University of Stuttgart
Institute for Sanitary Engineering, Water Quality
and Solid Waste Management

Microplastics in compost and digestate from biowaste treatment plants and their input into soils

- Recording, evaluation, avoidance

Hildemar Mendez

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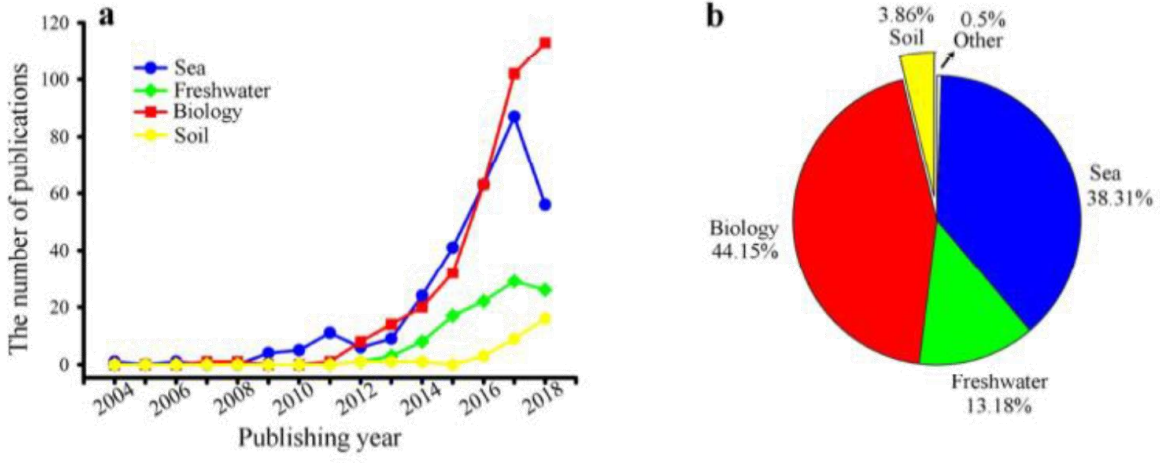
iswa

- **Universität Stuttgart**
  - Institut für Siedlungswasserbau, Wassergüte- und Abfallwirtschaft (ISWA)
  - Institut für Kunststofftechnik (IKT)
  - Institut für Biomaterialien und biomolekulare Systeme (IBBS)
- **Universität Hohenheim**
  - Institut für Bodenkunde und Standortslehre (IBS)
- **Universität Bayreuth**
  - Lehrstuhl für Tierökologie I (TÖK I)
  - Lehrstuhl für Bioprozesstechnik (BPT)
- **Fraunhofer Institut für Chemische Technologie ICT**

Why this research on soil?

- Little research on the introduction, exposure, and hazards of plastics in terrestrial ecosystems
- Contribution of compost and digestate from biowaste treatment plants on the introduction of microplastics (MP) into the soil



Number of publications about microplastic pollution in different types of environment matrices

Source: He et al. 2018

Objectives

Investigate the behaviour of plastics during the aerobic and anaerobic degradation of biowaste

- ✓ PE, PLA, PBAT/PLA-Blends

How does the process conditions affect the behavior of plastics and their fragmentation into microplastic?

- Temperature
- Degree of mechanical stress
- Retention time

Laboratory installation

a

b

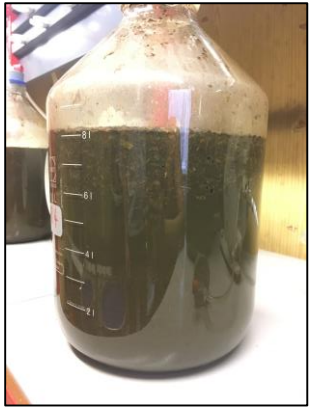
c

a) Compost tumbler

b) Mesophilic anaerobic digestion

a) Thermophilic anaerobic digestion

Product



- Sample taking
- Plastic films extraction
- Plastic films analysis

Plastic films extraction

- Bundesgütegemeinschaft Kompost (BGK)
  - Dry temperature 105 °C
  - Sizes 10 mm, 5 mm, and 2 mm
  - MP < 5 mm

Development of a methodology to extract MP from compost and digestate from 5 mm to 0,5 mm

Topics

- Continuation on the methodology for bioplastics → End of March/April

- From macroplastics to microplastics during a composting process → From now!

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Thank you!

Hildemar Mendez

e-mail Hildemar.mendez@iswa.uni-stuttgart.de
phone +49 (0) 711 685-63785
fax +49 (0) 711 685-65460

University of Stuttgart
Institute for Sanitary Engineering, Water Quality and Solid Waste Management
Chair of Waste Management and Emissions
Bandtäle 2
70569 Stuttgart
Deutschland