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00004	Not reported	-	Not reported	0.26	0.097	0.0252	0.0252	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00006	Not reported	-	Not reported	0.21	0.097	0.0204	0.0204	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00009	Not reported	-	Not reported	0.45	0.097	0.0437	0.0437	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00008	Not reported	-	Not reported	0.12	0.097	0.0116	0.0116	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00009	Not reported	-	Not reported	0.21	0.097	0.0204	0.0204	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00007	Not reported	-	Not reported	0.74	0.097	0.0718	0.0718	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2023	SIVARAM A.K. , LEE, E. , CURNOW, A., SURAPANENI, A., KANNAN, K., MEGHARAJ, M., 2023. Uptake, accumulation, and toxicity of per- and polyfluoroalkyl substances in Allium cepa grown in soils amended with biosolids. ENVIRONMENTAL CHALLENGES, 10 art. 100670.	Pot greenhouse	Western Australia	Sandy loam agricultural soil amended with biosolids	5.64-7.10	SOC 3.1-3.5%	Onion root	Root vegetable	1	0.00016	Not reported	-	Not reported	0.9	0.097	0.0873	0.0873	Composite	Biosolid application between 2007-2020 in the fields. 7 different soils collected, air-dried and sieved to 2 mm before study. Seeds planted directly into soil. 3 replicates for each test and samples homogenised before analysis. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Carrot, radish	Root vegetable	1	0.0014	0.00219	0.103	0.000226	Not reported	-	0.161	0.161	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'root vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Carrot	Root vegetable	1	0.039	Not reported	-	Not reported	1.57	0.097	0.152	0.152	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Carrot	Root vegetable	1	0.077333333	Not reported	-	Not reported	0.09	0.097	0.00873	0.00873	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Carrot	Root vegetable	1	0.152	Not reported	-	Not reported	0.448	0.097	0.0435	0.0435	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Radish	Root vegetable	1	0.0815	Not reported	-	Not reported	13.24	0.138	1.83	1.83	Mean	Soils dosed and 20 seeds planted in soil. 2 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Radish	Root vegetable	1	0.055	Not reported	-	Not reported	0.59	0.138	0.0814	0.0814	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Radish	Root vegetable	1	0.148	Not reported	-	Not reported	0.329	0.138	0.0454	0.0454	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Carrot	Root vegetable	1	0.00007	0.00005	0.097	0.00000485	Not reported	-	0.0693	0.0693	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as μg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam	7.6	1.51% as SOC	Radish	Root vegetable	1	0.00044	0.00381	0.138	0.00052578	Not reported	-	1.19	1.19	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Radish	Root vegetable	1	0.00138	0.00284	0.138	0.00039192	Not reported	-	0.284	0.284	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Radish	Root vegetable	1	0.00511	0.00433	0.138	0.00059754	Not reported	-	0.117	0.117	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Pepper	Herbaceous fruit	1	0.0016	Not reported	-	Not reported	0.245	0.058	0.0142	0.0142	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The BAF was estimated from a graph presented in the paper because the mean soil and vegetable PFAS concentrations for peppers were included within a 'fruit vegetables' category which also included beans, soyabeans and broad beans - these are not within the 'herbaceous fruit' category used in CLEA. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Tomato	Herbaceous fruit	1	0.061	Not reported	-	Not reported	0.110	0.053	0.00583	0.00583	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Tomato	Herbaceous fruit	1	0.146	Not reported	-	Not reported	0.011	0.053	0.000583	0.000583	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam with biosolid amendment	6.1	2.24% as SOC	Tomato	Herbaceous fruit	1	0.00138	0.00076	-	-	0.5	0.053	0.0265	0.0265	Mean	Industrial' soil - silt loam plus composted biosolids (10% by mass). Soils, sieved to 6.3 mm. 2 seeds per pot, thinned to 1 plant per pot. 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg soil DW per kg plant DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg kg^{-1} DW)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Cabbage, greens, shepherd purse, spinach	Green vegetable	1	0.00086	0.00107	0.096	0.000103	Not reported	-	0.119	0.119	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'leafy vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Broccoli	Green vegetable	1	0.00032	0.00015	0.08	0.000012	Not reported	-	0.0375	0.0375	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'flower vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.22	1.07	Chinese cabbage	Green vegetable	1	0.00046	0.00064	0.105	0.0000672	Not reported	-	0.146	0.146	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2022	LIU Z., XU C., JOHNSON A.C., SUN X., DING X., DING D., LIU S., LIANG X. 2022. Source apportionment and crop bioaccumulation of perfluoroalkyl acids and novel alternatives in an industrial-intensive region with fluorochemical production, China: Health implications for human exposure. JOURNAL OF HAZARDOUS MATERIALS, 423, Part A, 5 February 2022, 127019.	Soil outdoor	Changshu City, Jiangsu Province, China	Agricultural (not specified)	7.55	1.76	Chinese cabbage	Green vegetable	1	0.00051	0.00118	0.105	0.0001239	Not reported	-	0.243	0.243	Composite	Soil and produce samples collected from within 1 km of a flurochemical complex. At each sampling site the edible portions were sampled from the centre and four corners of a 10 m × 10 m field plot, and then mixed into one composite sample. The corresponding top surface soils (0–20 cm) in the root zone of each plant were collected at the same time and location, and mixed into one composite sample. Soil and plant concentrations reported as ng g-1 dw, converted to mg kg-1 dw. CFs converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	1.066	-	-	0.00156	-	-	0.00146	0.00146	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	4.737	-	-	0.0148	-	-	0.00312	0.00312	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Pea	Green vegetable	1	9.999	-	-	0.0067	-	-	0.000670	0.000670	Composite	5 lysimeters, 4 applications rates plus a control. 6 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	0.0982	-	-	0.00164	-	-	0.0167	0.0167	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	1.066	-	-	0.1858	-	-	0.174	0.174	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.

