

Biodegradable plastics: challenges and opportunities in food waste anaerobic digestion – a stakeholder analysis

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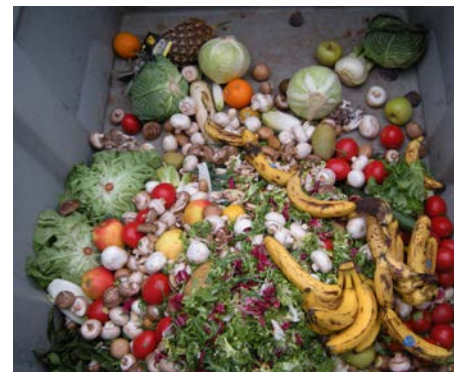
The bigger picture

- Plastic pollution: more than 12,000 Mt accumulated by 2050¹
- Majority of plastics are single-use²
- Calls for a shift to bio-based and biodegradable alternatives³
- Bioplastics as part of the circular bioeconomy
- Closing the resource loop through organics recycling (OFMSW)



Policy: Separate food waste collections 2023

- Huge opportunity for anaerobic digestion (AD) - **BUT**
- Feedstock contamination (60% plastics)⁴



en.wikipedia.org

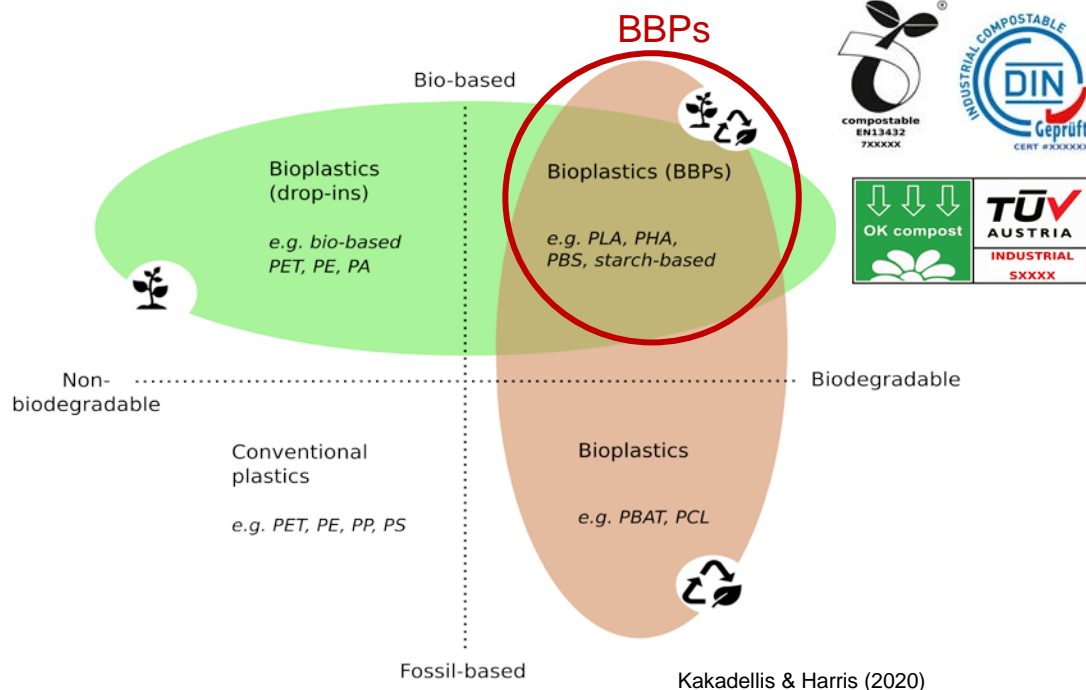


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Bioplastics: a leaky terminology

- Biodegradable plastics
- Industrially compostable plastics
- Home compostable plastics
- Bio-based plastics
- Drop-in plastics
- Oxo-degradable plastics

No certified 'AD-able' plastic



Methodology

Exploring attitudes towards BBPs to understand common issues and barriers

- I. What are the attitudes towards the treatment of BBPs in AD among stakeholders?
- II. How suitable is the current infrastructure for AD industry and what are the barriers?
- III. How do various stakeholder groups' views relate to each other?



