Detailed Data Category Descriptions

October 5, 2020

General Information

Source	Description of study source **Aquatic Organism Database** • Koelmans (de Ruijter et al. 2020, doi: 10.1021/acs.est.0c03057) • Rochman (Bucci et al. 2020, doi: 10.1002/eap.2044) • Jacob (Jacob et al. 2020, doi: 10.1021/acs.est.9b05995) **Human Database** • Search – Original literature search (ProQuest, 7/20/20) • He – (He et al. 2020, Table 1, doi: 10.1016/j.scitotenv.2020.138180) • Yong – (Yong et al. 2020, Table 2, doi: 10.3390/ijerph17051509) • Other – Unintentionally discovered relevant paper (e.g., Google alert) • Workshop – *Manuscript added at the request of workshop participant*
Authors	Last name of first author. If only 2 authors, both are listed.
Year	Publication year

Note: All of the data descriptions below are **endpoint specific**. For instance, if a cytotoxicity test is performed with 5 concentrations of plastic particles, but a second experiment within the same study tested 3 doses for reactive oxygen species production, data associated with each endpoint would be designated as having 5 or 3 treatment groups, respectively.

(*) – Data category currently only included in the Microplastics Toxicity Database for aquatic organisms.

Data Category #1: Test Organism

Genus	Genus of test organism or genus from which cell lined is derived
Species	Species of test organism or Species from which cell lined is derived
Organism Group*	• Algae • Annelida • Bacteria • Cnidaria • Crustacea • Echinodermata • Fish • Insect • Mollusca • Nematoda • Plant • Rotifera
Environment*	• Freshwater • Marine *Estuarine species listed as marine*
Life Stage	• Early – Defined as embryonic or larval life stages • Juvenile • Adult – Sexually mature organisms *In vitro experiments are reported as "NA"*
In vitro/In vivo	• In vitro • In vivo
Sex	• Male • Female *In vitro experiments or in vivo experiments where sex is not listed are reported as "NA"*

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Data Category #2: Experimental Parameters

Exposure Route	Description of how plastics and/or chemicals were introduced to organisms. **Aquatic Organism Database:** • Water: Dissolved in water or other aqueous media. If plastics are introduced at feeding time but not wrapped in food this descriptor is used. • Food: Incorporated into food. This designation is only used when particles are wrapped in food. • Sediment: Mixed into sediment. If an organism derives nutrition from sediment, this descriptor is still used rather than food. **Human Database:** • Dermal: Directly applied to skin • Drinking water: Dissolved in drinking water (*ad libitum*) • Food: Incorporated into food. This designation is only used when particles are wrapped in food. • Gavage • Inhalation • Intratracheal instillation • IV Injection *In vitro experiments are reported as "NA" as it is assumed that cells are exposed via media.*
Leachate	• Yes – Organisms are only exposed to leachate derived from plastics and not physical particles • No – All other studies
Mix	• Yes – Organisms are exposed to a mixture of plastics simultaneously • No – All other studies
Study Type*	• Lab – Experiments are performed in the laboratory • Mesocosm – Experiments are performed in the field under controlled conditions
Negative Control	• Yes – A treatment without particles and/or leachate (e.g., clean water) was used • No – Design does not include a treatment without particles
Positive Control	• Yes – A treatment with a non-plastic particle was used (e.g., kaolin) • No – Design does not include a treatment with non-plastic particles
Exposure Duration	Numeric value for length of exposure period in days.
Treatment Groups	Numeric value for the number of treatment groups or doses used for *a given condition*. The negative control and positive control groups are not used in this count.
Replicates	Number of times the experiment was replicated.
Dose	The particle dose used for each measurement. All doses are recorded at reported in the manuscript.
Dose Units	The units that the particle doses are reported in.

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Chemical Addition	Chemicals that were intentionally sorbed to the particles prior to exposures as part of the experimental design. Chemicals that were used as a co-exposure with particles.
Chemical Addition Dose	If organisms are exposed to chemicals sorbed to particles or as part of a co-exposure, this column reports the dose used.
Chemical Addition Dose Units	The units that the chemical addition doses are reported in.
Chemical Addition Exposure Type	If organisms are exposed to chemicals, this descriptor designates if chemicals were sorbed to particles prior to the exposure or introduced to organisms as a co-exposure.

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Data Category #3: Biological Effects

Effect	• Particle/leachate only exposure:
	  ○ Yes – Statistically significant difference between treatment group and negative control.
	  ○ No – Difference between treatment group and control is not statistically significant.
	• Particle exposure in the presence of additional chemical (either sorbed or co-exposure)
	  ○ Yes – Statistically significant difference between treatment group with particle and chemical and chemical only treatment at the same dose.
	  ○ No – Difference between treatment group with particle and chemical and chemical only treatment at the same dose is not statistically significant.
	  ○ *If there is no treatment group with only the chemical exposure, this data is excluded from the database.*

