

Throwaway Packaging, Forever Chemicals

European wide survey of PFAS in disposable
food packaging and tableware



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Throwaway Packaging, Forever Chemicals:

European wide survey of PFAS in disposable food
packaging and tableware

Presented by

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Moderated by Genon Jensen (HEAL)

Joint study between 9 civil society organisations

Arnika, CHEM Trust, HEAL, IPEN, BUND, Danish Consumer Council, Tegengif, Generation Future, Client Earth



HEAL
HEALTH AND
ENVIRONMENT
ALLIANCE



CHEMTrust
Protecting humans and wildlife
from harmful chemicals



for a toxics-free future



Forbrugerrådet
Tænk
Danish Consumer Council



ClientEarth 

Content



1. Background - Julie

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3. Results and interpretations - Jitka

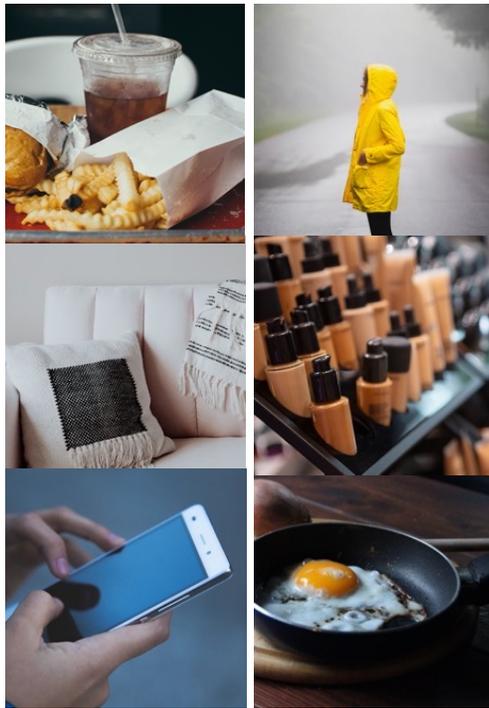
4. Conclusions and recommendations - Julie

Background

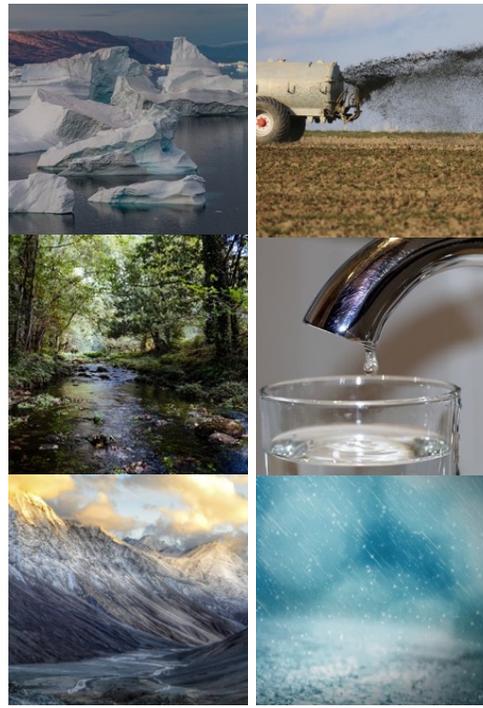
Per- and Polyfluoroalkyl Substances - PFAS

