

Food packaging material as a source of toxic chemicals

Dr. Jane Muncke & Dr. Lisa Zimmermann
Food Packaging Forum Foundation



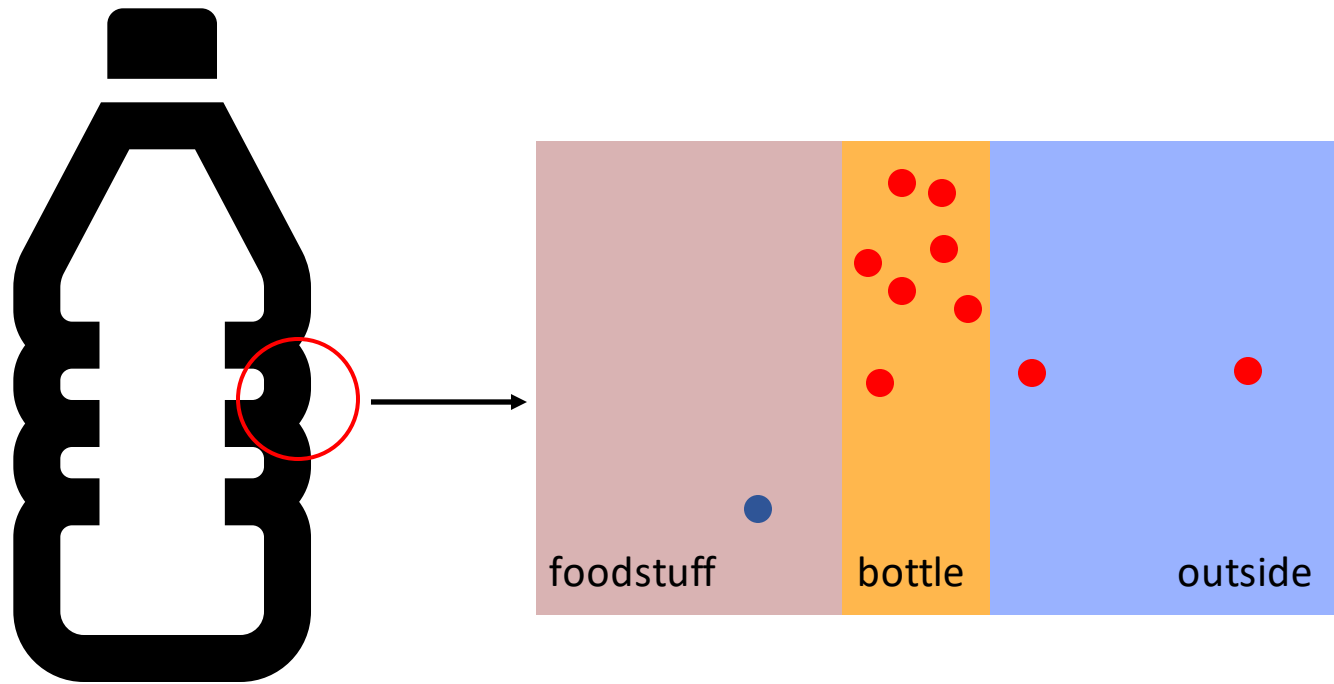
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A hand holding a small green plant against a background of sunlight filtering through trees.

SAFE & SUSTAINABLE food packaging

How does food packaging become a
source of toxic chemicals?

Migration: chemicals transfer into food



- small molecule food contact chemical
- small molecule food ingredient

How is *safety*
defined for food packaging?

Legal definition of FCM safety in the EU

[EU 1935/2004, Art. 3.1.\(a\)](#)

*“Materials and articles, [...], shall be manufactured [...] so that, under normal or foreseeable conditions of use, they **do not transfer** their constituents to food in quantities which could **endanger human health**”*



low levels \neq safe levels

WHAT INFLUENCES MIGRATION OF CHEMICALS INTO FOOD?



