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
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”

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
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

Adapted from sustainable.org
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
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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