> 5000 PFAS and counting

Found in many things



everywhere



and in everyone

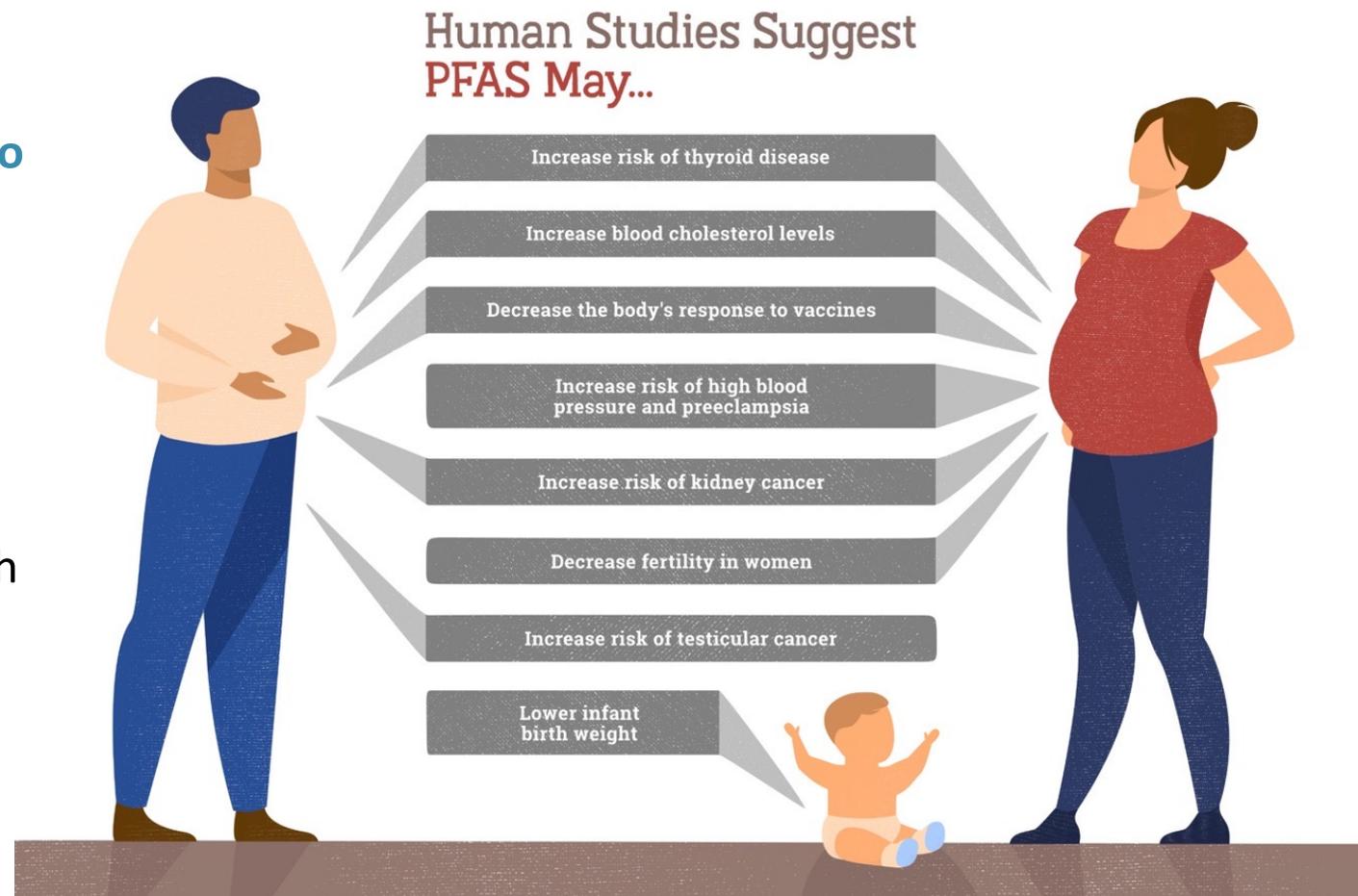


Urgency to stop the accumulation of PFAS in the environment and our bodies

→ **PFAS**, the *Forever Chemicals*, are the **most persistent synthetic chemicals known to date**

→ **Continuous emission** means **increasing levels** in the environment

→ **The more we learn** about their impact on human health and the environment, **the more concerning it is**



Why focussing on PFAS in food packaging in this study?



Aim of this study



1. Collect evidence on the **intentional use of PFAS** chemicals in disposable food packaging and tableware in Europe
2. Assessing the level of **background contamination** (unintentional) with PFAS chemicals in paper and board food packaging
3. Generate **in vitro toxicological data** on PFAS and PFOA-like compounds in consumer products that are scarce in current scientific literature

→ **Gathering evidence to support regulation on PFAS; engage with companies to move away from PFAS; raise awareness in the public domain**

Scope and Methodology

Scope of the study

What – 99 disposable food packaging and tableware items made of paper, board and moulded plant fibre



Where – 6 European countries: Czech Republic, Denmark, France, Germany, the Netherlands, the United Kingdom

When – Sampling from May to December 2020

Step 1 – Pre screening with oil beading test



Oil beading → Intentional treatment with PFAS likely

- 38 out of 99 samples (38%) beading
- 28 beading samples selected for further chemical analysis to confirm intentional PFAS treatment



Oil spreading/soaking → Intentional treatment with PFAS unlikely

- 61 samples not beading
- 14 non-beading samples selected for further chemical analysis to assess background contamination levels

Step 2 – Chemical analysis

Estimating the **total PFAS load** + identifying the **nature of the PFAS present** in 42 samples

Total Organic Fluorine

→ TOF = proxy for total PFAS content

→ Full combustion of all PFAS compounds
(including fluorinated polymers)

