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The ABC of Separate Food Waste Collection –
A Simple, Economic and Effective Approach

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http://www

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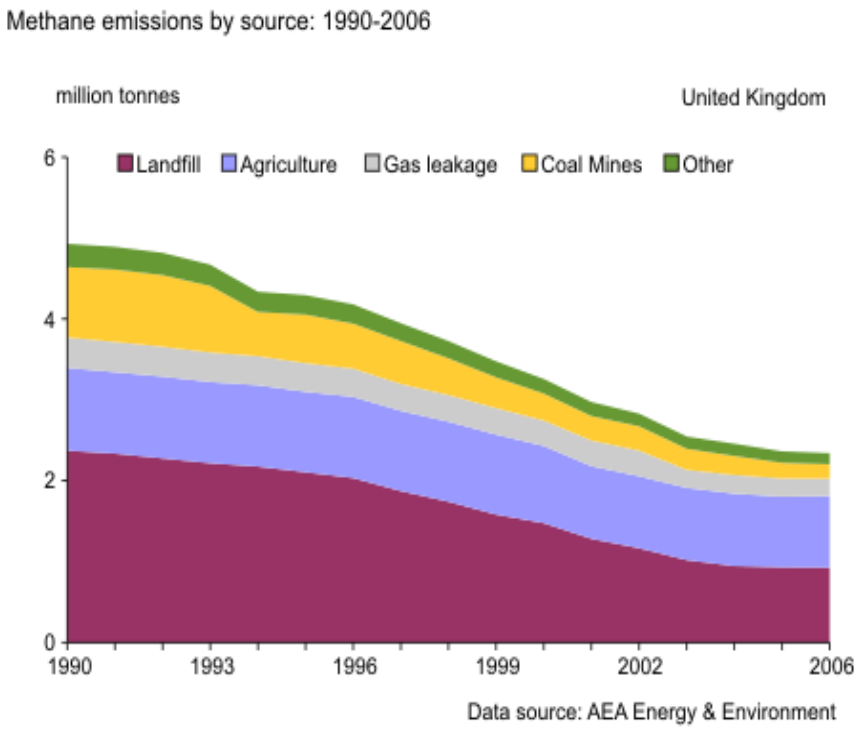
Food Waste – Its Disposal and Impact



WRAP: *Food discarded by households represents 25% of food purchased (by weight)*

UK: 14 Mt/y
EU: 89 Mt/y

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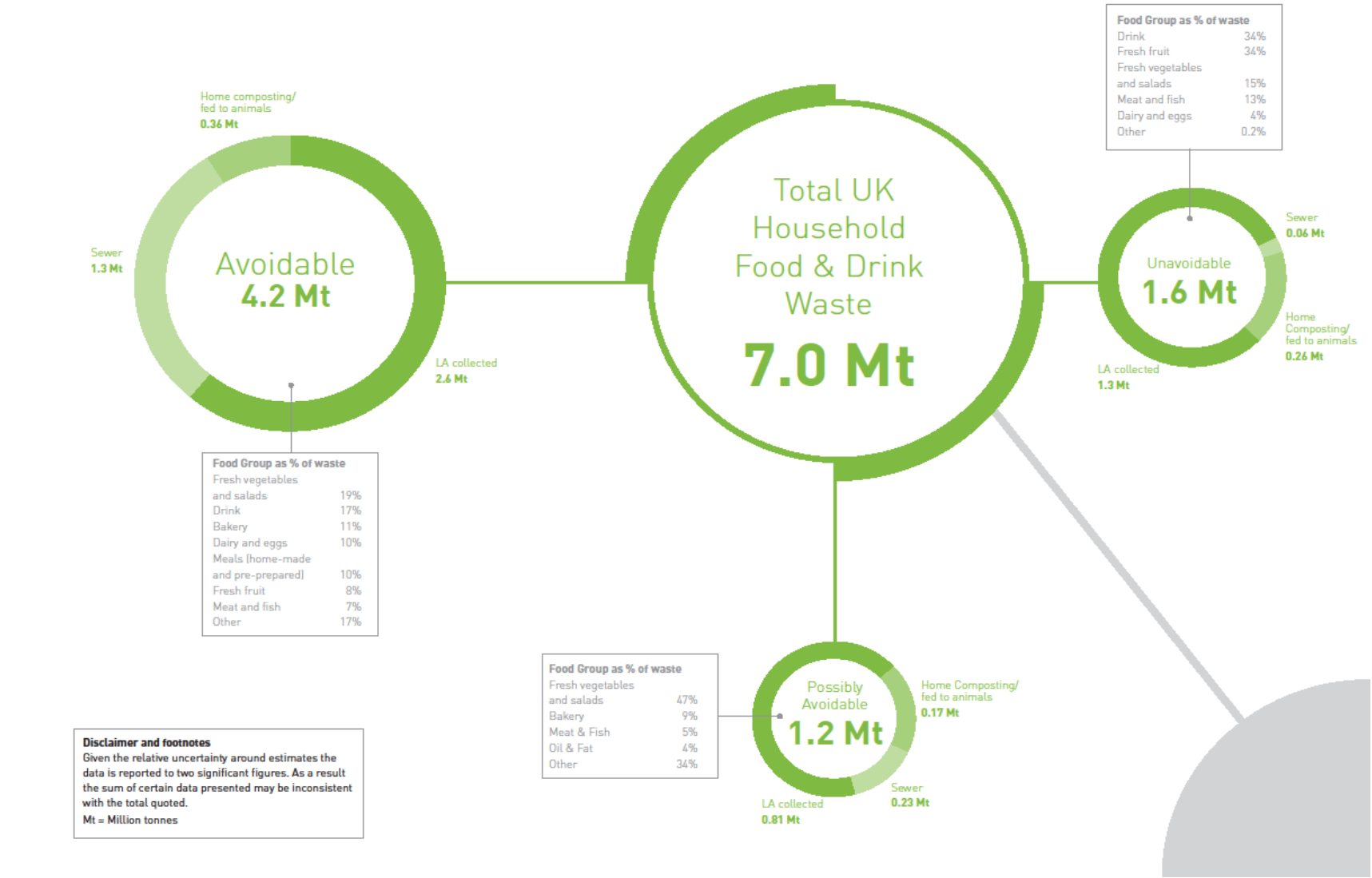
Food Waste – The Scale of the Problem



