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Sustainable developments of consumer products in the focus of official control laboratories

Lydia Richter

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Baden-Württemberg

Who we are – Official Control Laboratory

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- Independent Official Control Laboratory of the Federal State of Baden-Wuerttemberg, Germany
- Department of Consumer Products:
  About 2000 samples of FCM, textiles, other body contact materials and toys / year

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Sustainability

- Climate change
- Limited resources
- persistent plastic in the oceans
- Exposure to hazardous substances in the environment

Picture: private

Picture: private

Growing desire for sustainable consumption

Implementation

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- How?
  - Development of new packaging materials
  - Reduce packaging material - as little as possible, as much as necessary
  - Ban on single-use tableware
  - Development of return-refill systems

Picture: private

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Advertising sustainability - a financial benefit

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Some examples of advertising on the Internet:

„Our tea-bag is made of pla… PLA“
or
„Now in the biobased PLA bag #no plastic“

Is this true?

„Our films consist of biodegradeable cellophane“

„… bamboo … ily made of 100% corn starch and is biodegradeable“

„100% natural“

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Example “bamboo ware”

„The cup is only made of 100% bamboo and corn starch and is biodegradeable“

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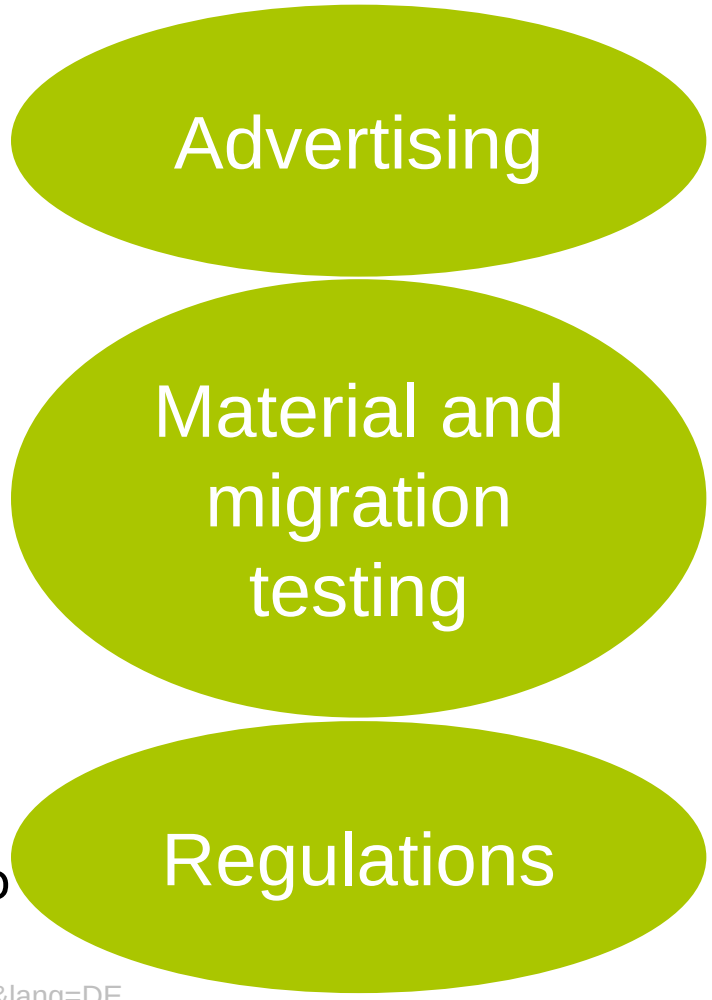
How the story began:

- 2012: first samples with misleading advertising
- 2018: new research about migration / release studies of melamine and formaldehyde
- 2019: Statement from the BfR
- Since then: discussion in the FCM-working group of the European Commission and EFSA Opinion: “bamboo note”



https://www.ua-bw.de/pub/beitrag.asp?subid=0&Thema_ID=3&ID=3205&Pdf=No&lang=DE

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Sustainability - a financial benefit

Advertising

- Article 3 Paragraph 2 Regulation (EG) No 1935/2004:

„The labelling, advertising and presentation of a material or article shall not mislead the consumers.”