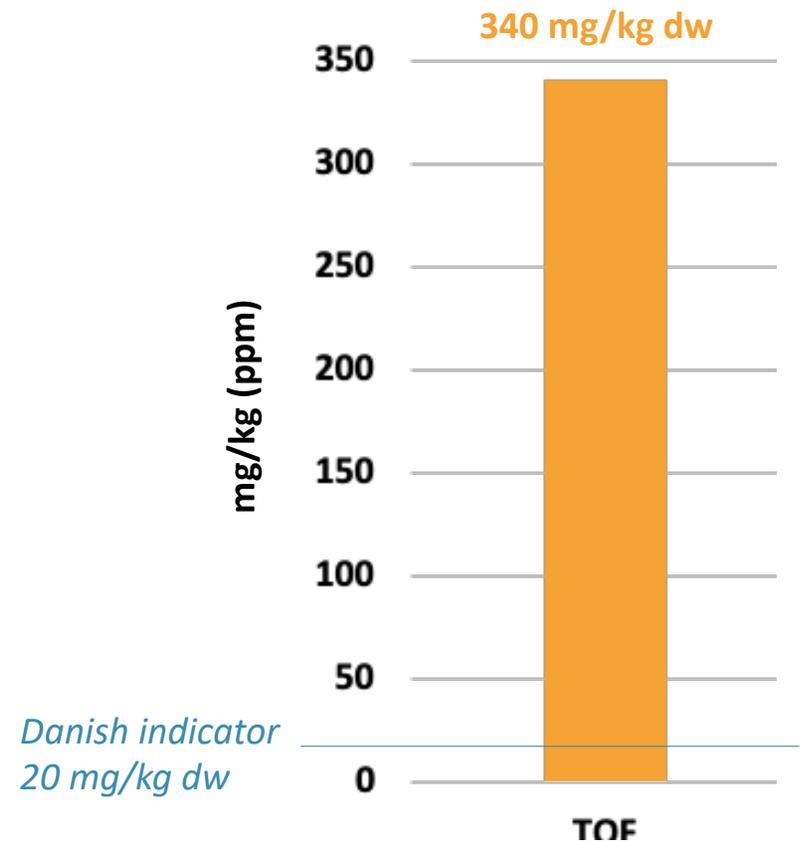
**Identified Organic
Fluorine**

→ Targeted analysis of 55 PFAS compounds

→ (Non-polymeric) PFAS extracted with a
solvent

Total Organic Fluorine – TOF indicator value

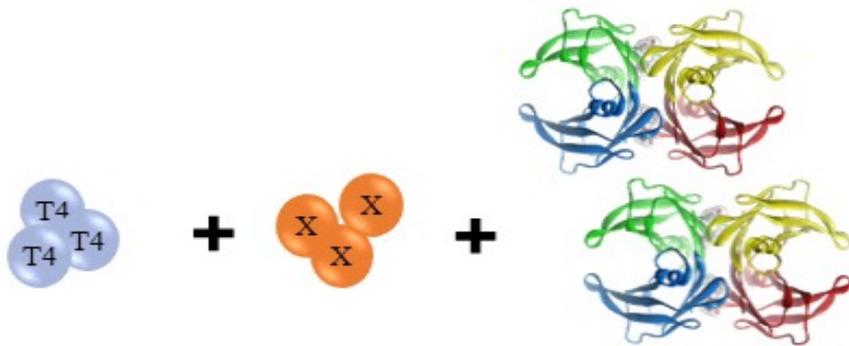
- All TOF values have been compared to the Danish indicator value of **20mg/kg dw**
- Indicator established by the Danish authority for companies to assess if their products have been treated intentionally with PFAS
- **TOF > 20mg/kg dw interpreted as intentional PFAS treatment to achieve oil repellency**



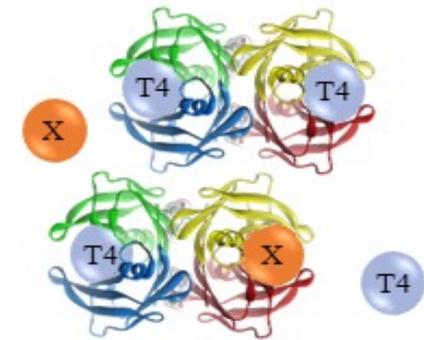
Step 3 – Bioassay – screening for thyroid hormone-disruption potential

- Effect based bioanalytical in-vitro method on (non-polymeric) PFAS extracts
- Test the potential of PFAS to interfere with the binding of the thyroid hormone thyroxine (T4) to the plasma transport protein transthyretin (TTR)

17 samples analysed



→
In vitro-reaction



Compare how much:
T4 bound to **TTR**
Vs **PFAS (X)** bound to **TTR**

Thyroid hormone
(T4)

PFAS
competitor
(X)

Transport protein
(TTR)

