



brigid

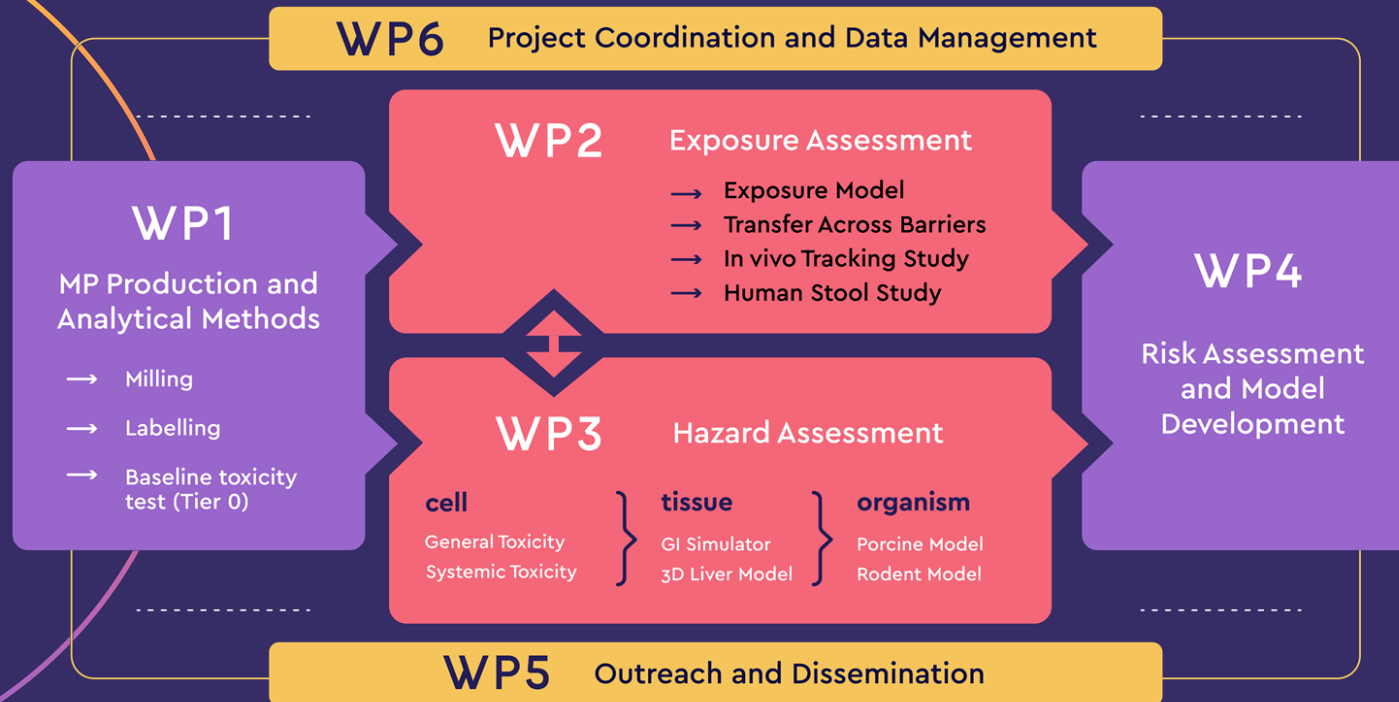


The Brigid project

- Camilla C. Carteny
- Plastics Europe

MARII 2nd Conference – 12th June 2023

Brigid: structure and aims



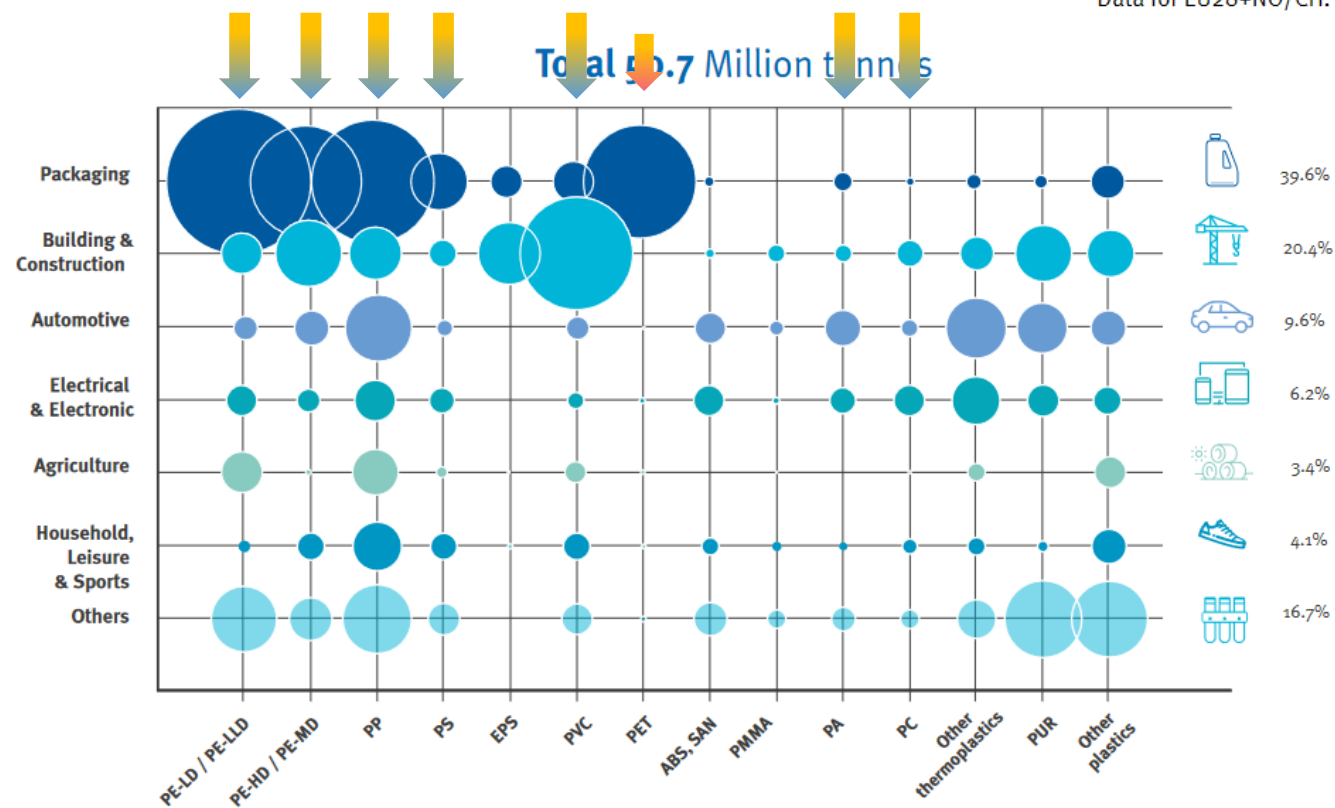
- **Multimillion euro-budget**
- **Five years duration (2022-2026)**
- Consortium of **impartial scientific partners** from public and private institutes
- **Open and transparent** communication of results
- **Objective: human health risk assessment of microplastics ingestion**

Polymer selection

SOURCE: PlasticsEurope
Market Research Group
(PEMRG) and Conversio
Market & Strategy GmbH

PLASTICS DEMAND BY SEGMENT AND POLYMER TYPE IN 2019

Data for EU28+NO/CH.