2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	4.737	-	-	1.837	-	-	0.388	0.388	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Influence of soil on the uptake of perfluoroalkyl acids by lettuce: A comparison between a hydroponic study and a field study. CHEMOSPHERE, 260, art. 127608.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Lettuce	Green vegetable	1	9.999	-	-	4.184	-	-	0.418	0.418	Composite	5 lysimeters, 4 applications rates plus a control. 20 seedlings per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	GREDELJ A., NICOLETTO C., VALSECCHI S., FERRARIO C., POLESELLO S., LAVA R., ZANON F., BARAUSSE A., PALMERI L., GUIDOLIN L., BONATO M., 2020. Uptake and translocation of perfluoroalkyl acids (PFAA) in red chicory (*Cichorium intybus* L.) under various treatments with pre-contaminated soil and irrigation water. SCIENCE OF THE TOTAL ENVIRONMENT, 708, art. 134766.	Pot greenhouse	Legnaro, Italy	Loam agricultural soil	7.8	2.46	Red chicory	Green vegetable	1	0.08682	0.13379	-	Not reported	1.4	0.08	0.112	0.112	Mean	Soils sieved to 10 mm, dried and spiked with 100 or 200 ng/g and and irrigation water spiked with 1, 10 or 80 µl/l plus controls. Total of 12 treatments. Only data for the control irrigation water test is included, to prevent interference of results between uptake of PFAS into plants by soil and water. 5 replication plants, transplanted as seedlings. Composite samples from 3 plants and 3 soils analysed. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	GREDELJ A., NICOLETTO C., VALSECCHI S., FERRARIO C., POLESELLO S., LAVA R., ZANON F., BARAUSSE A., PALMERI L., GUIDOLIN L., BONATO M., 2020. Uptake and translocation of perfluoroalkyl acids (PFAA) in red chicory (*Cichorium intybus* L.) under various treatments with pre-contaminated soil and irrigation water. SCIENCE OF THE TOTAL ENVIRONMENT, 708, art. 134766.	Pot greenhouse	Legnaro, Italy	Loam agricultural soil	7.8	2.46	Red chicory	Green vegetable	1	0.15372	0.18061	-	Not reported	1.0	0.08	0.0800	0.0800	Mean	Soils sieved to 10 mm, dried and spiked with 100 or 200 ng/g and and irrigation water spiked with 1, 10 or 80 µl/l plus controls. Total of 12 treatments. Only data for the control irrigation water test is included, to prevent interference of results between uptake of PFAS into plants by soil and water. 5 replication plants, transplanted as seedlings. Composite samples from 3 plants and 3 soils analysed. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Alfalfa	Green vegetable	1	0.034	Not reported	-	Not reported	1.74	0.113	0.197	0.197	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Alfalfa	Green vegetable	1	0.098	Not reported	-	Not reported	0.46	0.113	0.0520	0.0520	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Alfalfa	Green vegetable	1	0.142	Not reported	-	Not reported	0.171	0.113	0.0193	0.0193	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese cabbage	Green vegetable	1	0.00006	0.00015	0.105	0.00001575	Not reported	-	0.263	0.263	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese cabbage	Green vegetable	1	0.00006	0.0001	0.105	0.0000105	Not reported	-	0.175	0.175	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese chives	Green vegetable	1	0.00016	0.00055	0.079	0.00004345	Not reported	-	0.272	0.272	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Chinese chives	Green vegetable	1	0.00006	0.00006	0.079	0.00000474	Not reported	-	0.0790	0.0790	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Lettuce	Green vegetable	1	0.00011	0.00009	0.04	0.0000036	Not reported	-	0.0327	0.0327	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Celery	Green vegetable	1	0.00009	0.0001	0.079	0.0000079	Not reported	-	0.0878	0.0878	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Cauliflower	Green vegetable	1	0.00005	0.00007	0.076	0.00000532	Not reported	-	0.106	0.106	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam	7.6	1.51% as SOC	Celery	Green vegetable	1	0.0003	0.00189	0.079	0.00014931	Not reported		0.498	0.498	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Celery	Green vegetable	1	0.02015	0.01381	0.079	0.00109099	Not reported		0.0541	0.0541	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Celery	Green vegetable	1	0.00611	0.00162	0.079	0.00012798	Not reported		0.0209	0.0209	Mean	Soil collected from a field and sieved to 6.3 mm. 5 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Sugar snap pea	Green vegetable	1	0.02015	0.00145	0.178	0.0002581	Not reported		0.01281	0.01281	Mean	Soil collected from a field and sieved to 6.3 mm. 2 seeds planted and thinned to 1 per plant per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam with biosolid amendment (10% by mass)	6.1	2.24% as SOC	Lettuce	Green vegetable	1	0.02015	0.05739	-	-	2.85	0.04	0.114	0.114	Mean	Industrial' soil - silt loam plus composted biosolids (10% by mass). Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2013	BLAINE, A.C., RICH, C.D., HUNDAL, L.S., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2013. Uptake of perfluoroalkyl acids into edible crops via land applied biosolids: Field and greenhouse studies. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 47, 14062 - 14069.	Pot greenhouse	Mid-west US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Lettuce	Green vegetable	1	0.00611	0.00473	-	-	0.77	0.04	0.0308	0.0308	Mean	Municipal' soil - silt loam from field where biosolids were applied for 20 years. Soils, sieved to 6.3 mm. 2 seeds per pot, 5 replicates. Edible portions per pot combined and homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2022	GAO, C., HUA, Z., LI, X., 2022. Distribution, sources, and dietetic-related health risk assessment of perfluoroalkyl acids (PFAAs) in the agricultural environment of an industrial-agricultural interaction region (IAIR), Changshu, East China. SCIENCE OF THE TOTAL ENVIRONMENT, 809, 152159.	Soil outdoor	Changshu, East China	Agricultural (not specified)	6.18-7.2	TOC 2.12-11.81%	Carrot, radish	Root vegetable	1	0.00059	0.00152	0.103	0.000157	Not reported	-	0.265	0.265	Mean	Soil and produce samples collected from agricultural fields in an area of mixed agriculture and industry. Samples from up to 15 sites. At each sampling site the edible portions were sampled from the centre and four corners of a 5 m x 5 m area and then mixed into one composite sample. The corresponding top surface soils (0-20 cm) in the root zone of each plant were collected at the same time and location and mixed into a composite sample. The mean soil and edible plant PFAS concentrations were reported for 'root vegetables'. Soil concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	0.864	-	-	0.0327	-	-	0.0378	0.0378	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	1.098	-	-	0.0327	-	-	0.0298	0.0298	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	4.455	-	-	0.1426	-	-	0.0320	0.0320	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2021	FELIZETER S., JÜRLING H., KOTTHOFF M., DE VOOGT P., MCLACHLAN M.S., 2020. Uptake of perfluorinated alkyl acids by crops: results from a field study. ENVIRON. SCI.: PROCESSES IMPACTS, 2021, 23, 1158–1170.	Soil outdoor	Lysimeter experiment, Germany	Loamy sand (reference soil Refesol 01-A)	5.67	0.93% organic carbon	Radish	Root vegetable	1	9.572	-	-	0.282	-	-	0.0295	0.0295	Composite	5 lysimeters, 4 applications rates plus a control. 20 seeds per lysimeter. Upper 30 cm soil was a loamy sand, lower 30 cm was a sand. Data for the loamy sand only has been included here. Reported concentrations in soil and foliage were subtracted the concentrations from the contol lysimeter in the study. Soil and crop concentrations reported as ng g^{-1}, converted to mg kg^{-1}. The study calculated FCF using the final soil concentrations, whereas the initial concentrations have been used here.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Carrot	Root vegetable	1	0.0203	Not reported	-	Not reported	1.85	0.097	0.179	0.179	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Carrot	Root vegetable	1	0.099	Not reported	-	Not reported	0.21	0.097	0.0204	0.0204	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Carrot	Root vegetable	1	0.148	Not reported	-	Not reported	0.36	0.097	0.0349	0.0349	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Sand	Not reported	<0.1% as FOC	Radish	Root vegetable	1	0.0325	Not reported	-	Not reported	10.1	0.138	1.39	1.39	Mean	Soils dosed and 20 seeds planted in soil. 2 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Radish	Root vegetable	1	0.097	Not reported	-	Not reported	0.61	0.138	0.0842	0.0842	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Radish	Root vegetable	1	