Food Packaging Forum Foundation | Staffelstrasse 10 | 8045 Zürich | Switzerland

Environmental Protection Agency

Food Packaging Forum Foundation

Staffelstrasse 10
8045 Zürich
Switzerland

Telephone +41 44 515 52 55
info@fp-forum.org

www.foodpackagingforum.org

Mai 28, 2026

Comments on draft CCL6, docket number EPA-HQ-OW-2022-0946

Dear Madam or Sir,

We appreciate the opportunity to comment on EPA's draft Sixth Contaminant Candidate List (CCL 6), and specifically on the chemical group "Microplastics".

Introduction to the Food Packaging Forum (FPF) Foundation

FPF is a charitable, independent scientific organization located in Switzerland. Our work supports the protection of the public from hazardous chemicals and micro- and nanoplastics (MNP) related to food contact materials and articles, by providing the scientific evidence base. FPF is part of the AURORA research project, which aims to develop an Actionable European Roadmap for early-life health Risk Assessment of micro- and nanoplastics. The five-year project with scientific partners across nine countries is funded by the European Union under the Horizon 2020 research and innovation program. The AURORA project is a member of the CUSP consortium, the European research cluster to understand the health impacts of MNPs. Both research initiatives have published a range of relevant resources for the Committee to consider, and we remain available to provide the Committee with further information or scientific expertise on the matter.

General comment

We appreciate EPA's initiative to include microplastics as a chemical group on the CCL as a first step towards regulating microplastics in drinking water. While we agree that current data gaps prevent to "fully understanding the health risks associated with microplastics in drinking water," we wish to outline why action to protect human health must begin now, through the development and implementation of measures to reduce exposure to microplastics from drinking water and other sources. In the following, we include evidence on nanoplastics and we consider micro- and nanoplastics (MNPs) together, unless explicitly stated otherwise.

Health impacts

First, current evidence suggests an association between MNPs and adverse health outcomes. Early clinical and epidemiological studies have reported associations between

these small plastic particles and cardiovascular disease, adverse reproductive outcomes, and immune modulation (Lamoree et al. 2025; Marfella et al. 2024). These findings are supported by a growing body of experimental, toxicological research demonstrating that MNPs can cross cell barriers in the human lung and intestine, enter systemic circulation, and subsequently reach tissues such as reproductive organs, the placenta, and the brain (Lamoree et al. 2025).

Although additional research is needed to clarify the potential effects of MNPs on hormone production during pregnancy (Van Boxel et al. 2025), there is a scientific basis for concern regarding potential endocrine-disrupting effects. Human foetal development is tightly regulated by the endocrine system, and even small disruptions can result in health effects that may manifest later in life. It is well-established that plastics leach endocrine-disrupting chemicals, including bisphenol A, nonylphenol, and several others (Wiesinger et al. under review).

Recent scientific publications and research initiatives can help EPA prioritize future research activities. For example, the AURORA project, with contributions from FPF, supported the development of the CUSP Roadmap on the health impacts of micro- and nanoplastics. Structured around five transversal themes, the CUSP Roadmap summarizes the current state of the science and describes research needs across short-, medium-, and long-term time horizons. In addition, The Lancet Countdown on Health and Plastics, launched in 2025, will quantify plastics-related harm to health, assess plastic chemicals' contribution to the Global Burden of Disease, identify knowledge gaps, as well as identify and monitor interventions to mitigate harm (Landrigan et al. 2025)

Further research to address existing knowledge gaps is essential. However, such research inevitably requires time. During this period, delaying risk-reduction measures would mean accepting potential risks to human and environmental health. The available evidence supports consideration of the precautionary principle, which holds that a lack of scientific certainty should not delay action to prevent potential harm to human health. These considerations are reinforced by extensive and ever-emerging scientific evidence demonstrating the harmful effects of plastic-associated chemicals on human health across all life stages (Symeonides et al. 2024). More than 16,000 chemicals are used or present in plastics and are inevitably also present in MNPs (Monclús et al. 2025). Due to their larger surface-to-volume ratio, MNPs are more prone than larger plastic materials to releasing such chemicals. In addition, MNPs that become incorporated in tissue may inadvertently become a sink for endogenous, lipophilic substances such as hormones, thereby becoming "passive endocrine disrupting factors", because levels of endogenous hormones are tightly controlled. However, empirical evidence of this mechanism is currently not available.

Accordingly, implementing evidence-based mitigation measures is warranted, even in the absence of comprehensive evidence on all potential health effects of MNP particles.