Testing materials



LLDPE/LDPE, HDPE, PP, PS, sPVC, PA-6, PC, PET*

Three size classes: <1, 10, 100 μm

Micronisation:

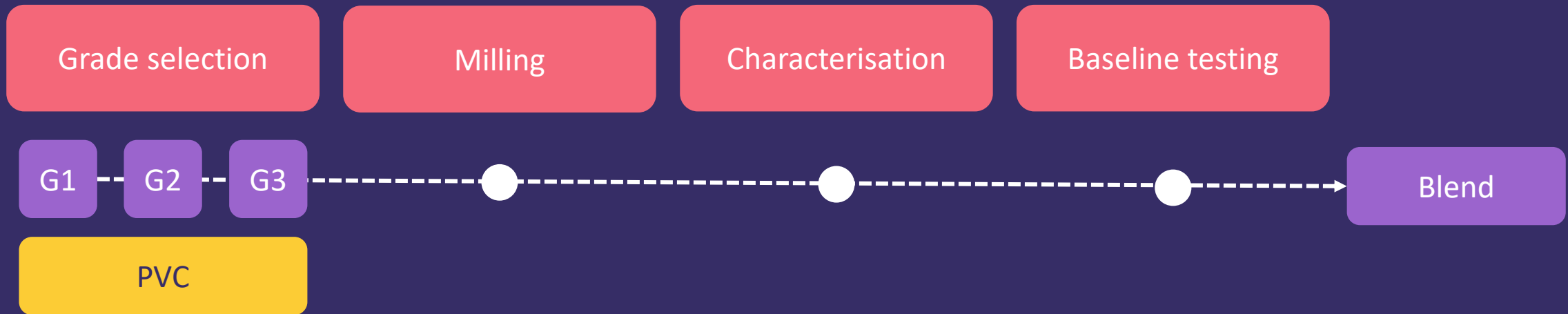
- Jet milling
- Cryogenic milling
- Ball milling
- Melt emulsion

Labelling:

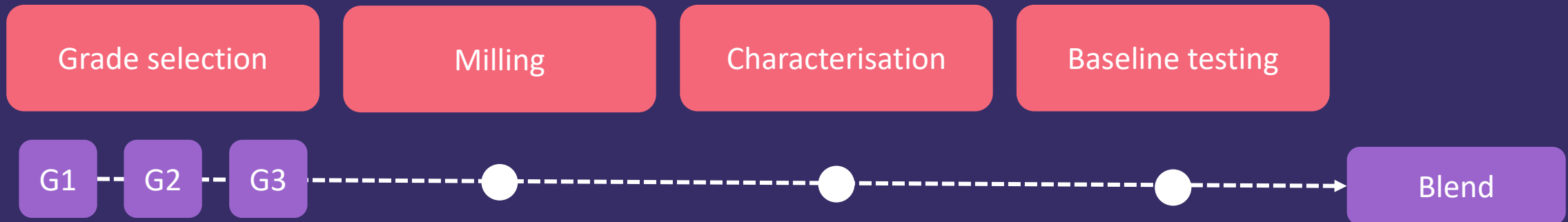
- C^{14}
- Fluorescent probe
- Yttrium oxide
- Quantum dot



Focus on WP1: microplastic production



Focus on WP1: microplastic production

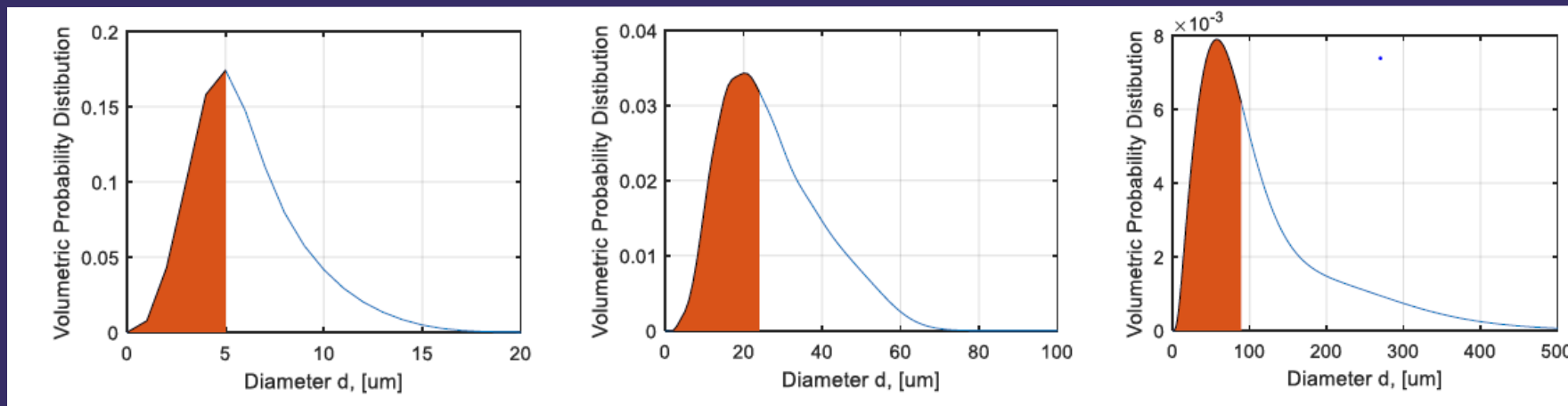


PVC

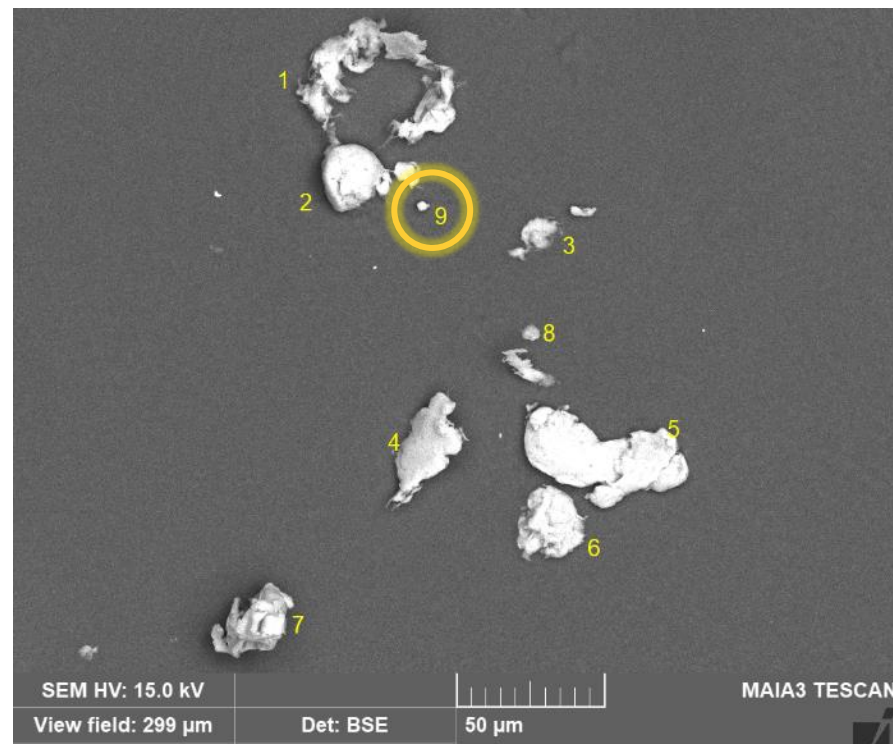
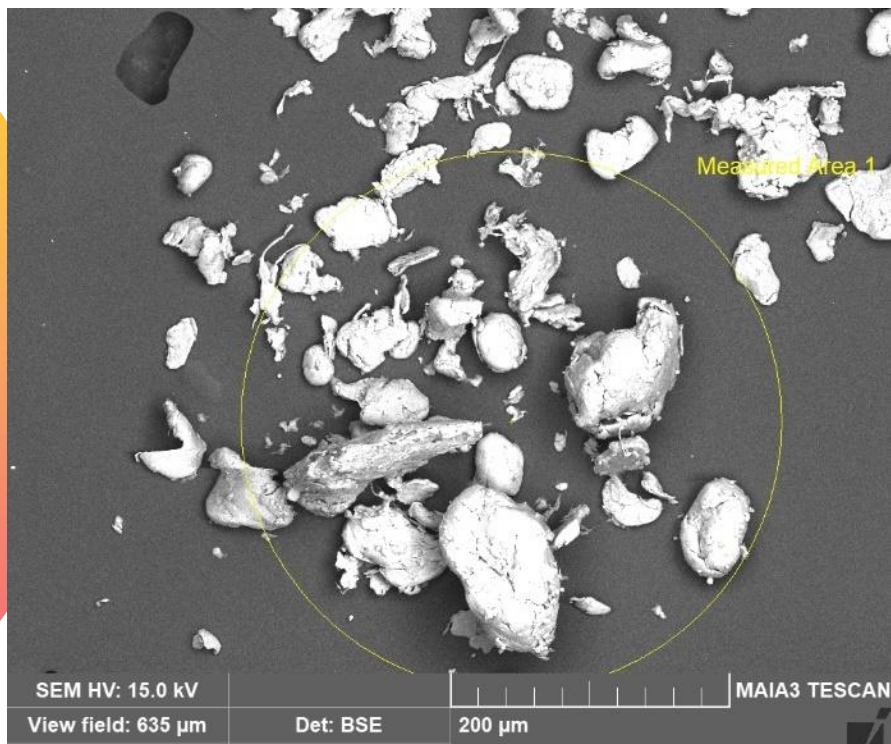
1 μm

