

STUDY OF THE BIOAVAILABLE FRACTION OF METALS DERIVED FROM POLYLACTIC ACID (PLA) MICROPLASTICS (MPs)

SETAC EUROPE 33RD ANNUAL MEETING

30 APRIL - 4 MAY 2023 | DUBLIN, IRELAND + ONLINE

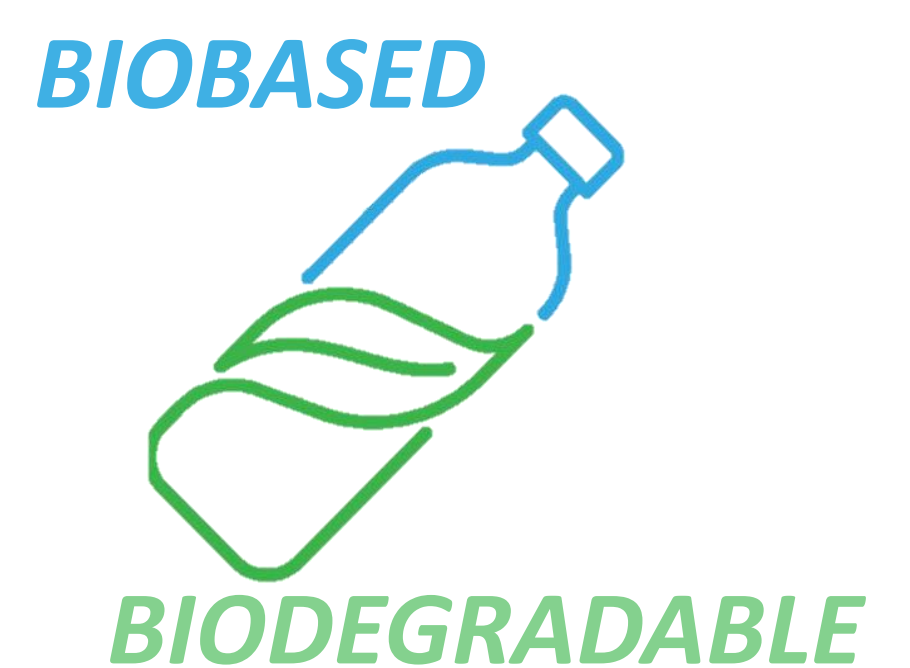
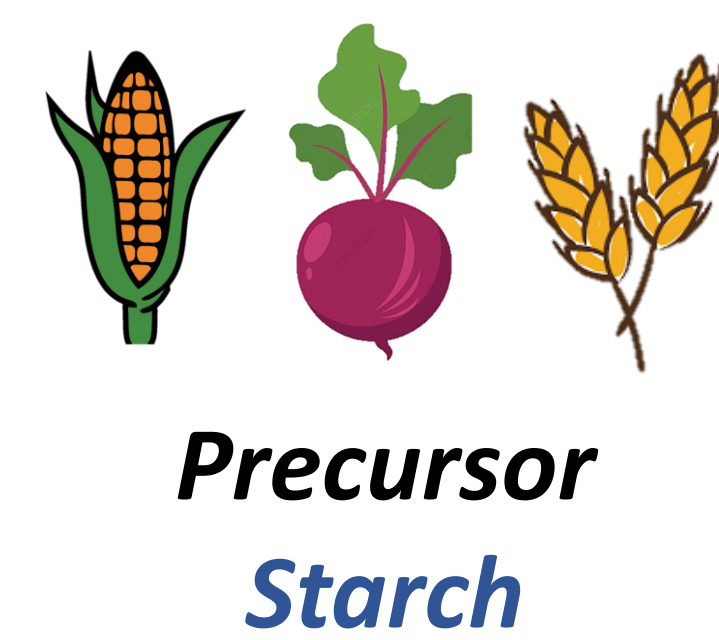
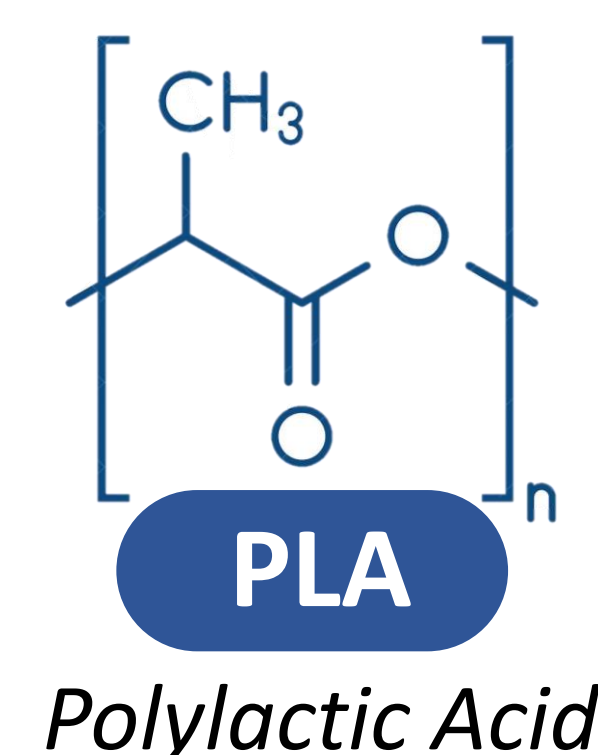
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European Union Plastic Estrategy