Results & interpretation

Grouping of the samples based on oil beading results

Group 1
Oil-beading samples
Compostables
n=13



Group 2
Oil-beading samples
Takeaway papers
n=15

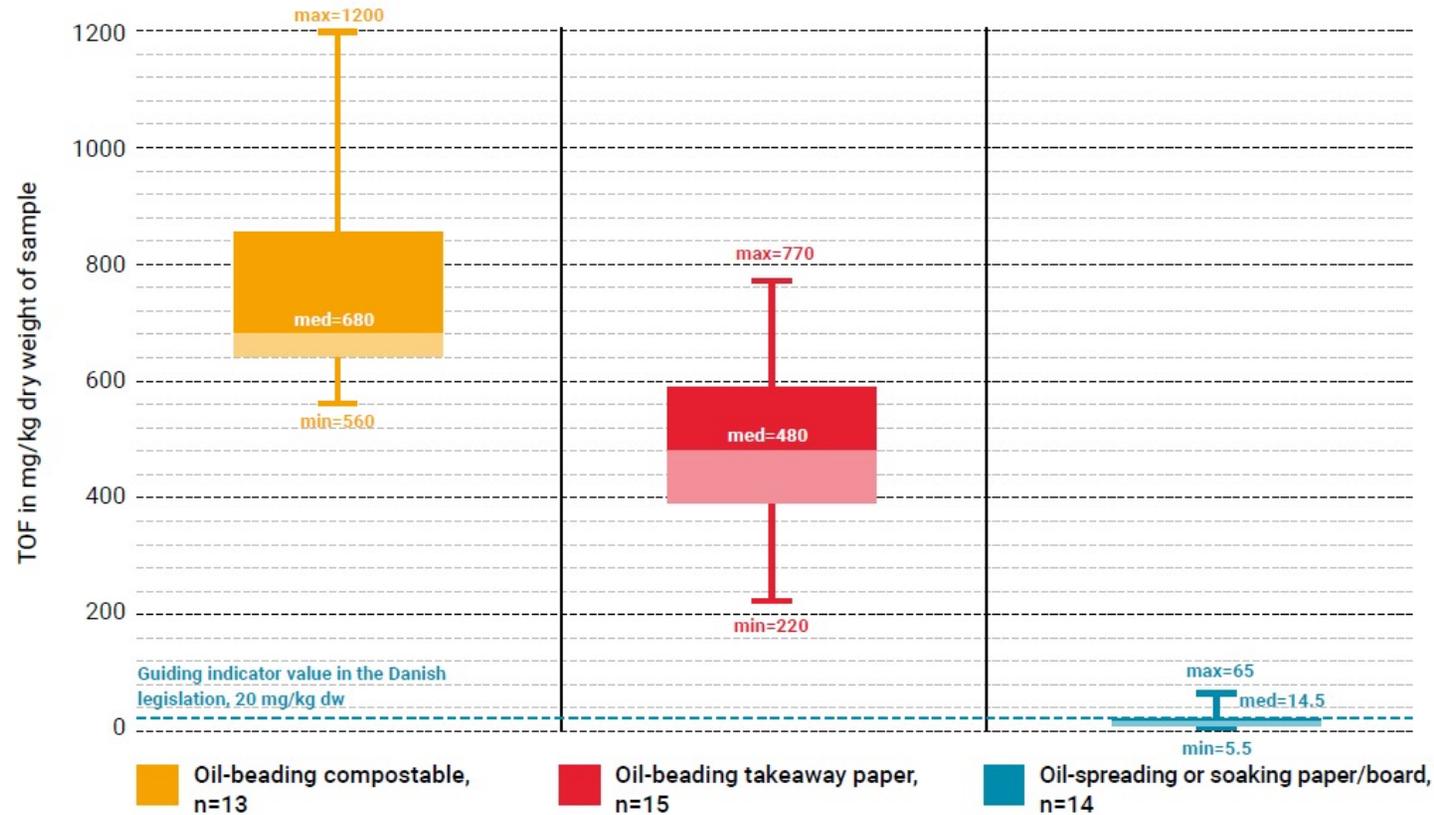


Group 3
Oil-spreading/soaking samples
Paper/Board
n=14



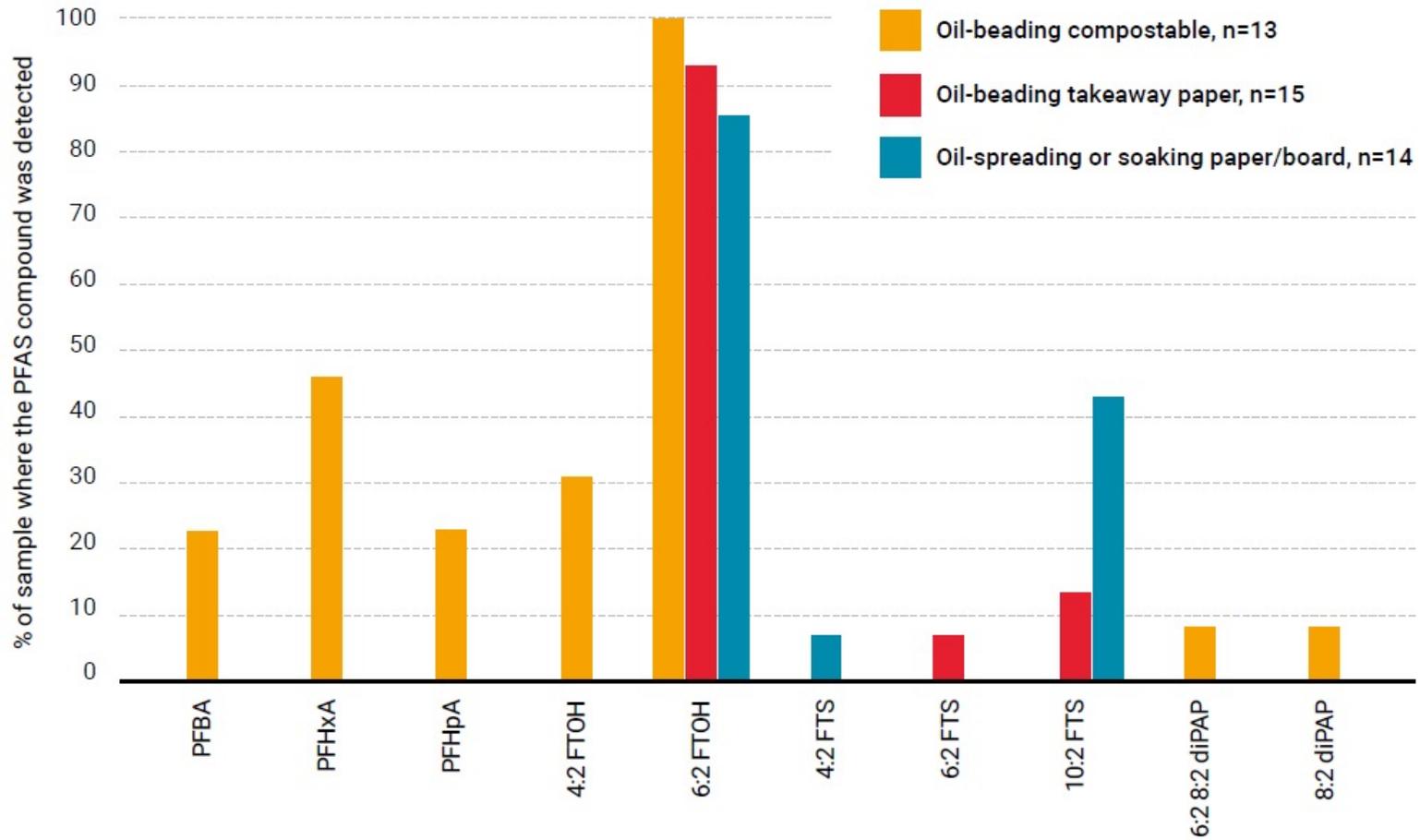
TOF results

- Oil beading test working: 100% of oil beading samples have TOF > 20mg/kg dw
- 32 out of 42 samples analysed = intentionally treated with PFAS
- **Compostable have the highest concentrations**
- Paper and cardboard food packaging contaminated with PFAS (eg. pizza boxes; packaging made of recycled paper)