...at high temperature



...when using small portion sizes



...after long contact times



...of fat-soluble chemicals into fatty foods



Find out more: bit.ly/fpf-factsheet

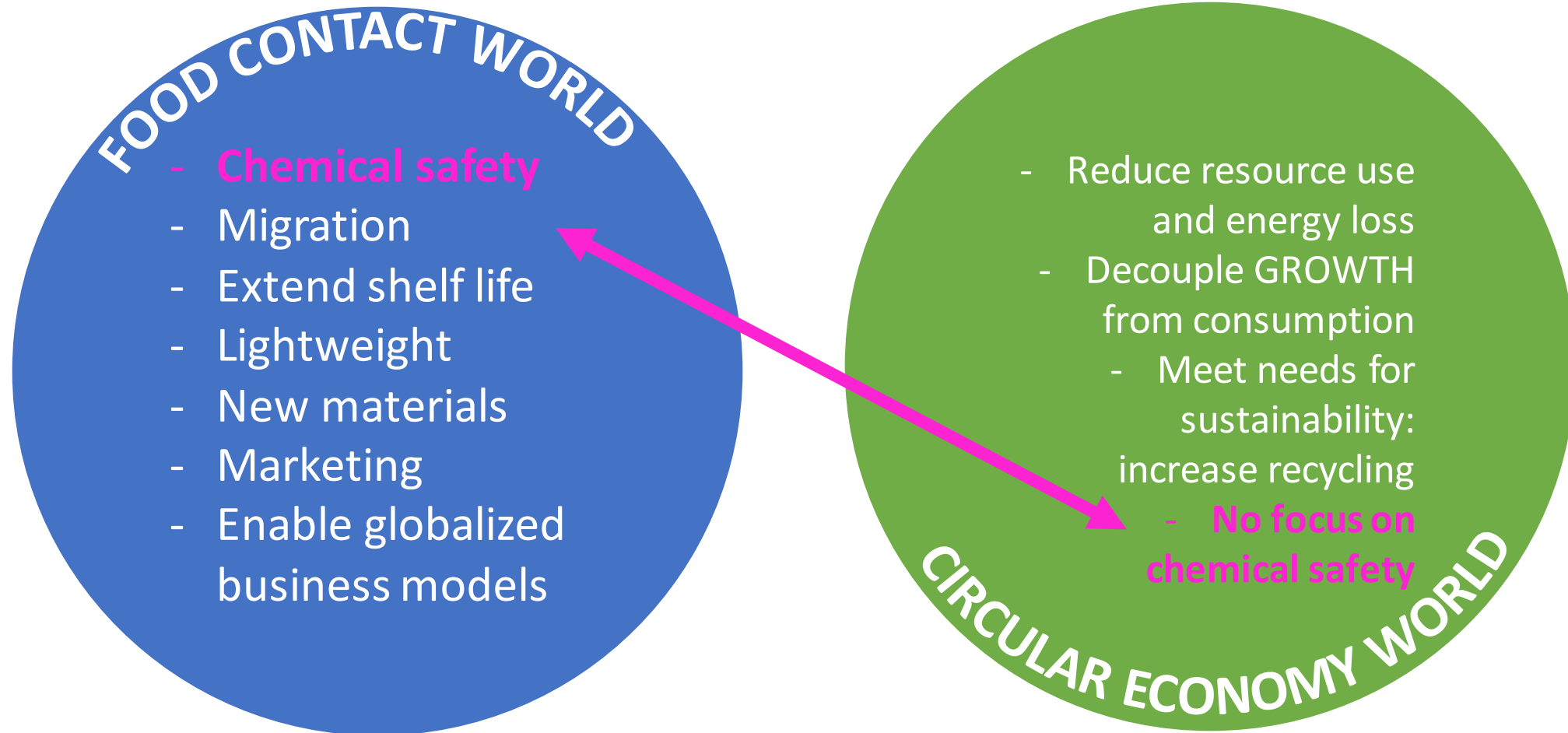


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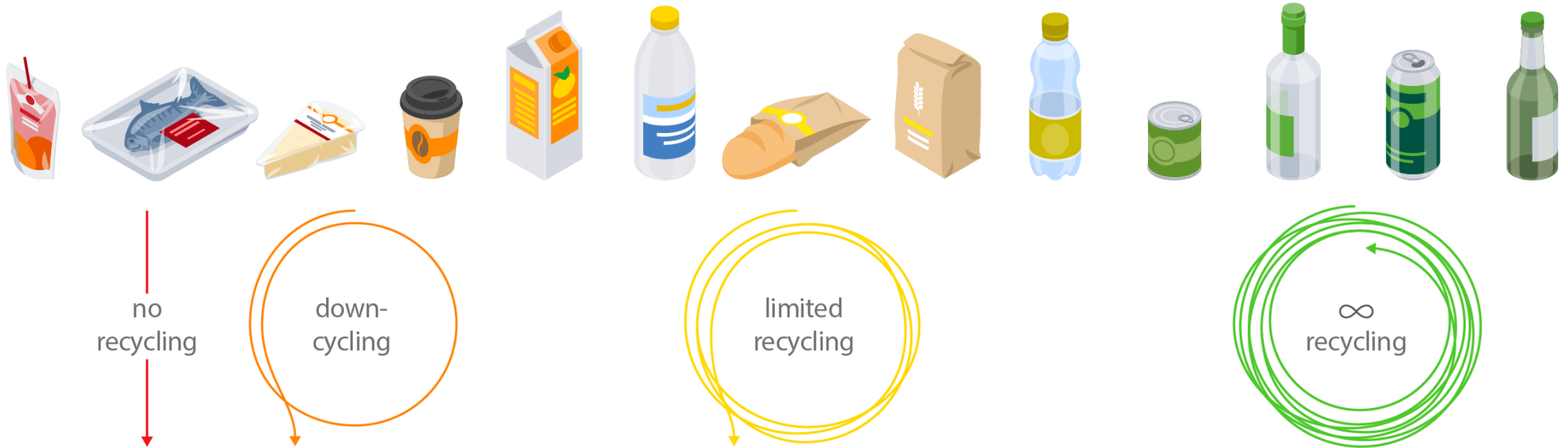
SAFETY and SUSTAINABILITY of food packaging are related.

If it's not healthy, it's not sustainable.

Two disconnected worlds...



Different types of *recycling*



Material properties and/or missing processes do not allow recycling into new food packaging