Disclaimer and footnotes
Given the relative uncertainty around estimates the data is reported to two significant figures. As a result the sum of certain data presented may be inconsistent with the total quoted.
Mt = Million tonnes

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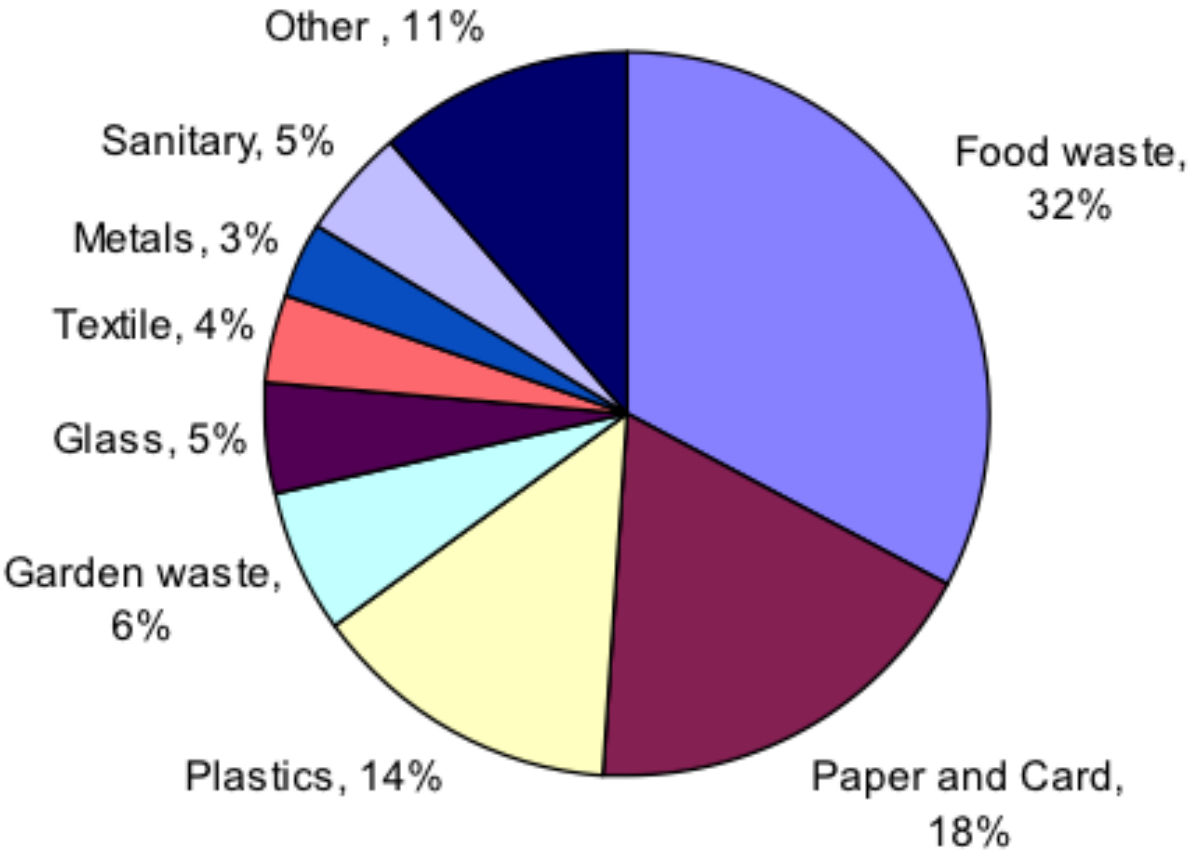
UK Residual MSW Waste Composition



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Regulatory Drivers Impacting Food Waste Management

Landfill Directive 1999/31/EC

- *Article 5* Waste and treatment not acceptable in landfills: to ultimately reduce the landfill disposal of biodegradable waste to 35 % of 1995 levels
- Encourages separate collection of biodegradable waste for recovery and recycling
- Specific treatment options are not prescribed, but the Directive identifies composting and biomethanisation for further consideration

Waste Framework Directive 2008/98/EC

- *Article 22* Bio-waste: to encourage the separate collection of bio-waste with a view to the composting and digestion of bio-waste
- *Article 11* Reuse and recycling: to recycle or prepare for reuse 50% of household waste by 2020

Renewable Energy Directive 2009/28/EC

- *Article 3* Mandatory national overall targets and measures for the use of energy from renewable sources: to achieve 20% of EU energy needs from renewable sources by 2020

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Current Food Waste Collection Systems are Ineffective

