Food safety and sustainability of chemicals in food contact materials – is risk assessment the right tool?

Trier, Xenia

Published in:
Book of Abstracts. DTU's Sustain Conference 2015

Publication date:
2015

Document Version
Publisher's PDF, also known as Version of record

Food safety and sustainability of chemicals in food contact materials – is risk assessment the right tool?

Xenia Trier*

DTU Food

- xttr@food.dtu.dk

Food contact materials (FCM) are an example of consumer products with the potential to release chemicals into food during the food production, packaging or preparation, and in amounts that are harmful to human health. During the production and the disposal, FCM chemicals can also be released to workers and the environment. It has been estimated that more than 15,000 chemicals can be present in FCM. The question is therefore if it is possible to ensure that this mixture of chemicals is safe and sustainable for humans and the environment – and if the tools we currently apply are adequate to perform such assessments?

In the EU, risk assessment (RA) is used to assess the safety of chemicals in food, and requires quantification of both the hazard (evaluation and characterization) and the exposure (concentration in a food and the food consumption). In practice this requires knowledge of the chemical structures. However, only for five (mainly plastics and ceramics) of the 17 categories of FCM, there are lists of authorized *starting* substances with limits set by the EU Commission. These IAS are evaluated by EFSA, one by one in relation to human health. Cocktail effects, aggregate exposure, the toxicity of the intentional reaction products (IRP) or the non-intentionally added substances (NIAS) and environmental effects are not evaluated. For the rest of the 12 non-harmonised materials, such as coatings, printing inks, and paper and board packaging, the FCM manufacturers and business are expected to perform the RA, since it is their responsibility to ensure the safety of their FCMs. These data can be kept as proprietary and are not evaluated but independent parties.

Not having a limited list of suspect substances to look for, makes it extremely time consuming to assess materials: First each substances must be identified, then the concentrations be measured by confirmatory methods in various foods (Backhaus & Trier 2015), which requires access to standards which more often than not are not commercially available (Trier et al. 2011). Then the hazard needs to be evaluated and characterized. An option is to make bio-directed analysis, but even after fractionation of the sample and identifying which of the fraction(s) that are toxic, each fraction may contain 50-100 substances that need to be quantified and/or identified (Bengtström et al. 2014). This talk will mainly focus on how to accurately quantify the exposure of chemicals, which in turn also is used to prioritize the level of hazard evaluations, e.g. using the threshold of toxicological concern.

Given the economical, scientific and time constraints, several questions arise: Should we perform few, accurate measurements on few substances, or frequent less accurate measurements on more substances? Is the RA uncertainty too large to prioritize semi-quantified substances? Can classical RA in practice ensure food safety and an environmentally sustainable production of FCM? Or is it time to consider other pragmatic tools, fewer chemicals, or innovation of less toxic chemicals being more compatible with a human and environmental health in a circular economy (Scheringer et al. 2014; Fantke et al. 2015)?