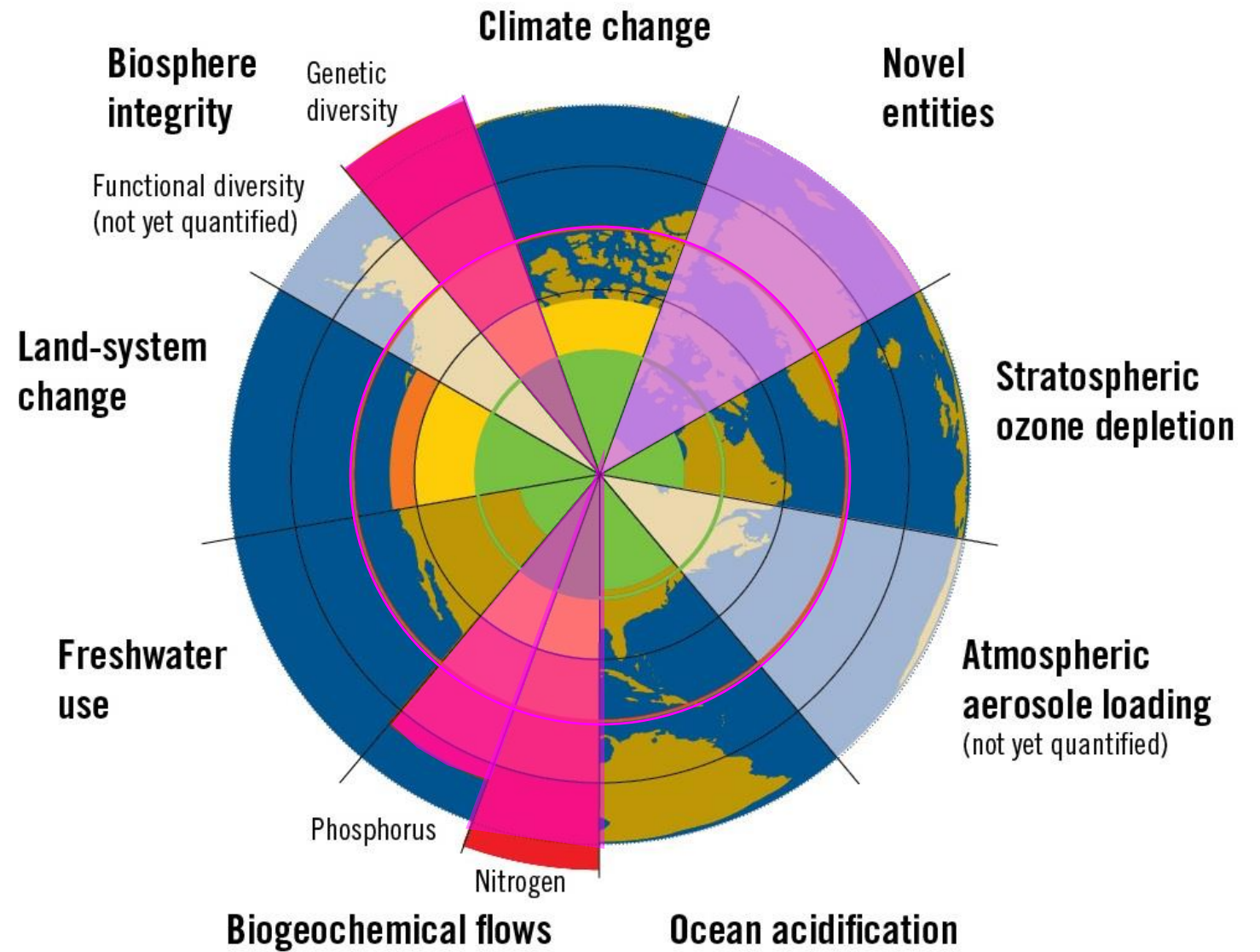
Addition of virgin material and special measures needed to guarantee function and safety of recycled food packaging

Material properties and chemical safety of recycled food packaging remain high after repeated cycles



recyclable \neq sustainable

More aspects to “sustainability”



Steffen et al. 2015. Planetary boundaries: Guiding human development on a changing planet. *Science* 347(6223).
Persson et al. 2022. Outside the Safe Operating Space of the Planetary Boundary for Novel Entities. *ES&T*.
Image adapted from: <https://www.globalagriculture.org/whats-new/news/en/33901.html>