Example “Bamboo ware”

„ The cup is only made of 100% bamboo and corn starch and is biodegradeable“

- → 30 - 70 % of the products are made of melamine resin

- **Art. 3 of Regulation (EU) No 10/2011:**
  - Definition of plastic:

    ‘plastic’ means polymer to which additives or other substances may have been added, which is capable of functioning as a main structural component of final materials and articles
  - and polymer:

    ‘polymer’ means any macromolecular substance obtained by:(a) a polymerisation process such as polyaddition or polycondensation, or by any other similar process of monomers and other starting substances; or(b) chemical modification of natural or synthetic macromolecules; or(c) microbial fermentation;

Advertising vs. reality of biodegradability

- Does the consumer understand the difference between industrial composting and degradation in the environment?
  - industrial composting: at 60°C within 6 months (theory EN 13432 [4])
  - industrial composting: at 60°C within 6 to 8 weeks (reality in German composting facilities [3])
  - biodegradeable plastics are not allowed in organic waste in Germany [3]
  - → sort them out [1,3]
  - → supply to thermal recycling [1,2,3]

- Unknown:
  - Composting: Degradation into H_2O and CO_2 or only into small „invisible“ polymer pieces?
  - What happens in the ocean? (temperature / conditions totally different to soil)

→ Federal Environmental Agency: Composting is the least sustainable way of disposal [2]

And melamine resin?
Melamin resin is neither biodegradeable nor compostable

Picture: private

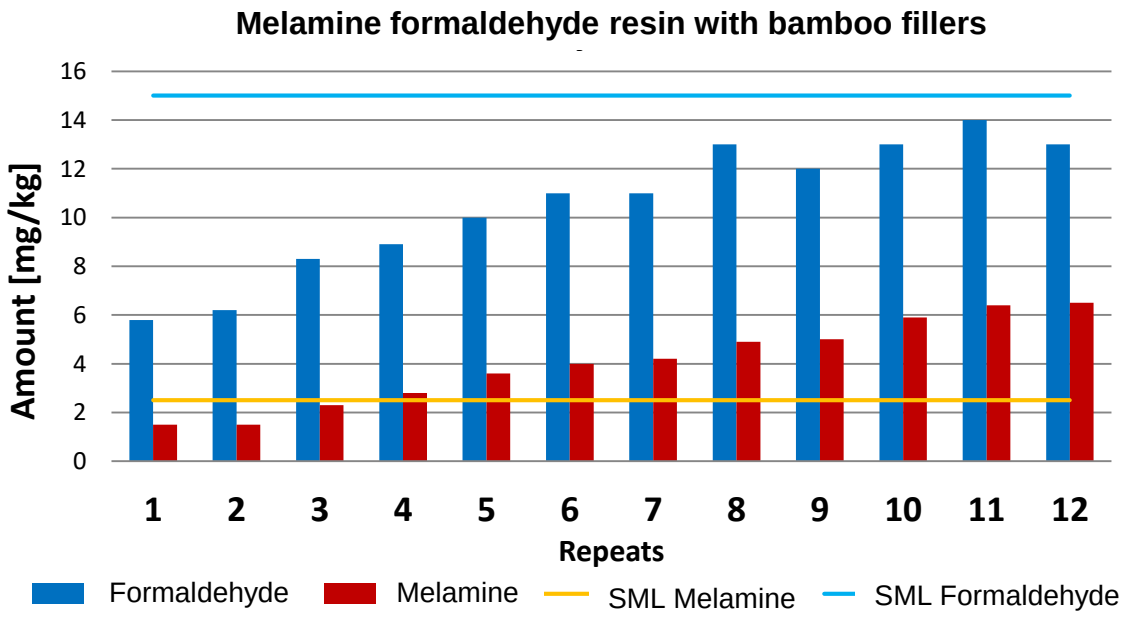
[1] Wissenschaftliche Dienste Deutscher Bundestag – Ausarbeitung WD 8-02815: Biologisch abbaubare Kunststoffe (2015)
[2] German Umweltbundesamt: Biologisch abbaubare Kunststoffe (2009)
[3] Deutsche Umwelthilfe: Bioplastik in der Kompostierung, Ergebnisbericht – Umfrage (2018)
[4]: european bioplastics: Zertifizierungsprogramm, Produkte aus kompostierbaren Werkstoffen nach EN 13432 (2016)