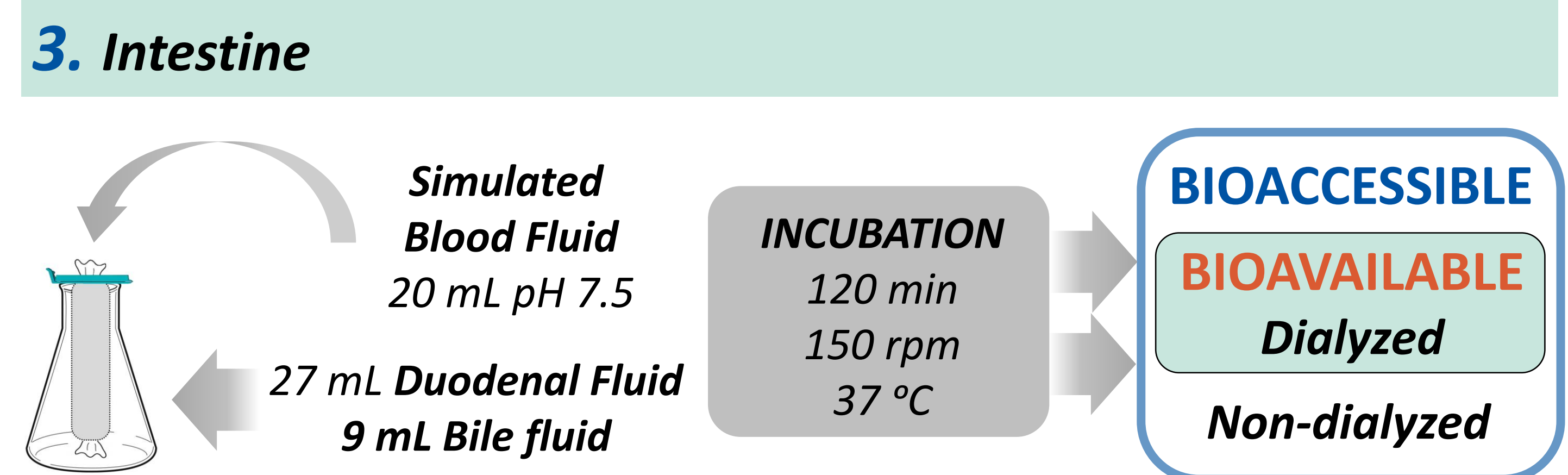
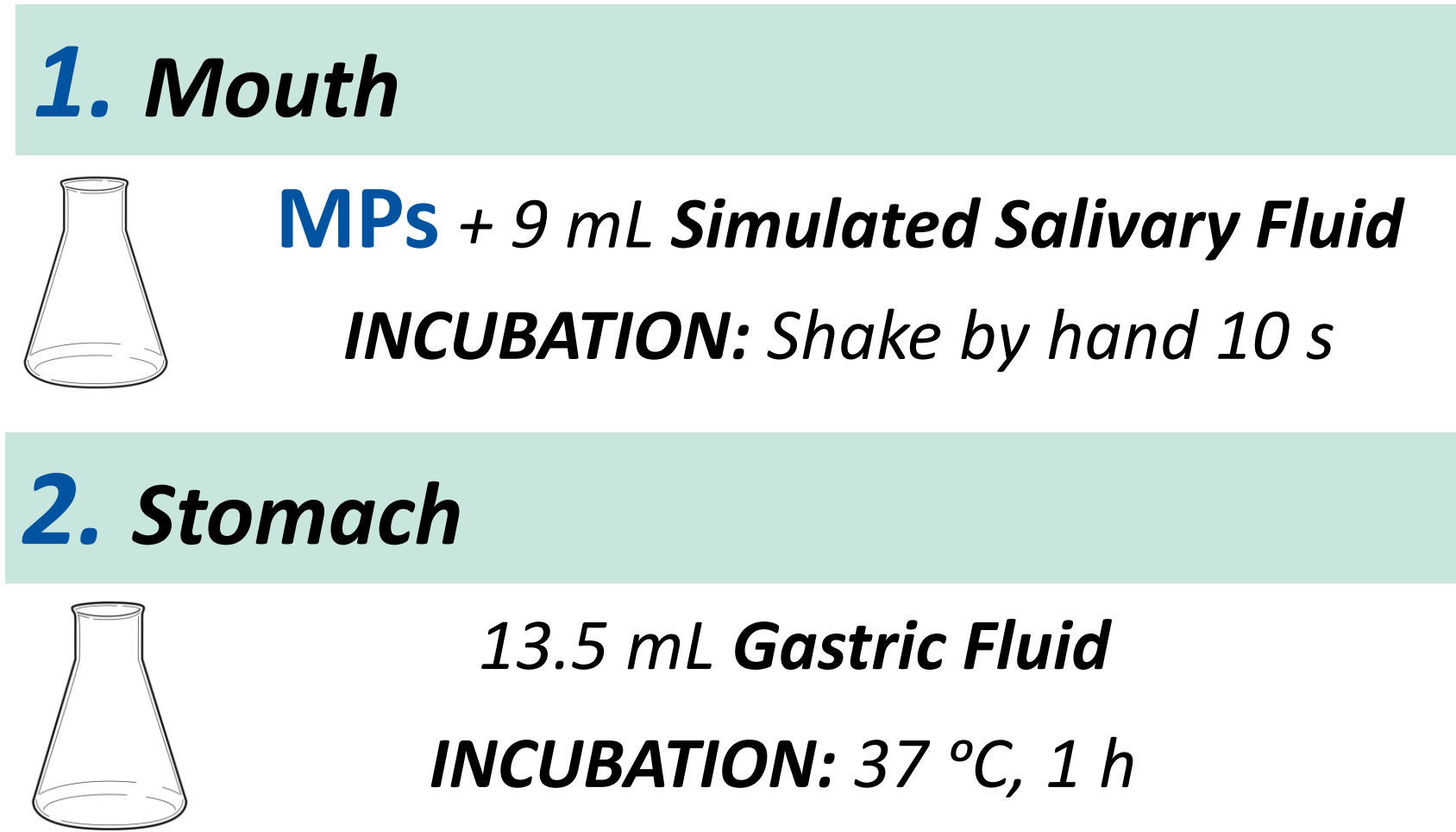
