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How MBT can Contribute to Sustainable Solid Waste Management – A Practical and Operational Analysis

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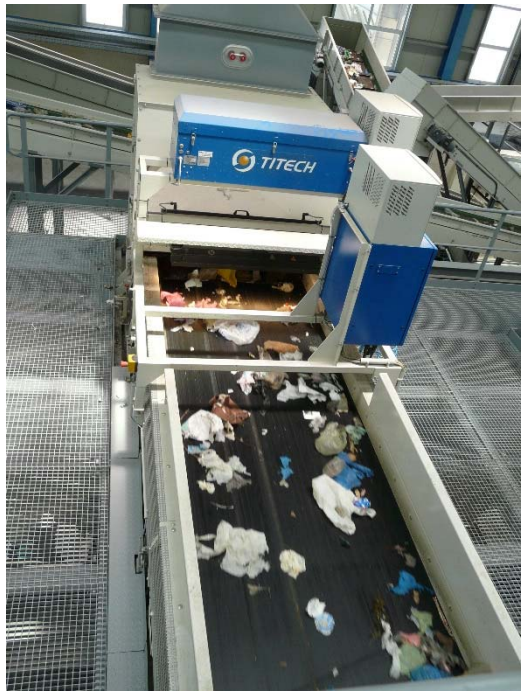
Advantages and Disadvantages



Advantages

- 100% participation rate
- Captures all recoverable value
- Established technologies
- Control over product outputs through advanced separation technology
- Minimises landfill disposal (a zero rate is achievable)
- Simple bin and collection systems
- Flexible and adaptive to future demands
- Does not compete with other recycling schemes

Disadvantages

- Mixed waste treatment favoured less than source separation
- Negative public perception towards waste processing facilities
- ***Markets critical for fuel and other outputs***

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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/

There will always be a residual waste stream and MBT can extract the value from this fraction!

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Integrated Waste Management Contract

- 25 year PFI contract with ELWA Ltd
- Service to 4 London Boroughs for acceptance, treatment and disposal of all domestic and LA waste arisings
- Operated by Shanks
- *435,000* t/y of contract *w*aste arisings
- Minimum 45% diversion from landfill (2002 to 2015) raised to 67% from April 1st 2015 until contract end-date in 2027
- £130 million investment
  - *2 x MBTs, 4 x* RRCs, 2 x MRFs
- MBT is a central feature of the contract to maximise moisture loss and produce SRF

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Frog Island, East London, 180,000 t/y MSW

