

Special Focus Morning on PFAS

Introduction

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10 April 2024



Per- and polyfluoroalkyl substances (PFAS)

Definition

- **Large class of synthetic** chemicals containing at least one **carbon-fluorine bond** (CF₃- or -CF₂-)
- PFAS can be sorted in many ways based on their structure ~10,000 molecules

Uses

- **Unique properties**, such as stable under intense heat, surfacting properties (water/grease repellents)
- **Widely used** in aerospace, defense, automotive, aviation, food contact materials, textiles, leather and apparel, construction, household products, electronics, firefighting, food processing, medical articles...
- Released into the environment from **direct and indirect sources** - from industrial facilities using consumer products.

Issues

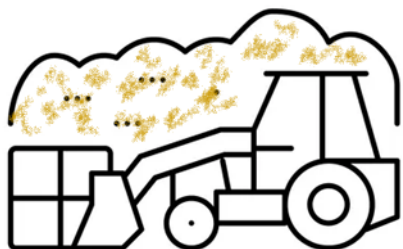
- **Persistent and bioaccumulative substances.** PFAS tend to **pollute ground and drinking water.**
- **Very difficult and extremely costly to remove** when released to the environment.
- Some PFAS documented as **toxic substances**, both for **environment and human health** (toxic for reproduction, cancer, endocrine disruptor).

PFAS regulation for waste



Classification of waste

- EU Commission Decision 955 /2014
- EU Commission regulation 1357/2014
- 2017/997/EU



Recovery and disposal

- Annex IV and V of Regulation (EU) 2019/1021
- Directive 1999/31/CE (Landfill)



End of waste

- Article 6 (1) and (2) of the Waste Framework Directive
- Reach Regulation
- Annex IV and V of Regulation (EU) 2019/1021
- POPs under the Stockholm Convention – Annex A and B

Concentration threshold for chemicals decreases

➤ No direct provisions for PFASs

➤ Wastes containing POPs exceeding the concentration limits classified as hazardous

➤ Specific provisions are set only for PFOA, PFOS and PFHxS.

➤ Restriction for production and use for PFOA, PFOS, PFHxS and C9-C14 PFCAs

➤ Proposals in discussion for PFHxA and for all PFASs (ECHA broad proposal)

FEAD study on PFAS in waste streams

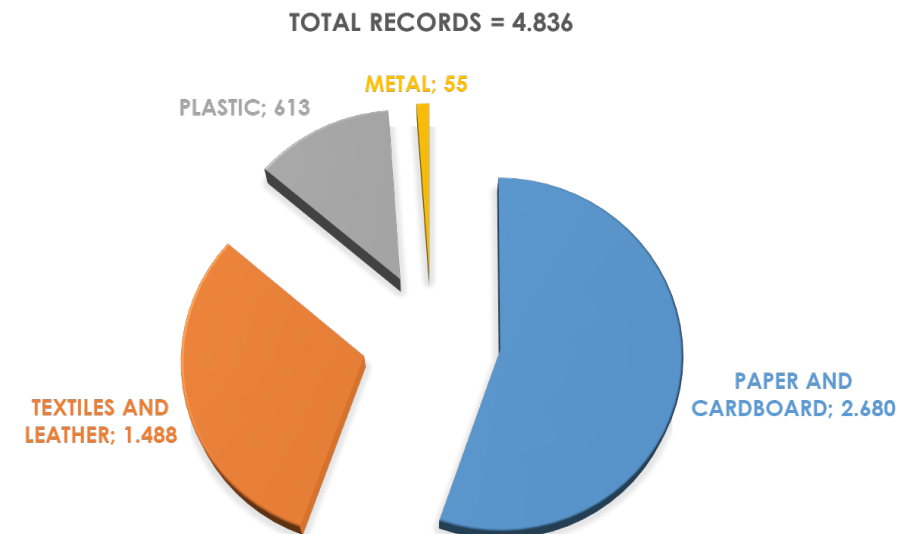
- Study of University of Padova with FEAD, published in March 2024
 - deepen the knowledge of the presence of PFASs in relevant waste streams
 - influence of future relative legal framework on waste management practices
- Focus on 4 waste streams through critical review and data extraction of 25 scientific publications

