Circular food packaging: focus on hazardous chemicals and microplastics in reuse and recycling

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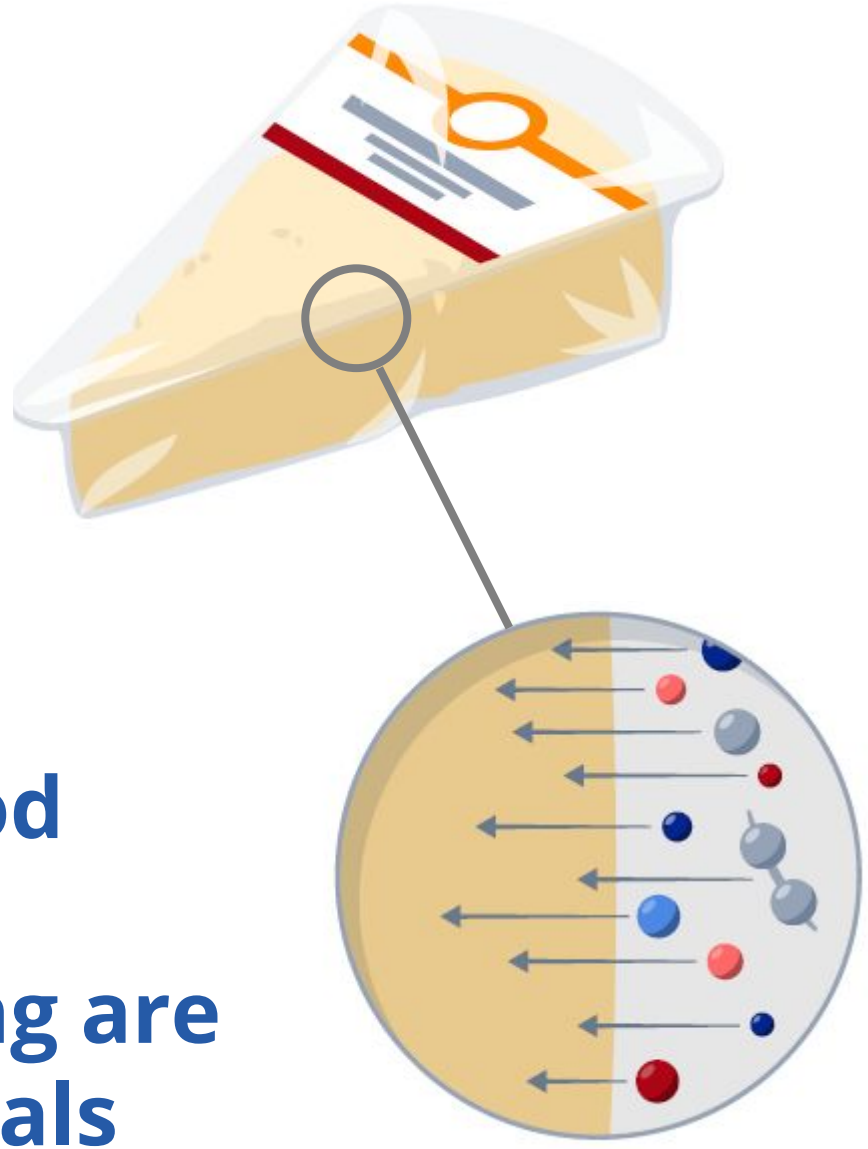
Key Points

- Chemicals migrate from plastic packaging into food, including some hazardous chemicals
- Reusing and recycling plastic food packaging leads to increased migration of hazardous chemicals
- The normal and intended use of plastic food packaging leads to the generation of micro- and nanoplastics

Chemicals migrate from plastic packaging into foodstuffs, including some hazardous chemicals

chemical migration



chemicals transfer into food from food packaging
chemicals in food packaging are called food contact chemicals

How many *food contact chemicals* are there?

~16’000
food contact chemicals are known

for at least
1’822
chemicals evidence for migration exists

100’000 chemicals could potentially be migrating into foodstuffs – huge data gaps exist

Food Contact Materials (FCMs)

How many chemicals in FCMs are of concern?

What are their hazards?

