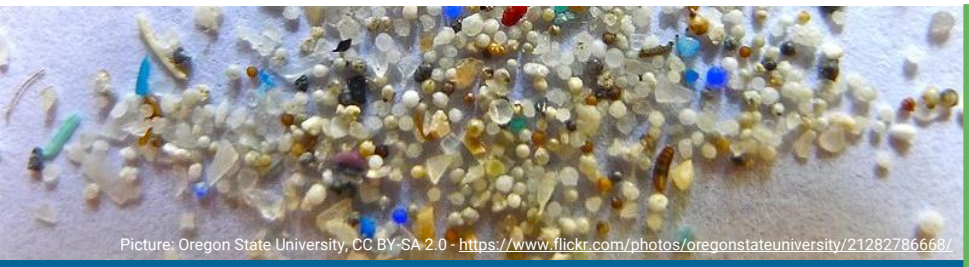


Picture: Oregon State University, CC BY-SA 2.0 - https://www.flickr.com/photos/oregonstateuniversity/21282786668/

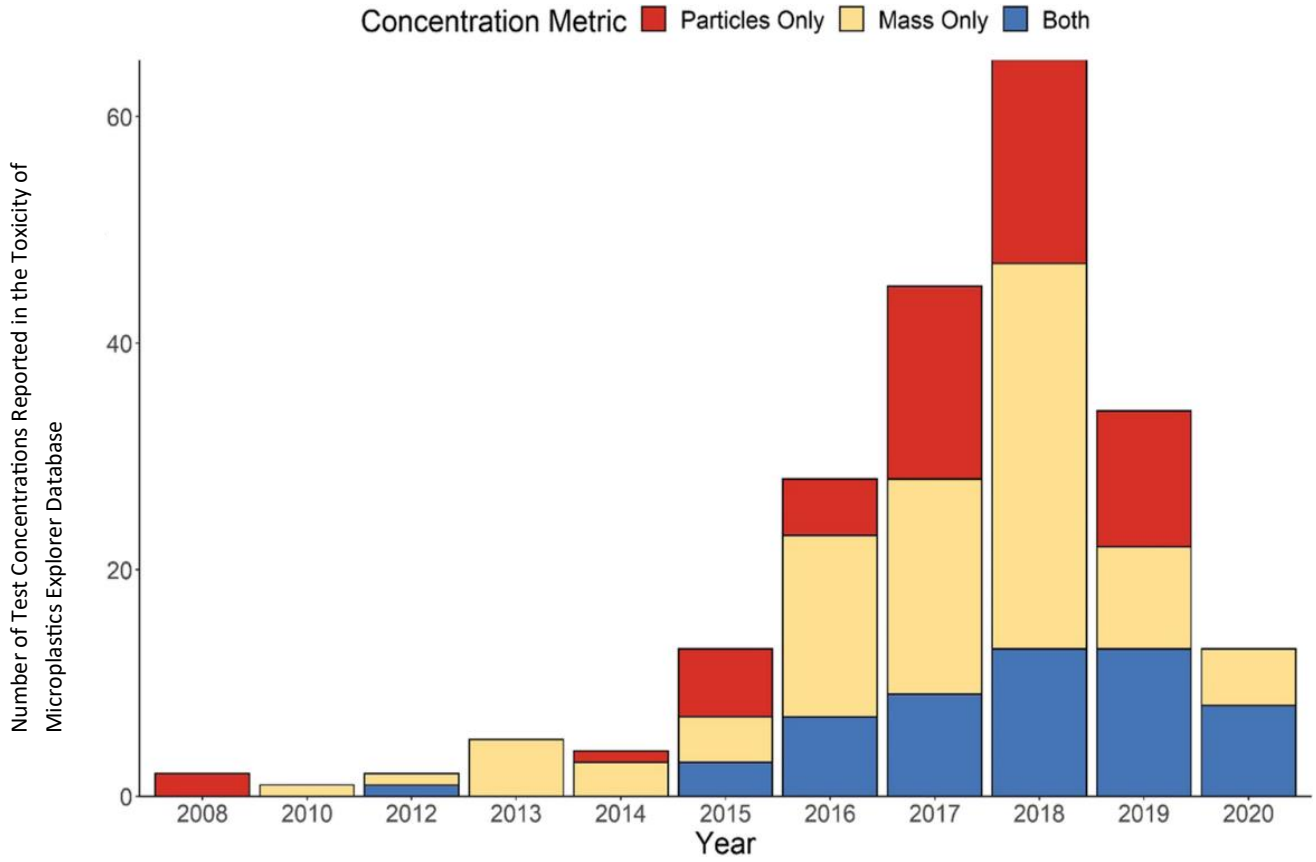
Use Comparable Units for Microplastics Data Reporting