Targeted PFAS – Detection frequency

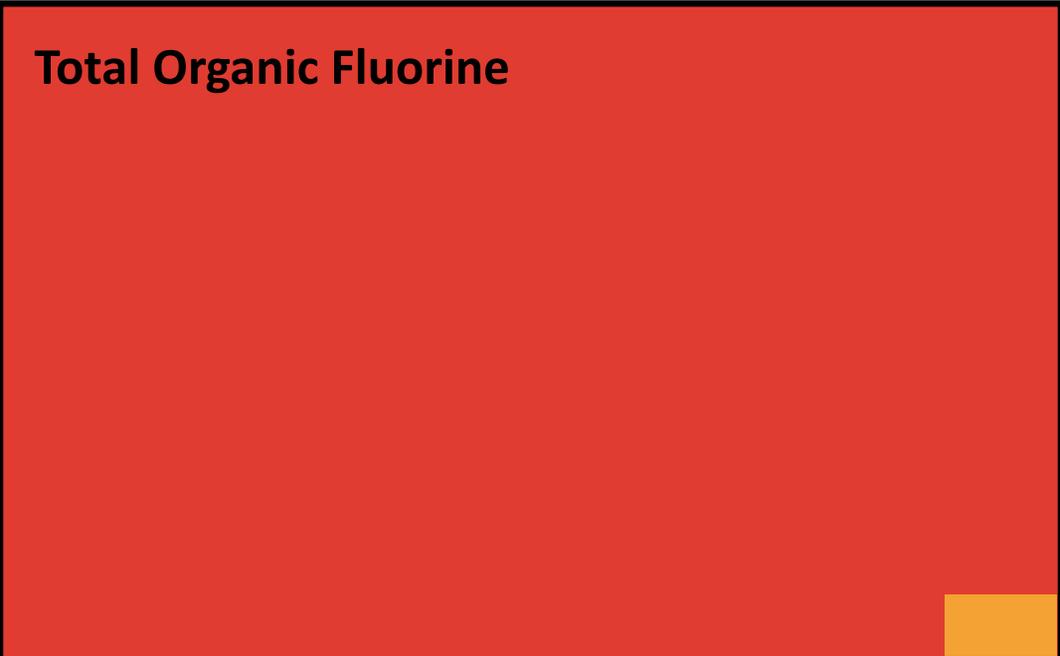
- PFAS detected in all samples analysed
- Main PFAS identified = fluorotelomer 6:2FTOH
- PFAS identified = impurities frequently associated with PFAS treatment involving C6 side-chain fluorinated polymers



Organic fluorine mass balance

- Only 10 out of 55 PFAS analysed detected in samples
- The fluorine from the targeted PFAS identified in the samples = between 0.01 to 3.4% of the total organic fluorine detected (Max 6:2FTOH = 5 000 ng/kg versus Max TOF = 1 200 000 ng/kg)
- **Vast majority of PFAS not identified** despite analysing 55 compounds

