Microplastic testing materials: the Brigid project experience

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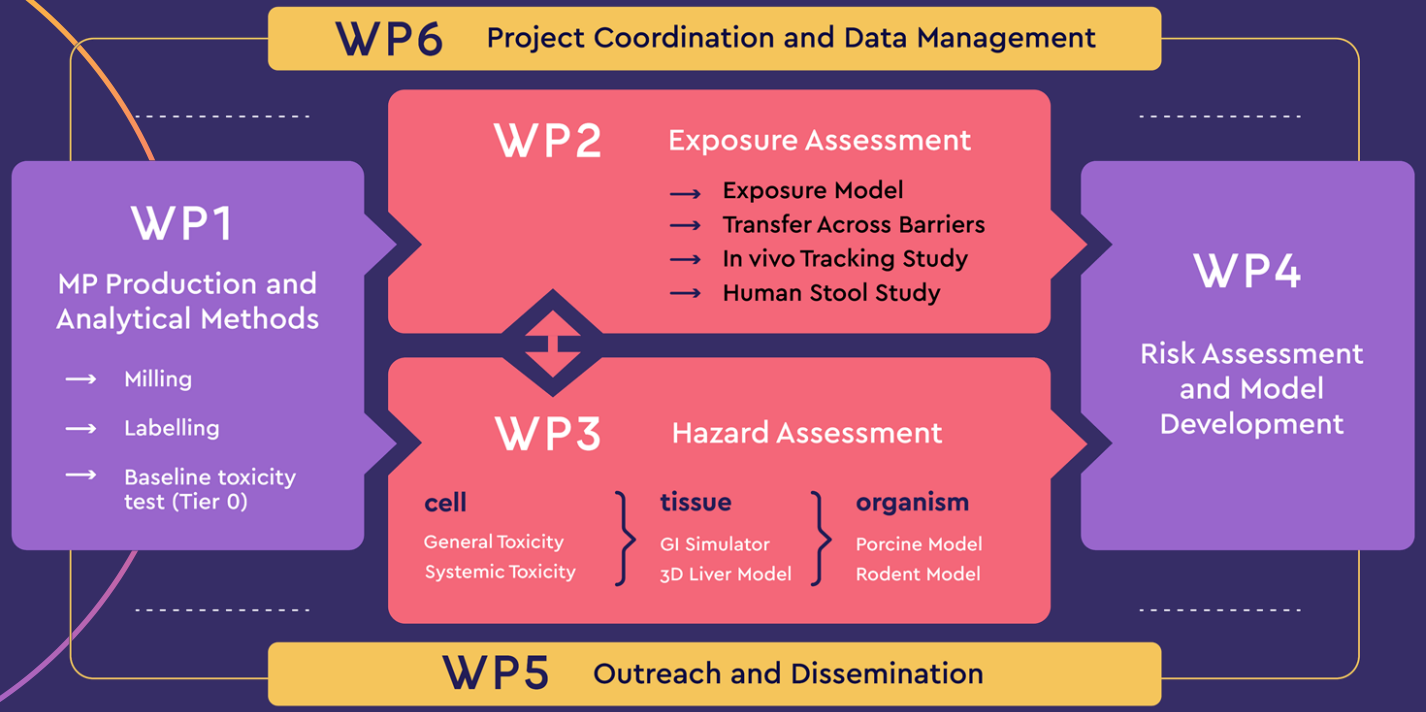
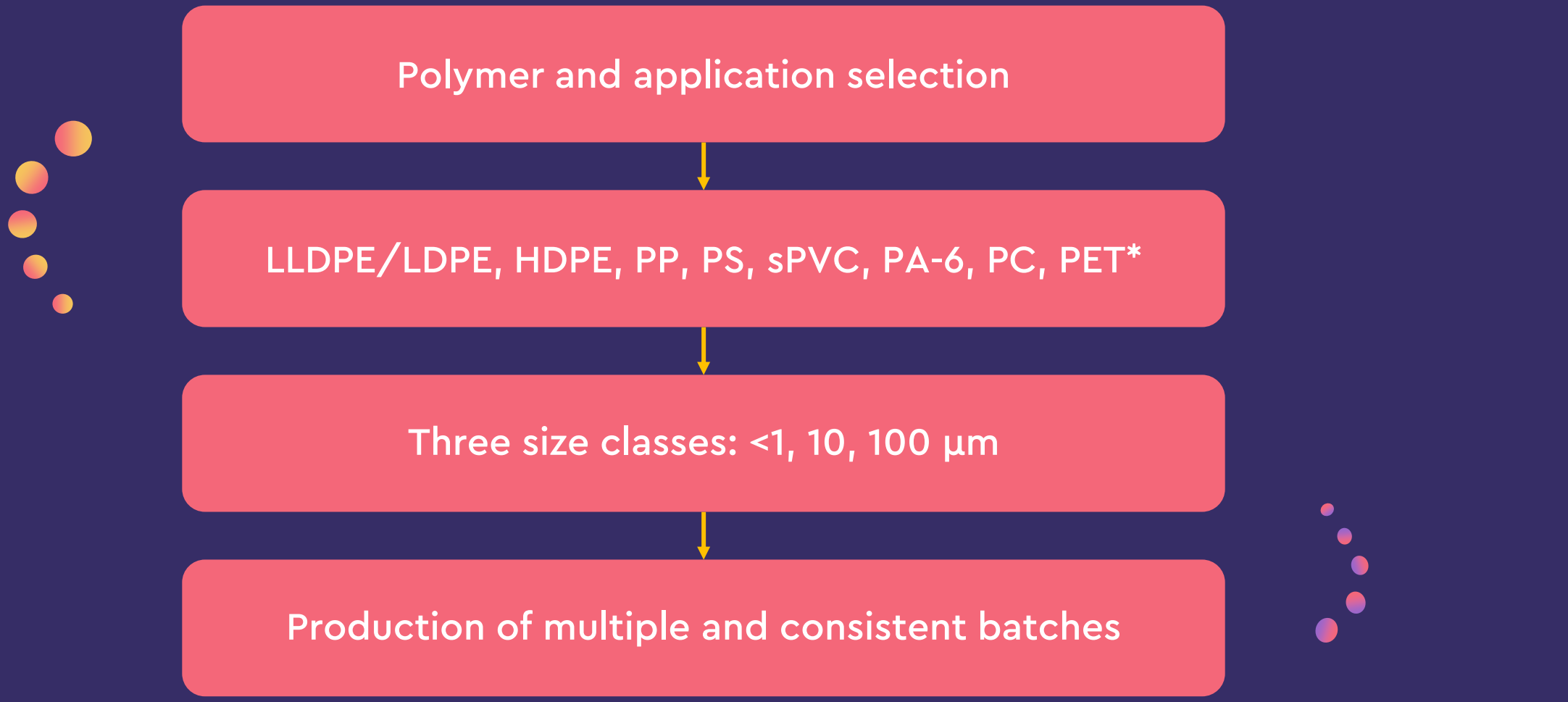
Brigid: structure and aims



