An NGO’s View of the Safety of Food Contact Materials

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About CHEM Trust

• A charity working mainly at EU level to protect humans & wildlife from harmful chemicals

• Offices in UK and Germany

• Working with scientists, technical processes and decision makers, in partnership with other civil society groups

• See our blog & twitter for more: https://chemtrust.org @chemtrust
What does society expect of food contact materials safety?
Consumers are concerned about chemicals

*Base: all respondents (n= 27,498)*

Special Eurobarometer 501 (chemicals safety)
Published March 2020, field work December 2019
Relevance of the topic
Food packaging

Question: In general – How important is the topic of food packaging and its labelling for you?

Für die überwiegende Mehrheit ist die Kennzeichnung von Lebensmittelverpackungen von „eher“ oder „sehr hoher“ Bedeutung. Frauen ist dies geringfügig wichtiger als Männern (MW: 1,7 vs. 1,9).

Very important

<table>
<thead>
<tr>
<th></th>
<th>Very important</th>
<th>not important at all</th>
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</thead>
<tbody>
<tr>
<td>Count</td>
<td>36</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>3</td>
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</tbody>
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(Angaben in Prozent und Mittelwert)

Translated/modified by CHEMTrust
All FCM on the market should be safe, i.e. free of hazardous substances.

Agreement with the statement: “Packaging in direct contact with food cookware and cutlery should not contain any chemicals that are hazardous to human health.”

93% (fully) agree
6% Do not agree (at all)
1% Don’t know no answer


Translated/modified by CHEMTrust
Majority of consumers would stop using food packaging, cookware and cutlery if they could be hazardous to health

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop use</td>
<td>73%</td>
</tr>
<tr>
<td>Further use, if they knew that contamination with harmful chemicals is relatively low</td>
<td>16%</td>
</tr>
<tr>
<td>Further use</td>
<td>9%</td>
</tr>
<tr>
<td>Don’t know, no answer</td>
<td>3%</td>
</tr>
</tbody>
</table>


Translated/modified by CHEMTrust
Consumers trust that FCMs are safe, however...

- Consumer NGOs tested 57 samples of single use non-plastic FCMs (paper straws, moulded fibre products)
  - 53% of samples contained chemicals of concern above recommended limits
  - 66% of FCMs analysed for fluorinated compounds exceeded the Danish limit value
  - 27% of FCMs analysed for chloropropanols exceeded BfR recommendation for 3-MCPD

BEUC: “TOWARDS SAFE AND SUSTAINABLE FOOD PACKAGING”
PFAS found in disposable food packaging and tableware

- Widely used incl. by popular fast-food chains
- Traces detected in all (!) tested samples
- Some TOF levels 60 times > DK indicator value
- Intentional PFAS treatment confirmed in 32 out of the 42 samples
- Compared to other countries, samples from Denmark with the lowest TOF levels (ban since 2020)

Consumers trust that FCMs are safe, however...

Silicone baking moulds found to

- Release volatile organic compounds
- Degrade over time
- Release SVHCs into the baked products
Melamine now added to REACH candidate list

A Commission slide on ‘bamboo’ FCM enforcement, May 2021

How can bisphenols enter your body?

Most human exposure to BPA is through the consumption of food and beverages that have been in contact with epoxy resin linings or polycarbonate plastic containers.

How can PFAS enter your body?

The widespread use of PFAS over the past decade implies that the vast majority of people are now exposed to these chemicals. We are exposed to PFAS from food, drinking water, house dust, indoor and outdoor air and certain consumer products.

How can phthalates enter your body?

Factsheets HBM4EU
https://www.hbm4eu.eu/citizens-corner/factsheets/
DiBP concentrations in children in the EU exceed the HBM guidance value (HBM-GV)

HBM-GV = concentration below which no adverse effects (from single substance) is expected