Bioplastics



Source: enclosure



Source: bioökonomie.de



Source: WWF

Bioplastics – Defining the terms

Bio-based



Biodegradable

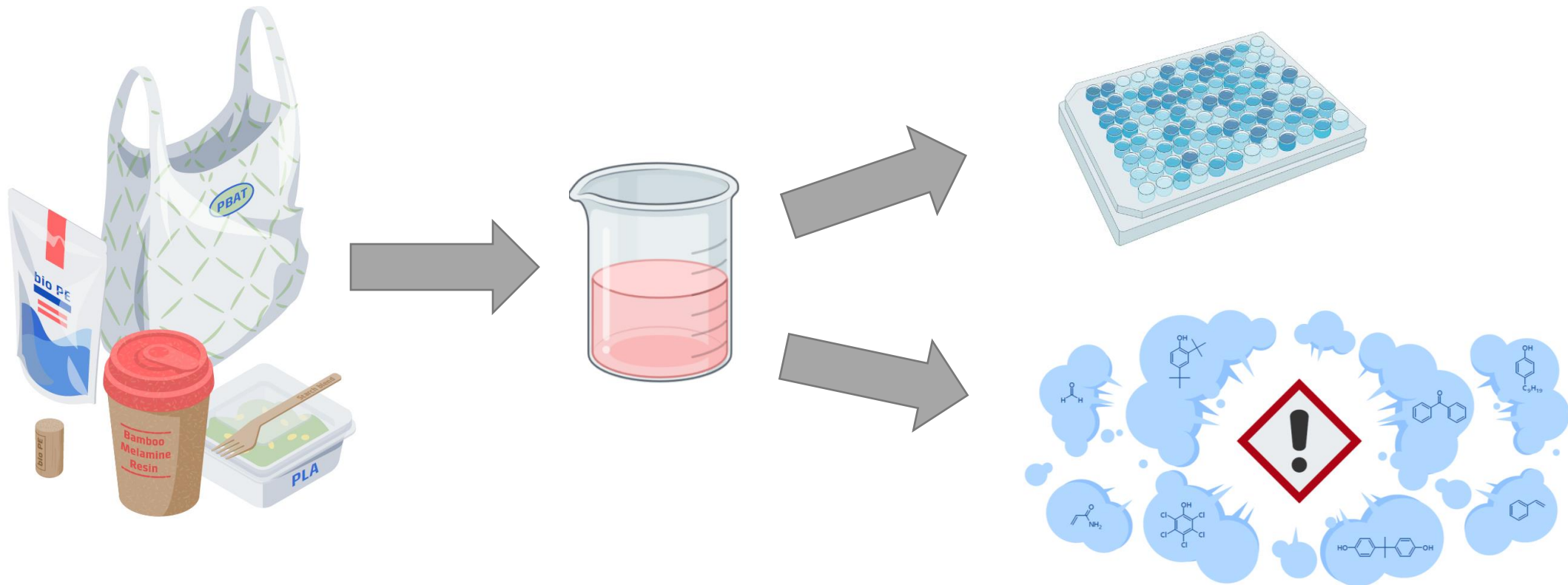


Bioplastics can be bio-based plastics, biodegradable, or both.

Bioplastics – Chemical safety

Contents lists available at ScienceDirect
Environment International
journal homepage: www.elsevier.com/locate/envint

Are bioplastics and plant-based materials safer than conventional plastics?
In vitro toxicity and chemical composition
Lisa Zimmermann^{a,*}, Andrea Dombrowski^a, Carolin Völker^b, Martin Wagner^c



Bioplastics just as conventional plastics can contain toxic chemical mixtures.

Bioplastics – FPF fact sheet



<https://www.foodpackagingforum.org/packaging-fact-sheets>

Fact sheet addresses common questions on bioplastics, dicusses chemical safety, environmental impacts, and practical implications for use and disposal.

Microplastics



Microplastics – Contamination and exposure



Humans are exposed to plastic particles via food, drinking water, and air.

