

COMMITTEE ON TOXICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT

Item for Matters Arising: Proposed BBFCMs for health risk assessment

1. In May 2020, a paper entitled “*Scoping paper: alternatives to conventional plastics for food & drinks packaging* (TOX/2020/24) ¹” was presented to the Committee. The Committee was asked to advise on which biobased food contact materials (BBFCMs) should be the priorities for consideration in further detail. Due to the diversity of the available BBFCMs for industrial use, the Committee agreed that in addition to policy priorities, it would be helpful to focus on the BBFCMs that were most, or most likely, to be used in the UK, either directly or through import.
2. The Secretariat agreed to identify the most widely used BBFCMs for further review. Subsequently, in October 2020, a paper entitled “*Update on alternatives to conventional plastics for food and drinks packaging* TOX/2020/50 ²” was taken to the COT, which provided a table of enquiries received from the FSA Food Contact Material (FCM) Policy Team in addition to relevant market data.
3. Committee Members were unable to provide any further guidance on the potential hazards of BBFCMs as there was insufficient information concerning potential hazards or other toxicological data. Members requested the Secretariat to produce a list of BBFCMs based on hazard and extent of use (as a surrogate for exposure data where this information was insufficient).
4. An FSA research report was published in October 2020 entitled “Market and safety analysis of alternatives to plastic food packaging” (Renton, 2020). This project was undertaken to investigate the health and economic implications of plastic food packaging alternatives. It was designed to facilitate an evidence-based, coordinated response to the proliferation of plastic alternatives, one that considers balancing consumer safety with innovation. It was concluded that “the transition away from traditional plastics is accompanied by a host of potential unintended consequences, such as health hazards, allergic reactions, shorter shelf life, and a possibly worse environmental impact”.
5. The BBFCMs below in Table 1 were identified by the Secretariat as fitting the criteria for health risk assessment priorities, based on potential health hazards, usage, and priorities from the FSA FCM Policy Team.

¹ <https://cot.food.gov.uk/sites/default/files/2020-10/Tox%202020%2024%20Alternatives%20to%20conventional%20plastics%20for%20foods%20and%20drinks.pdf>

² <https://cot.food.gov.uk/sites/default/files/2020-10/TOX.2020.50%20BBFCM%20paper%20update.pdf>

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Table 1: Proposed priority BBFCMs for health risk assessment

BBFCM	Monomers & additives	Use in FCM	Potential hazard(s) (non-exhaustive)	Extent of usage	Non-FCM uses
Poly(lactic acid) (PLA)	Lactic acid, with plasticisers such as sorbitol or glycerine	Packaging of viscous, oily liquids in addition to dry products, and those with short shelf-lives.	Migration potential of nanoparticles when PLA is used in nanocomposite materials	18.7 % of global production capacity of all bioplastics in 2020 (European bioplastics, 2020)	Biodegradable medical devices (e.g. screws, sutures)
Starches, e.g. thermoplastic starch (TPS)	Plant-derived starch, with plasticisers e.g. glycerol, glycol, and urea. Starch blends include e.g. chitosan, cellulose/lignin fibres, and PLA.	Wrapping films, trays, boxes and tableware.	Non-intentionally added substances e.g. mycotoxins, and pesticide residues.	18.7 % of global production capacity of all bioplastics in 2020 (European bioplastics, 2020)	Compostable films and bags for domestic waste, retail, and agriculture.
Bamboo bio composites	Bamboo flour, melamine-formaldehyde resin	Large volume of tableware/kit chenware sets containing bamboo have been involved in UK incidents.	Migration of plasticisers such as formaldehyde	Unknown	Interior design, furniture, and construction
Polyhydroxyalkanoates (PHAs)	The most common PHA is poly(3-hydroxybutyrate) (PHB), produced by polymerisation of 3-hydroxybutyrate monomer.	Cutlery and packaging (bags, boxes, and foams).	Migration of plasticisers, and other additives.	1.7 % of global production capacity of all bioplastics in 2020 (European bioplastics, 2020)	Biomedical applications (e.g. drug delivery and tissue engineering scaffolds)

6. Additional BBFCMs that were identified in the 2020 FSA research report include alginate, cellulose, paperboard, polybutylene succinate adipate (PBSA), polybutylene succinate (PBS), polybutylene adipate tetraphthalate (PBAT), polybutylene adipate (PBA), and polyhydroxybutyrate (PHB).

7. According to the FSA FCM Policy Team, additional BBFCMs are those used in kitchenware (wheat, avocado seed, rice husk, bagasse, and coconut shells), and food packaging (chitosan, eucalyptus, and beeswax).

8. In 2019, the UK FSA commissioned Fera Science Limited (Fera) to conduct a literature review to better understand the potential health risks and other unintended consequences of replacing fossil-based plastic FCMs with BBFCMs (Fera, 2019).

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The prominent potential safety hazards identified included shelf-life, and the presence and migration of heavy metals, plasticisers, trace elements, persistent organic pollutants, pesticide or veterinary residues, natural toxins, process contaminants, nanomaterials (in the context of nanotechnology and intelligent packaging), endocrine active materials, genetically modified materials, and allergens.

9. Additional hazards may include monomers, additives, and breakdown products.

Questions on which the views of the Committee are sought:

- I. Do Members consider there to be BBFCMs for inclusion or exclusion from Table 1?

**Secretariat
January 2021**

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References

Fera (2019) Bio-Based Materials For Use In Food Contact Applications. Fera project number FR/001658. Report to the Food Standards Agency. Available at: <https://www.food.gov.uk/research/strategic-evidence-programme/bio-based-materials-for-use-in-food-contact-applications>

Renton M. (2020) Report to the Food Standards Agency: Market and safety analysis of alternatives to plastic food packaging. Available at: <https://www.food.gov.uk/research/research-projects/market-and-safety-analysis-of-alternatives-to-plastic-food-packaging>

European bioplastics (2020) Bioplastics market update. Available at: https://docs.european-bioplastics.org/conference/Report_Bioplastics_Market_Data_2020_short_version.pdf