<table>
<thead>
<tr>
<th>Country</th>
<th>Percentage</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>OCC - Denmark</td>
<td>0% (n = 0; N = 300)</td>
<td></td>
</tr>
<tr>
<td>NEB II - Norway</td>
<td>4.3% (n = 13; N = 300)</td>
<td></td>
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<tr>
<td>InAirQ - Hungary</td>
<td>4.2% (n = 11; N = 262)</td>
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<tr>
<td>PCB cohort - Slovakia</td>
<td>12.2% (n = 36; N = 258)</td>
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<tr>
<td>CROME - Greece</td>
<td>5.6% (n = 9; N = 161)</td>
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<tr>
<td>NAC II - Italy</td>
<td>1.7% (n = 5; N = 299)</td>
<td></td>
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<tr>
<td>SLO CRP - Slovenia</td>
<td>2.7% (n = 4; N = 149)</td>
<td></td>
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<tr>
<td>3xG - Belgium</td>
<td>2.3% (n = 3; N = 133)</td>
<td></td>
</tr>
<tr>
<td>ESTEBAN - France</td>
<td>5.9% (n = 17; N = 286)</td>
<td></td>
</tr>
<tr>
<td>GerES V - Germany</td>
<td>App. 290,000 children!</td>
<td></td>
</tr>
<tr>
<td>SPECIMEEn - The Netherlands</td>
<td>1.12% (n = 1; N = 39)</td>
<td></td>
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Source: Additional deliverable Report AD5.6, WP5 - Translation of results into policy. https://www.hbm4eu.eu/work-packages/additional-deliverable-5-6-policy-implications-of-the-indicators/
Body burden - DINCH

Metabolite OH-MINCH (µg/l)

Source: Additional deliverable Report AD5.6, WP5 - Translation of results into policy.
https://www.hbm4eu.eu/work-packages/additional-deliverable-5-6-policy-implications-of-the-indicators/
• 96% of the urine samples contain BPA
• Different bisphenols act together (cocktail effect)

Source: Additional deliverable Report ADS.6, WPS - Translation of results into policy. Available at https://www.hbm4eu.eu/work-packages/additional-deliverable-5-6-policy-implications-of-the-indicators/
Bisphenols – Trends

Source: own representation based on HBM4EU data
Bisphenol S
HBM4EU data

Source: Additional deliverable Report AD5.6, WP5 - Translation of results into policy. Available at https://www.hbm4eu.eu/work-packages/additional-deliverable-5-6-policy-implications-of-the-indicators/
What challenges does the circular economy pose to food contact materials?
Recycling means ...

• A large variety of (consumer) products (without information on their composition) are sorted, disintegrated and separated into a limited number of (fairly) similar material streams
  → Waste inputs to each material stream are diverse in composition and actual chemical contents are largely unknown

• Material streams are then homogenised and processed into secondary materials
  – This may or may not include purification steps
  – This may or may not include quality control (regarding chemical safety) of the final product
Use of recycled materials means …

• “Non-food grade” wastes enter FCM supply chains → toxic chemicals (unknown to the FCM chain) may/likely to be present
  – BFR from WEEE in thermo cups (Samsonek J., Puype F. (2013)) → prohibition exists, but…??? Lack of control!
  – BPA in disposable (paper) food packaging from thermal paper → ban implemented, legacy BPA and similar bisphenols are circulating
  – MOSH/MOAH in recycled paper and board from news-paper (inks) → authorisation of paper recycling processes?
• Much less/no information available about the secondary material as compared to virgin materials
Challenges even with established technologies

• Example recycled PET bottles (Gerassimidou et.al (2022))

• Found to release more chemicals than virgin PET ones, including BPA, potentially due to
  – Design elements like labels, adhesives,
  – misuse by consumers or
  – cross contamination (not a closed loop…?)

• No specific legislation exists on recycled paper and board for FCMs
Some materials are less critical

- Metals and glass: high temperatures during recycling destroys most organic contaminants, however

- Hazardous metal ions may accumulate, if not separated before recycling processes
  - Potentially problematic at higher concentrations
  - If no barriers to migration exist

Source: pixabay
Others should not be recycled at all

• If containing substances of very high concern, recycling not the “best option”

• High temperature incineration and landfilling to prevent toxic cycling
Solutions

• From CHEM Trust‘s perspective it is crucial to:
  – Prevent the use of toxic chemicals from the start ➔ phase out substances of concern
  – Consider “final disposal” as a valid option for contaminated materials
  – Not to make recycled materials available for use in FCM without information
  – Increase transparency and traceability of the composition of (recycled) materials
How can EU legislation address societal demands and circular economy challenges?
50% believe the level of protection is not sufficient

QD8 In order to protect human health and the environment from hazardous chemicals, do you think that the current level of regulation and standards in the EU is...

