

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

### Overarching statement on the potential risks from exposure to microplastics: Lay summary

1. As part of horizon scanning, the Committee on Toxicity of Chemicals in Food, Consumer Products and the Environment (COT) identified the potential risks from microplastics as a topic it should consider. Upon review of the literature, it was decided that nanoplastics should also be included. An initial scoping paper was presented to the COT in October 2019 (TOX/2019/62)<sup>1</sup>. Since then, the topic and additional information has been discussed several times by COT with the final substantive discussion in December 2020.
2. The purpose of this overarching statement is to bring together these discussions, summarise the COT conclusions reached to date and provide a high-level overview of the current state of knowledge, data gaps and research needs with regards to this topic.
3. Future sub-statements, which will consider in detail the potential toxicological risks of exposure to microplastics *via* the oral and inhalation routes, are intended to provide supplementary material for this overarching statement. The Committee will review the potential risks from oral exposure of microplastics (resulting from their presence in food and bottled drinks). A review of the potential risks of microplastics *via* the inhalation route will be produced jointly with the Committee of Medical Effects of Air Pollutants (COMEAP) Secretariat at Public Health England. The need for additional reviews of other significant routes of exposure will also be considered.
4. Micro- and nanoplastics are widespread. They are either intentionally added to products or occur as a result of plastics being fragmented down into smaller sizes by natural processes such as wear, weathering and corrosion. There is no internationally agreed definition of what a microplastic is, however, the most widely used size range is 0.1 to 5,000  $\mu\text{m}$ . Plastic particles that are smaller than the lower range are considered nanoplastics (*i.e.* 1 nm to 0.1  $\mu\text{m}$ ).

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<sup>1</sup> TOX/2019/62 is available on the [COT website](#).

5. The COT noted that there is little data on the effects of microplastics on mammals (including humans) whether taken in orally or *via* inhalation. Some microplastics are excreted from the body (~>90%) but small amounts of others may remain in the gut (gastrointestinal tract; GIT) or move from the GIT into organs or tissues (*via* endocytosis by M cells and paracellular persorption). No epidemiological or controlled dose studies that evaluated the effects of orally ingested microplastics in humans were identified. There is a similar lack of information on inhaled microplastics.
6. As such, the COT concludes that based on the available data, it is not yet possible to perform a complete assessment for the potential risks from exposure to micro and nanoplastics *via* the oral and inhalation routes. However, the Committee concurs with the conclusions reached by other authoritative bodies (EFSA, 2016; WHO, 2019; SAPEA, 2019; SAM, 2020; ECCC and HC, 2020) that further research is required to better identify target tissues, threshold doses, and the toxic mode(s) of action for any toxicity observed.
7. The COT concluded that the literature data on exposure to particles from tyre wear would need separate consideration from microplastic exposure from food, since the particles were chemically quite different (in their polymeric nature). Risk assessment of such material was considered potentially outside the scope of the current exercise.
8. The most significant data gaps are the lack of appropriate and harmonised analytical methods for the detection of micro- and nanoplastics (together with suitable reference standards), as well as information on their toxicokinetic and toxicity profiles in/relevant to humans.
9. The COT highlighted that additional information will be needed from all exposure sources, which include indoor and outdoor air, dust and soil, before a risk assessment can be completed. The presence of MPs in food and water needs to be put into perspective with other sources of MPs such as atmospheric fallout.
10. Comprehensive assessment of microplastics and contaminant concentrations in different foods and the impact of cooking (on the release of and subsequent bioavailability of contaminants/leachates) need to be further investigated to better understand the implications for human health.
11. Current studies typically focus only on one type of particle/tissue interaction. As such, further research is necessary to explore the effects of the range of particle types in different tissues *in silico*, *in vitro* and *in vivo*. The range of particle types studied should also take account of emerging/novel plastic-based materials such as bioplastics.
12. The full COT statement can be found on the COT website: [COT Microplastics Overarching Statement 2021 \(food.gov.uk\)](#)

## Lay Summary to COT Statement 2021/02

## References

- ECCE & HC. (2020) Science assessment of plastic pollution. Available at: <https://www.canada.ca/en/environment-climate-change/services/evaluating-existing-substances/science-assessment-plastic-pollution.html>. Accessed: 23/12/2020.
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- WHO. (2019) Microplastics in drinking-water. Available at: [https://www.who.int/water\\_sanitation\\_health/publications/microplastics-in-drinking-water/en/](https://www.who.int/water_sanitation_health/publications/microplastics-in-drinking-water/en/). Accessed: 23/08/2020.