TOX/2024/09

Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT)

The Potential Human Health Risks of Bamboo Bio-Composites in Food Contact Materials

Background

1. In 2019, the European Food Safety Authority (EFSA) panel on food contact materials (FCMs) was asked by the European Commission (EC) to assess whether the authorisation of untreated wood flour and fibres (FCM no. 96) as an additive in plastic food contact materials was still in accordance with EC Regulation 10/2011, and also to consider whether bamboo could be considered under the scope of this authorisation. EFSA concluded that wood and bamboo should be considered distinct, and each material regarded on a case-by-case basis (EFSA, 2019). In addition, the food safety authorities of Belgium, Luxembourg and the Netherlands (Benelux) published a joint letter calling for the market withdrawal of bamboo-melamine plastics (NVWA, 2021a). In April 2021, the EC recommended that Member States should take stringent action on bamboo composite FCMs and set out a coordinated control plan.

This is a background paper for discussion. It has not been finalised and should not be cited.

2. Following increased risk assessment requests on biologically based food contact materials (BBFCMs) by the Food Standards Agency (FSA), the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) was considering alternatives to conventional plastics for food and drinks packaging in 2020 (COT, 2021a). Part of the Committees review(s) included the potential toxicological hazards associated with BBFCMs (TOX/2020/24), relevant market data and a table of enquiries received from the FSA Food Contact Material (FCM) Policy Team in (TOX/2020/50). At the time, the COT acknowledged the challenges and complexities associated with BBFCMs and highlighted several limitations and knowledge gaps on BBFCMs in the current research and regulation, e.g. labelling, the composition of products, including biodegradability, potential contamination and the lack of standardisation (COT, 2021a).

3. One of the alternatives considered was bamboo composite FCMS. Prior to 2021, reports and incidents relating to bamboo composite FCMs were predominantly based on misleading labelling on packaging and/or their advertisement, and exceedances of the legal limits for formaldehyde/melamine migration. Since EFSA's and the EU's conclusion that bamboo is an unauthorised additive within plastic FCMs, reports and incidents received by the FSA have changed and are now predominantly focused on non-compliance of plastic-bamboo FCMs in the European market. This included the advertisement of products from UK businesses on EU facing markets.

4. In 2021, the COT assessed the available reports by the German Federal Institute for Risk Assessment (BfR) and the Netherlands Food and Consumer

Product Safety Authority (NVWA) on the potential health risks of bamboo FCMs. The Committee noted that the BfR applied their own tolerable daily intake (TDI) of 0.6 mg/kg/day for formaldehyde whereas the NVWA and EFSA used a lower TDI of 0.15 mg/kg/day (BfR 2020; NVWA 2021b; COT 2021c). Overall, the COT concluded that the exposure assessments were conservative but not necessarily worst-case. Although the NVWA and BfR opinions took slightly different approaches, in general the reports reached the same conclusions. Based on the assessment of the BfR and NVWA reports the Committee concluded that the migration of formaldehyde and melamine from bamboo composite cups was a potential concern to human health (COT 2021c).

5. In 2022, the COT published a position paper and concluded that due to insufficient UK data, it was not possible to conclude on the safety of bamboo bio-composites FCMs. To assist the COT, the FSA launched a call for evidence in June 2023 to obtain further information from industry, the individuals as consumers, or interested parties. In addition, a study assessing the health risks associated with bamboo-based packaging and other biobased materials was underway, the report being due in 2023.

6. The following paper (Annex A) briefly summarises the information on bamboo composites in FCMs that was received following the FSA's call for evidence. In addition, a relevant report has been circulated to Members. Please note the report is confidential and further details have not been provided.

Questions to the Committee

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i. Do the Committee have any comments on the information provided by the call for evidence or study report?

ii. Is the information/data from either source sufficient to undertake a full assessment of bamboo composite products?

    - If the data is not sufficient to undertake a full assessment, does any of the information warrant changing of the current interim position statement?

iii. Do the Committee have any further comments?

Secretariat

March 2024

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Annex A to TOX/2024/09

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Responses to the call for evidence

The attached document is a modified version to that seen by the Committee, with all commercially confidential information removed.

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1. To assist the COT with their assessment of bamboo-composite FCMs, the FSA launched a call for evidence in June 2023 to obtain further information from industry, the individuals as consumers, or interested parties.