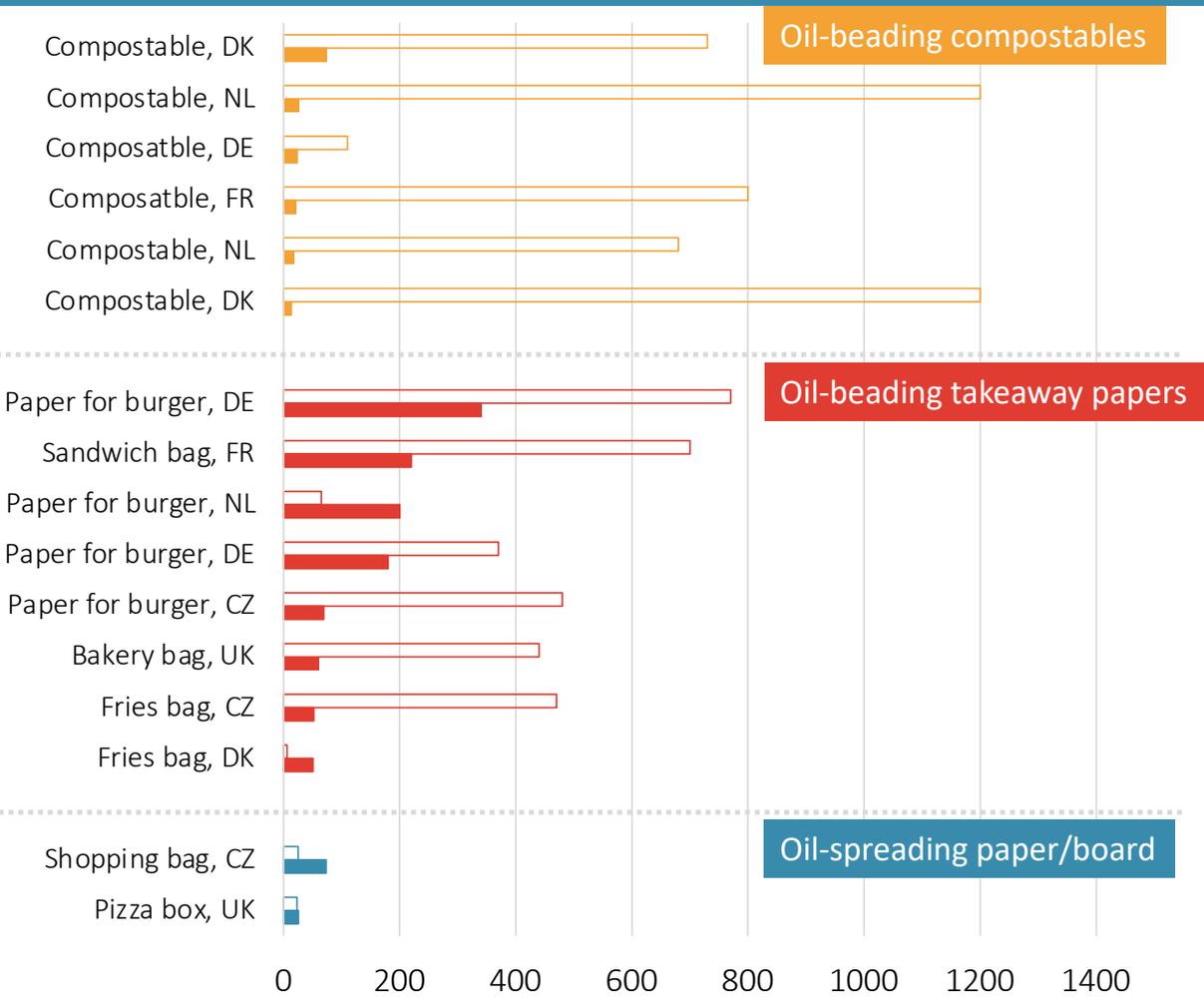
Total Organic Fluorine



Unidentified Organic Fluorine
>99% in average

Identified Organic Fluorine
<1% in average

In-vitro bioassay results



■ µg PFOA-EQ/g sample – Bioassay results
 mg/kg sample dw – TOF results

- **11 out of the 17 samples analysed (65%) did show significant thyroid hormone transport disruption in the in vitro FTIC-T4 bioassay**
- Between 51 and 340 µg PFOA-EQ/g sample
- No clear correlation between TOF, targeted PFAS concentrations and bioassay results

Key findings, conclusions and
recommendations

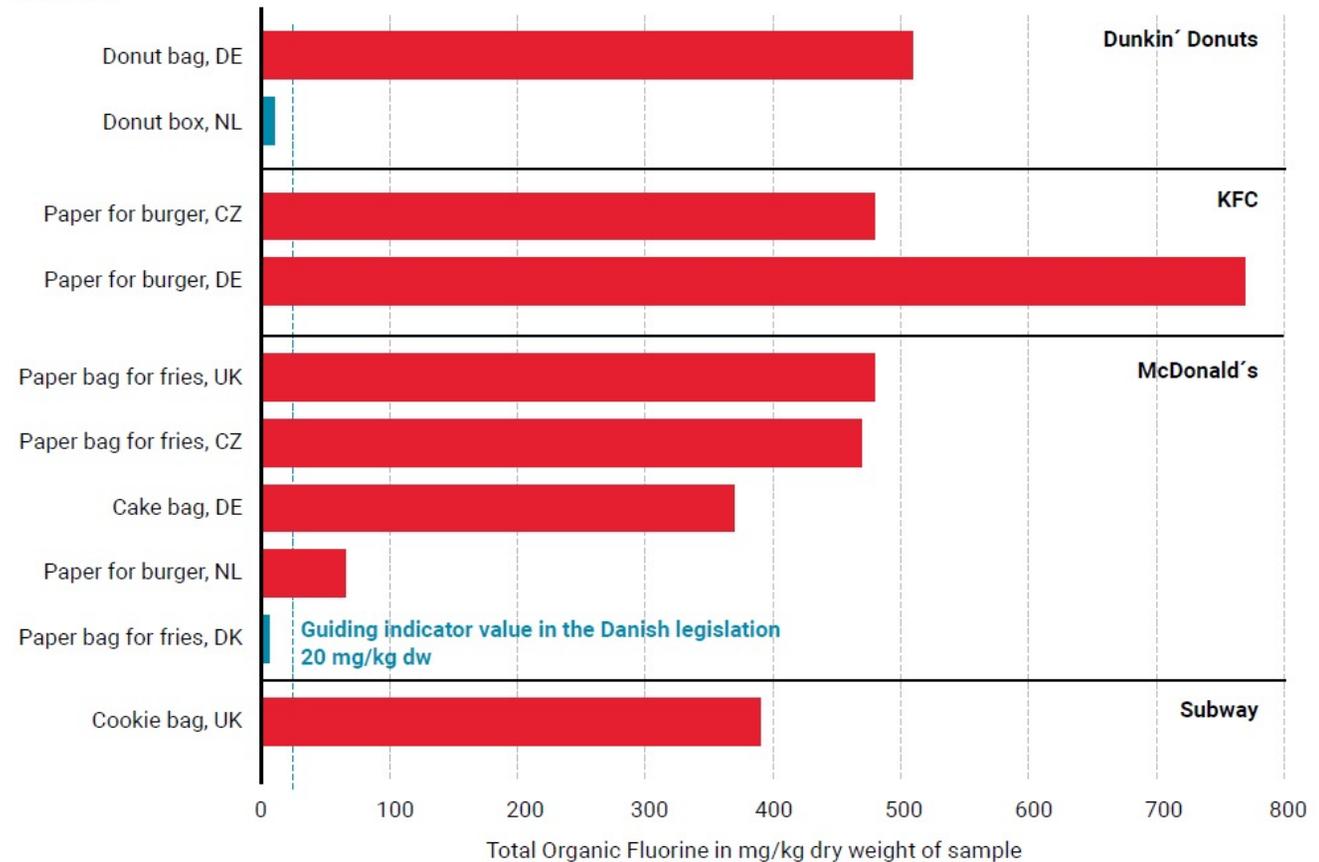
The use of PFAS in food packaging is a widespread practice