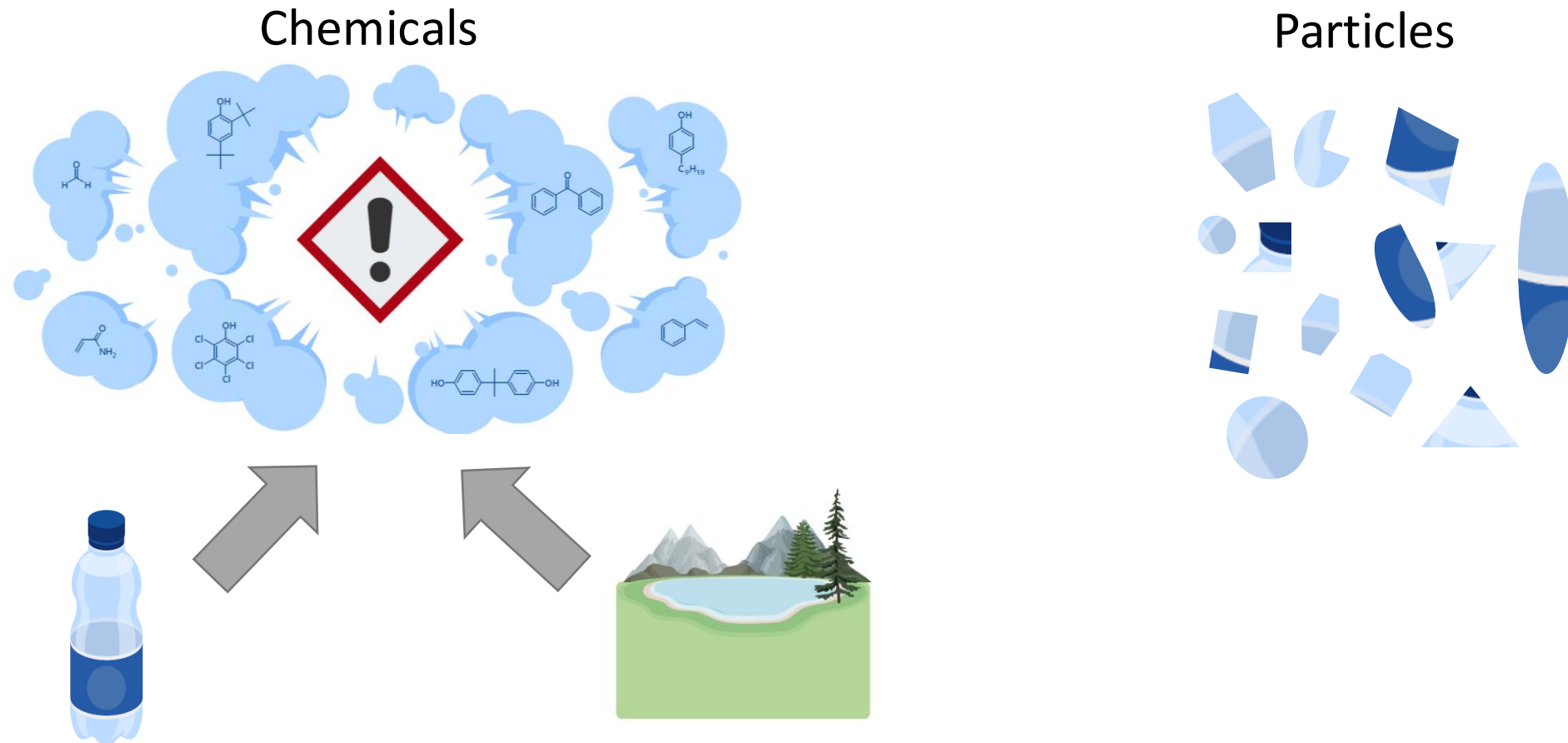
Microplastics – Health impacts



Source: Jose y yo Estudio/Shutterstock.com

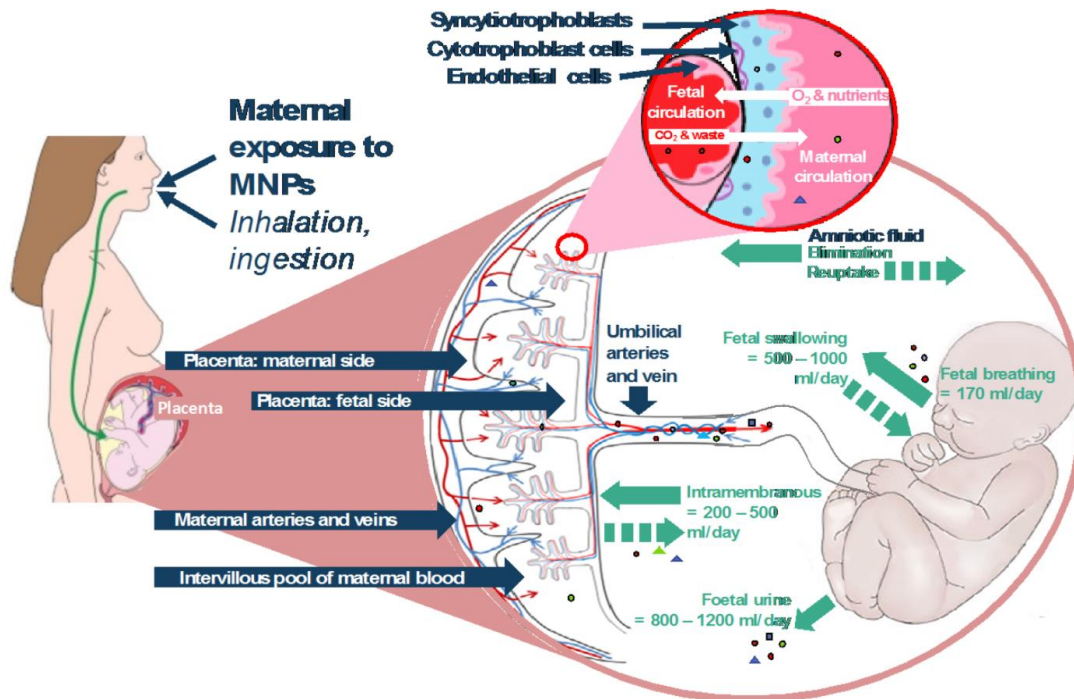
Microplastic exposure may affect human health but knowledge gaps remain.

Microplastics – Drivers of toxicity



Chemicals and particle can drive microplastics' toxicity.

Microplastics – AURORA project



