Brief for POPRC-19
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Long-chain perfluorocarboxylic acids, their salts and related compounds – IPEN studies and views

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At its eighteenth meeting in 2022, the Persistent Organic Pollutants Review Committee (POPRC) concluded in its scientific review that long-chain perfluorocarboxylic acids, their salts and related compounds (hereafter called "long-chain PFCAs") are likely, as a result of their demonstrated long-range environmental transport, to lead to significant adverse human health and/or environmental effects to the extent that global action is warranted.

In October 2023, the Committee will, among other things, consider a draft risk management evaluation for long-chain PFCAs.

This brief presents results from IPEN's research on the presence of long-chain PFCAs in consumer products from several different UN regions, contributing additional support as to why long-chain PFCAs should be listed in Annex A of the Stockholm Convention without exemptions.

It shows that:

1. **Long-chain PFCAs have widespread use in applications such as textiles and food-packaging where safe, non-fluorinated alternatives are already widely available and in use**
2. **Recycling of products containing long-chain PFCAs leads to uncontrollable contamination of new products**
3. **Strong international controls are urgently needed to ban long-chain PFCAs in all countries to protect human health and the environment**

Therefore, IPEN calls on the POPRC to recommend long-chain PFCAs, their salts and related compounds for listing in Annex A without exemptions, as well as strong provisions relating to the disposal of stockpiles and waste.

Background

Long-chain perfluorocarboxylic acids, their salts and related compounds (hereafter "long-chain PFCAs") are, or have been, widely used in a range of both industrial and consumer applications, including in coatings, cookware, fabric/carpet protectors, textile impregnation agents, production

of fluoropolymers, and firefighting foams. However, they are not only intentional ingredients used in different applications, but also present as residuals or chemical reaction impurities. As such, long-chain PFCAs are unintentionally produced during the manufacture of other PFAS, including fluorinated polymers, or during waste incineration.

Long-chain PFCAs are globally ubiquitous in the environment, and have been found in wildlife, water sources, soil, and humans. They are persistent and bioaccumulative, have adverse effects on human health and/or the environment, and have the potential to undergo long-range environmental transport. The high persistence and bioaccumulation of long-chain PFCAs leads to widespread and increasing exposure, increasing the likelihood of adverse effects for people and wildlife.

Due to the ongoing production and use of long-chain PFCAs, long-chain PFCAs are emitted into the environment from human activities. Long-chain PFCAs are released to the environment at all life cycle stages - either directly or indirectly through transformation from other PFAS. They are emitted from the production of long-chain PFCAs, and from the manufacturing, use, and disposal (i.e., from landfills, wastewater treatment and incineration plants) of long-chain PFCAs-containing articles.

Alternatives are available for most known applications of long-chain PFCAs. These include both fluorinated and non-fluorinated substances, as well as non-chemical solutions. However, because they may be equally as toxic as long-chain PFCAs, other fluorinated alternatives are hazardous (so-called " regrettable") substitutes and should not be considered.

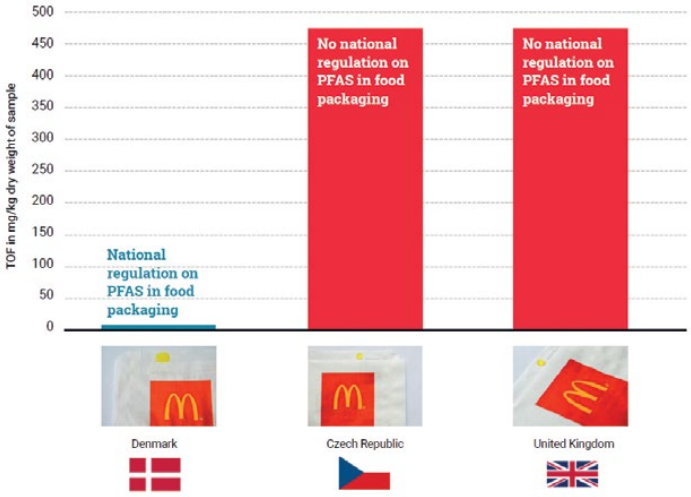
Summary of IPEN studies on long-chain PFCAs

Throwaway packaging, Forever Chemicals: European wide survey of PFAS in disposable food packaging and tableware (2021)

This study shows widespread use of PFAS in food packaging, including long-chain PFCAs[1], based on the analysis of 42 disposable food packaging

1 For the purpose of this report, "long-chain PFCAs" are all substances defined and listed in UNEP/POPS/POPRC.19/INF/9 "Draft indicative list of long-chain perfluorocarboxylic acids, their salts and related compounds" posted here, and other known precursors of long-chain perfluorocarboxylic acids cited in peer-reviewed literature.

Graph 1: Policies create change.



and tableware items. Therefore, a strong POPRC recommendation of listing with no exemption is needed as an incentive for companies everywhere to clean up their act and move away from long-chain PFCAs. It is the only way to stop further exposure to PFCAs from food packaging materials.