Mean decrease in food waste in residual stream after separate collection (%)			
England	Spain	Sweden	Portugal
9	7	16	-4

http://www.valorgas.soton.ac.uk/

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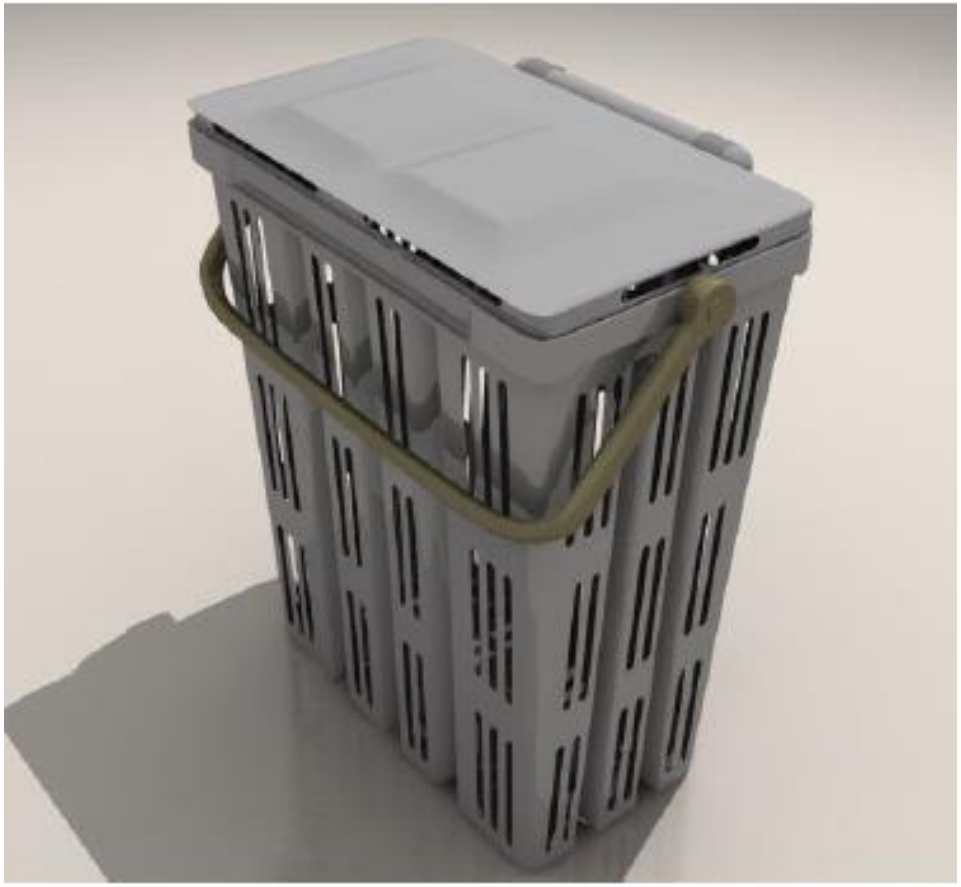
Aerobic Bin Company – An Alternative Food Waste Collection Technology



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Objectives of the Research

- Measure and compare the water vapour transmission properties of liner materials
- Test the effects of environmental conditions on Aerobic Bin performance
  - Temperature
  - Air flow rate
- Examine the effects of loading rate
  - Single
  - Sequential
- Measure mass and moisture losses
- Evaluate the microbiological and biochemical status of the food waste
  - Temperature
  - pH value

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Methodology

Liner Evaporation Experiments

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Methodology

Food Waste Experiments

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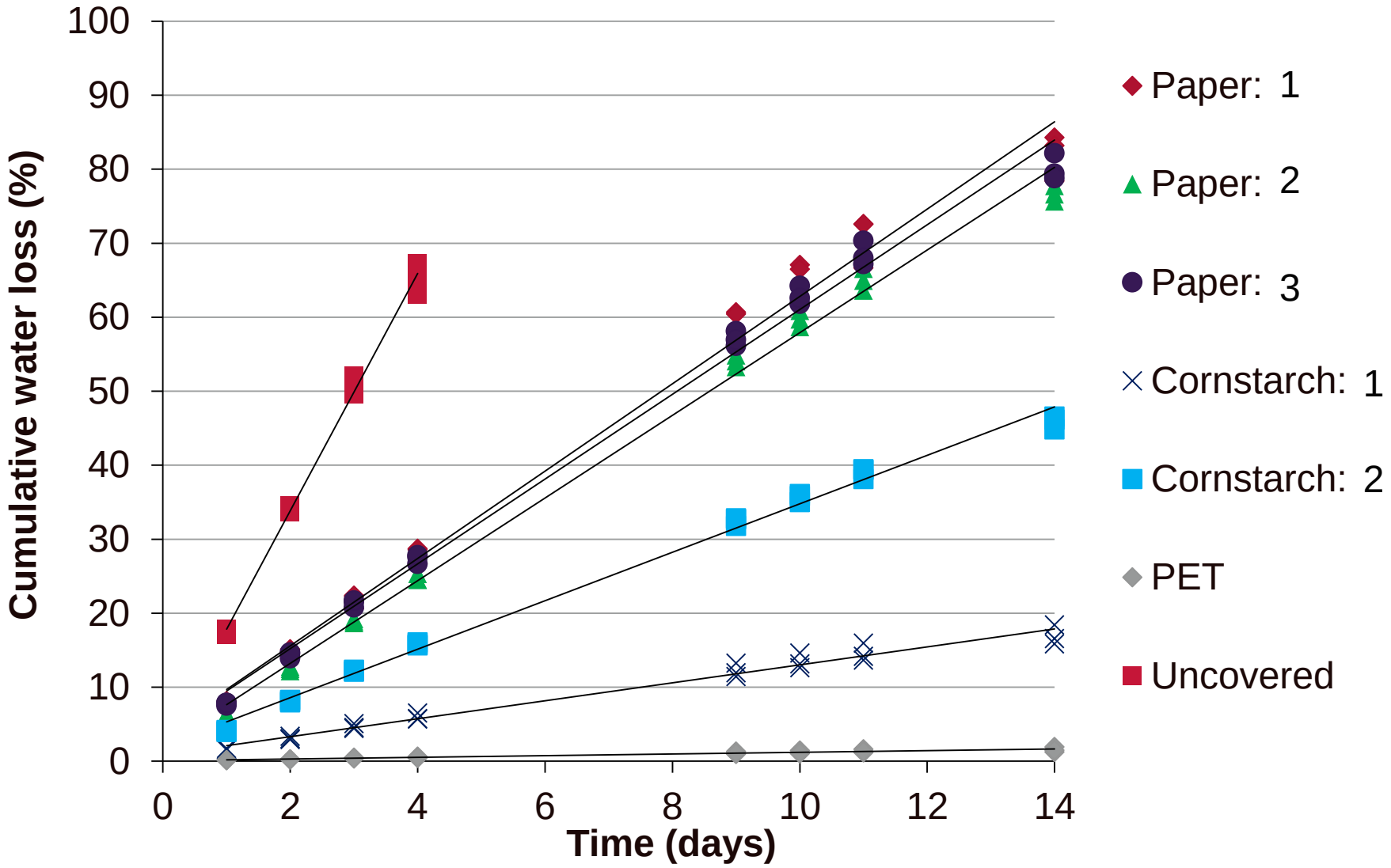
Evaporation Test and Liner Selection