Stakeholder mapping



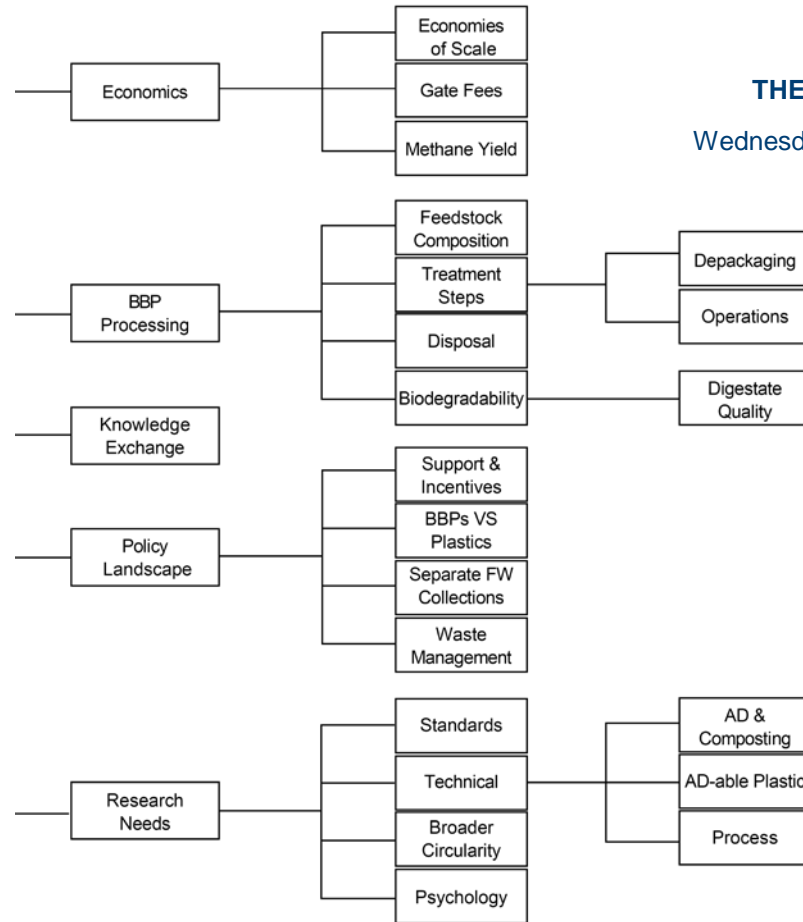
Semi-structured
stakeholder interviews



Computer-assisted
qualitative data analysis

Real-life insights: stakeholders attitudes

- Thematic nodes and sub-nodes
- Inductive and deductive strategies
- Majority of coding references on capability of infrastructure
- Confusion around defining “biodegradable”