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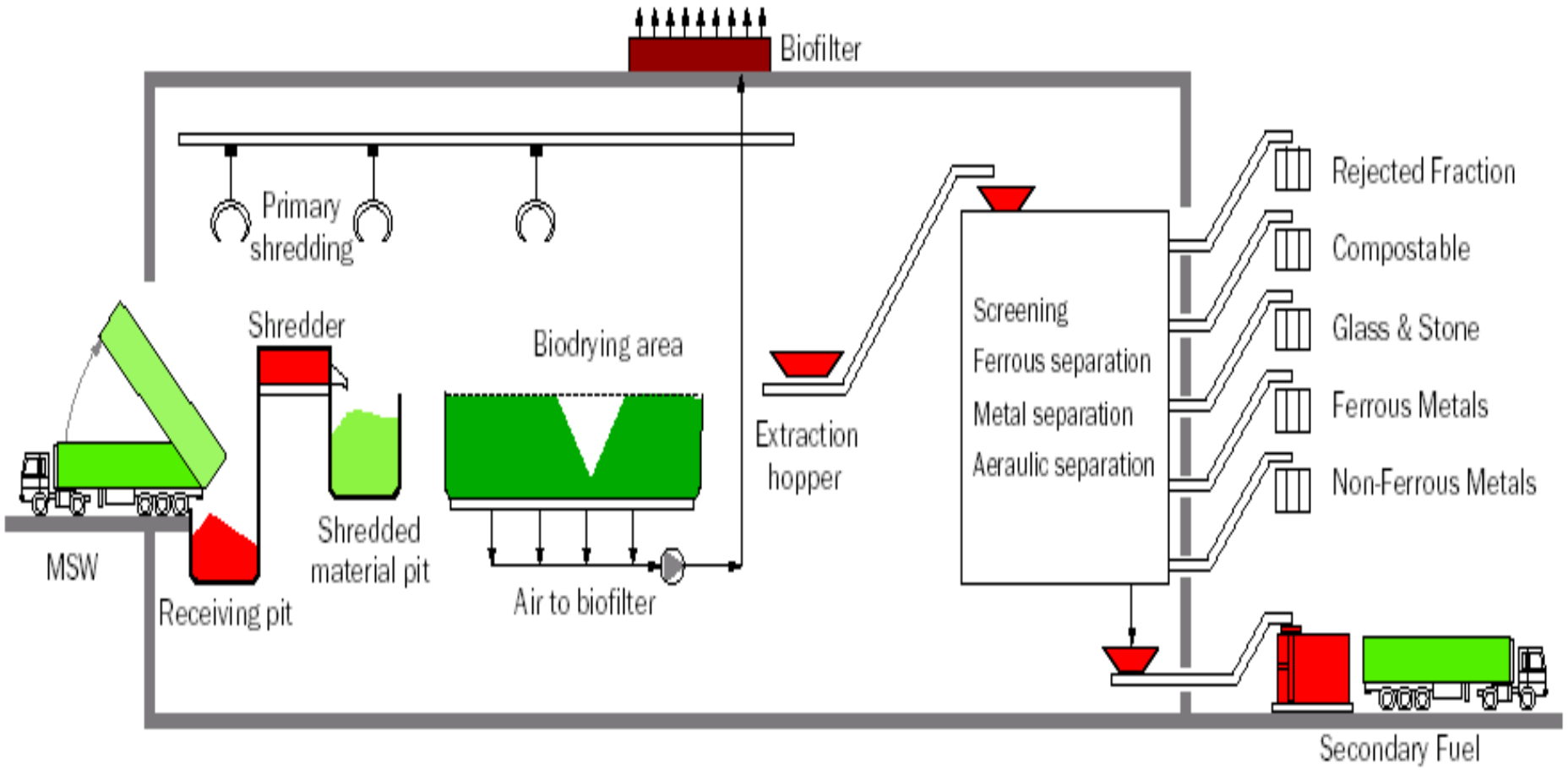
Static Windrow MBT Technology



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Biodrying Line Showing Floor Aeration Manifold and External Ducting

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Mixed MSW Loaded into Biodrying Line After Shredding