Graph 1: Policies create change. The study showed that McDonald's has abandoned the use of PFAS in Denmark to comply with the national restriction. However, the analysis of McDonald's food packaging bought at the same time from the Czech Republic, Germany and the United Kingdom demonstrated intentional use of PFAS, highlighting different practices and double standards depending on the national regulation. This underscores the need for strong policies to promote alternatives, and that international regulations are needed to ensure that companies apply these alternatives in all countries and don´t apply double standards.

- According to the total organic fluorine analysis, 32 out of the 42 items selected for chemical analysis (76%) show intentional treatment with PFAS. They include disposable packaging and tableware from popular fast-food chains and restaurants in six countries.
- Long-chain PFCAs were detected in 9 out of 42 items. The concentrations of fluorotelomer sulfonic acid (10:2 FTS) were between 33-104 ng/g and fluorotelomer phosphate diester (8:2 diPAP) 290 ng/g. The levels of total organic fluorine content indicate that 2 items were intentionally treated with PFAS and that 7 items were contaminated with PFAS. The source of contamination is unknown, but is likely to have

come from waste paper that was recycled. **This underscores that the use of long-chain PFCAs in waste paper leads to toxic recycling and creates a barrier for circularity.**

- Less than 1% of the total organic fluorine content present in the PFAS-treated items could be assigned to specific PFAS chemicals identified via targeted analysis. **This means that over 99% of the total PFAS load, including long-chain PFCAs, remains unidentified due to analytical limitations. Defining the group of annexed long-chain PFCAs under the Stockholm Convention as broadly as possible will reduce the analytical limitations as it will enable using simpler screening methods instead of targeted analysis.**
- 11 out of the 17 items (65%) showed significant thyroid hormone transport disruption in the in vitro FTIC-T4 bioassay, at levels between 39 and 340 µg PFOA-EQ/g sample.

Toxic hazards in US-based microwave popcorn bags imported to Indonesia (2023)

This study highlights the importance of urgent global action by the Stockholm Convention that will stop exports of long-chain PFCAs-containing products into developing countries or countries with economies in transition.

It included 18 microwave popcorn bags purchased from local markets and online retailers in Indonesia, and 11 microwave popcorn bags purchased online and from markets in the US. Both the Indonesian and the US microwave popcorn bags were produced by the same four US food companies. All 29 popcorn bags contained one or more PFAS.

Only strict, harmonized international policy regulations can stop the exposure of consumers and workers in the waste disposal sector to highly toxic and persistent chemicals. This is particularly crucial for countries lacking adequate national policy or technical capacities to deal with materials contaminated by long-chain PFCAs.

- Long-chain PFCAs were quantified in five microwave popcorn bags from two US-based brands (Jolly Time and Preferred Popcorn), sold in Indonesia. The long-chain PFCAs present in the bags included 6:2 8:2 diPAP, 8:2 diPAP, and 8:2 monoPAP, ranging from 0.1 to 63.7 ng/g.
- A lack of federal PFAS regulations in the US, along with corporate indifference, can result in spreading toxic PFAS in food products to other countries, such as Indonesia. The lack of PFAS regulations in Indonesia compounds the problem, leaving its residents vulnerable to exposure from PFAS-containing products.

PFAS in clothing from Indonesia, China, and Russia Shows Barriers for Non-toxic Circular Economy (2022)