Exposure through tap water

Multiple scientific studies have demonstrated the presence of MNPs in tap water, with reported concentrations of up to 61 particles per liter (means 9 particles per liter) in the United States (Kosuth et al. 2018). Monitoring efforts are ongoing, including initiatives by the California State Water Resources Control Board. These data can support the generation of

updated estimates of population-level exposure to MNPs via drinking water in the United States.

Importantly, humans consume tap water daily, both directly and through food preparation, resulting in continuous and widespread exposure. This exposure pattern further supports the application of the precautionary principle and highlights the importance of developing and implementing mitigation measures to reduce risks. Also, American citizens are concerned about microplastics contaminating their drinking water; in a survey conducted in 2025, they ranked them as the fourth most concerning contaminant.

Consideration of nanoplastics

Smaller plastic particles are generally considered to present a higher potential health risk than larger particles. First, as evidence from *in vitro* and *in vivo* studies demonstrates, they are more readily absorbed and can cross biological barriers such as the gastrointestinal epithelium, the placental, and the blood-brain barrier and can enter cells (Lamoree et al. 2025). Second, their larger surface-to-volume ratio increases their potential to release chemicals present in plastics, including chemicals of concern and chemicals that have been absorbed to weathered MNPs, such as persistent organic pollutants. Given these considerations, inclusion of nano-sized particles (*i.e.,* nanoplastics) within the scope of the CCL would support a more comprehensive evaluation of plastic particle exposure through drinking water. In any case, the scope of the group “microplastics” in CCL would benefit from a clear definition.

MNP mitigation measures

Reducing MNP levels in tap water requires a comprehensive approach due to the diverse sources contributing to contamination. These sources include, but are not limited to, MNP generated from the normal and intended use of tires, synthetic textiles, and from personal care products that enter surface and groundwater systems used as drinking water sources. Existing drinking water treatment processes cannot fully remove plastic, particularly those smaller than 500 µm (Cai et al. 2025). In addition, drinking water treatment systems themselves may be a source of MNPs in tap water through plastic components, such as polymer-based filtration membranes (Maliwan et al. 2025). Furthermore, drinking water distribution systems rely predominantly on plastic pipes made from materials such as PVC and polyethylene (PE), which have been shown to release MNP particles into drinking water (Gomiero et al. 2021; Weber et al. 2021; Shen et al. 2021), in addition to plastic chemicals.

Due to the manifold uses of plastics, many different sources of MNPs are relevant for drinking water and tap water contamination. The evidence shows that reducing plastic production has the potential to decrease MNP exposure not only via drinking water but also via other exposure pathways, such as ingestion through food and inhalation from air (Baztan et al. 2024). In this context, a robust global plastics treaty can become a powerful tool to address plastic-related health and environmental impacts. Importantly, this requires that countries align and agree on plastic production limits.

Food packaging as an additional source of human exposure to MNPs

Given FPF's focus on food contact materials, we wish to draw the EPA's attention to food packaging and other food contact articles (*e.g.,* food packaging and processing equipment) as a direct source of human exposure to MNPs.

While single-use plastic food contact articles are known to be the most relevant category of plastic pollution (Kelly et al. 2026), it is reasonable to assume that they will also be a major source of MNPs that contaminate the environment and subsequently, the human food chain. This indirect contamination of foodstuffs with MNPs via environmental pollution has been acknowledged (FDA 2024). However, plastic food contact articles are now also known to be a direct source of MNPs in foodstuffs (EFSA 2025).

In 2025, we published a peer-reviewed systematic evidence map on assessing food contact articles as sources of MNPs in foodstuffs (Zimmermann et al. 2025). The evidence map included 103 studies, resulting in 600 database entries that are openly accessible via the interactive FCMiNo dashboard. The dashboard provides details on the food contact article types, MNPs characteristics, foodstuffs or food simulants, experimental design, data reliability (*i.e.,* whether the study design allows linking detected MNPs to food contact articles), and links to the original studies. Notably, we also included tap water in the mapping, given its likely contact with plastic materials such as pipes during distribution.

Our study findings indicate that the normal and intended use of plastic food contact materials and articles can lead to the generation and migration of MNPs into foodstuffs, thereby representing a direct source of human exposure. These conclusions are consistent with a non-peer-reviewed technical report published by the European Food Safety Authority (EFSA) on MNPs generated from food contact articles (EFSA 2025).

The contribution of food packaging and other food contact articles to overall human exposure to MNPs remains yet to be understood. Improved understanding of direct exposure sources is important for informing effective exposure-reduction strategies. Nevertheless, consistent with the precautionary principle, measures to reduce MNP exposure from food contact materials and articles should be considered now, particularly given that this exposure source is avoidable. Importantly, we are currently updating the freely available FCMiNo database to incorporate the latest science published up to 2026.