10 μm

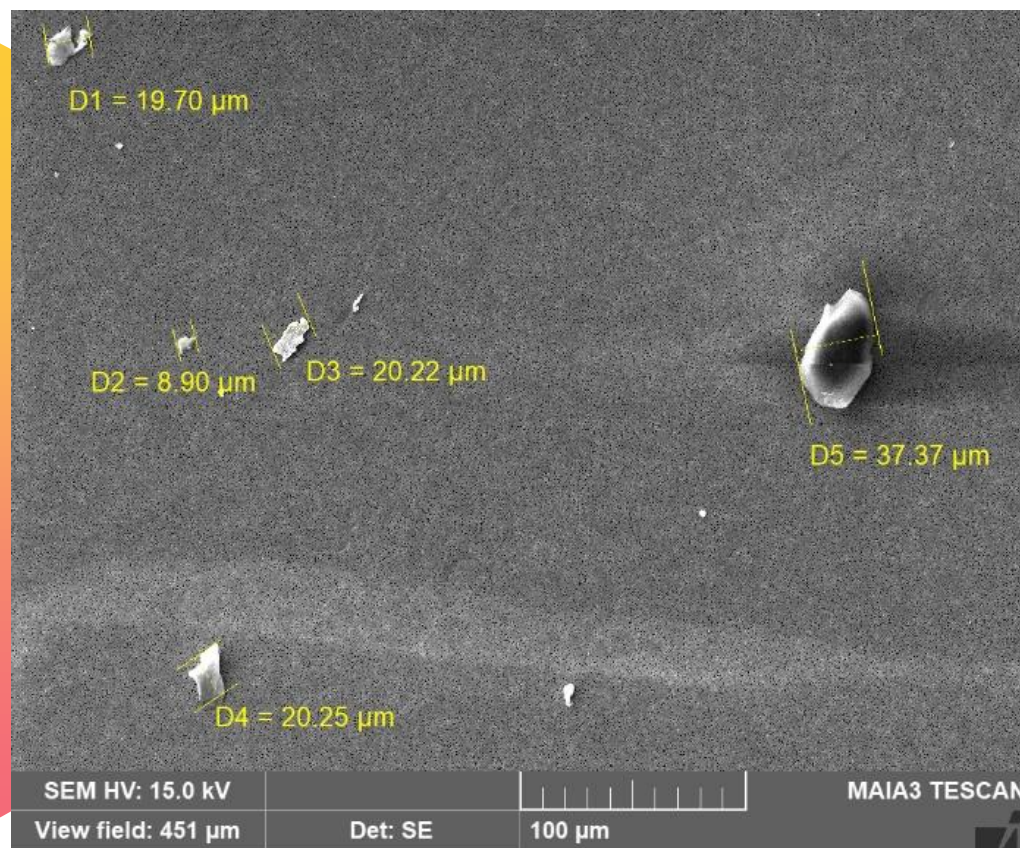
100 μm



Inorganic contamination



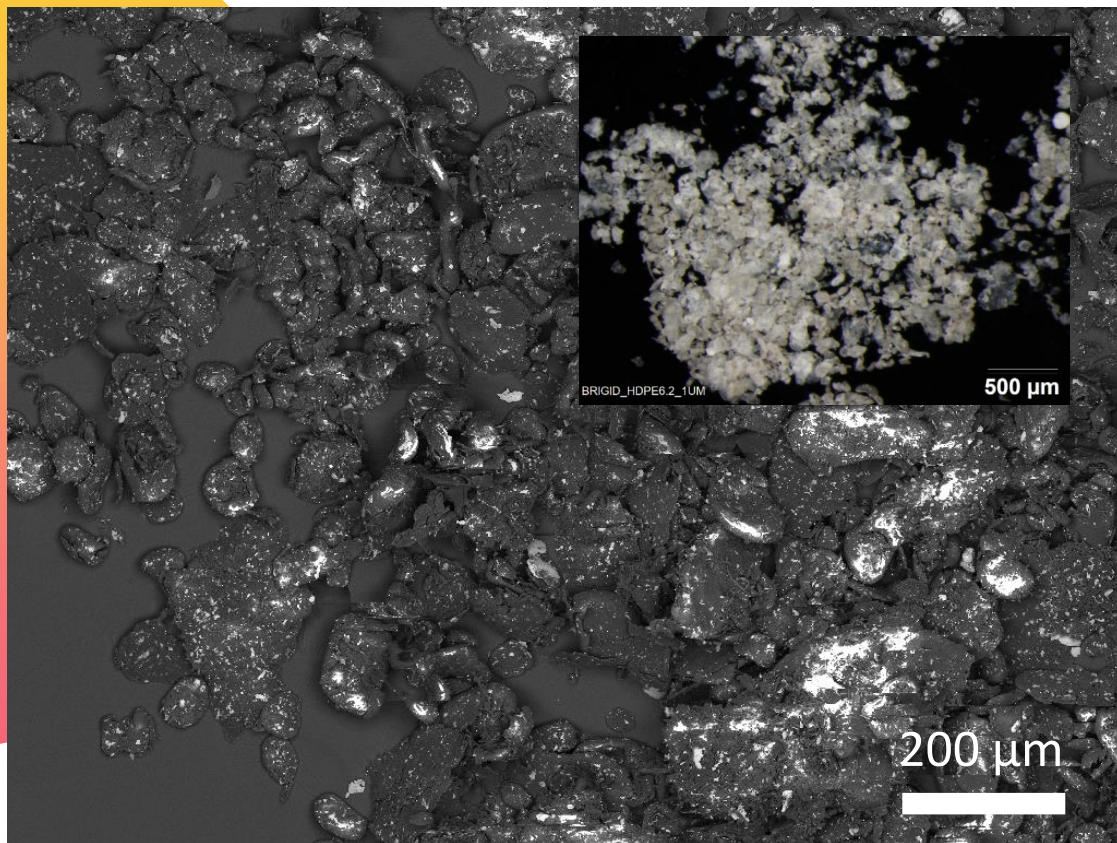
Inorganic contamination (cont.)