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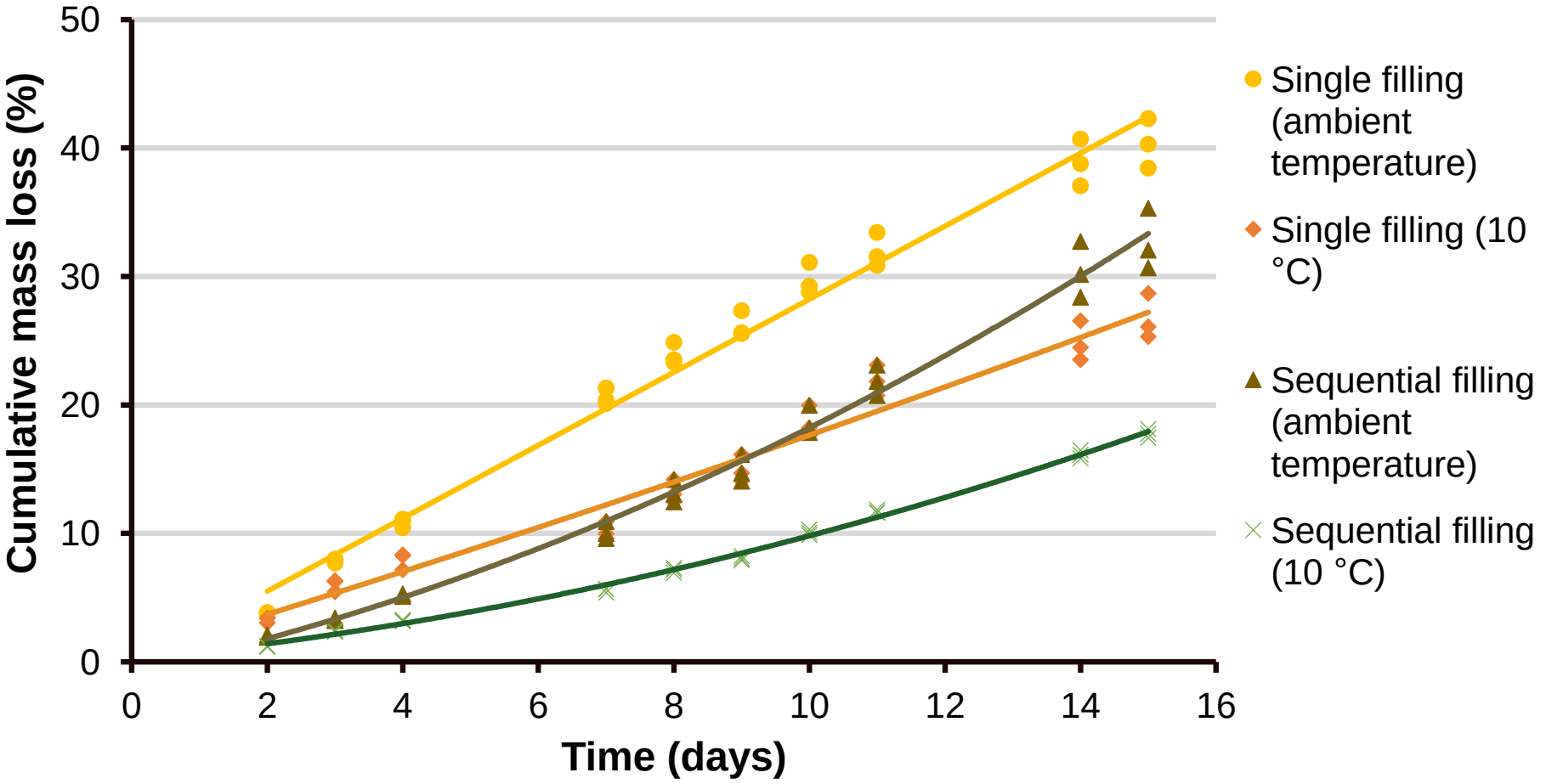
12L Liner: Effect of Temperature and Filling Rate on Mass Loss Rate