Material & migration testing

Material and migration testing

Regulation (EU) No 10 / 2011:

- Testing conditions 2h, 70°C with 3% Acetic Acid
- Repeated use: Compliance tested at the 3rd repeat



SML formaldehyde: 15 mg/kg

SML melamine: 2,5 mg/kg

Picture: CVUA Stuttgart

→ Material hydrolyses more and more

Material & migration testing

Material and migration testing

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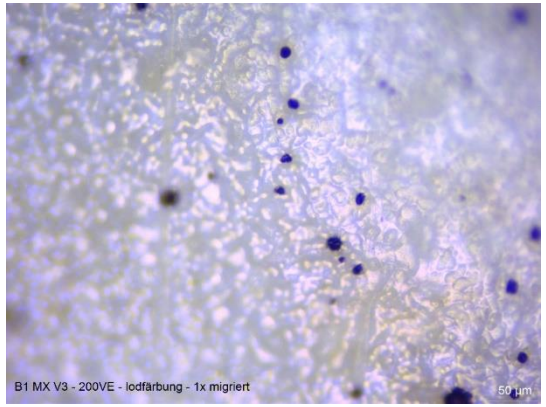
→ Material consists of 30-70% melamine resin = plastic

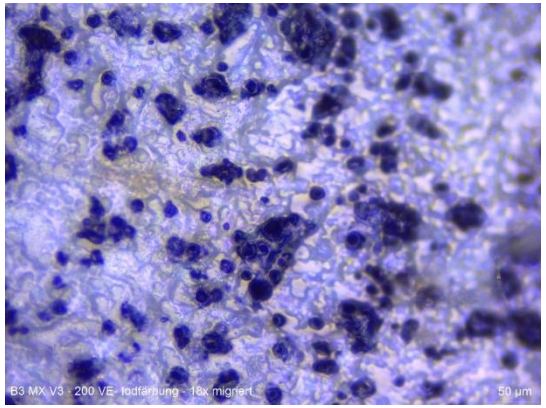
→ Release of melamine and formaldehyde

Use with hot-lemon drink:

When melamine resin gets unstable and hydrolyses:



Inside of the cup after single use with hot lemon drink; Iodine colouring; microscopic magnification: 200



Inside of the cup after 18x use with hot lemon drink; Iodine colouring; microscopic magnification 200

Photo: CVUA Stuttgart

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Legal regulation

Is bamboo the same as wood?

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Some new information about natural fibres as fillers in plastic:

- Bamboo Note of FCM-WG 2019/20: “no legal basis exists for the use of bamboo flour as an additive in plastics.”
- Consequences:
  - FCM No. 96 in Annex I Reg (EU) No 10/2011: “wood flour and fibers, untreated” should be deleted from annex because of EFSA Opinion
  - Bamboo ware is not legally on the market
  - Application for inclusion in the positive list not submitted:
    - Rice husks
    - Wheat straw
    - Coffee powder
    - …

Photo: CVUA Stuttgart

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What is the problem?

- Technologies are still in an early state of development
- Unclear / missing definitions (e.g. bioplastic)
- Lack of knowledge / information (supply chain / customers)
- Lack of legal knowledge
  - every material in contact with food must comply with Regulation (EC) 1935/2004
  - New developments must be tested for safety in advance
  - new substances/polymers/components must be applied for at EFSA (for listing in positive list)

for example sunflower seed hulls in Regulation (EU) No. 10/2011:

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1060			ground sunflower seed hulls	yes	no	no			Only to be used at room temperature or below in contact with foods for which Table 2 of Annex III assigns food simulant E. The seed hulls shall be obtained from sunflower seeds that are fit for human consumption. The processing temperature of the plastic containing the additive shall not exceed 240 °C.	

Conclusion

- "natural" alternatives for synthetic plastic often mislead the consumer
- Biodegradability does not yet guarantee biodegradation in everyday life
  - For example PLA
- Biodegradability only tested for industrial pathway (EN 13432)
- Within the bamboo ware we did a big step of clarification (regulation)

But with other materials: There is still a lot of work to do!

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Thank you for your attention.

Special thanks to my team.

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