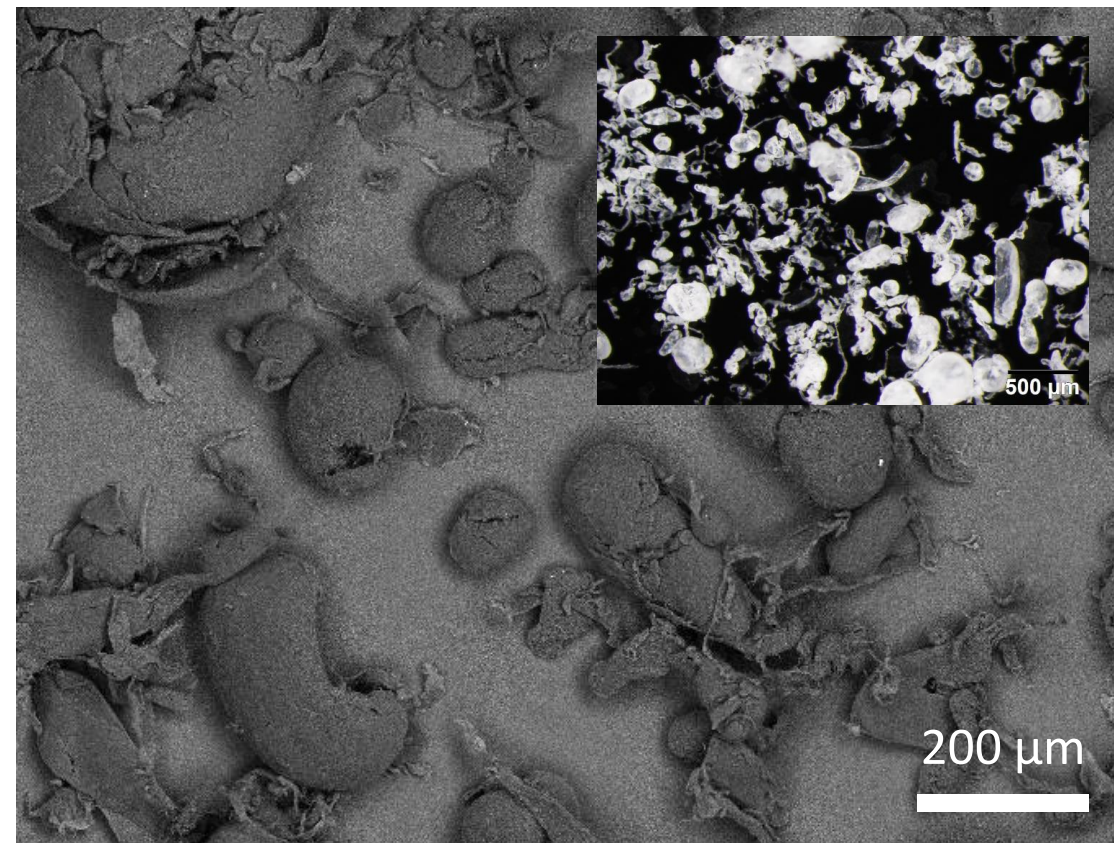
Particle	Size (μm)	Elemental Comp.	Identification
1	19.70	C, O, Cl	PVC (clean)
2	8.90	C, O, Cl	PVC (clean)
3	20.22	C, O, Fe, Ni, Cr, Mn	Stainless Steel
4	20.25	C, N, O, Ca	Organic
5	37.37	C, N, O Na, S	Organic

Trouble in paradise: HDPE

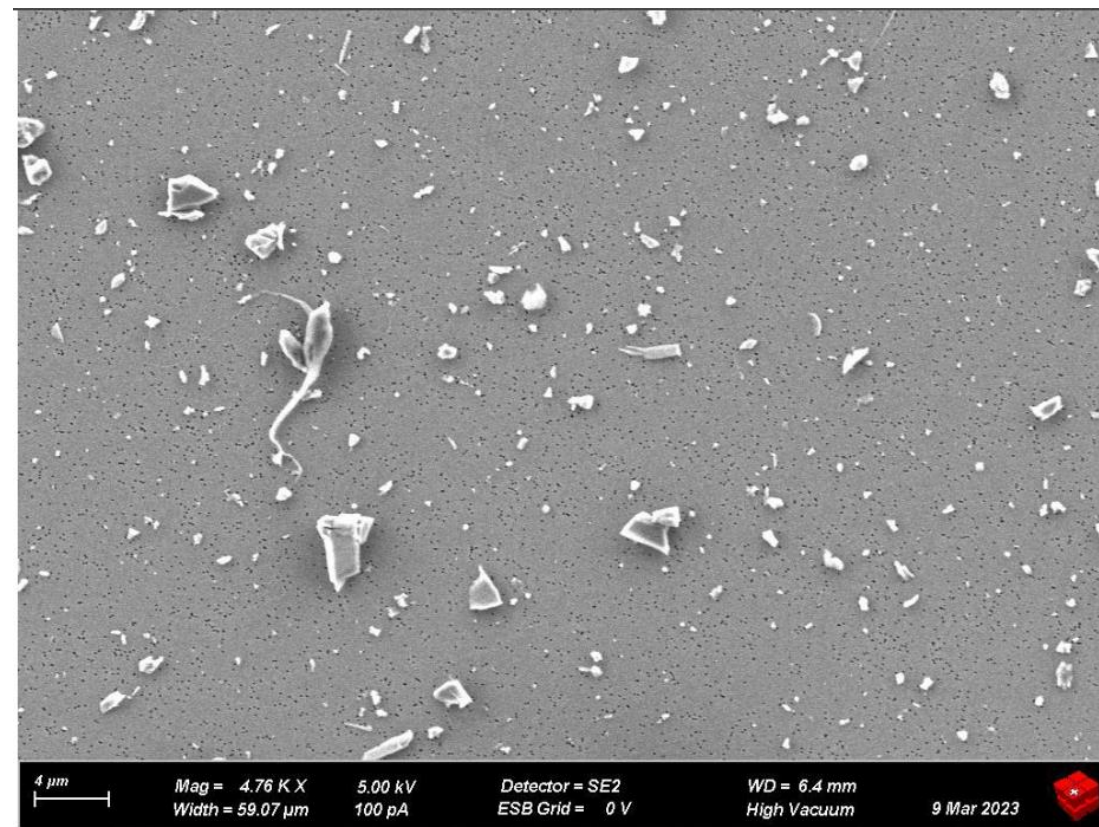
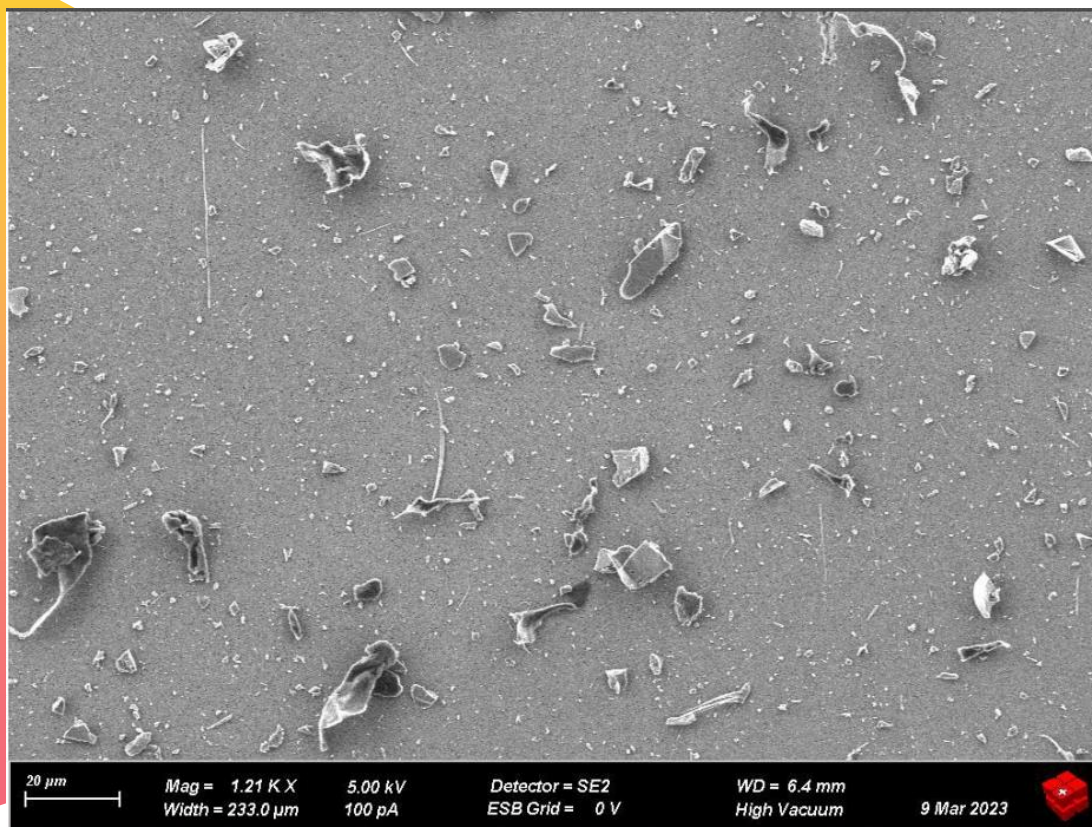
Before optimisation