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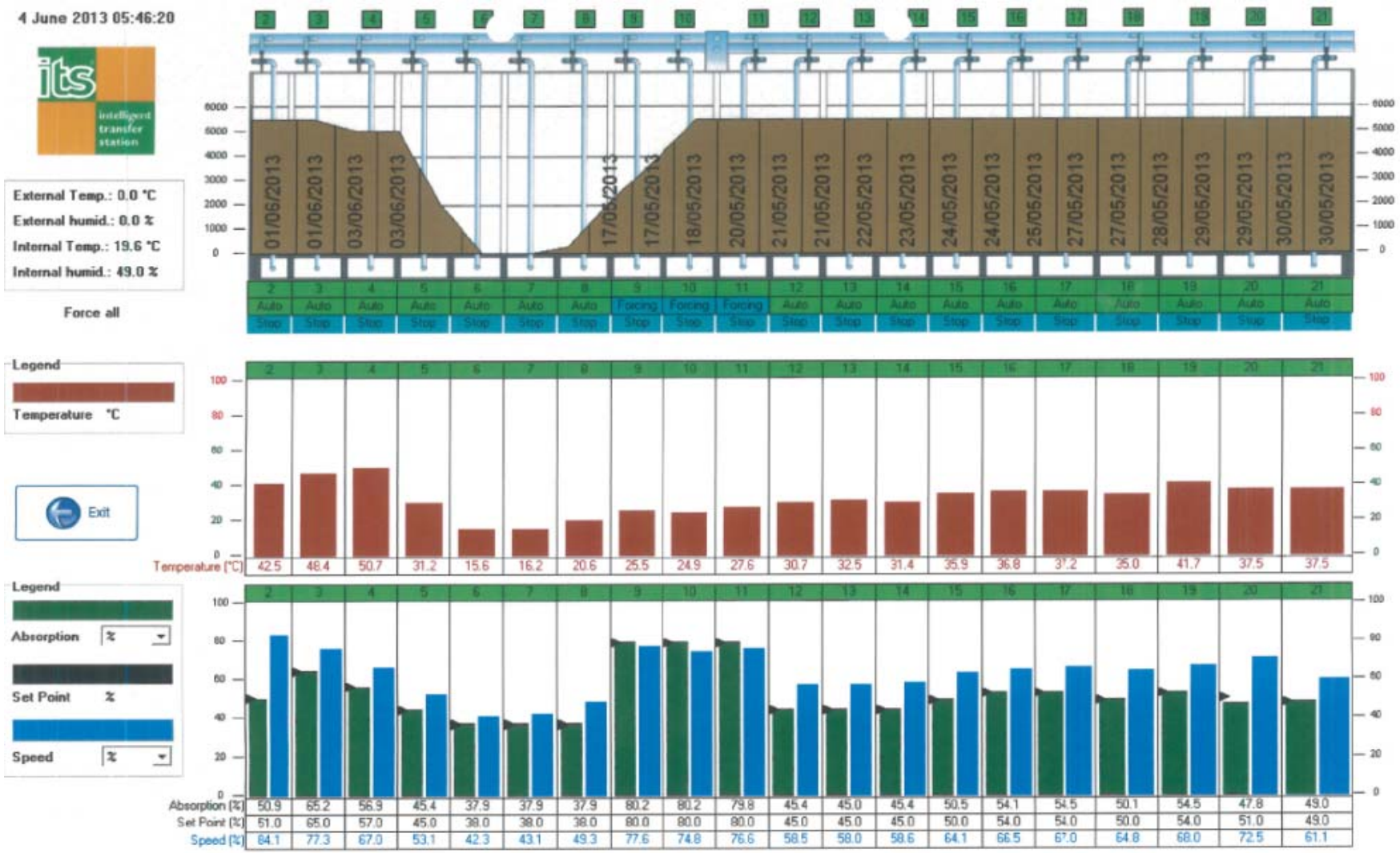
Process Management and Control



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After 14 Days, Biodried Material Is Transferred to the Refinement Process

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Material Refinement: SRF, Metals, Fines

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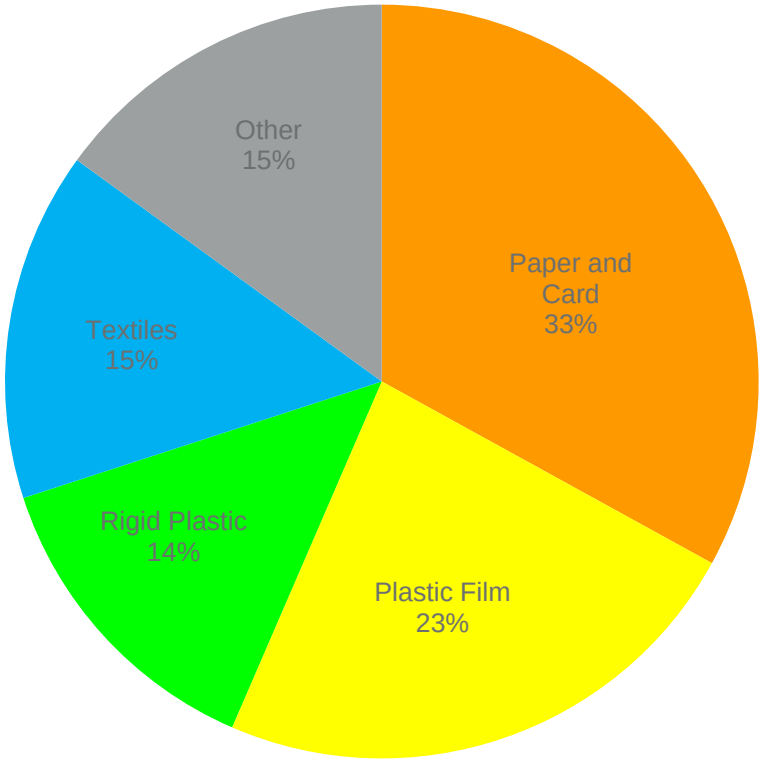
Average ELWA SRF Analysis (2012)