<https://auroraresearch.eu/>

AURORA assesses early life human health impacts of micro- and nanoplastics.

Food Packaging Forum (FPF) Foundation



Science communication & scientific research (desk-based)



Food contact materials, chemicals, migration, human health



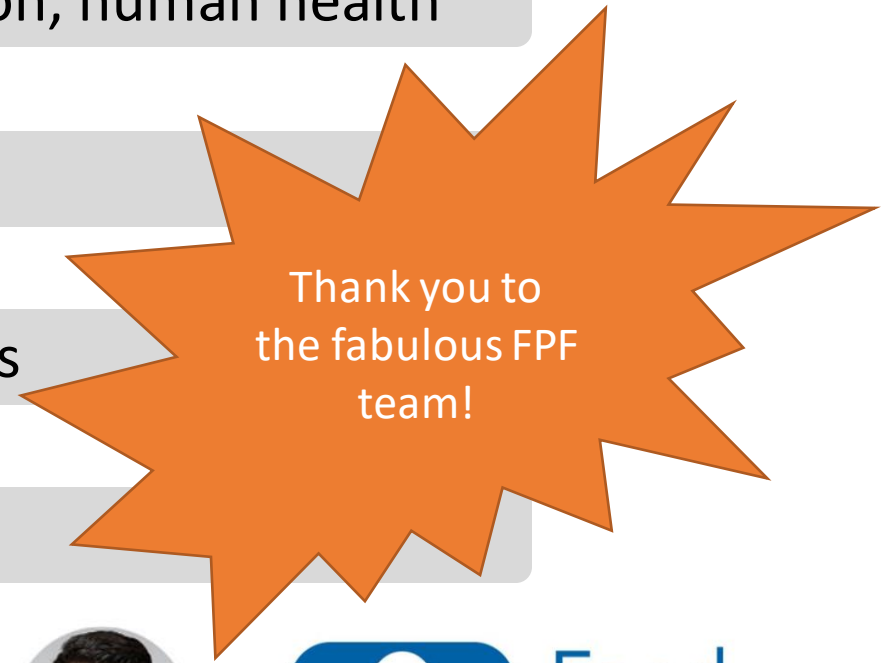
2012 in Zurich



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