EJP SOIL BioCASH

ASSESMENT OF THE PRESENCE OF MICROPLASTICS IN COMPOST SAMPLES

Paloma Sánchez-Argüello[1], Gema Sáez-Salto[1], Simon Weldon[2], Pierre-Adrien Rivier[2], Alice Budai[2] and Antonio Martín-Esteban[1]

[1]National Institute for Agricultural and Food Research and Technology (INIA), Spanish National Research Council (CSIC), Madrid, Spain
[2]Norwegian Institute of Bioeconomy Research (NIBIO), Ås, Norway

*Presenting author: arguello@inia.csic.es

EJP SOIL European Joint Programme

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

CSIC Consejo Superior de Investigaciones Científicas

INIA Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria

NIBIO Norsk institutt for bioøkonomi

OBJECTIVE

To evaluate the **presence of microplastics** in two different **compost samples** and corresponding feedstocks

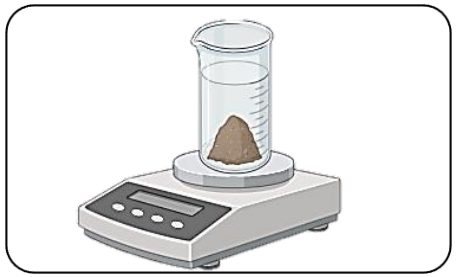
SAMPLES

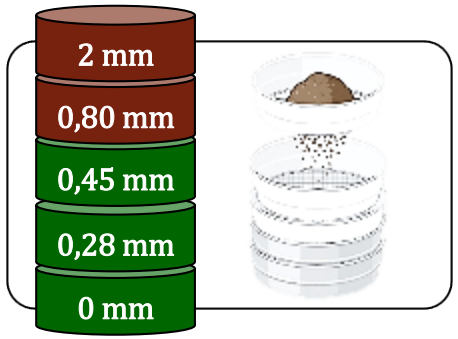
Substrate: mix of 55% household food waste and 45% animal manure
Biochar: mixed wood pyrolysed at 550°C HTT (Highest Treatment Temperature)
Compost 1: substrate (30 L) + wood shavings (68 L) + wood chips (20 L)
Compost 2: substrate (30 L) + wood shaving (65 L)+ wood chips (20 L) + **biochar** (3 L)

Composting conditions: Composts were turned daily during the thermophilic stage (3 weeks above 50°C with peaks above 65°C) and then turned every second week during the maturation phase (about 6 month).

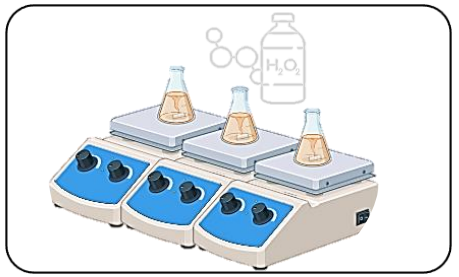
METHODS

5 g of sample

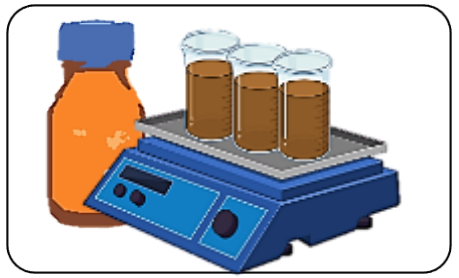


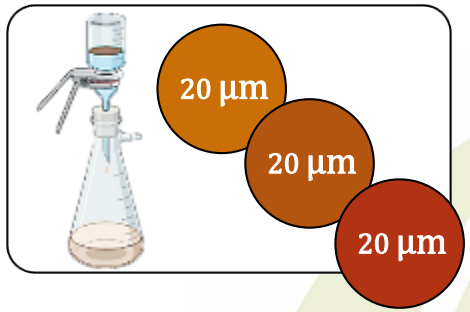


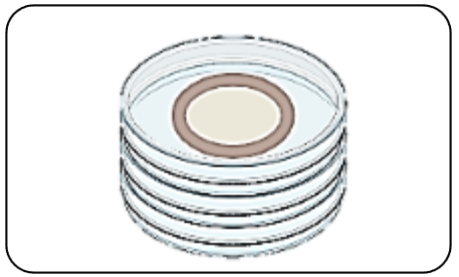
10 ml H_2O_2, 24 h
under stirring

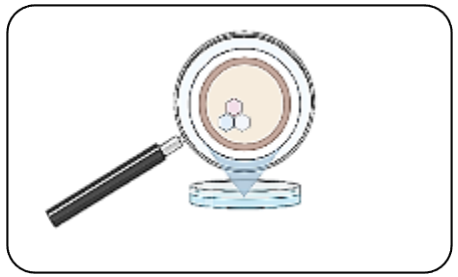


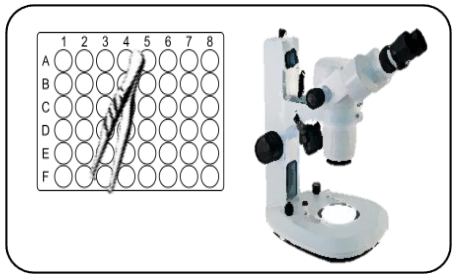
100 ml $ZnCl_2$ (d= 1.6 mg/l)
1.5 h under stirring
2 h sedimentation