After optimisation

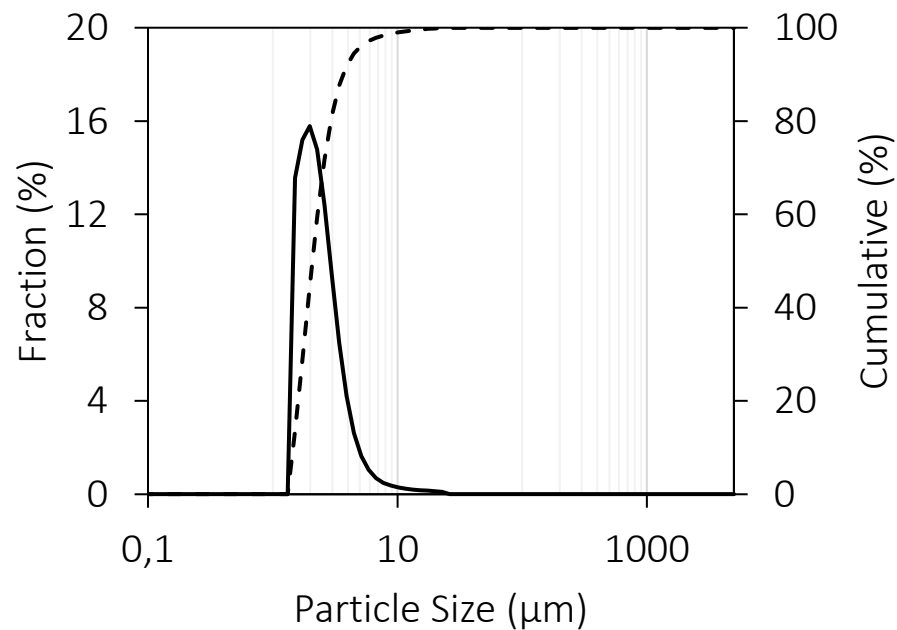


HDPE: SEM images



“Ghost” small particles

Number

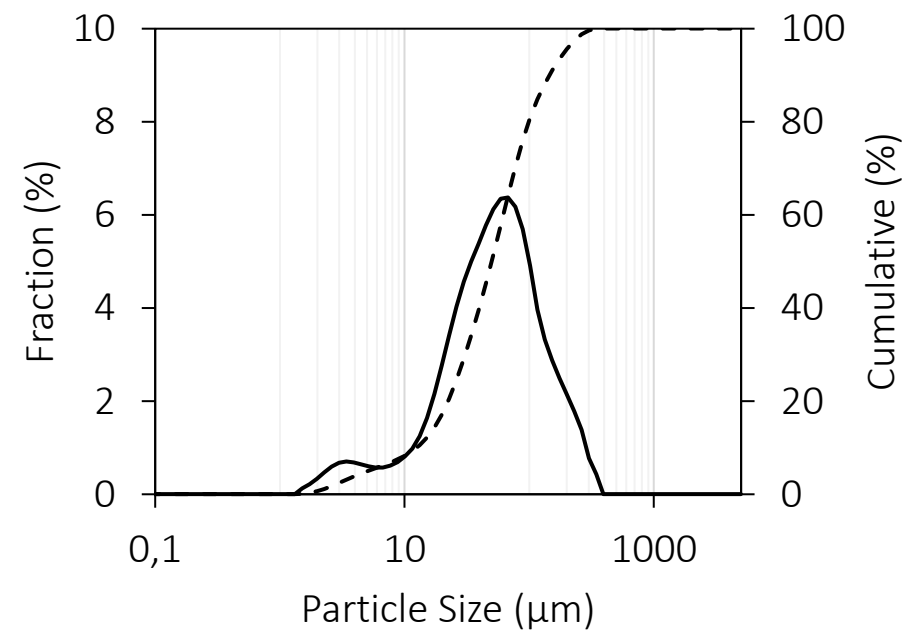


D10 = 1.5 µm

D50 = 2.1 µm

D90 = 3.7 µm

Volume

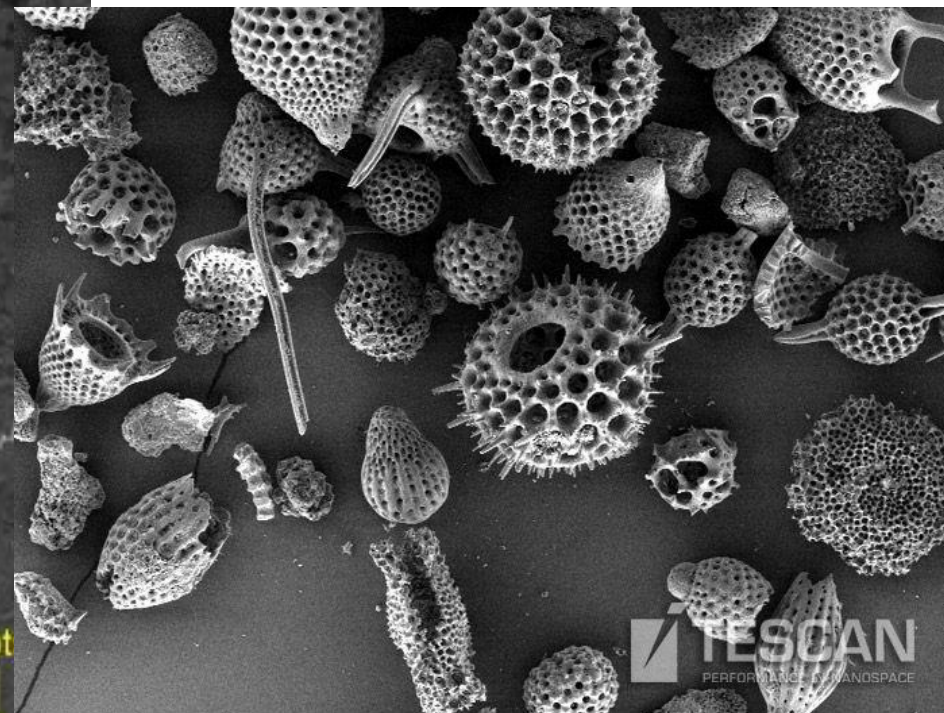