388 Food Contact Chemicals of Concern

(harmful according to the Chemicals Strategy for Sustainability)

352 CMRs
(carcinogenic, mutagenic, or toxic to reproduction)

32 Persistent, bioaccumulative

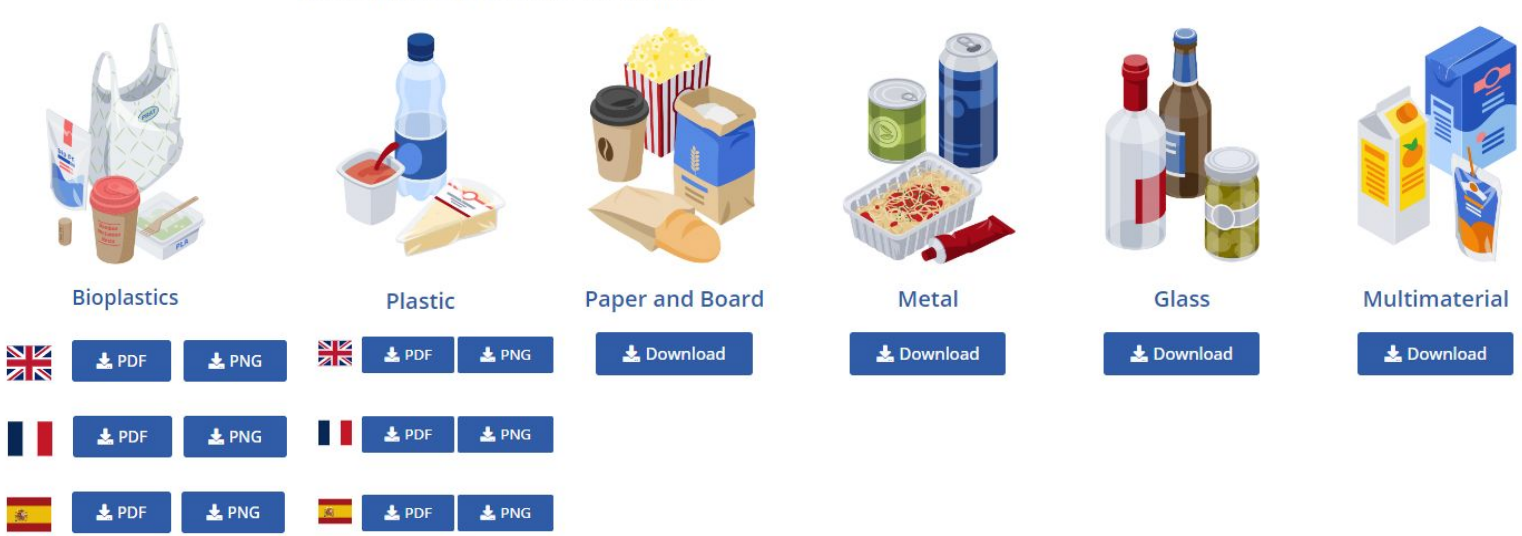
3 STOT
(specific target organ toxicity)

22 EDCs
(endocrine-disrupting chemicals)

Evidence for migration: 127 chemicals

Reusing and recycling plastic food packaging leads to increased migration of hazardous chemicals

Fact sheets



FoodPackagingForum.org/packaging-fact-sheets

Recycled and reused food contact plastics contain hazardous chemicals – new study by Food Packaging Forum

Recycled and reused food contact plastics are 'vectors' for toxins – study

Research provides a unique review of contact chemicals in packaging, utensils, plates, etc and how they contaminate food

The Guardian

The study comes amid a debate over how to reduce the amount of plastic waste filling up the globe. Photograph: DutchScenery/Getty Images/iStockphoto

Recycled and reused food contact plastics are "vectors for spreading chemicals of concern" because they accumulate and release hundreds of dangerous toxins like styrene, benzene, bisphenol, heavy metals, formaldehyde and phthalates, new research finds.

The normal and intended use of plastic food packaging leads to the generation of micro- and nanoplastics

Food contact plastics as source of micro- and nanoplastics: recent studies


Water Research 166 (2019) 115082

Contents lists available at ScienceDirect

Water Research

journal homepage: www.elsevier.com/locate/watres

Does mechanical stress cause microplastic release from plastic water bottles?

Anna Winkler [a], Nadia Santo [b], Marco Aldo Ortenzi [c], Elisa Bolzoni [a], Renato Bacchetta [a,*], Paolo Tremolada [a]


Journal of Hazardous Materials

Volume 417, 5 September 2021, 126074

Research Paper

Migration of (non-) intentionally added substances and microplastics from microwavable plastic food containers

Ying-Jie He [a, 1, 2], Yan Qin [a, 1], Tie-Li Zhang [a], Yan-Yan Zhu [a], Zhao-Jie Wang [a], Zhong-Shun Zhou [a], Tian-Zhen Xie [a], Xiao-Dong Luo [a, b, *]