2. Following the call for evidence, nine responses were received, six of which raised technical or other queries related to the call for evidence and/or the next steps following the call for evidence. As these responses did not provide any evidence towards the call for evidence, they are not further considered here. Three responses were received from businesses that marketed plastic products which contained

bamboo or similar plant-based materials. All three businesses provided evidence in the form of test reports and in two cases of compositional data.

3. The following paragraphs summarise the data received from respondents of the call for evidence. Please note, that confidential information, i.e. the name of the companies responding to the call, as well as information that could identify the companies, due to the small number of respondents, have been marked in red/as confidential and will not be included in the public available version.

4. Respondent 1 provided test reports of different products. The products tested negative (non-detect) for formaldehyde (mug) and polyvinyl chloride (PVC) and passed the tests for total lead, cadmium and phthalates (containers, trays).

5. Respondent 2 provided test reports, including migration testing and the composition for different products, i.e. cups, plates, bowls and lunchboxes. The products tested passed the tests for chloroform soluble extractives (mugs and kid's plates). The overall migration testing was undertaken with 10% and 95% ethanol, 3% acetic acid and isooctane, following assimilated Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food. The product (a kid's bowl) passed migration testing, but no informative data were provided. In accordance with the German Food, Article of Daily Use and Feed Code, no colour release was detected in coconut oil or 2% acetic acid. Furthermore, specific migration testing showed non-detects for polycyclic aromatic hydrocarbons (PAHs) (95% ethanol), heavy metals (3% acetic acid) and lead and cadmium (3% acetic acid).

6. The respondent stated that the products are made up of 50% bamboo fibre, 25% cornstarch and 25% melamine binding resin.

7. Respondent 3 provided test reports, including migration testing and the composition for different products. The test reports showed melamine and formaldehyde (lunchbox), and PFAS as non-detects (straw). Migration data provided (10, 20, 50% ethanol, 4% acetic acid) showed no migration or migration to be below any reported limits, cadmium and lead to be non-detected and specific migration of heavy metals and PAHs to be below the respective limits, where applicable, or non-detects in straws.

8. Some of the products (spoon, fork, straw) underwent a dishwasher test and no visible damage were noted after a normal (120 min, 65°C rinse, 65°C dry cycle) wash cycle. However, no other data (e.g. migration testing) was provided to demonstrate whether the stability of the product had been affected.

9. The products are made from a resin comprising of an aliphatic polyester; 40-60%), a mineral filler (; 25-45%), starch (corn, tapioca; 10-20%) and plant fibre powder (bamboo, pine wood; 5-15%). The respondent provided a material safety data sheet and technical data sheet for the resin.

10. None of the respondents were producers of bamboo ware but rather businesses importing bamboo products from abroad/non-EU countries.

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References

BfR (2020) Fillable articles made from melamine formaldehyde resin, such as a coffee-to-go cups sold as ‘’bamboo-ware’’, may leak harmful substances into hot foods. Available online: Fillable articles made from melamine formaldehyde resin, such as coffee-to-go cups sold as ‘bambooware’, may leak harmful substances into hot foods (bund.de)

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European Food Safety Authority (2019) Update of the risk assessment of ‘wood flour and fibres, untreated’ (FCM No 96) for use in food contact materials, and criteria for future applications of materials from plant origin as additives for plastic food contact materials: Update of the risk assessment of ‘wood flour and fibres, untreated’ (FCM No 96) for use in food contact materials, and criteria for future applications of materials from plant origin as additives for plastic food contact materials - - 2019 - EFSA Journal - Wiley Online Library

Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food: Commission Regulation (EU) No 10/2011 of 14 January 2011 on plastic materials and articles intended to come into contact with food (Text with EEA relevance) (legislation.gov.uk)

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Netherlands Food and Consumer Product Safety Authority (2021a) Benelux statement on bamboo or other unauthorized additives. Available online: benelux-statement-on-bamboo-or-other-unauthorized-additives.pdf

NVWA-English Netherlands Food and Consumer Product Safety Authority (2021b) Health Risks of Bamboo Cups. Available online: Advice from BuRO on the health risks of bamboo cups | Risk analysis | NVWA-English