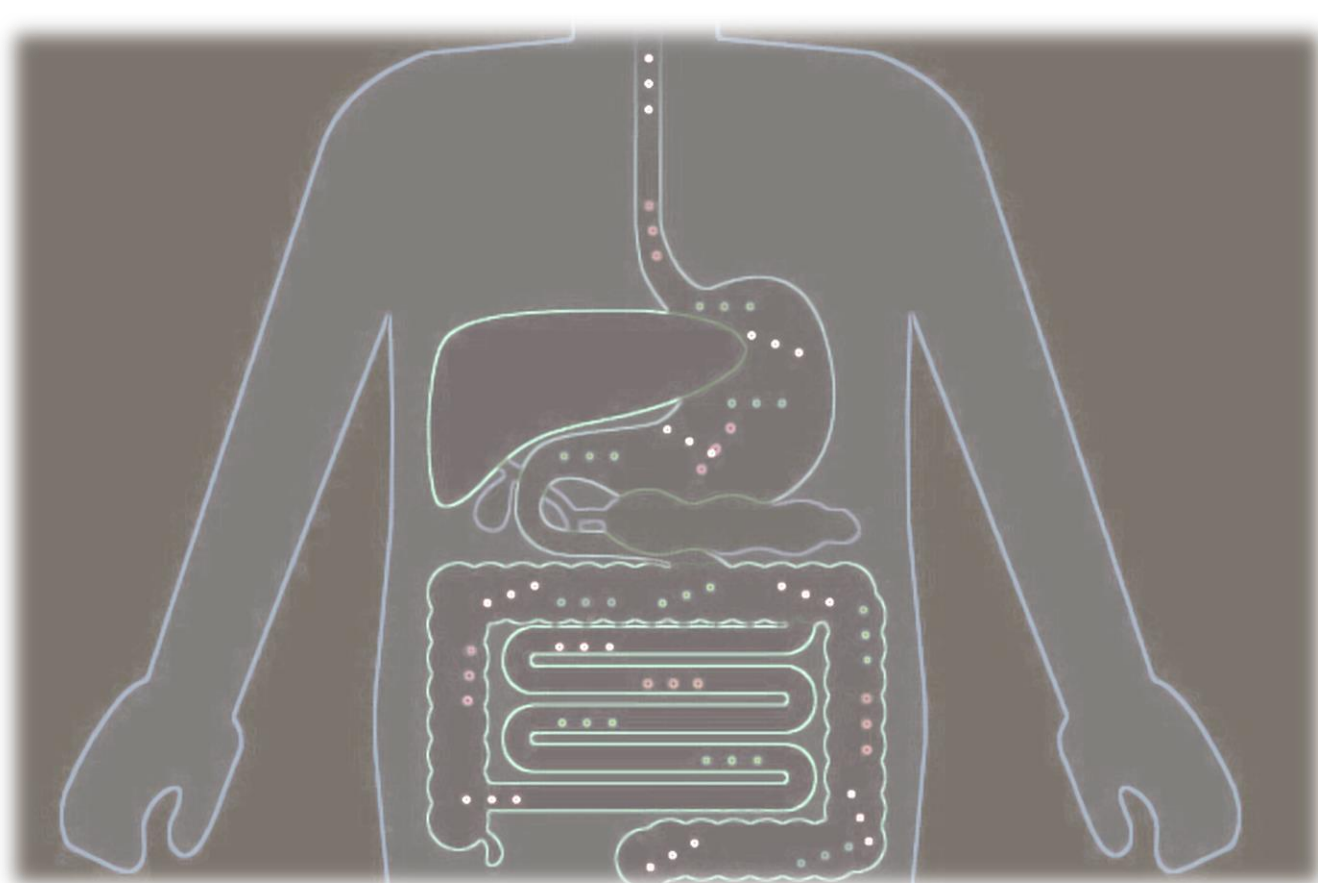


