

With Hot Beverages Worst Offenders Microplastics Found in All Popular UK Drinks

Researchers assessed the levels of [microplastics](#) (MPs) that people are exposed to through their daily intake of fluids using survey data and laboratory analysis in the UK.

They detected MPs in all the beverages that people reported consuming and noted higher concentrations in [hot drinks](#) like tea, probably due to leaching from plastic packaging induced by heat, with average concentrations expressed in MPs per litre also reported for direct comparison.



Study

In this study, researchers analyzed MPs in 155 samples comprising 5 samples from 31 beverage types from popular UK brands, collected from supermarkets and coffee shops in 2024. Beverages included hot and iced coffee, hot and iced tea, [juices](#), energy drinks, and soft drinks.

Samples were processed in a clean room under strict contamination controls. Cold drinks were filtered immediately, while hot drinks were cooled for 30 minutes before filtration. MPs were extracted by vacuum filtration through 0.45 µm silver membrane filters, followed by digestion of organic matter using [hydrogen peroxide](#) at 60 °C for 24 hours.

Analysis was performed using spectroscopy methods to identify polymer types and particle characteristics with a 70% or more spectral match. Shapes, sizes, and counts were determined via [microscope](#) imaging.

An online survey of 201 adults recorded daily beverage intake, which was combined with MPs concentration data (expressed in MPs/L in the primary results and in MPs/cup for product-specific discussion) from this study and previous UK water studies to estimate exposure in MPs/kg body weight/day. Quality control included blank samples and recovery tests. [Statistical analyses](#) assessed differences between beverage types.

Results

MPs were detected in all 155 beverage samples analyzed. In MPs/L terms, hot coffee averaged 43 ± 14 MPs/L, [iced coffee](#) 37 ± 6 MPs/L, hot tea 60 ± 21 MPs/L, iced tea 31 ± 7 MPs/L, fruit juice 30 ± 11 MPs/L, energy drinks 25 ± 11 MPs/L, and soft drinks 17 ± 4 MPs/L.

For product-specific serving comparisons, hot coffee in disposable paper cups averaged 16 MPs/cup, much lower than some previous studies, as they excluded cellulose-based particles and focused only on synthetic [polymers](#) thicker than 10 µm. Coffee in glass cups had fewer MPs, while older coffee machines released more MPs, likely from material degradation. Iced coffee in

cups made of polyethylene terephthalate (PET) averaged 11 MPs/cup, mostly PET, with possible contributions from ice. Ice used in iced coffee has previously been identified as a potential MP source. Hot coffee contained significantly more MPs than iced coffee.

Hot tea in paper cups averaged 22 MPs/cup, higher than tea in glass cups (14 MPs/cup). The most expensive tea bags had the highest MP counts, averaging 27 ± 3 MPs/cup. Iced tea in [PET bottles](#) had fewer MPs than hot tea, reinforcing heat's role in MP release.

[Fruit juice](#) in PET bottles had higher MP levels (42 ± 4 MPs/L) than carton packs (23 ± 3 MPs/L). Energy drinks in plastic packaging contained more MPs (40 ± 7 MPs/L) than canned versions (18 ± 3 MPs/L). Soft drinks in plastic bottles averaged 17 ± 4 MPs/L, in line with international studies.

Particle sizes ranged mostly from 10–200 μm , with iced tea having the smallest particles and hot tea the largest. Across all beverages, fragments dominated (72–93%) over fibres. Polymer types matched packaging materials, with polypropylene (PP) the most abundant overall, followed by polystyrene (PS), polyethylene terephthalate (PET), and [polyethylene](#) (PE). Detection of polyamide (PA) and polylactic acid (PLA) in some tea and coffee sachets was linked to intentional inclusion for texture. This confirmed packaging as a major MP source, with additional contributions from production processes, air, and water, including atmospheric deposition and wear from plastic machinery parts.

Conclusion

In this study, researchers revealed widespread MP contamination across popular UK beverages, with higher levels in hot drinks, underscoring the role of [temperature](#) in accelerating MP release from packaging.

Polymer composition largely reflected packaging materials, but secondary sources, such as contaminated water, atmospheric fallout, and production equipment, also contribute. Estimated daily intakes from all [beverages](#) were 1.7 MPs/kg body weight/day for females and 1.6 MPs/kg body weight/day for males, exceeding UK drinking-water-only estimates, suggesting that water-based exposure assessments underestimate true intake.

Strengths include a large sample size across multiple brands, focus on synthetic [polymers](#), and polymer-type identification. The inclusion of a local consumption survey allowed estimation of real-world exposure.

Limitations involve the use of regional consumption data rather than [national statistics](#), potential market representation gaps, and a detection limit excluding MPs less than 10 μm . This size restriction may underestimate the total MP burden.

Overall, the findings provide robust evidence that beverage consumption contributes significantly to microplastic ingestion. The research team highlighted the need for more comprehensive monitoring, improved packaging materials, and [public awareness](#), in line with the discussion in the paper.

Source:

<https://www.news-medical.net/news/20250811/Microplastics-found-in-all-popular-UK-drinks-with-hot-beverages-worst-offenders.aspx>