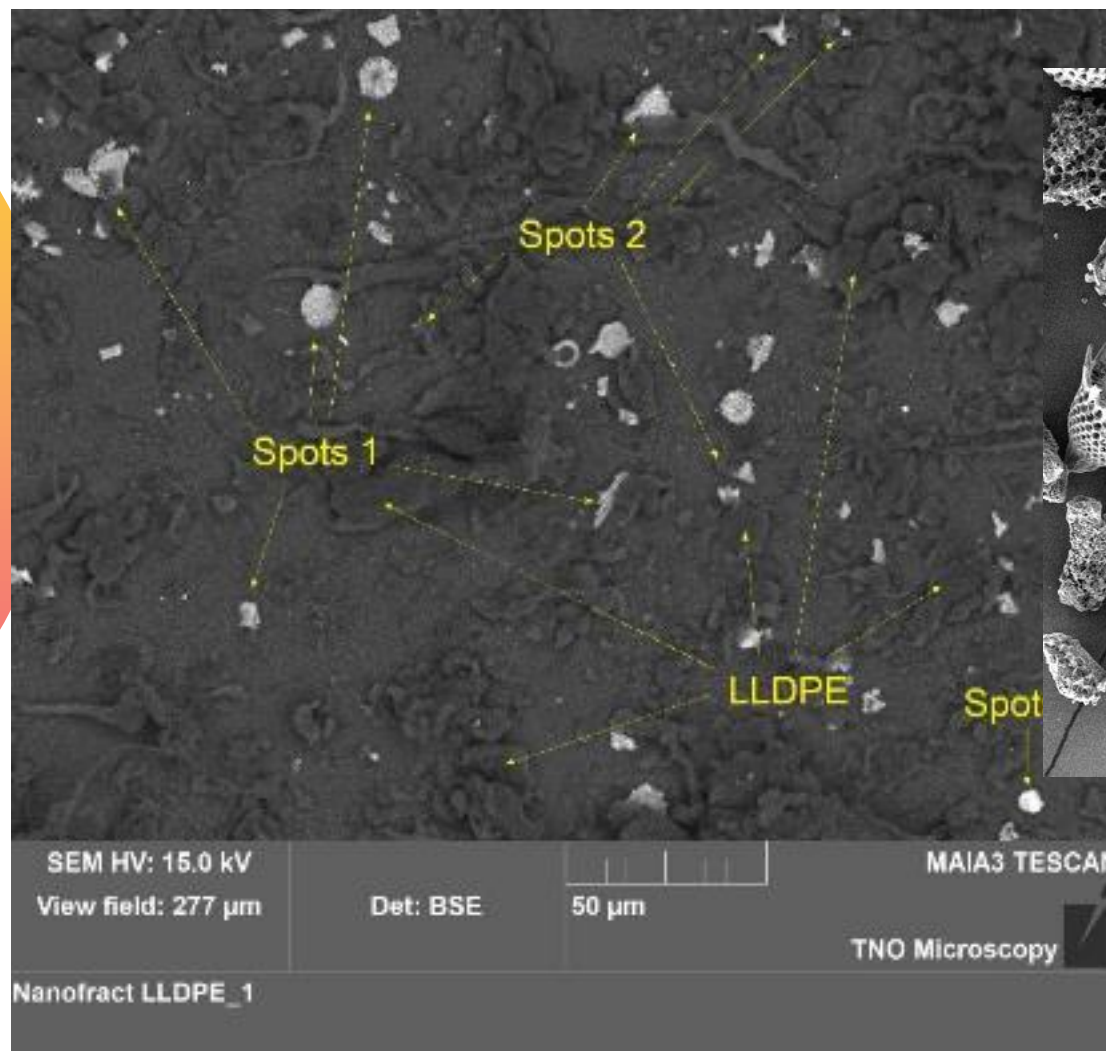


D10 = 12.5 µm

D50 = 49.9 µm

D90 = 145.4 µm

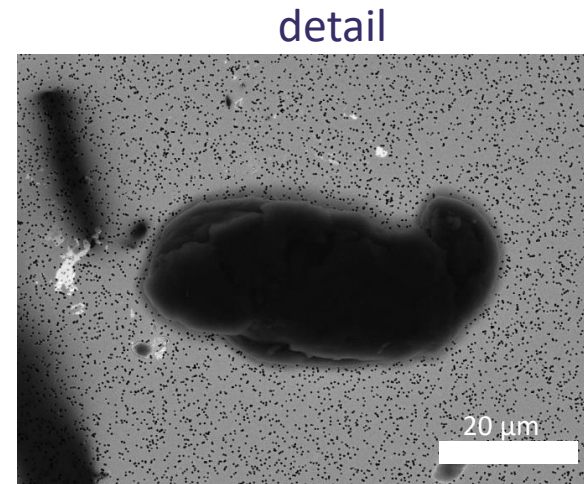
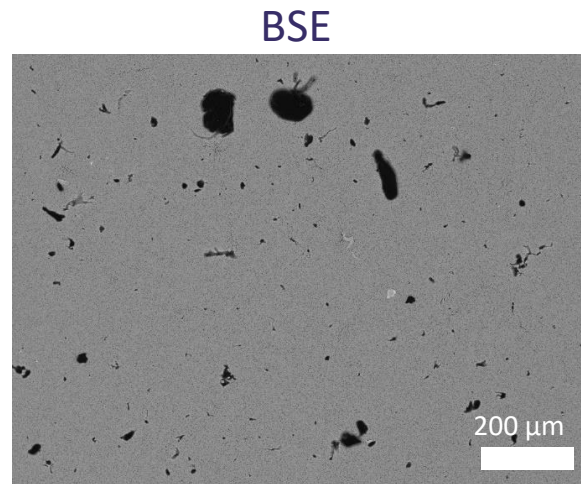
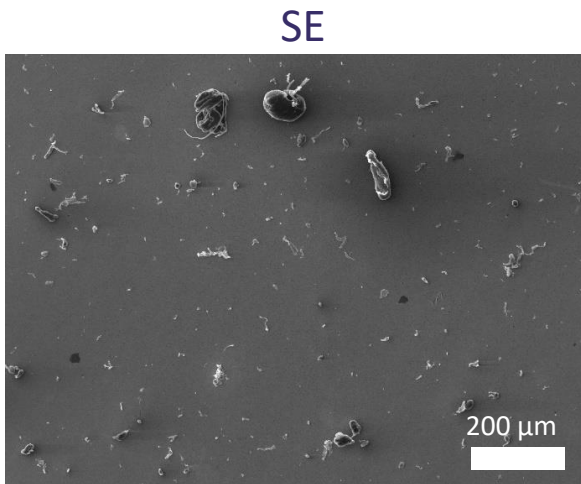
More trouble: LLDPE