RECOGNIZE health and environmental risks.
RESTRICT uses.
REDUCE wastes.
REUSE or **RECYCLE** all plastic packaging.

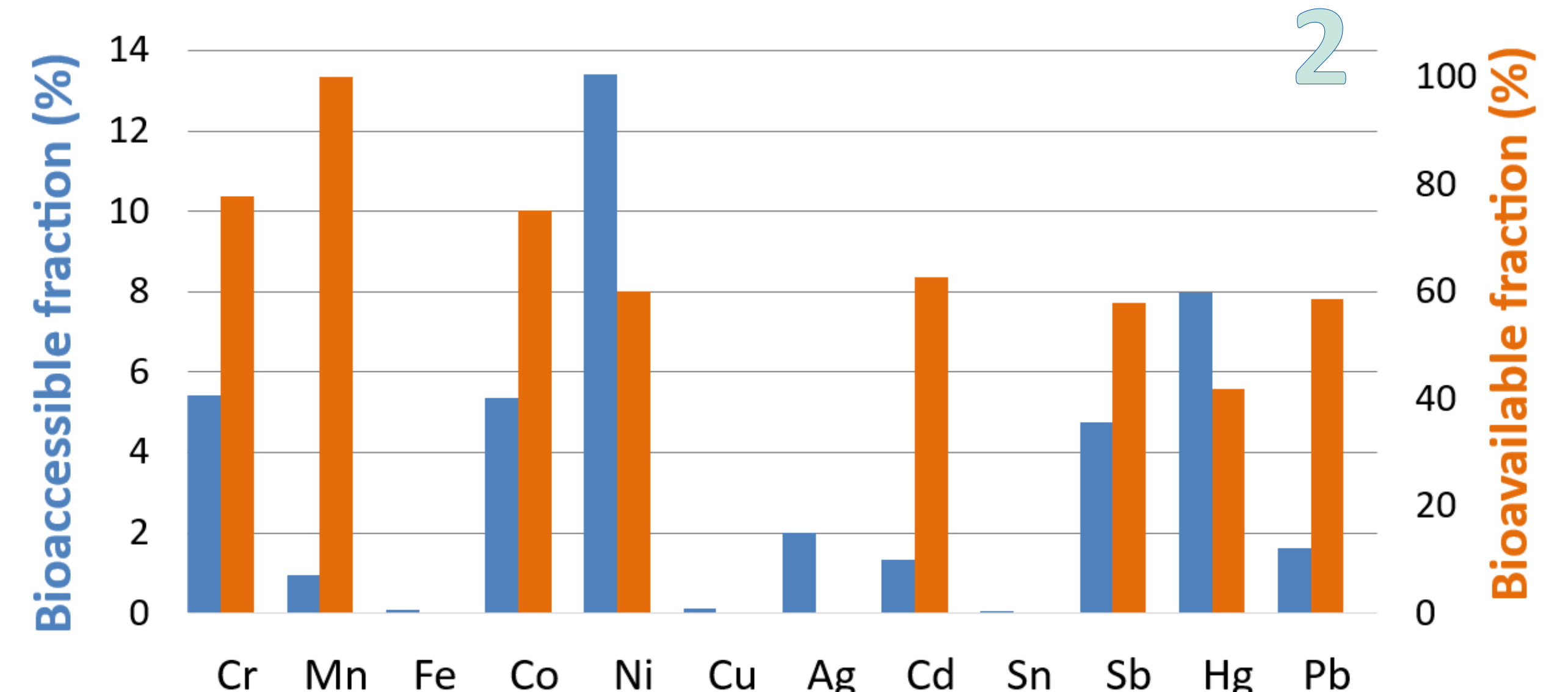
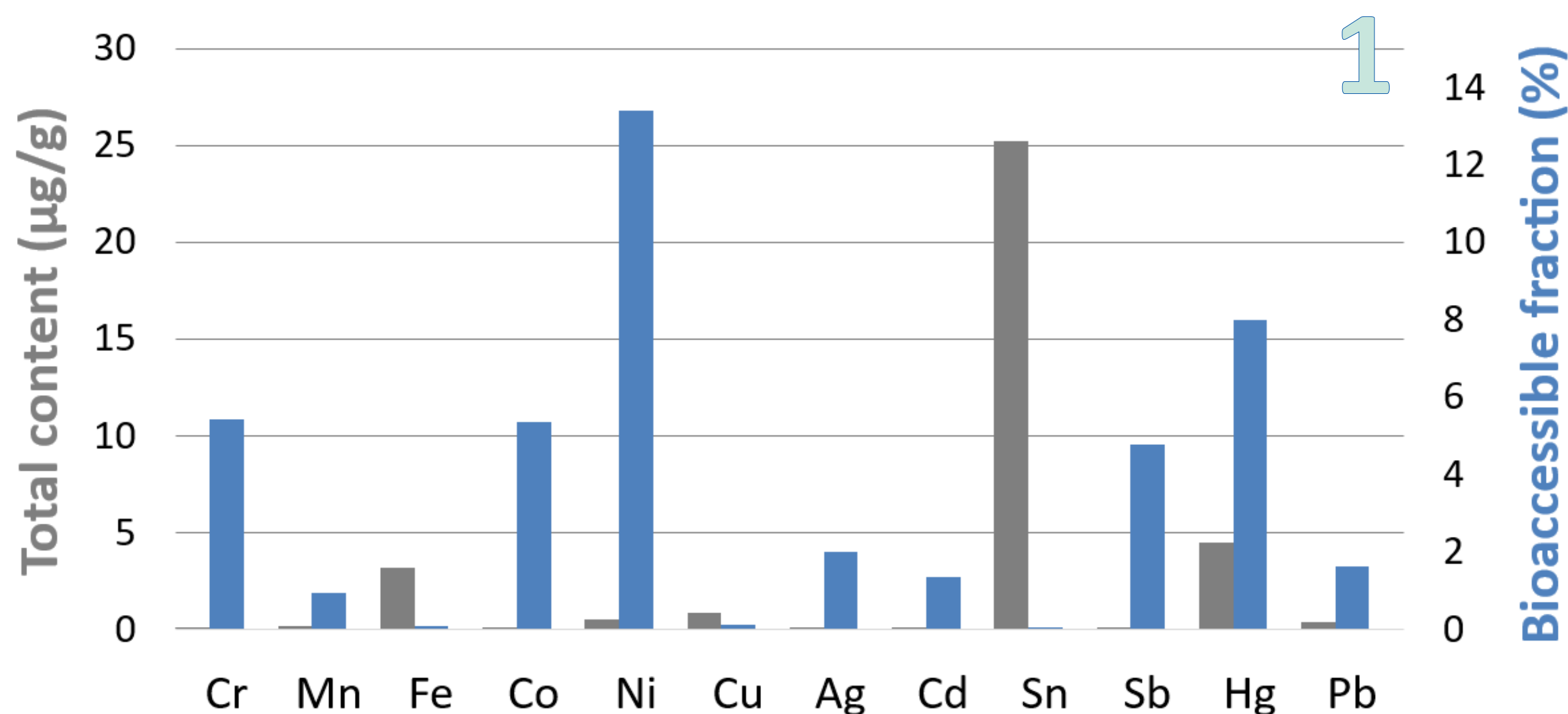