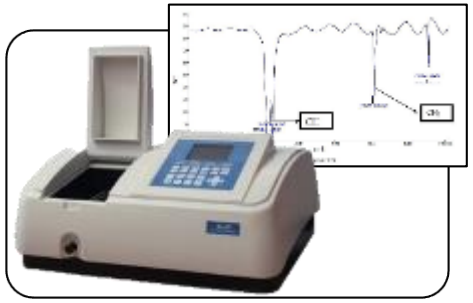










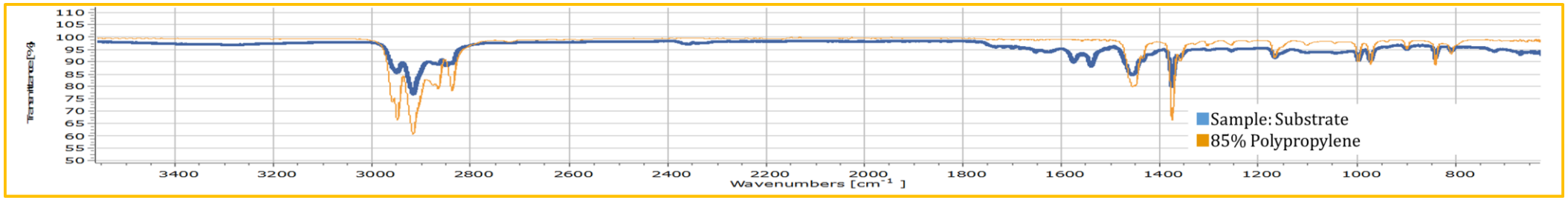


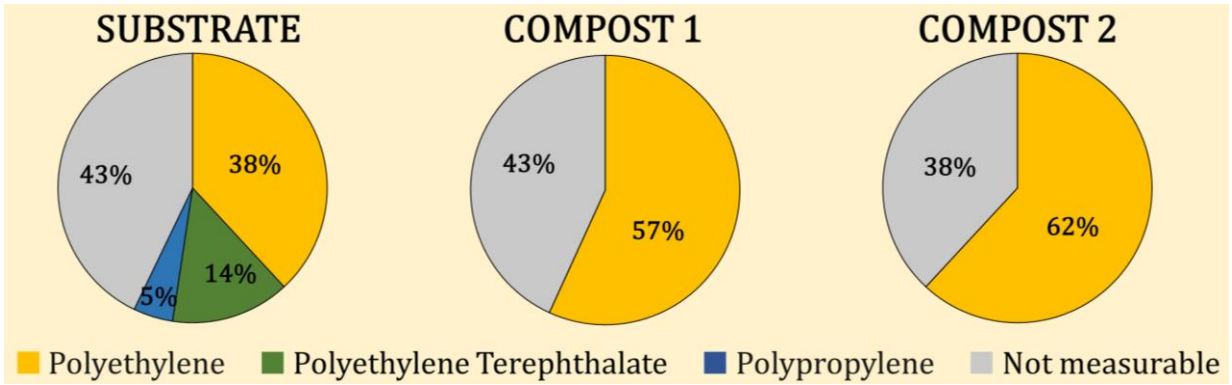
EJP SOIL
European Joint Programme

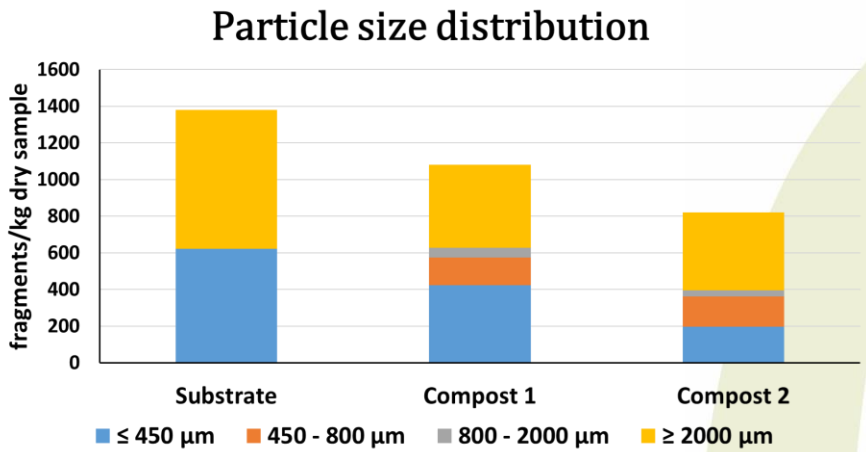
RESULTS

EXAMPLE

SUBSTRATE	Texture	Hard
	Colour	Red
	Size	>2000 µm
	Composition	Polypropylene







EJP SOIL
European Joint Programme

CONCLUSIONS

- The estimated **concentration of microplastics ranged from 820 to 1340 fragments/Kg** of dry sample range, depending upon the sample.

- Three polymers represented the totality of **identified plastic items**: **polyethylene** (including both low and high density), **polyethylene terephthalate** and **polypropylene** in order of abundance.

- Fragments presented different shape, size and colour.

- Although an effect due to 'dilution' with wood additives cannot be ruled out, **the results obtained suggest that microplastics are further fragmented during composting.**

- Finally, **further research is needed to determine whether biochar in compost enhances microplastic fragmentation**, as the lower levels of microplastic fragments observed in our study could be explained by an increase in fragments not measurable with our method (i.e. extremely small fragments and nanoplastics).

ACKOWLEDGEMENTS

EJP SOIL has received funding from the European Union's Horizon 2020 research and innovation programme: Grant agreement No 862695

EJP SOIL
European Joint Programme