To reduce MNP exposure related to plastic food packaging and other food contact articles, regulatory frameworks could build on the existing evidence that food contact materials are a source of MNPs. Reductions in MNPs migrating from food contact materials into foodstuffs could be achieved by requiring the determination of MNP migration propensity before market placement of food contact articles. Thereby, establishing and implementing a harmonized testing and reporting framework is critical for generating reliable and comparable data to inform risk assessment and mitigation measures, and to improve the protection of public health from MNPs and hazardous plastic chemicals.

Conclusions

We thank the US EPA for this opportunity to comment on the proposal to list microplastics as a Contaminant Candidate on the sixth CCL and applaud the decision to propose their listing.

Based on the available evidence, microplastics in drinking water are of concern to human health, and action to reduce their levels in drinking water should not be delayed, also for the sake of trustworthiness, as a majority of US citizens are already concerned about hazardous chemicals in drinking water, and have expressed the need for the government to be more active on this matter (McPartland 2026).

Yours sincerely,

Jane Muncke

Managing Director and Chief Scientific Officer

Lisa Zimmermann

Scientific Communication Officer

References

Baztan J, Jorgensen B, Carney Almroth B, et al. Primary plastic polymers: urgently needed upstream reduction. *Plastics* 2024; 2: e7.

Cai T, Tang Z, Gu T, et al. Microplastics in drinking water: a review of sources, removal, detection, occurrence, and potential risks. *Toxics* 2025; 13: 782.

European Food Safety Authority (EFSA), Barthélémy E, Cariou R, Castle L, Crebelli R, Di Consiglio E, et al. Literature review on micro- and nanoplastic release from food contact materials during their use. *EFSA Support Publ* 2025; 22(10): 9733E.

FDA. Microplastics and Nanoplastics in Foods. *FDA website.* 2024.

Gomiero A, Øysæd KB, Palmas L, Skogerbø G, et al. Application of GC–MS pyrolysis to estimate the levels of microplastics in a drinking water supply system. *Journal of Hazardous Materials* 2021; 416: 125708.

Kelly MR, Cordova MR, Jobling S, et al. Food and beverage plastics dominate global shorelines: a harmonized rank-based assessment of usage types to guide interventions. *One Earth* 2026; 2026; 101712.

Kosuth M, Mason SA, Wattenberg EV, et al. Anthropogenic contamination of tap water, beer, and sea salt. *PLoS ONE* 2018; 13: e0194970

Lamoree MH, van Boxel J, Nardella F, et al. Health impacts of microplastic and nanoplastic exposure. *Nat Med* 2025; 31: 2873–87.

Landrigan PJ, Dunlop S, Treskova M, et al. The Lancet Countdown on health and plastics. *Lancet* 2025; 406: 1044–62.

Maliwan T, Hu J. Release of microplastics from polymeric ultrafiltration membrane system for drinking water treatment under different operating conditions. *Water Research* 2025; 274: 123047.

Marfella R, Prattichizzo F, Sardu C, et al. Microplastics and nanoplastics in atheromas and cardiovascular events. *N Engl J Med* 2024; 390: 900–10.

Monclús L, Arp HPH, Groh KJ, et al. Mapping the chemical complexity of plastics. *Nature* 2025; 643**:** 349–55.

McPartland J. Americans Are Concerned About Harmful Chemicals in Food, Water and Everyday Products. *Pew* 2026.

Shen M, Zeng Z, Wen X, et al. Presence of microplastics in drinking water from freshwater sources: the investigation in Changsha, China. *Environ Sci Pollut Res* 2021; 28: 42313–24.

Symeonides C, Aromataris E, Mulders Y, et al. An umbrella review of meta-analyses evaluating associations between human health and exposure to major classes of plastic-associated chemicals. *Ann Glob Health* 2024; 90**:** 52

van Boxel J, Nijmeijer SM, Heinzelmann MT, et al. Limited passage and functional effects of polystyrene micro- and nanoplastics in a physiologically relevant *in vitro* human placental co-culture model. *Reprod Toxicol* 2025; 136: 108956.

Weber F, Kerpen J, Wolff S, et al. Investigation of microplastics contamination in drinking water of a German city. *Sci Total Environ* 2021; 755: 143421.

Wiesinger H, Parkinson LV, Geueke B, et al. Prioritising and grouping food contact chemicals – from chaos to clarity. E*nviron Sci Technol* 2026; under review.

Zimmermann L, Geueke B, Parkinson LV, et al. Food contact articles as source of micro- and nanoplastics: a systematic evidence map. *npj Sci Food* 2025; 9: 111.