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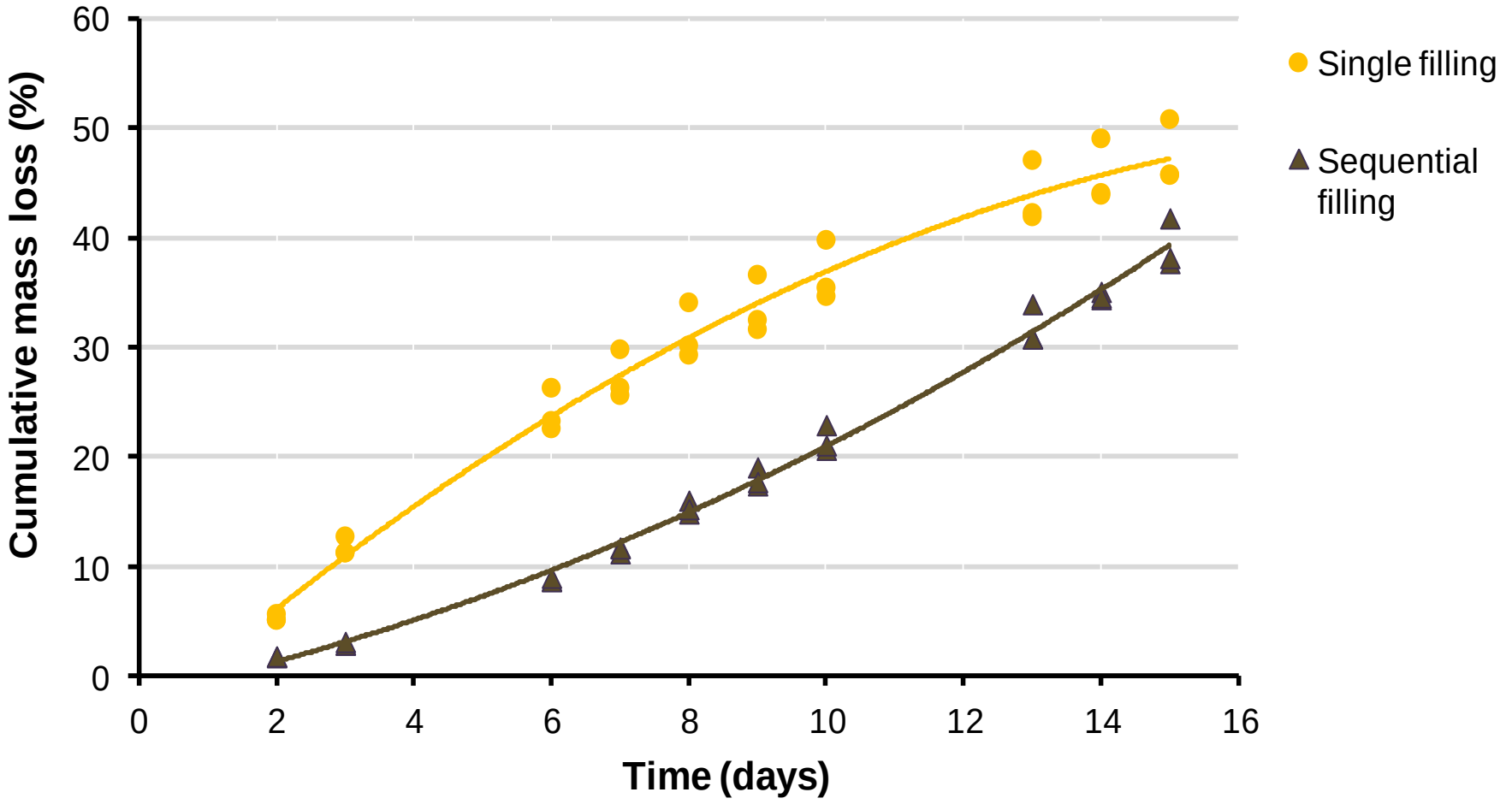

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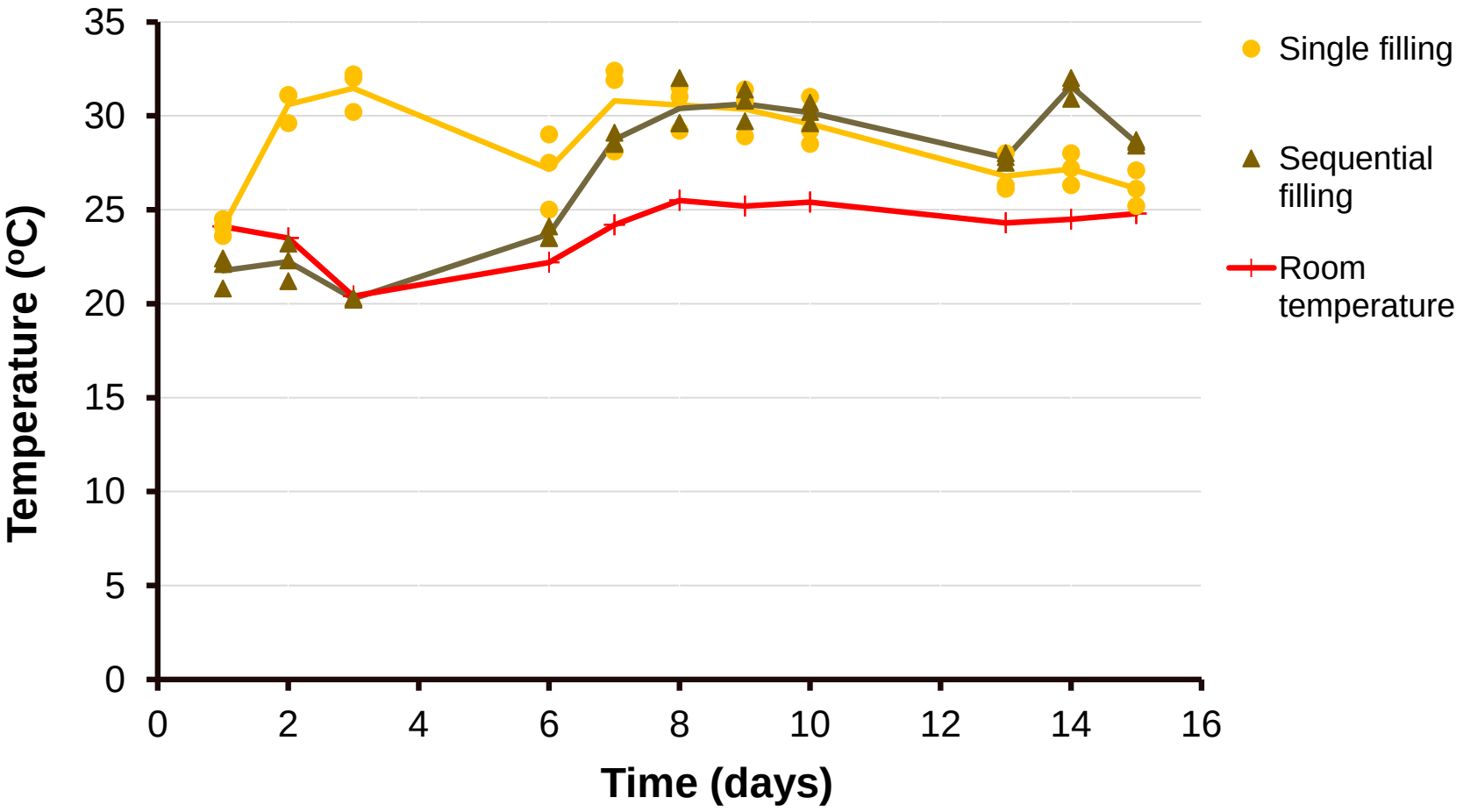
12L Liner: Effect of Filling Rate on Temperature