Statistical Clarity	• Clear – There is no ambiguity in the statistical approach used or where statistically significant differences are reported. • Unclear – Best judgement was used in determining if the reported differences were statistically significant between the treatment and appropriate control group. This may occur due to the statistical test used for the specific goals of the study.
Level 1 Endpoint Category	Broadest category by which endpoints are organized (e.g., Metabolism, Fitness, Immune, etc.)
Level 2 Endpoint Category	Mid-tier category by which endpoints are organized (e.g., oxidative stress, lipid metabolism, etc.)
Level 3 Endpoint Category	Most specific category by which endpoints are categorized. In some cases, endpoints are collapsed where appropriate (e.g., "number of neonates produced" and "number of eggs laid" would both be categorized as "reproductive output").
Level of Biological Organization	Descriptor of the measured endpoint (Level 3). • Population • Organism • Tissue • Cell • Subcellular
Target	Tissue, cell type or cell line in which endpoint was measured (Level 3) *Endpoints categorized as at the organism or population levels of biological organization are reported as "NA"*

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Data Category #4: Particle Characteristics

Polymer	**Aquatic Organism Database:** • BIO – biopolymer (as described by authors) • EVA – ethylene vinyl acetate • LTX – latex • PA – polyamide • PE – polyethylene • PC – polycarbonate • PET – polyethylene terephthalate • PI – polyisoprene • PMMA – polymethylmethacrylate • PP – polypropylene • PS – polystyrene • PUR – polyurethane • PVC - polyvinylchloride **Human Database:** • PA – polyamide • PE – polyethylene • PMMA – polymethylmethacrylate • PP – polypropylene • PS – polystyrene • PUR – polyurethane • PVC - polyvinylchloride • TR – tire rubber
Shape	• Sphere • Fragment • Fiber* • Cube*
Functional Group	**Aquatic Organism Database:** • COOH • NH_2 **Human Database:** • COOH • NH_2 • COOH + protein coat • NH_2 + protein coat • PEG • PEG – M • PEG - NH_2 • SH • SH – MO_6Br_8 • SH – MO_6Cl_8 • SH – MO_6I_8

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Size	Average or nominal size reported in mm. If both nominal and measured sizes are reported, the measured size is reported in the database.
Minimum Size	If a size range is reported, the minimum size in mm. If both nominal and measured sizes are reported, the measured size is reported in the database.
Maximum Size	If a size range is reported, the maximum size in mm. If both nominal and measured sizes are reported, the measured size is reported in the database.
Size Category	Size category corresponding to the California state definition of microplastics. 1. 1 < 100nm 2. 100nm < 1µm 3. 1µm < 100µm 4. 100µm < 1mm 5. 1mm < 5mm
Weathering and Biofouling	• Yes – Particles were subjected to natural or artificial weathering and/or biofouling • No – Particles were not subjected to natural or artificial weathering and/or biofouling (i.e., virgin particles)

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Note: Quality criteria category designations are based on the attempt of the researchers not the success. Even if measurements or validation is unsuccessful due to experimental constraints or challenges, the category is still designated as a "yes." Quality criteria are based on recommendations made by de Ruijter et al. 2020 (doi: 10.1021/acs.est.0c03057).

Data Category #5: Quality Criteria

Size Validation	• Yes – Sizes of particles were validated by the researchers and measurements are reported. • No – Sizes of particles were not validated and/or size measurements are not reported. *Leachate only exposures using plastics > 5mm are reported as "NA"*
Polymer Validation	• Yes – Polymer composition of particles were validated by the researchers (e.g., FTIR or Raman) • No – Polymer composition of particles were not validated by the researchers.
Shape Validation	• Yes – Particle shape is validation by the researchers or images are included in the manuscript. • No – Particle shape is not validated by the researchers and no images are included in the manuscript. *Leachate only exposures using plastics > 5mm are reported as "NA"*
Source	• Commercial – Particles were purchased from a commercial supplier and used as is. • Lab – Particles were generated in the lab through mechanical (e.g., cutting or cryomill) or chemical synthesis. Commercial particles that are modified before use (e.g., biofouling) receive this designation. • No – Source of particles is not reported.
Contaminant Screen	• Yes – Chemical analysis was performed to screen for any potential chemical contaminants that may be associated with particles but were not intentionally added as part of the experimental design. • No – No chemical analysis was performed.
Solvent Rinse	• Yes – Particles were rinsed with an organic solvent prior to exposures to remove any potential contaminants. • No – Particles were not rinsed with an organic solvent prior to exposures or were only rinsed with water.
Background Contamination	• Yes – Control groups were analyzed to determine potential background contamination of plastic particles and contamination levels are reported.

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	• No - Control groups were not analyzed for background contamination.
Concentration Validation	• Yes – Nominal concentrations were validated during the exposure period by measuring particle concentrations in the exposure media during the exposure. • No – Nominal concentrations were not validated during the exposure period by measuring particle concentrations in the exposure media during the exposure.
Particle Behavior	• Yes – A description of the particles behavior in the exposure media is provided (e.g., particles were allowed to sink to the bottom of the chamber to ensure bioavailability). Particles were sonicated prior to exposure to ensure homogeneous dispersal. • No – No description of particle behavior in the exposure media is provided.
Uptake Validation	• Yes – Ingestion or uptake of particles into organisms or cells (in vitro studies) is confirmed via microscopy, histology, dissection, etc. • No – Ingestion or uptake is not confirmed.

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