MP-1-15 07/2024

An increasing number of microplastics studies are being conducted and published. It is important to use a common system of measurement to allow scientists to share, repeat, and compare results of research and experiments. This fact sheet summarizes the challenges and necessity of using comparable units for microplastics data reporting.

Standardization Is Lacking

A universally standardized method of reporting results from laboratory analyses of microplastics does not currently exist. However, a microplastics reporting guidelines checklist has been published and is available in Cowger et al. (2020).



Test concentrations of microplastics and the metrics they have been reported in over time.
Source: Thornton Hampton et al. 2022 https://microplastics.springeropen.com/articles/10.1186/s43591-022-00040-4

The **Interstate Technology and Regulatory Council** (ITRC) is a state-led environmental coalition devoted to creating innovative solutions, best management practices, documents, and trainings to foster technical knowledge and quality regulatory decision-making to protect human health and the environment. Visit Home - ITRC (itrcweb.org).

Use Comparable Units for Microplastics Data Reporting

Comparison Between Microplastic Studies Is Difficult

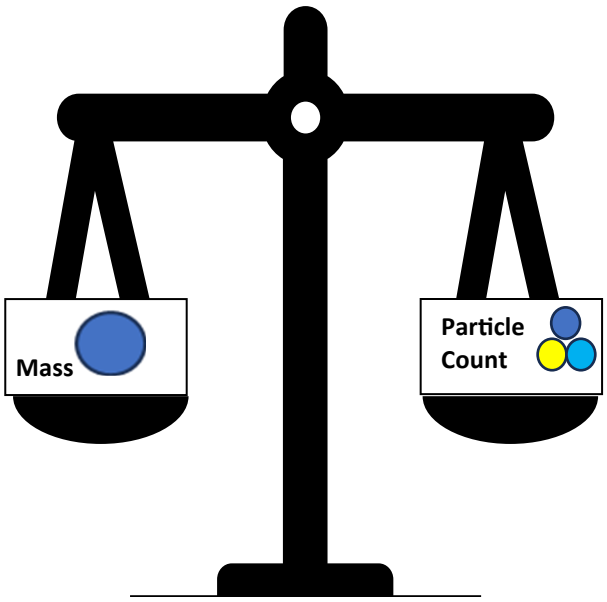
Comparison of data between studies is complicated by variability in how microplastics are defined, a lack of standardized analytical methods, differences in the units used to report the presence of microplastics in various media, and missing particle size data. Microplastics can be quantified in mass, particle count, or both, depending upon project goals.

Units Need to Be Comparable to Be Useful

Many current microplastics analytical methods report results using particle count (per volume or surface area) as the numerical value unit. Particle count allows descriptors of shape and size that support calculation of concentrations of specific types of particles and are therefore easier to link to toxicity studies. Particle size should be reported in all studies.

Another reporting unit is mass per volume (e.g., µg/L) or mass per weight (e.g., mg/kg). These concentration units are commonly used for contaminants in regulatory, monitoring, and toxicological programs. In addition, pyrolysis gas chromatography/mass spectrometry (GC/MS) is increasingly used as an analytical method to identify and quantify small microplastics. This instrument reports microplastics in concentration (mass/volume), not particle count.

Concentrations in sediment or soil samples containing microplastics should be reported as dry or wet weight. The weight of dry sample particles remains constant, but as water content varies, wet weight will vary; therefore, include a wet:dry ratio if using wet weight so that it can be converted to dry weight based on moisture content.



Note: The mass of one large particle can be equal to the mass of multiple smaller particles. Units need to be comparable to be useful.

Suggested Reporting

To provide maximum usefulness when comparing concentrations to other toxicity studies or environmental concentrations, microplastics concentrations should be reported as both mass (per volume or per unit dry weight) and particle count (per volume or surface area). Microplastic particles that are well-characterized (e.g., detailed characterization of particle size distributions) can allow concentrations to be converted between mass, count, and volume, if the density of the plastic is also reported.