SRF Composition



- Waste origin = 97% MSW, 3% commercial
- 85% of material = paper, card, plastics & textiles
- 'Other' = misc combustibles, ferrous & non-ferrous, putrescible
- Material shred size = 50mm (variable according to off-take market requirements)
- Particle Size <50mm = 98%
- Energy potential (CV) = 17.0MJ/kg (net CV)
- Moisture content = 16.9%
- Ash content = 7%
- Chlorine = 0.41%
- Delivery method = compacted & loose loaded on trailers for road haulage
- End use = pre-heating, cement kiln pre-calciner
- Production potential = 27.5% of input, by weight

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MBT Mass Balance

		Frog Island, Target		Jenkins Lane, June 2014		Cumbria 2014/15		Comment
Route	Outputs	**t**	%	t	%	t	%	
Diversion	SRF/RDF	115,679	64.3%	6,756	45.7%	55814	48.8%	Used as alternative fuel in cement production and in efw plant
Diversion	Moisture	52,380	29.1%	5,007	33.9%	31612	27.7%	Evaporative losses
Recycling	Mixed Metals	3,827	2.1%	283	1.9%	2622	2.3%	Recycled through the scrap metal industry
Recycling	Glass & Stone	1,776	1.0%	229	1.5%	8763	7.7%	Used as aggregate in road building
Recycling	Fines (0 - 6mm)	6,138	3.4%	91	0.6%	8518	7.5%	Goes for further treatment for land restoration
Landfill	Dust	200	0.1%	0	0.0%)			Extracted from refinement air treatment
Landfill	Fines (0 - 6mm)			548	3.7%	6882	6.0%	
Landfill	RDF			1,872	12.7%)			
	Total Input t	**179,800**	**100.0%**	**14,787**	**100.0%**	**114,211**	**100%**	
	Summary							
	Diversion		93.3%		79.6%		76.5%	
	Recycling		6.%		4.1%		17.5%	
	Landfill		0.10%		16.4%		6.0%	
	Total		100%		100%		100%	

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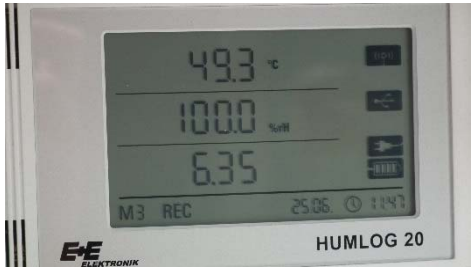
Collaborative Research with Shanks to Increase MBT Performance

Aims

1. Increase SRF and recyclate quality
2. Reduce retention time and resource demand

Temperature

Gases and Humidity



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Rotary Biodrying Research with Vassiliko Cement Works, Cyprus

- Metabolic heat removes water from biodegradable waste
- Critical control of microbial activity at low moisture
- Optimised rotation, aeration and temperature management
- Minimises drying time: <3 days
- Small plant foot print, reduced capital and operating costs
- Maximises calorific value, fuel homogeneity and recyclate recovery
- Direct combustion or pretreatment in advanced thermal treatment (gasification)