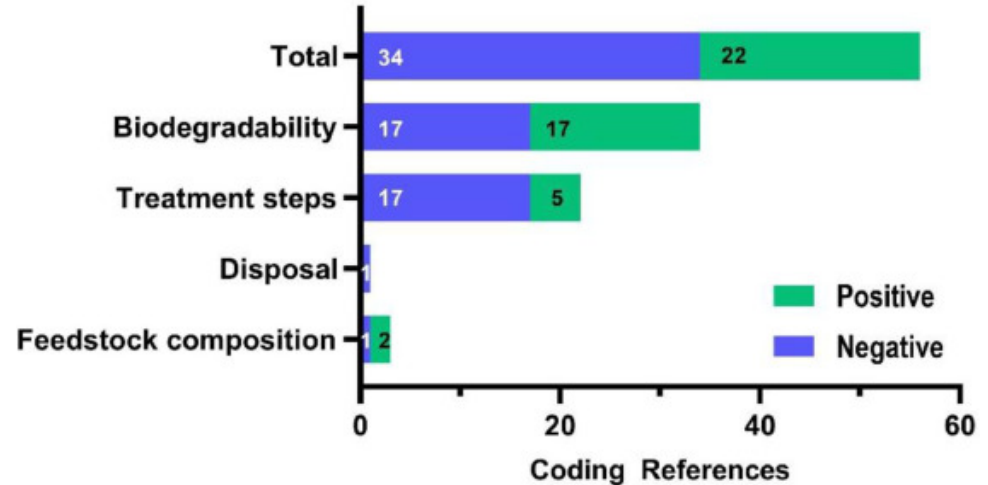


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Kakadellis, Woods & Harris (2021)

Real-life insights: stakeholders attitudes

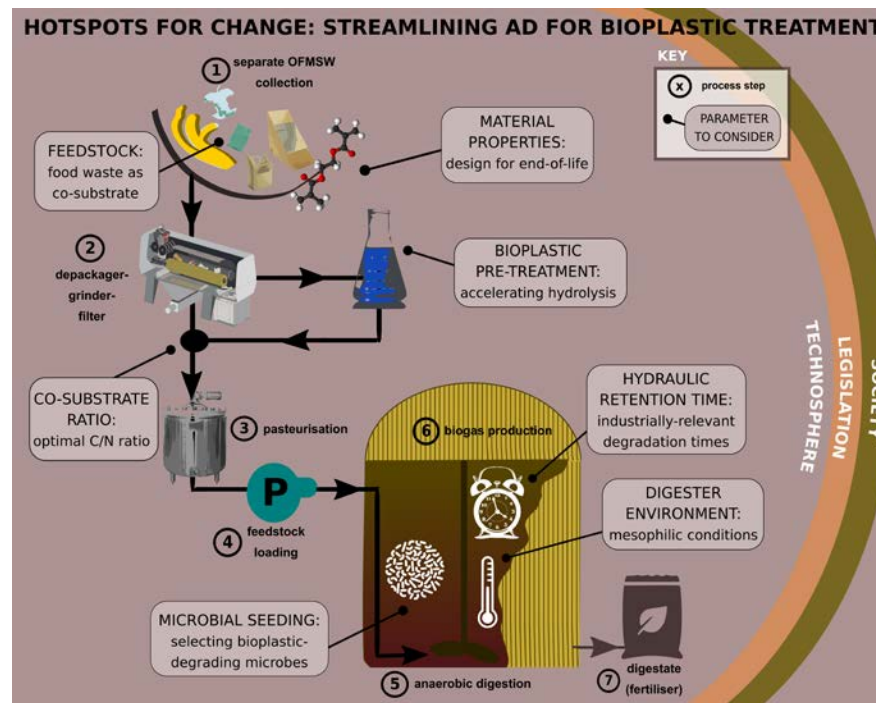
- Systematic depackaging at pre-treatment stage
- Concerns over biodegradability
- Focus shift from methane yield to digestate quality is needed
- Inconsistencies in policy landscape



Kakadellis, Woods & Harris (2021)