0.151	Not reported	-	Not reported	0.305	0.138	0.0421	0.0421	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Radish	Root vegetable	1	0.00005	0.00007	0.138	0.00000966	Not reported	-	0.193	0.193	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Carrot	Root vegetable	1	0.00005	0.00005	0.097	0.00000485	Not reported	-	0.0970	0.0970	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Welsh onion	Root vegetable	1	0.00003	0.00006	0.097	0.00000582	Not reported	-	0.194	0.194	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam	7.6	1.51% as SOC	Radish	Root vegetable	1	0.0003	0.00479	0.138	0.00066102	Not reported	-	2.20	2.20	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam amended with composted biosolids (10% by mass)	6.1	2.24% as SOC	Radish	Root vegetable	1	0.02015	0.02668	0.138	0.00368184	Not reported	-	0.183	0.183	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2014	BLAINE, A.C., RICH, C.D., SEDLACKO, E.M., HUNDAL, L.S., KUMAR, K., LAU, C., MILLS, M.A., HARRIS, K.M., HIGGINS, C.P., 2014. Perfluoroalkyl acid distribution in various plant compartments of edible crops grown in biosolids-amended soils. ENVIRONMENTAL SCIENCE AND TECHNOLOGY, 48, 7858 - 7865.	Pot greenhouse	US	Lenzburg silty loam, biosolids applied for 20 years.	6.4	6.34% as SOC	Radish	Root vegetable	1	0.00611	0.00599	0.138	0.00082662	Not reported	-	0.135	0.135	Mean	Soil collected from a field and sieved to 6.3 mm. 3 seeds per pot. 5 replicates per plant and soil type. Samples were homogenised before analysis. Soil and crop concentrations reported as ng g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.

Year	Reference	Type of study	Location	Soil Type	Soil pH	Soil Organic Matter (%)	Plant type(s)	CLEA produce type	Number of CF estimates	Range in soil concentrations (mg/kg(DW)soil)	Concentration in plant (dry weight) (mg kg^{-1})	Conversion factor plant DW to FW (if required)	Concentration in plant (fresh weight) (mg kg^{-1})	Soil to plant concentration factor (kg plant DW per kg soil DW)	Conversion factor plant DW to FW (if required)	Soil to plant concentration factor (kg plant FW per kg soil DW)	Used Soil to plant concentration factor (kg plant FW per kg soil DW)	Type	Additional notes
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Mixed sand and potting soil	Not reported	2.4% as FOC	Tomato	Herbaceous fruit	1	0.095	Not reported	-	Not reported	0.020	0.053	0.00106	0.00106	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2020	LASEE S., SUBBIAH S., DEB S., KAMJANAPIBOONWONG A., PAYTON P., ANDERSON T.A., 2020. The effects of soil organic carbon content on plant uptake of soil perfluoro alkyl acids (PFAAs) and the potential regulatory implications. ENVIRONMENTAL TOXICOLOGY AND CHEMISTRY, 1-14.	Pot greenhouse	Texas, US	Potting soil	Not reported	9.%% as FOC	Tomato	Herbaceous fruit	1	0.159	Not reported	-	Not reported	0.033	0.053	0.00175	0.00175	Mean	Soils dosed and 20 seeds planted in soil. 3 replicates. Composite plant samples analysed - ripe fruit. Soil concentrations reported as average of pre-and post study concentrations, in ng g-1, converted to mg kg-1. Plant concentrations not reported. Soil to plant concentration factor reported as kg plant DW per kg soil DW, converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pepper	Herbaceous fruit	1	0.00013	0.00015	0.058	0.0000087	-	-	0.0669	0.0669	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.
2019	LIU Z., LU Y., SONG X., JONES K., SWEETMAN A.J., JOHNSON A., ZHANG M., LU X., SU C., 2019. Multiple crop bioaccumulation and human exposure of perfluoroalkyl substances around a mega fluorochemical industrial park, China: Implication for planting optimization and food safety. ENVIRONMENT INTERNATIONAL, 127, 671 - 684.	Soil outdoor	China. Area around a fluorochemical production plant	Agricultural (not specified)	Range: 7.06-7.84 Mean: 7.4	Range: 1.31-2.28 Mean: 1.79	Pumpkin	Herbaceous fruit	1	0.00018	0.00008	0.058	0.00000464	-	-	0.0258	0.0258	Composite	5 crop and soil samples composited in each field. Soil sampled from top 0-20cm at same location as crop was harvested from. Soil and crop concentrations reported as µg g-1, converted to mg kg-1. Soil to plant concentrations reported in dry weights, soil to plant concentration factor converted to kg plant FW per kg soil DW using Table 7.1, SR3.