→ PFAS intentionally used in food packaging from popular global fast food chains

→ It is not an isolated practice



Graph 2: Total Organic Fluorine content of takeaway food packaging from global fast-food chains.



PFAS use in “eco-friendly” disposable tableware



- Highest PFAS levels found in moulded plant fibre food packaging and tableware **sold as sustainable alternatives to single-use plastic containers**
- **These containers are advertised as biodegradable and compostable**
- **The use of non-biodegradable, highly persistent PFAS chemicals clearly contradicts this claim**

Reads: bepulp, go natural, Compostable

Pervasive contamination of the production and supply chain

PFAS are already everywhere

- No paper/board food packaging is truly PFAS-free
- PFAS in food packaging is a barrier to recycling and a clean and safe circular economy



The use of PFAS in disposable food packaging is unacceptable and unnecessary



PFAS pollution generated by their use in:

high turnover, single use items

→ Will last for generations

impacting both people and wildlife

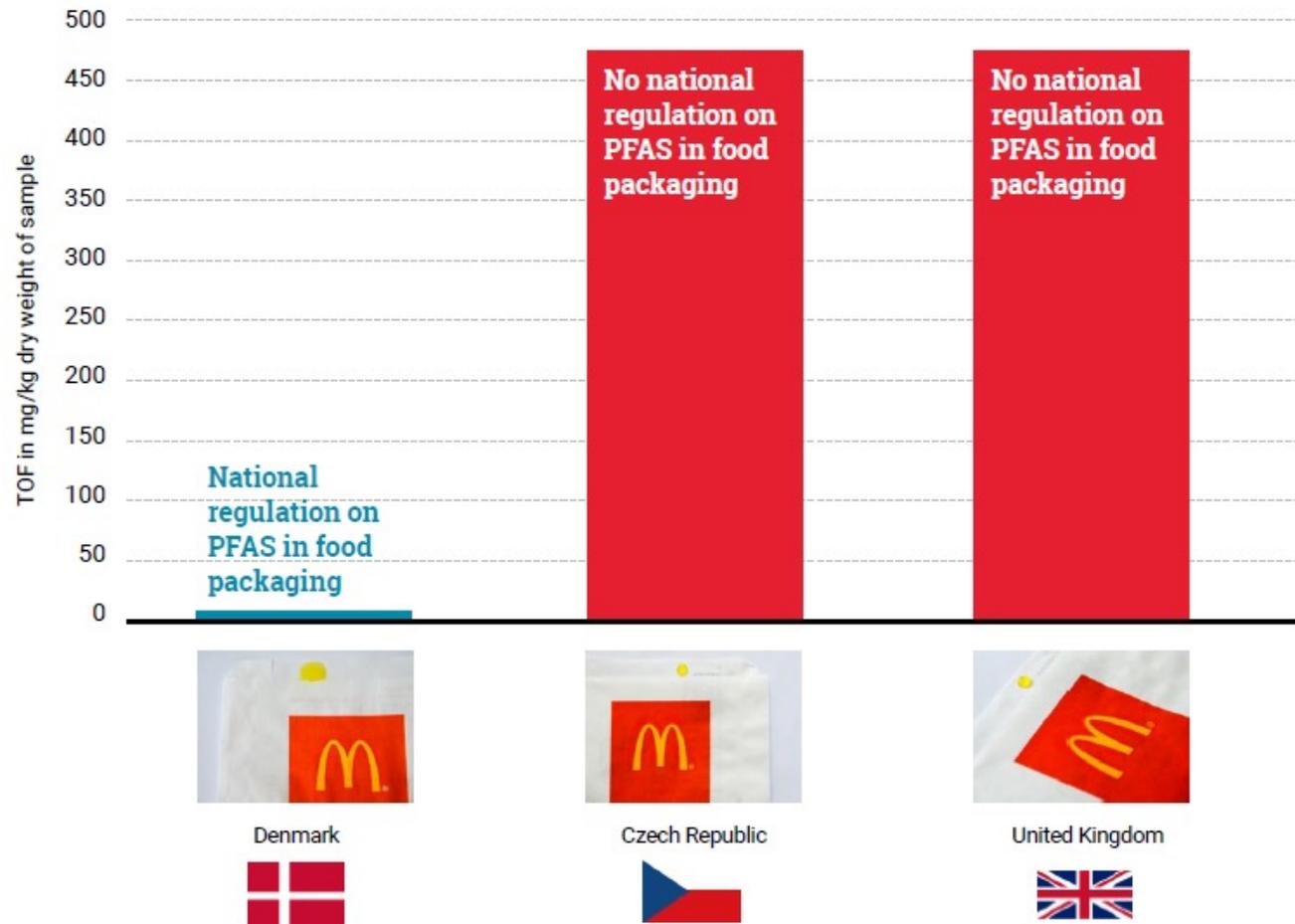
The treatment of disposable items with highly persistent and harmful PFAS chemicals