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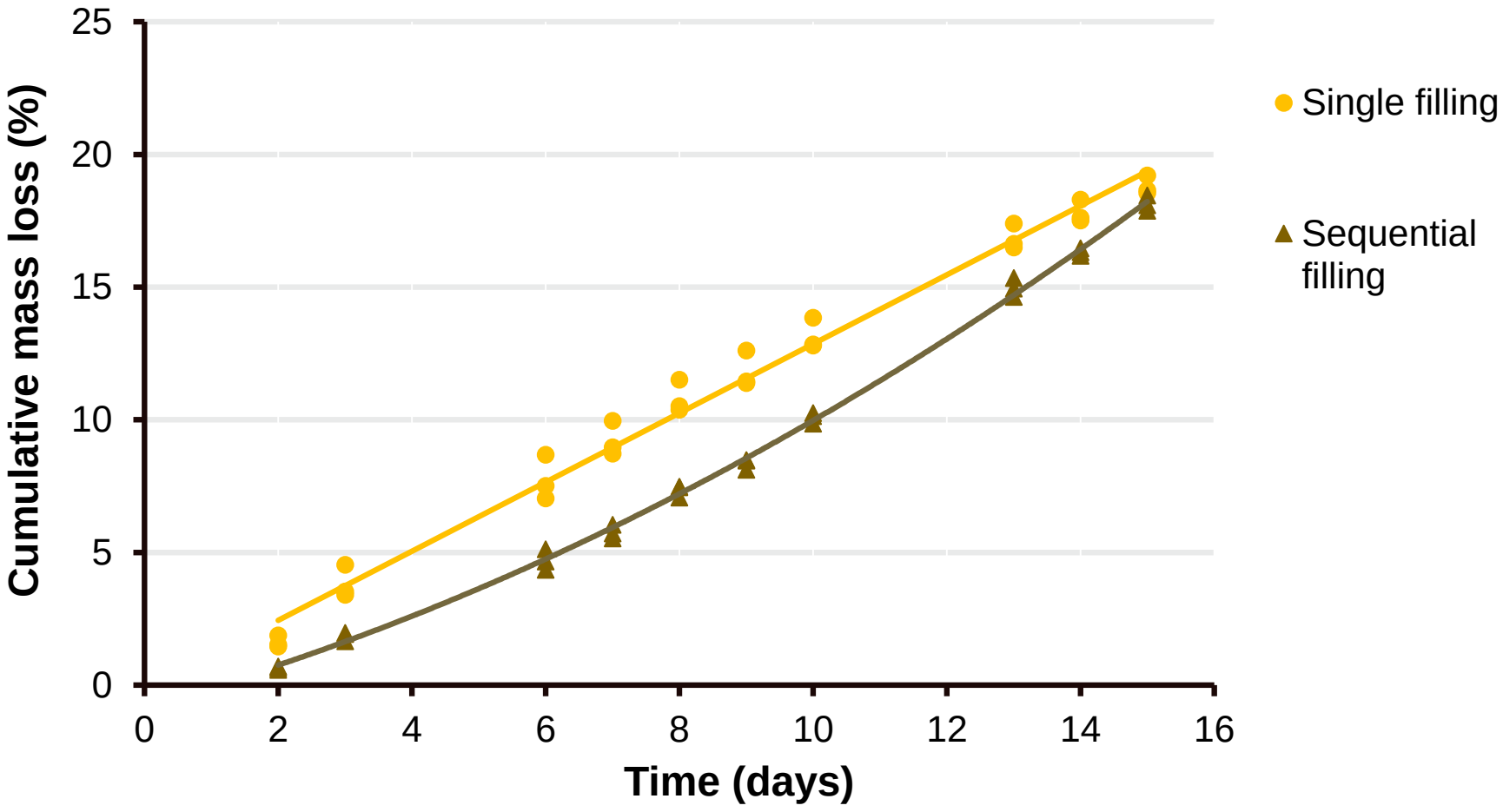
35L Aerobic Bin Experiment: Effect of Filling Rate on Mass Loss Rate