Aligning research with current AD practices

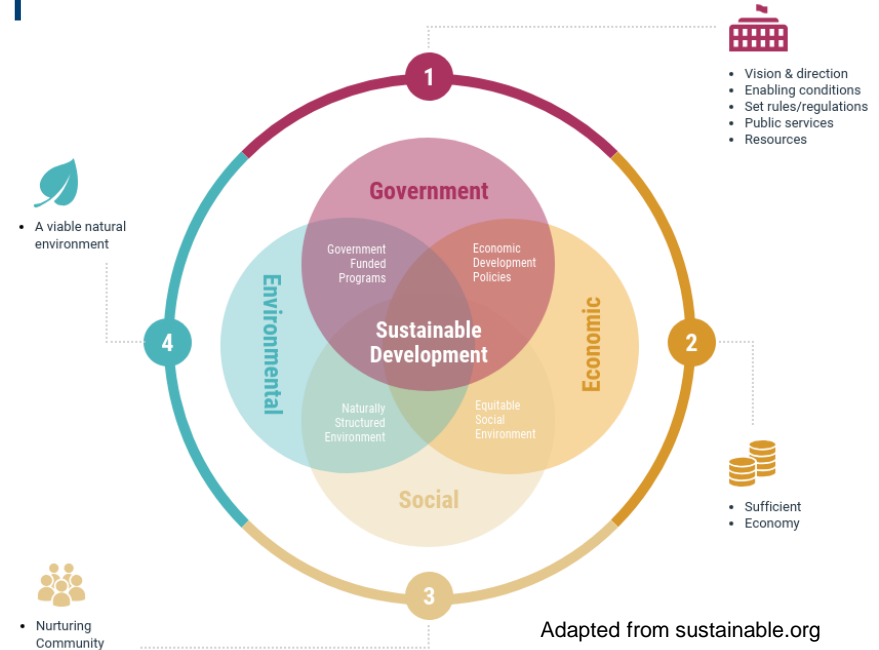
- Supporting scientific literature to support effective biodegradation in lab conditions
- Develop research design that is industry-relevant
- AD system still poorly characterised, particularly biological aspect



Kakadellis, Lee & Harris (in peer review)

Working holistically: legislation and consumer awareness

- Technological innovation only part of the solution
- Consumer awareness is still poor – but tends to favour biodegradability
- Clearer labelling for consumers
- Quality assurance schemes for sustainable and viable food waste AD industry

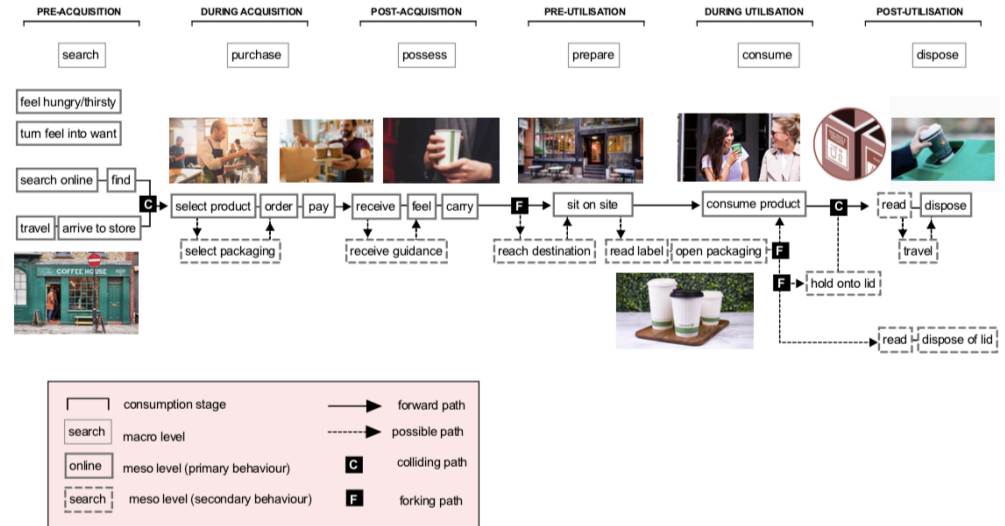


Future Work

- Framing bioplastic in the broader circular bioeconomy
- Systems modelling to tackle wicked problems
- Explore system elements and their interdependencies
- Behaviour chain as foundation of conceptual framework

Scenario 2: On-the go coffee cup (acquire and facilitate model)

2 sub-pathways: i) acquisition and consumption in the same location ii) acquisition and consumption in a different location



(Unpublished)

Closing Remarks

- Biodegradable plastics – an opportunity to enhance food waste capture
- Bioplastics – beware of pitfalls and ‘leaky’ terminology
- Biodegradable packaging only makes sense if treated accordingly
- Research needs to reflect real-life AD practices
- Need to work systemically to solve wicked problems

“
*We cannot solve our problems
with the same thinking we
used when we created them.*”

– Albert Einstein

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Thank you – Q&A

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