=

Typical example of unnecessary and avoidable chemical uses

Regulation is the strongest incentive for companies to move away from PFAS

- Same item tested in 3 countries (bought in Dec. 2020)
- In Denmark, the use of PFAS in paper and board food packaging has been banned since July 2020
- DK sample had the lowest TOF content of all samples tested
- Companies able to find alternatives when regulation is in place



Five US States have now banned PFAS in food packaging

PFAS should be banned as a group in all non-essential uses



In our views

A PFAS group restriction is the most efficient way to:

- ✓ Stop regrettable substitution
- ✓ Prevent further accumulation by minimising emissions
- ✓ **Protect present and future generations of people and wildlife from exposure to all PFAS chemicals**

→ The EU restriction should include the full range of PFAS chemicals, including fluorinated polymers



The process has been initiated in the EU



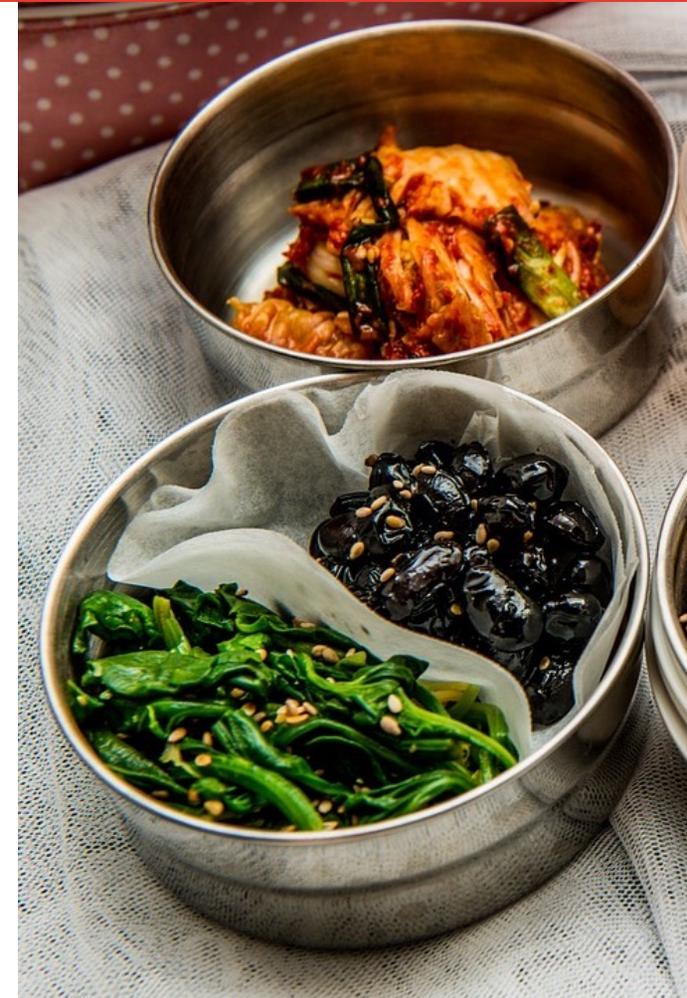
Canada has announced plans to manage PFAS as a class

→ **Ultimately, a global ban is needed**

Recommendations for citizens

- ✓ Ask your national government to phase out all non-essential uses of PFAS chemicals
- ✓ Urge companies to phase out PFAS from the products sold in your country
- ✓ Spread the word on social media #BanPFAS

In the mean-time: bring your own reusable food containers when visiting fast-food chains, bakeries and takeaway restaurants





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Thank you

Straková, J., Schneider, J., Cingotti, N. et al., 2021. Throwaway Packaging, Forever Chemicals: European wide survey of PFAS in disposable food packaging and tableware. 54 p.

Link to the full report:

<https://english.arnika.org/publications/throwaway-packaging-forever-chemicals-european-wide-survey-of-pfas-in-disposable-food-packaging-and-tableware>