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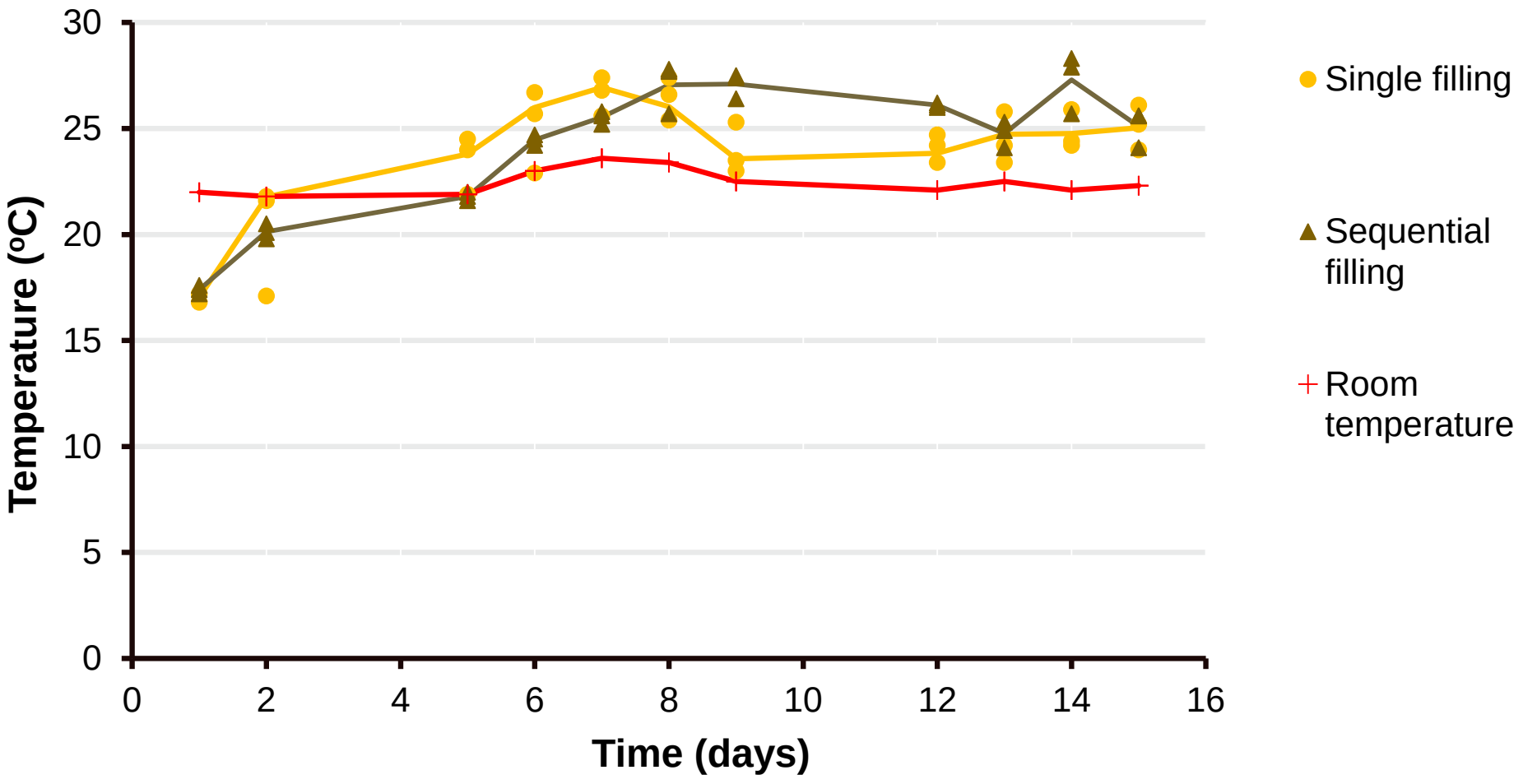
35L Aerobic Bin Experiment: Effect of Filling Rate on Temperature



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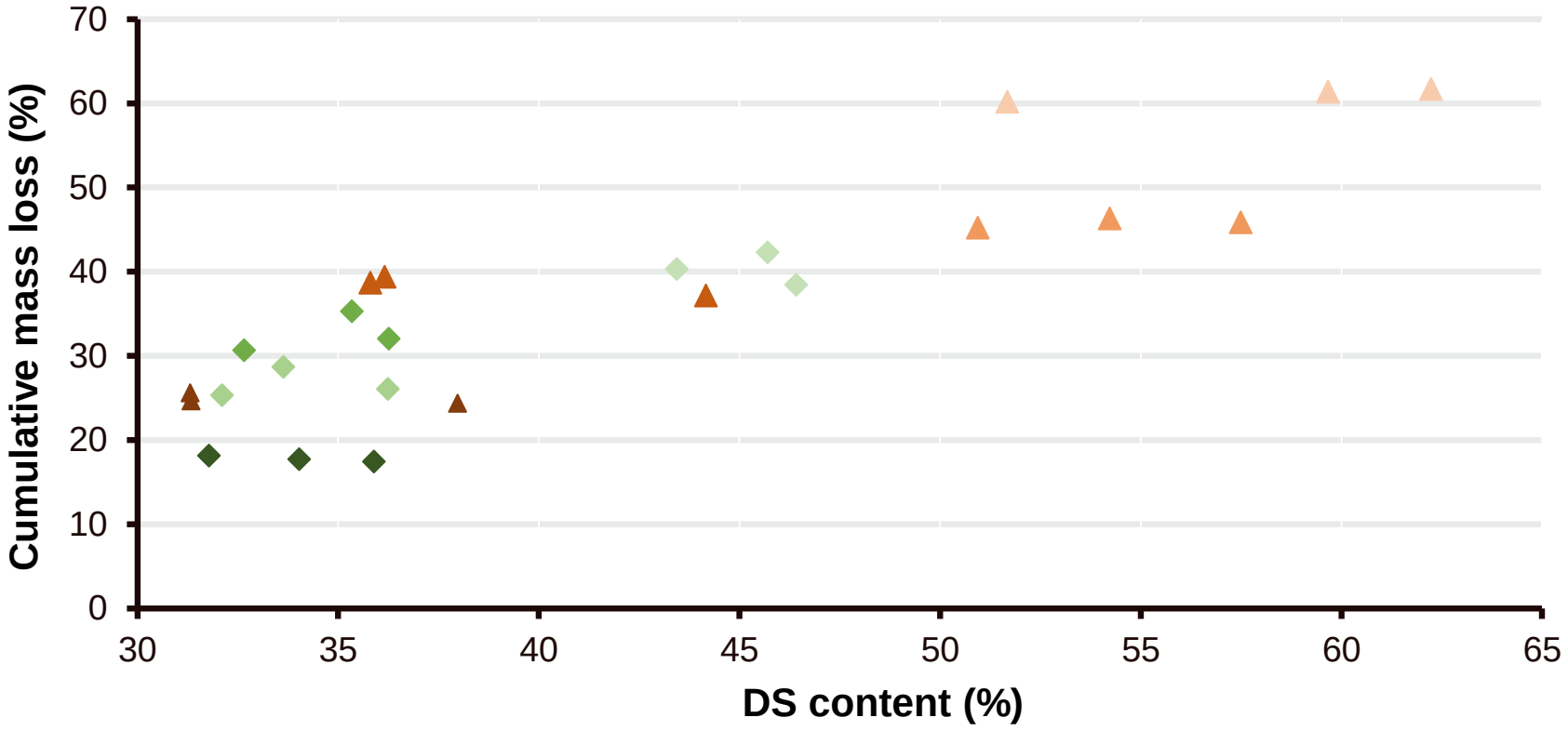
Mass Loss is a Function of Moisture Loss (12L Liner)