 **detritus** | Multidisciplinary Journal for
Circular Economy and Sustainable
Management of Residues



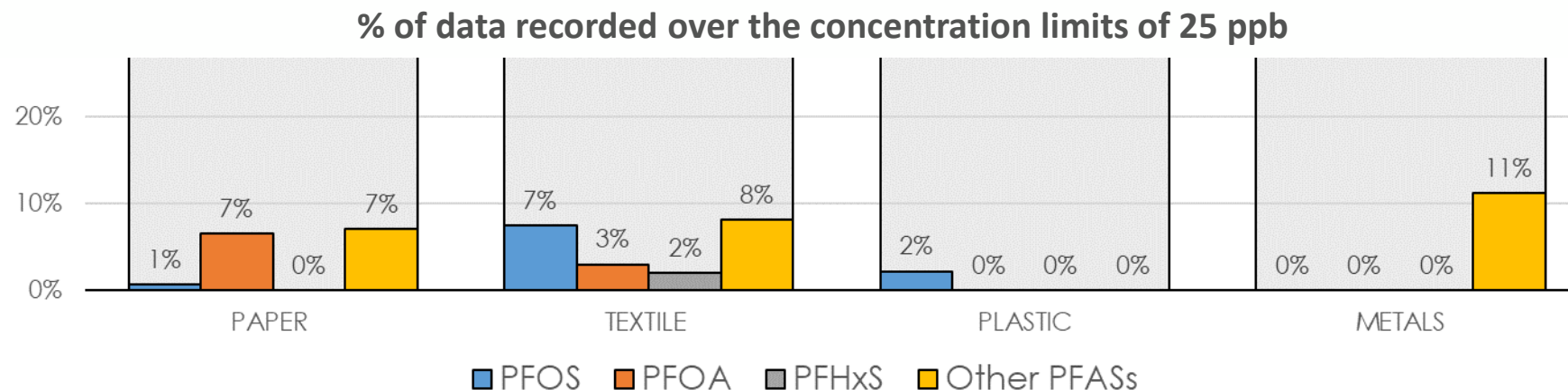
THE PRESENCE OF PFAS IN WASTES AND RELATED IMPLICATIONS ON THE CURRENT AND PROPOSED EUROPEAN REGULATORY FRAMEWORK: A SYSTEMATIC CRITICAL REVIEW

Alberto Pivato ¹, Giovanni Beggio ^{1,*}, Stefano Maggi ², Francesco Marrone ², Tiziano Bonato ³, Federico Peres ⁴, Wei Peng ^{5,6,7} and Maria Cristina Lavagnolo ¹



FEAD study on PFAS in waste streams - Findings

- Not enough data for plastics and metals
- Not enough data for the PFAS not already targeted by a regulation
- Difficulties in comparing data from studies due to different methods of analysis
- Percentage of exceedances compared to ECHA broad proposal threshold ranged from almost 1% (in paper and cardboard waste) to 8% (in textiles and leather waste)
- Proposal of a "not targeted" and "targeted" screening methodologies



PFAS in waste – Challenges for the industry

Lack of knowledge
about PFAS in
waste

Impact on the
waste management
sector

No standardized method
for screening PFAS in
waste streams

Lack of information on
the hazards of PFAS
incineration

Presence of PFAS
influence hazardousness
of the waste

Limited possibility of
landfill for PFAS waste
because of leachate

Restriction of PFAS will
apply to recyclates

Priorities for the waste management sector

- **Further investigations and investments in separation techniques**
- **Develop measurement methods and standards**



Thank you for your attention.

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