(% - EU)

- Not high enough and should be increased: 50
- At the right level and should not be lowered or increased: 32
- Sufficiently high and could even be lower: 11
- Don’t know: 7

Base: 27,929 respondents

Special Eurobarometer 456
Published June 2017, field work November/December 2016
Companies and authorities should take responsibility for ensuring the safety of chemicals in products …

(... and also products containing chemicals)

Special Eurobarometer 456
Published June 2017, field work November/December 2016
Chemical Safety as 1st Priority

- EU Chemicals Strategy for Sustainability:
  - chemicals are “a threat to human health”
  - chemical pollution is key driver “putting the Earth at risk”

- Regarding FCM:
  - generic risk management approach (REACH) to be extended, incl. to food contact materials
  - mixture effects to be taken into account, including in FCM legislation
Generic Risk Management Approach

• The most hazardous substances are prohibited in FCM per default. These are:
  – Substances that meet the SVHC criteria or
  – Classified as CMR (Cat 1 and 2) or respiratory sensitisers
  – (Classified/identified as) EDC (Cat 1 and 2), PBT/vPvB, PMT/vPvM, or
    – which have immunotoxic or neurotoxic properties
• Protects workers, consumers and the environment
• No input of substances of concern into circular material flows
• Key innovation driver for safer alternatives
For substances of “lesser concern”: assess mixture risks, preferably using a Mixture assessment factor (MAF).

see our report: https://chemtrust.org/chemicalcocktails/
Exposure to mixtures

• Total exposure of 17% of German teenagers to five phthalates reaches levels where health effects may occur
  R. Lange et al. (2022)

• Combined exposure to bisphenols, paracetamol and phthalates at critical levels due to mixture toxicity
  A. Kortenkamp et al. (2022)

• Exposure levels to PFAS in children and teenagers:
  „The assessments indicate that PFAS exposure may result in a health risk in a considerable fraction of individuals in the HBM4EU teenager study sample, […]”
  W. Bil et al. (2023)
Consistency of FCM legislation

• Cover all FCM materials →
  – Ensure same level of protection across the EU for all FCM
  – Facilitate compliance for companies providing FCM to different countries (with different legislation)

• Same requirements for recycled FCM

• Shifting focus of assessment to the final FCM is welcomed
  – NIAS, including from recycled materials must be addressed
Alignment of FCM legislation

• Align and interrelate FCM provisions with REACH
  – (Generic) Restrictions
  – Candidate list
  – Information requirements

• Align with strategies of the Green Deal
  – Phase out of substances of concern
  – Clean circular economy
  – Safe and healthy food
Persistent chemicals

- PBTs/vPvBs and PMTs/vPvMs threaten current and future generations
- PFAS found in FCMs reach food chains and/or drinking water
- FCMs are an important source of exposure of humans and the environment to persistent chemicals
- PBT/vPvB and PMT/vPvM substances must be banned from FCMs as soon as possible (potentially aligned with ongoing REACH restriction)
Transparency on chemical content

• More transparency in the supply chain to allow safe(r) choices → enabler or speed up substitution

• Pre-condition for information duties under
  – REACH Art. 33
  – Ecodesign for Sustainable Products Regulation (ESPR) (digital product passport)
  – Consumer information (labels)
Enforcement

• Control of the implementation of provisions is essential
  – Identify non-compliance
  – Ensure level playing field

• Both EU-produced and imported, as well as via online trade
  – Using best available methods
Conclusions

• Consumers want FCMs (including ones made from recycled materials) free from hazardous chemicals

• FCMs are a relevant source of exposure for several (very) hazardous chemicals

• Some of these substance have already been found at concerning levels

• Mixture toxicity adds urgency to act
Conclusions

- Substances of concern to be banned from FCMs (GRA under REACH or FCM Laws)
- Mixture toxicity to be considered for the remaining chemicals
- Harmonized requirements for all FCM
- Transparency about chemical content and effective control

- Ensure health and environment are safe
- Innovation for safe (and sustainable) FCM is triggered
- Regulatory uncertainty is minimised
Thank you for your attention
References

- HBM4EU (2022): Additional deliverable Report AD5.6, WP5 - Translation of results into policy, available at https://www.hbm4eu.eu/work-packages/additional-deliverable-5-6-policy-implications-of-the-indicators/
References


• CHEM Trust (2022): Chemical Cocktails – The neglected threat of toxic mixtures and how to fix it, available at [https://chemtrust.org/chemicalcocktails/](https://chemtrust.org/chemicalcocktails/)


• R. Lange et al. (2022): Cumulative risk assessment of five phthalates in European children and adolescents. *International Journal of Hygiene and Environmental Health*, Volume 246

• W. Bil et al. (2023): Approaches to mixture risk assessment of PFASs in the European population based on human hazard and biomonitoring data. *International Journal of Hygiene and Environmental Health* 247 (2023) 114071