- multimillion euro budget
- Five years duration (2022-2026)
- Consortium of impartial scientific partners from public and private institutes
- Open and transparent communication of results
- Objective: human health risk assessment of microplastics ingestion

From commercial grades to testing materials



* In collaboration with Petcore Europe

Micronisation methods

Method	Advantages	Disadvantages	Conclusion
Ball or disc milling	Relatively fast, bench-top scale	Inorganic (metal) contamination from contact with ball/disc, small output	Not ideal for homogeneous batches and contamination concerns
Cryogenic milling	Avoids melting, bench-top scale, can be combined with other methods	Small output	Recommended in combination with another method
Precipitation	High particle homogeneity	Solvents may remain in the particles after production	Potential issues in tox studies due to solvent contamination
Jet milling	No contact between particles and metal parts, high output	Energy intensive, melts plastic with low glass temperature	Recommended in combination with cryogenic elements

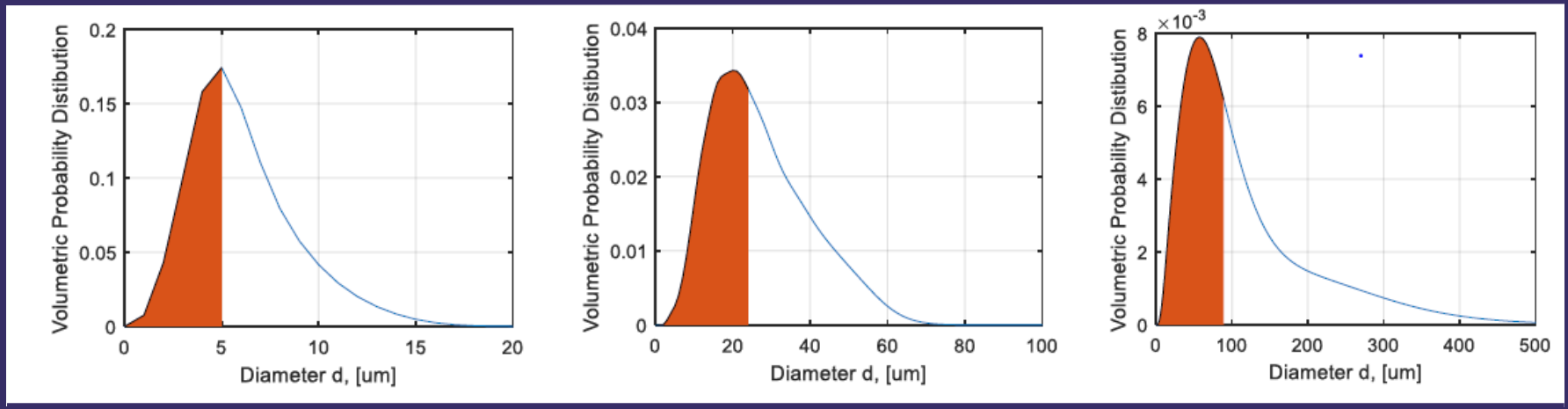
Milling and fractionation

Grade selection | Milling | Characterisation | Baseline testing

G1 -- G2 -- G3 ---------- ● ---------- ● ---------- ● ----------→ Blend

PVC

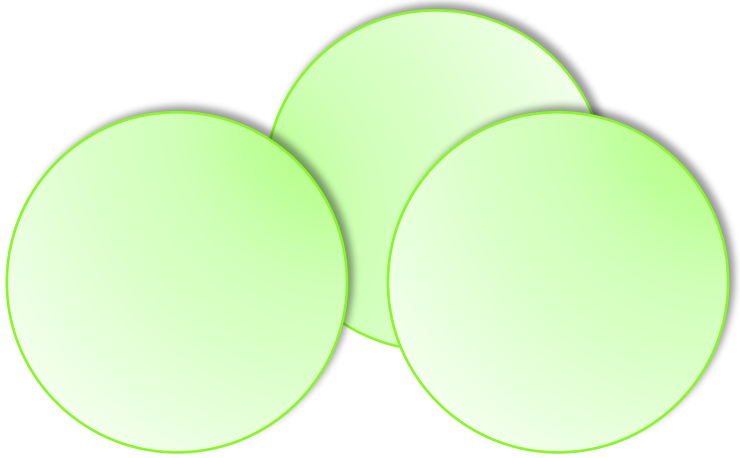
1 µm | 10 µm | 100 µm



MP labelling

Fluorescent labelling:

- Commercially available particles
- Morphology and surface greatly differ from unlabelled particles
- Fluorescent probe is toxic to biological systems



C^{14} labelling:

- Increasing the natural amount of C^{14} present in the polymer molecules
- Morphology equal to unlabelled particles
- Compatible with biological systems

Microplastics Testing Material Repository

American Chemistry Council

PLASTICS EUROPE
Enabling a sustainable future

Phase 1

- Selection of the **three most used polymer types** in (eco)tox MP studies
- **Batch** MP production

Phase 2

- Repository hosted by a **non-industry third party** (NIST, JRC)
- **Characterisation and QA/QC batch guarantee** performed by host institution

Phase 3

- Basic characterisation information for tox testing or complete for analytical/standardisation purposes
- **More polymer types added**

brigid

bridging the knowledge gap on microplastics' impact on human health

Thank you for your attention

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