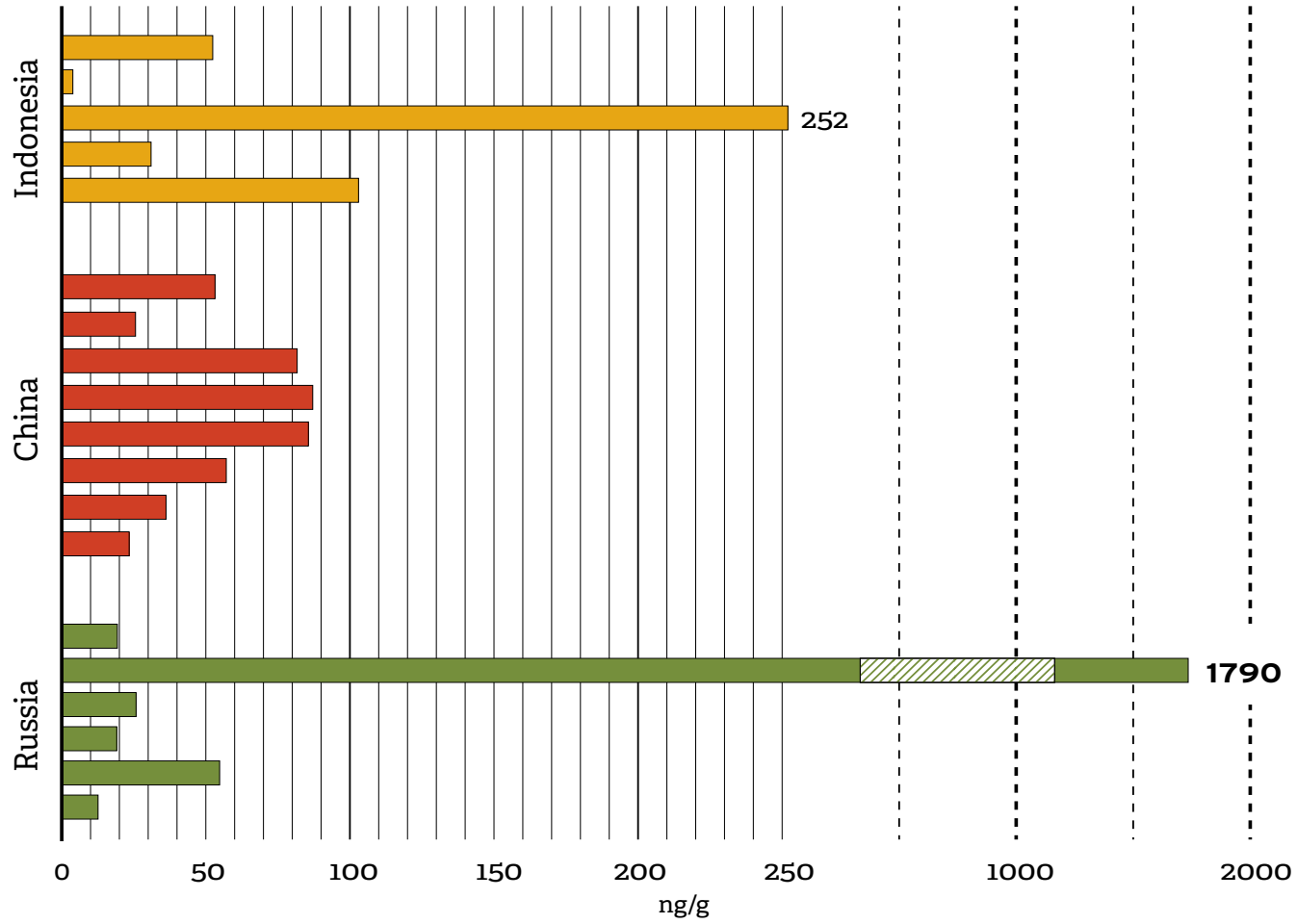
The study shows widespread presence of the long-chain PFCA 8:2 FTOH in outdoor- and sportswear products, based on an analysis of 25 products from Indonesia, China, and Russia.

- Long-chain PFCAs were detected in 21 of 25 (84%) of the analyzed outdoor- and sportswear products. Long-chain PFCAs presence was confirmed in all samples of winter gloves from China, in all samples of sport gloves and outdoor wear (hijab, trouser, t-shirt) from Indonesia, in all samples of adult winter gloves from Russia, and in four of seven (57%) children´s winter gloves from Russia.
- Two long-chain PFCAs (8:2 FTOH and 6:2/8:2 diPAP) were quantified in the samples, whereas one long-chain PFCA (12:2 FTOH) was detected but not quantified.

Graph 2: The most abundant long-chain PFCAs in the analyzed outdoor- and sportswear products was 8:2 FTOH. It was found in 84% of all synthetic textile samples at levels between 4.46-1791 ng/g. In four of the glove samples, 8:2 FTOH was accompanied by 12:2 FTOH.

- The presence of long-chain PFCAs in the post-consumer textile waste stocks constitutes a barrier

Graph 2: Concentrations of 8:2 FTOH in synthetic wear



for recycling since the PFAS will carry over to the new products. In addition, disposal of long-chain PFCAs-treated clothing and apparel in municipal incinerators likely leads to emissions of PFAS, fluorinated greenhouse gases and other products of incomplete combustion to the surrounding environment. **Strict limits for long-chain PFCAs in waste must be established to avoid contamination of recycled materials and continued emissions of long-chain PFCAs from waste streams.**

PFAS in textiles in Indonesia (2023)

The study shows widespread presence of a range of long-chain PFCAs in textiles in Indonesia.

- Eleven long-chain PFCAs, including eight long-chain perfluorocarboxylic acids (i.e., PFNA, PFDA, PFUdA, PFDoA, PFTrDA, PFTeDA, PFHxDA, and PFODA), and three fluorotelomer-based substances (i.e, 8:2 FTOH, 12:2 FTOH, and 6:2 8:2 diPAP) were identified in the analyzed items.
- The levels of PFCAs ranged between 0.75 and 144 ng/g, and the levels of FTOHs between 4.5 and 252 ng/g. DiPAP was quantified in the highest concentration of all PFAS at 679 ng/g in a hijab.
- The use of long-chain PFCAs in textiles in Indonesia increases both environmental pollution and human exposure of the Indonesian population, as PFAS are emitted into the environment at every stage of the textile product life cycle (via volatizing, weathering, or washing out). Moreover, the PFAS uses identified in tested textile products are not essential and alternatives exist.
- **Only global and universal elimination of long-chain PFCAs from production, use, and waste streams in countries lacking adequate national policy and technical capacities, such as Indonesia, may result in efficient control over emissions of long-chain PFCAs into the environment.**