WELCOME!

PFAS substitution in textile supply chains

POPFREE digital webinar 220902

VINNOVA
Swedish Innovation Agency
Aims with the webinar

2. Present activities, results and learnings from the POPFREE textile case
3. Encourage communication and collaboration within the supply chain regarding substitution of PFAS

https://www.ri.se/en/popfree/project-results/pfas-substitution-guide-for-textile-supply-chains
Agenda

• PFAS Substitution Guide for Textile Supply Chains
  – PFAS, concerns and potential uses in textile supply chains (RISE)
  – Practical use of the guide (Peak 63)
• The PFAS phase-out journey from a brand perspective (Houdini)
• The PFAS phase-out journey from a brand perspective (Bergans)
• Development of DWR guided by sustainability criteria (OrganoClick)
• Some more information and new possibilities for collaboration (RISE)
• Q&A
POPFREE vision
A systemic change

- Development, testing and risk assessment of alternatives
- Communication to increase awareness from producer to consumer
- Impact, policy and legislation

Cases: Firefighting foam, grease resistant paper, cosmetics, ski wax, film-forming products, and textile impregnation.

36 partners (UDI 2 + UDI 3)

Financing from Vinnova and partners

Read more at popfree.se
POPFREE textile case (stage 3)

• Focus on the further development and upscaling of biobased Durable Water Repellent (DWR) products (OrganoClick) to be tested in textile mills in collaboration with brands (Bergans and Houdini) and their suppliers

• Communication about alternatives and PFAS substitution
PFAS SUBSTITUTION IN TEXTILE SUPPLY CHAINS

PFAS, concerns and potential uses in textile supply chains

Lisa Skedung, RISE AB
Per-and poly Fluorinated Alkyl Substances
Fluorocarbons, PFCs, highly fluorinated substances, perfluorinated substances...

Industrially synthesised

>4730 → Millions of substances

At least one poly- or perfluorated alkyl group

Carbon-fluorine-bond is the strongest bond in organic chemistry and give an extreme persistence of substances (and unique properties).

Water repellent part

Water soluble part

PFAS - a large group of chemicals

e.g. PFOA
e.g. PFOS

MANY PFAS-substances with different structure and properties → behaves differently in nature and the human body.

There are polymeric PFAS such as PTFE
All are persistent (not degradable or degrades to other PFAS)
Unique functions

Due to their unique functions, they have been (are) used in many types of products.

The same performance will be hard to achieve with other chemistries and we should be prepared to accept lower performance (change of mindset!).

Water repellent  Oil/dirt repellent  Film forming  High thermal stability
Why are PFAS problematic?

- Persistent – do not degrade in nature
- Some are mobile (transports via air and water)
- Pollutes soil and water
- Bioaccumulates in plants, animals and humans
- Concentrates higher up in the food chain (biomagnification)
- High thermal stability – not destroyed in waste treatment
- Studied PFAS have shown a variety of adverse health effects on humans and animals
Health risks with PFAS

- Only a few PFAS have been studied in detail.
- Some PFAS bind to proteins in blood and distributes to the different tissues of the body.
- Can be transferred to the fetus via the placenta and to infants via breastfeeding.

Emissions and exposure of PFAS

Continuous release of PFAS results in increasing levels and increasing probabilities of known and unknown effects.

Life-cycle aspect important!
Outside the Safe Operating Space of a New Planetary Boundary for Per- and Polyfluoroalkyl Substances (PFAS)

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Abstract

It is hypothesized that environmental contamination by per- and polyfluoroalkyl substances (PFAS) defines a separate planetary boundary that has been exceeded. This hypothesis is tested by comparing the levels of four selected perfluoralkyl acids (PFAAs) (i.e., perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), perfluorohexanesulfonic acid (PFHxS), and perfluorononanoic acid (PFNA)) in various global environmental media (i.e., rainwater, soils, and surface waters) with recently proposed guideline levels. On the basis of the four PFAAs considered, it is concluded that (1) levels of PFOA and PFOS in rainwater often greatly exceed US Environmental Protection Agency (EPA) Lifetime Drinking Water Health Advisory levels and the sum of the aforementioned four PFAAs (Σ4 PFAS) in rainwater is often above Danish drinking water limit values also based on Σ4 PFAS; (2) levels of PFOS in rainwater are often above Environmental Quality Standard for Inland European Union Surface Water; and (3) atmospheric deposition also leads to global soils being ubiquitously contaminated and to be often above proposed Dutch guideline values. It is, therefore, concluded that the global spread of these four PFAAs in the atmosphere has led to the planetary boundary for chemical pollution being exceeded. Levels of PFAAs in atmospheric deposition are especially poorly reversible because of the high persistence of PFAAs and their ability to continuously cycle in the hydrosphere, including on sea spray aerosols emitted from the oceans. Because of the poor reversibility of environmental exposure to PFAS and their associated effects, it is vitally important that PFAS uses and emissions are rapidly restricted.
Proposal for broader PFAS regulation

• Proposal to regulate PFAS as a group
  – Impossible to evaluate substance by substance.
  – Similar properties that are worrying.
  – To avoid "regrettable substitution"
• PFAS should only be allowed for essential uses
  – Necessary for health and safety or critical for society, and
  – If there are no technically / economically available alternatives
• Dossier to be submitted to ECHA in January 2023
• Possible decision by European Commission in 2025

A collaboration between Sweden, Germany, the Netherlands, Denmark and Norway

Phasing out PFAS is a major focus of the EU's chemicals strategy, published in October 2020

https://ec.europa.eu/environment/strategy/chemicals-strategy_en
Potential PFAS uses in the textile supply chain

- Durable Water Repellent finishes (DWR)
- Membranes in waterproof breathable garments
- Trims and details
- Coated yarns
- Process auxiliaries for wetting and improving quality of coatings
- Re-impregnation products for home use
- Wash-in treatments

Ask questions and collaborate to find "hidden" uses of PFAS!

There is a very high risk for contamination in the factory if the same production line is used for applying both PFAS-containing and PFAS-free DWR on fabrics.
Lifecycle for textile DWR’s

Potential human exposure and diffuse spreading to surrounding ecosystems in each lifecycle step
No universal solution

Collaboration between chemical supplier, fabric producer and textile finishing mill, garment vendor and the retailer is favourable.
Thank you for your attention!

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