Metallic additives potential risk estimation

IN VITRO HUMAN ORAL DIGESTIVE PROCEDURE FOR METAL BIOAVAILABILITY ASSESSMENT¹



RESULTS & DISCUSSION



- Several metals were found in PLA, mainly derived from conventional polymerization of lactides.² Sn presented the highest content, ca. 25 µg/g; being < 2 µg/g for other metals. The maximum **BIOACCESSIBLE** fraction was 13% for Ni and 8% for Hg; 5% for Sb, Cr and Co; 1-2% for Pb, Mn and Cd; < 0,1% for Fe, Cu, Sn and Ag.
- 40-80 % of the **BIOACCESSIBLE** fraction was **BIOAVAILABLE** for majority of metals. For Fe, Cu, Ag, Sn this **BIOAVAILABLE** fraction was negligible.
- From the total metal content in PLA microplastics only a small fraction was **BIOAVAILABLE**. Ranging 3-8% for Cr, Co, Ni, Sb and Hg; < 1% for Mn, Cd and Pb and negligible for Sn, Fe, Cu and Ag.

Conclusions

- Low bioavailability (< 8%) was obtained for the metals studied.
- Sn exhibited a high concentration in PLA, but no bioaccessible and bioavailable fractions to humans were found for this metal.

To considerer any biopolymer as truly sustainable alternatives, the potential environmental and human risks derived from their use must be continuing deeply assessed.

References

- [1] BARGE/INERIS "UBM procedure for the measurements of inorganic contaminant bioaccessibility from solid matrices", 2011, <http://www.bgs.ac.uk/barge/ubm.html>.
 [2] Pretula, S. Slomkowski, S. Penczek, Advanced Drug Delivery Reviews, 107 (2016) 3-16.

Acknowledgements

Terán-Baamonde acknowledges Xunta de Galicia for the postdoctoral grant (ED481B-2021-090). This work was supported by Ministerio de Ciencia e Innovación (Ref: PID2019-108857RB-C31), MicroplastiX project (Ref. PCI2020-112145) from JPI Oceans program, Labplas Project (Grant No. 101003954) from EU Horizon2020, and Galician Government Xunta de Galicia (Ref: ED431C 2021/56).