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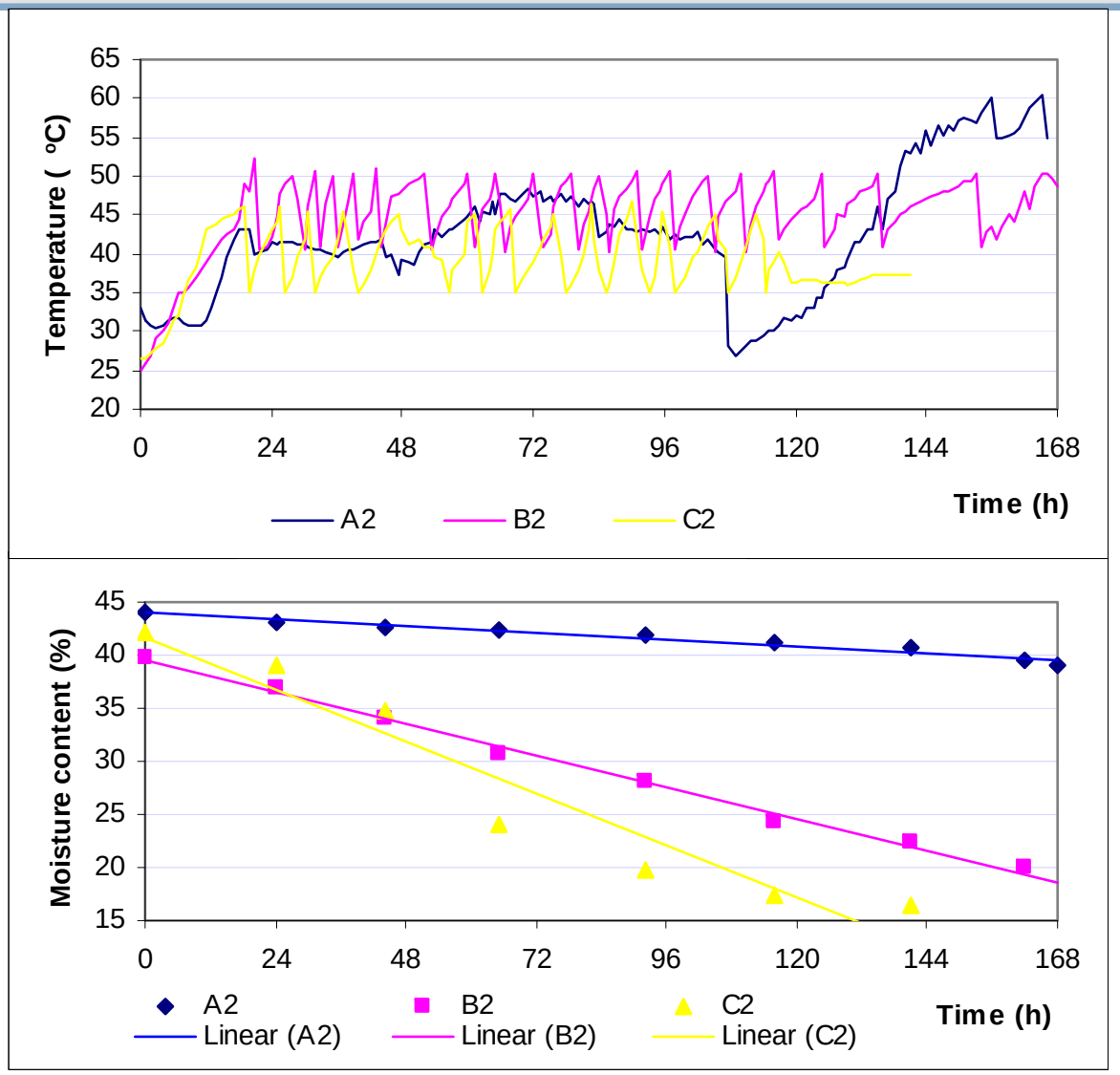
Rotary Biodrying Technology Can Reduce Processing Time to ≤3 Days



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Conclusions

- High diversion and recovery rates can be achieved close to 100%
- Captures all the residual value in waste
- Compatible with recycling systems
- Markets are necessary for fuel products or investment must include on-site energy production
- Fuel production to a specification (moisture, chemical composition):
  - Supports industrial fossil fuel reduction
  - Supports advanced thermal treatment processes
- Research to further optimise process and recovery efficiency