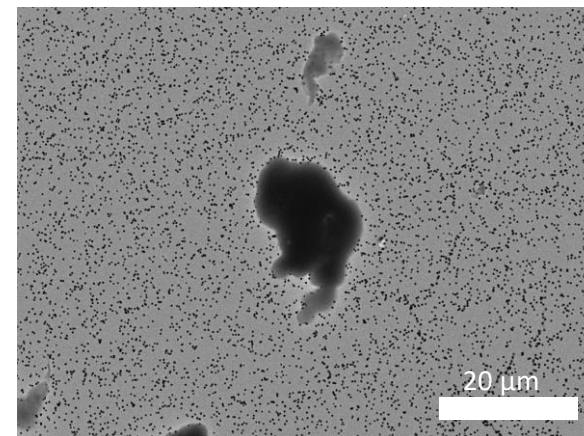
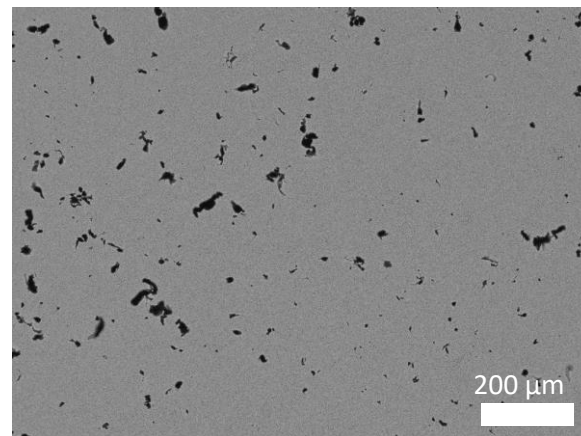
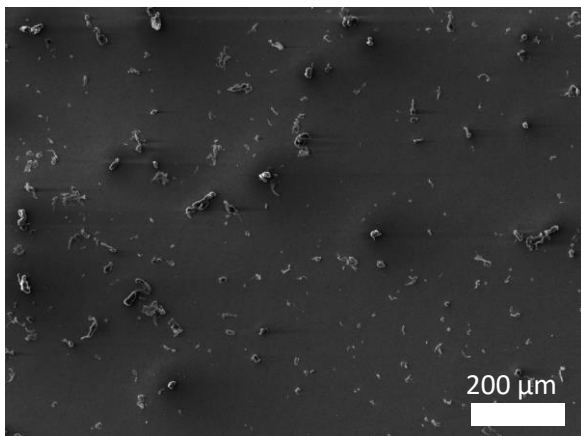
Diatomaceous earth is used as an anti-stick additive for films

PP 2.4 SEM images

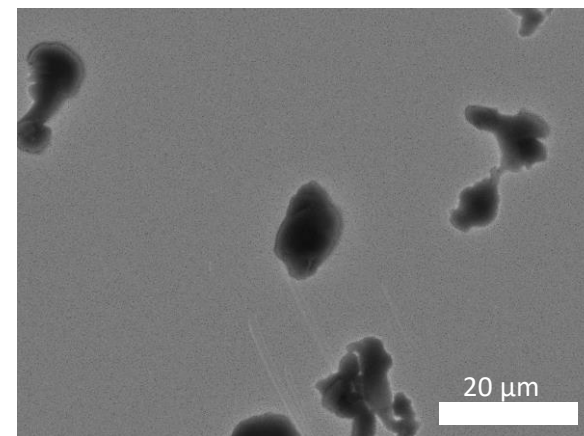
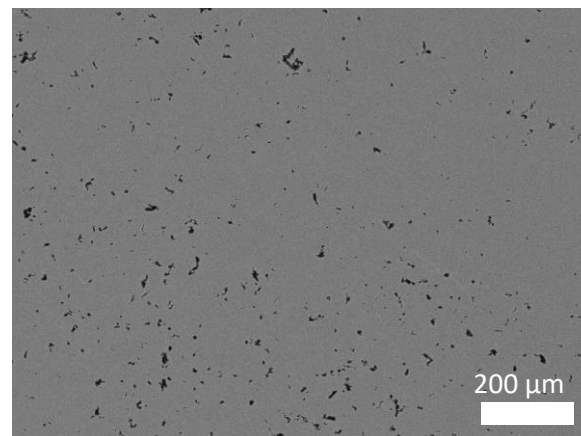
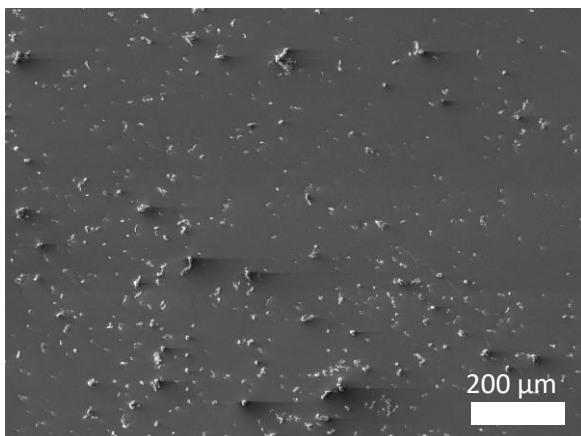
100 micron



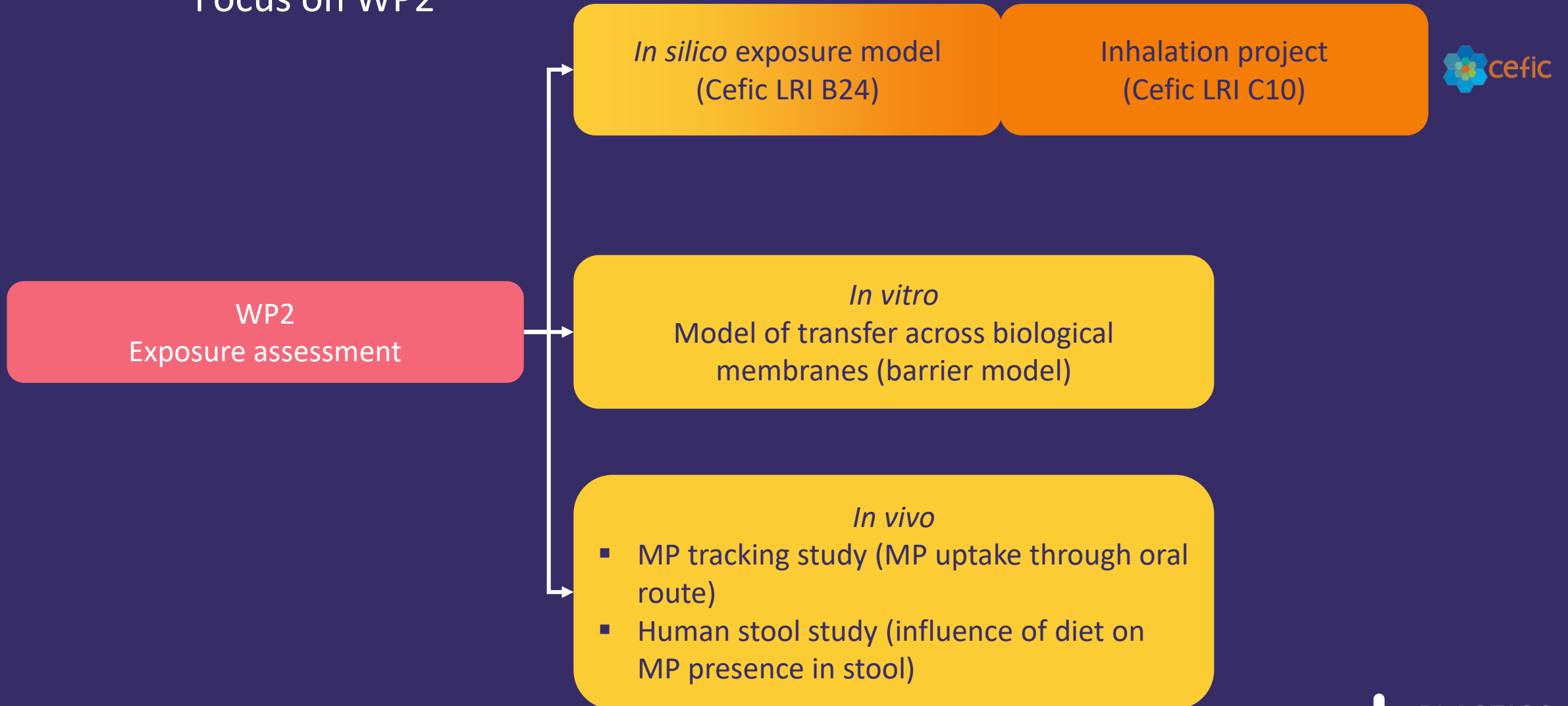
10 micron



1 micron



Focus on WP2



Human stool study

Pilot study aiming **to quantify the microplastics in the stools of 15 human volunteers**, following the initial study of Schwabl *et al.* (2019). The study will analyse the variation in quantity of microplastics detected in the stool samples after the volunteers eat three different types of food:



High exposure

- processed and plastic-packaged foods
- plastic utensils and cutlery



Normal diet

- both ready-made foods and foods cooked from scratch
- mixture of plastic and non-plastic utensils



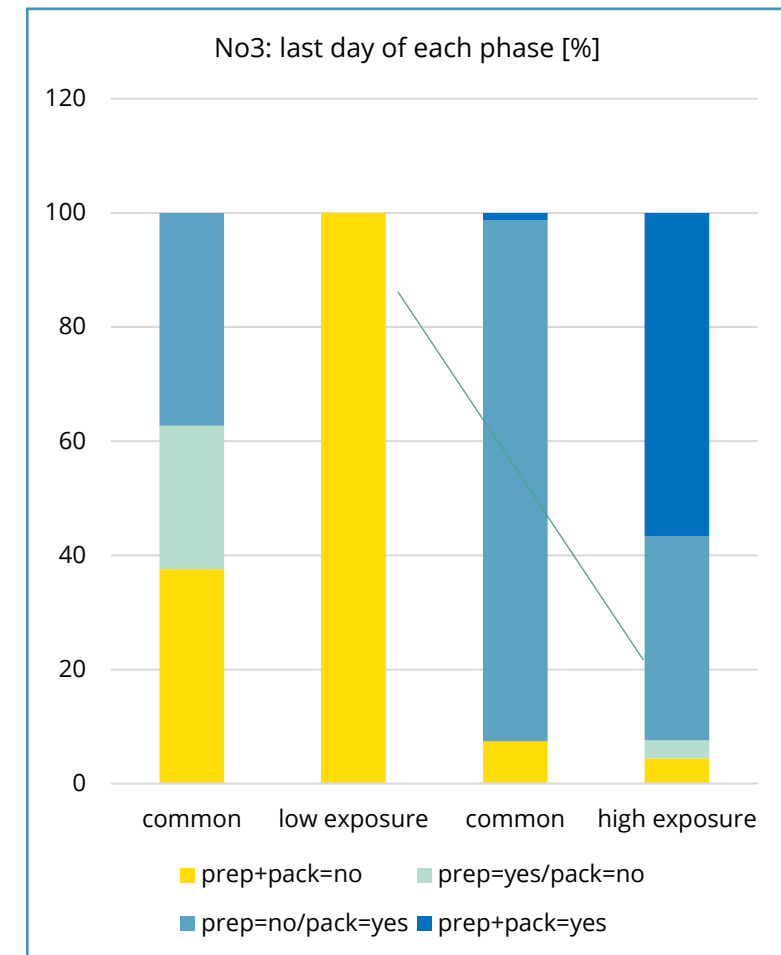
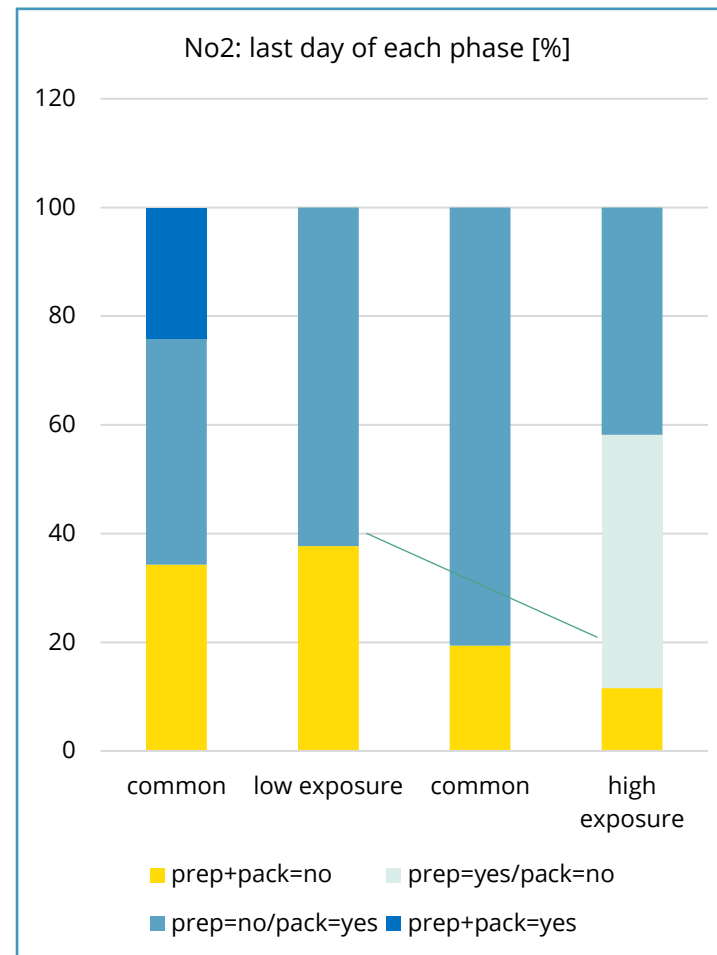
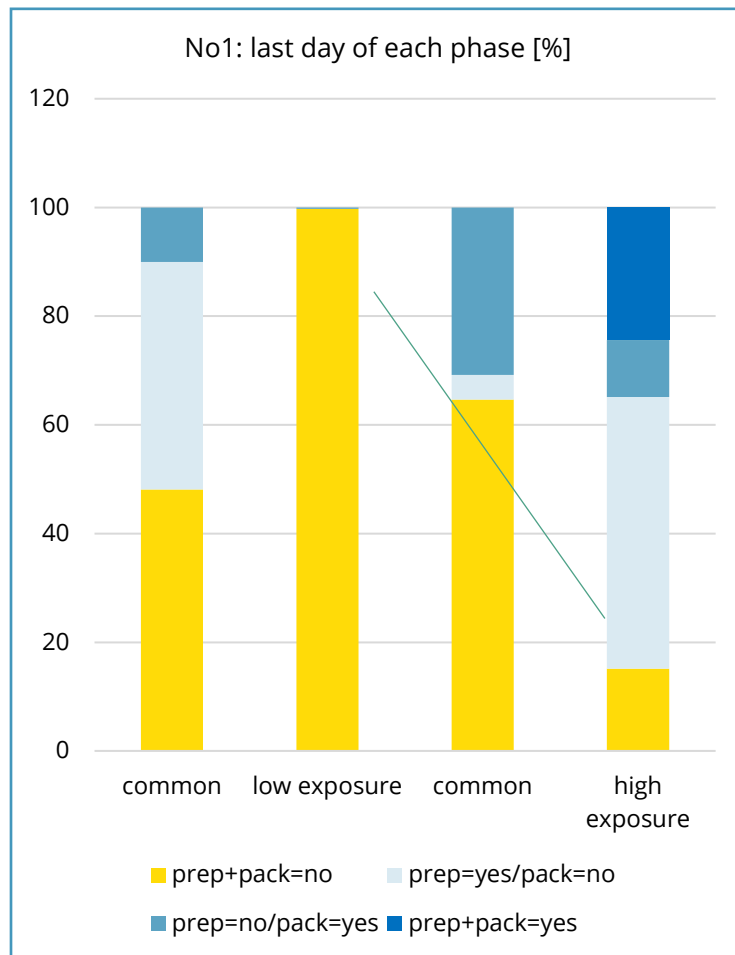
Low exposure

- food cooked from scratch
- packaged and cooked in/with non-plastic materials

Human stool study progress



USE OF PLASTICS IN FOOD PREPARATION AND FOOD PACKAGING DURING DIFFERENT PHASES OF INTERVENTION





brigid

bridging the knowledge
gap on microplastics'
impact on human health

Thank you for your attention

camilla.carteny@plasticseurope.org