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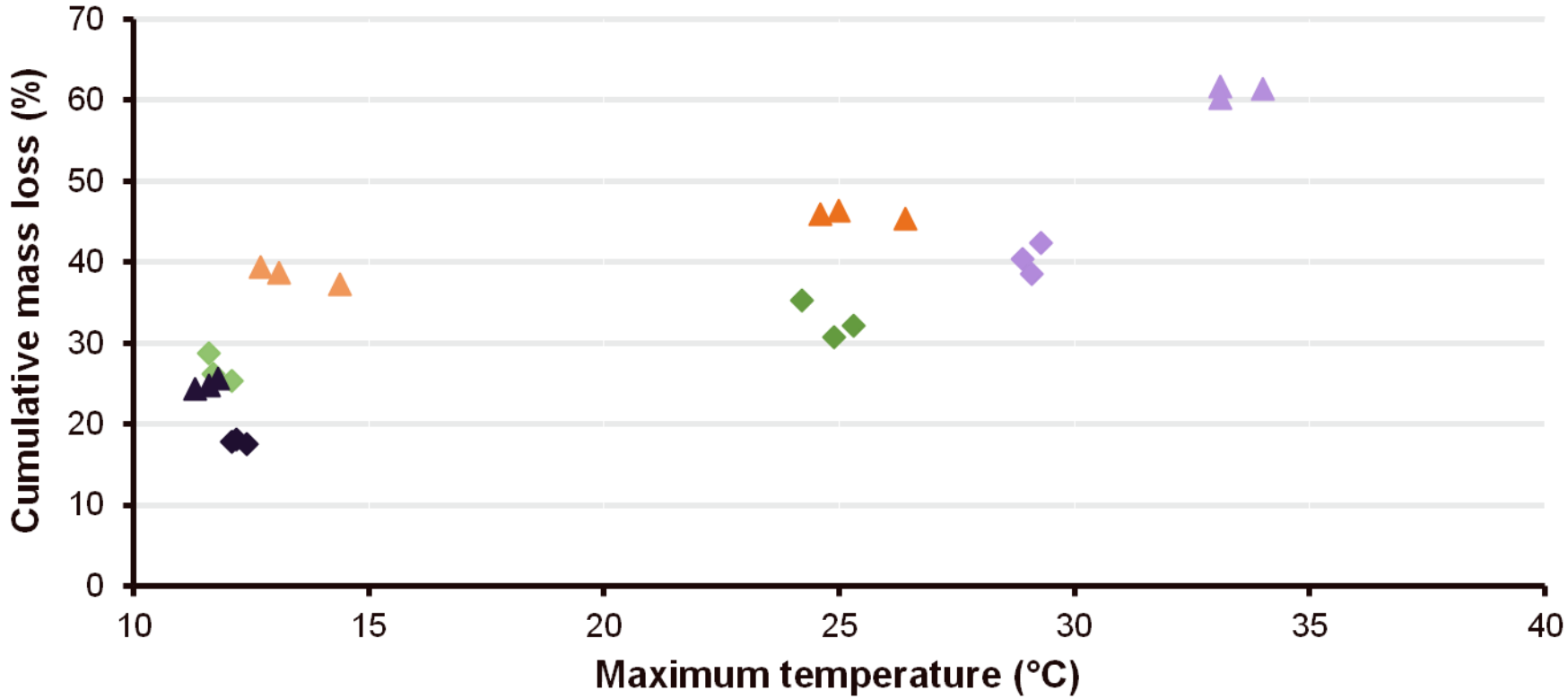
Mass Loss Increases with Temperature (12L Liner)



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Physical Changes in FW in Aerobic Bins

12L Liner

Day 1

Day 7

Day 14

35L Aerobic Bin

Day 7

Day 14

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Conclusions

- Aerobic bins avoid odour and nuisance
- Weight and volume loss through dessication and consolidation are significant
- Allows fortnightly collection of food waste increasing the viability of separate collection systems
- Simple technology requires no operating energy inputs or heat source
- Bin liner properties are critical and must be specified to ensure gas exchange and integrity are maintained and to minimise the consumable cost
- Preconditioning improves physico-chemical properties (eg pH) for subsequent biological treatment (aerobic or anaerobic)