

Human Stool Study: Aims and Scoping

Aims of this pilot-scale intervention study are:

- (1) Investigate potential relationships between three human plastics use in food and beverage packaging and meal preparation scenarios: typical (for the person) plastic use, lower than typical, and higher than typical, on the characteristics (polymer type, size and quantity) of MP in human stool samples.
- (2) Characterise the MP polymer types, size, and quantity in the study participants' stool.
- (3) Test and improve sample handling, processing and MP measurement and characterisation methods for human stools compared to the previously published studies - a key capability for future human exposure studies.

Scoping:

The study scope and design are appropriate for

- Providing qualitative (for MP >5 µm) and semi-quantitative information on the presence, type, and size (for MP >20 µm) of MP particles excreted by the human body via stool after three exposure scenarios.
- Providing information on the potential influence that higher- or lower plastics use in food and beverage packaging and meal preparation (self-reported via food diaries by the participants; participants could select known food and beverage items from a premade list) may have on the amount and type of excreted MPs, considering the other experimental conditions are kept constant.
- Correlations between MPs characteristics detected to type and relative amounts of plastic sources from the dietary pattern during the intervention phase.

The study scope and design are not appropriate for

- Providing quantitative mass balance data. The study does not measure MP in the study participant diets directly and does not measure rates or fractions of absorption. General levels of exposure are estimated using self-reported food diaries.
- Estimating human oral MP exposure with confidence, due to the small sampling size of the study and other intrinsic limitations associated to a non-clinical study.
- Directly identifying the source and pathways of MPs detected in the stool (e.g., food sources, ingestion, inhalation and then swallowing).
- Providing information on MP < 5 µm) due to limitations in analytical measurements
- Quantifying MPs present in various exposure sources (indoor/outdoor air, food, beverages, personal care products) used in the study itself. Proper controls (e.g.,

toilet blanks, processing blanks) have been employed to help identify different sources of possible sample contamination.

- Determining MP bioavailability (which MPs are potentially transported across the gastrointestinal barrier, potentially contributing to local or systemic cellular exposures)
 - It also cannot inform on the ratio of potentially retained particles vs excreted.
- Measuring or characterising non-plastic particles in stool samples, due to the enzymatic treatment during sample preparation (which destroys particles such as cellulose) for the MP analysis.
- Informing on the hazard and potential risk of MPs found in the stool of participants.