Plastic Teabags Release Billions of Microparticles and Nanoparticles into Tea

Laura M. Hernandez, Elvis Genbo Xu, Hans C. E. Larsson, Rui Tahara, Vimal B. Maisuria, and Nathalie Tufenkji*

Cite this: *Environ. Sci. Technol.* 2019, 53, 21, 12300−12310

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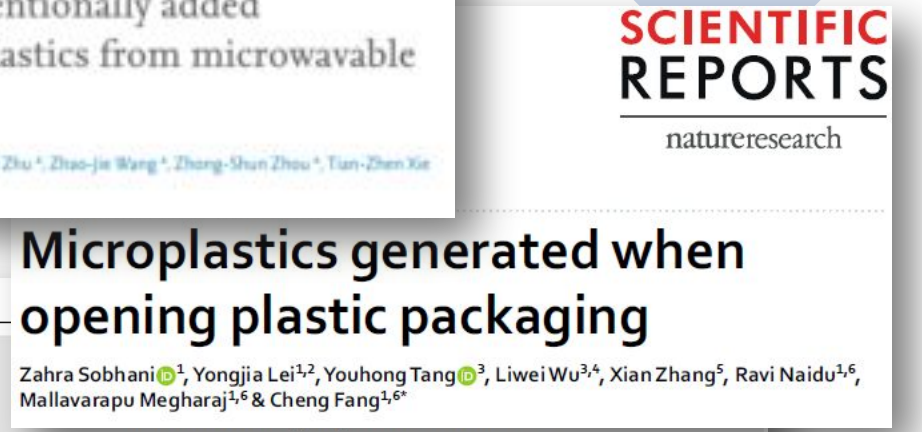
SCIENTIFIC REPORTS

nature research

Microplastics generated when opening plastic packaging

Zahra Sobhani [1], Yongjia Lei [1,2], Youhong Tang [3], Liwei Wu [3,4], Xian Zhang [5], Ravi Naidu [1,6], Mallavarapu Megharaj [1,6] & Cheng Fang [1,6*]


ARTICLES

https://doi.org/10.1038/s43016-020-00171-y

nature food

Check for updates

Microplastic release from the degradation of polypropylene feeding bottles during infant formula preparation

Dunzhu Li [1,2,6], Yunhong Shi [2,6], Luming Yang [1,2], Liwen Xiao [2,3], Daniel K. Kehoe [1], John J. Boland [1,4] and Jing Jing Wang [1]


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journal homepage: www.elsevier.com/locate/fpsl

Microplastic contamination of packaged meat: Occurrence and associated risks

[...]ivier Sire [b], Gwénaël Le Maguer [c], Véronique Le Tilly [b],


Common Single-Use Consumer Plastic Products Release Trillions of Sub-100 nm Nanoparticles per Liter into Water during Normal Use

Christopher D. Zangmeister*, James G. Radney, Kurt D. Benkstein, and Berc Kalanyan

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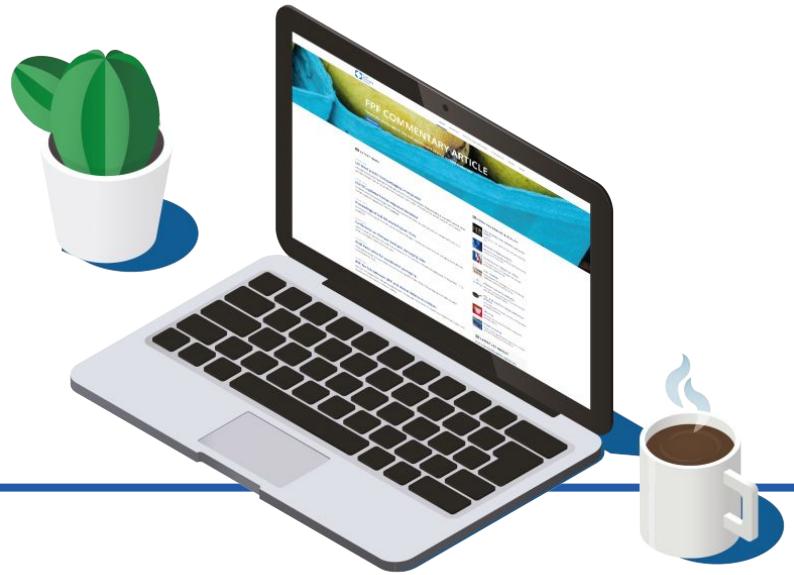

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BACKGROUND ARTICLES

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SCIENTIFIC PUBLICATIONS

ALL INFORMATION FREELY AVAILABLE:
www.foodpackagingforum.org

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VIDEO BLOG

BRAND & RETAILER INITIATIVES DATABASE