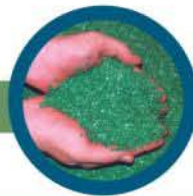


BIOPLASTICS

Understanding the terminology,
application options
and recyclability

Marcel Arsand



Environmental Line

Business Line

Summary

- A bit about RECOUP
- Introduction on bioplastics
- Terminologies
- Applications
- Recycling opportunities

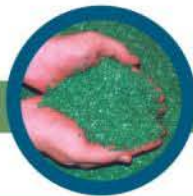


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About RECOUP

- Non-for-profit organisation founded in 1990;
- Built on a network of members representing all areas of the plastic supply chain;
- Stimulate, innovate and guide the design, procurement, collection, handling, sorting and reprocessing of UK plastic packaging.



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Activities

- Website
- Education Resources
- Enquiries
- Presentations
- Exhibitions
- Representation
- Conferences
- Communication
- Promotion
- Research
- Bespoke consultancy
- Stakeholder engagement



UK Household
Plastics Packaging
Collection Survey



Plastics Packaging
Recyclability by Design

An essential guide for all those involved in
development, design, marketing and procurement





UK Household
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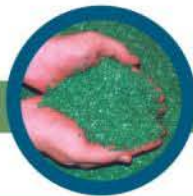
Board of Directors

- Ineos
- Coca Cola Enterprises
- GlaxoSmithKline
- Nampak Plastics
- Sharp Interpack
- Marks & Spencer
- Tesco
- LARAC
- Veolia
- Viridor
- TITECH
- Signode
- Eco Plastics
- Wellman
- Regain Polymers
- RECOUP

Introduction

The term 'bioplastics' is commonly used to describe two different aspects of the product:

- **Disposal option** –
i.e. biodegradable/compostable
- **Material source** –
i.e. renewable/biomass-based plastics.



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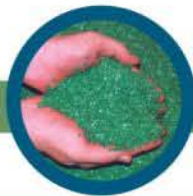
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Introduction

Bioplastics are generally understood to be either:

- Plastics made from renewable raw materials (converted to biodegradable or non-biodegradable products) or
- Biodegradable plastics made of either renewable or fossil raw materials (e.g. PLA)

Bioplastics should not be confused with oxo-degradable plastics!!



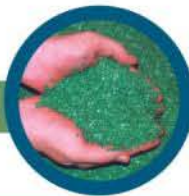
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Terminologies

Compostable Plastics

- Undergoes degradation by biological processes during composting;
- CO_2 , H_2O , inorganic compounds and biomass;
- Time – 180 days
- Generally based on renewable raw material - e.g. PLA



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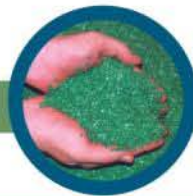
Terminologies



Compostable Plastics

- Certified according to international standards such as EN13432 / EN14995 (Europe), ASTM D-6400 (USA), ISO 17088 (other countries)
- EN13432: proof of compostability - *'disintegration in compost **after 3 months**'*

But commercial composting sites often operates at shorter time: 6-8 weeks



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Terminologies

‘Bio-based’ Plastics

- Produced from renewable resources;
- They are not in all cases biodegradable and compostable;
- e.g. polyethylene from sugar cane.



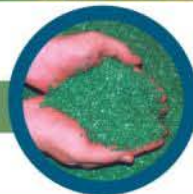
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Terminologies

The various terminologies available are likely to cause more confusion than clarification:

- *'Fully biodegradable'*
- *'100% fully compostable'*
- *'100% compostable'*

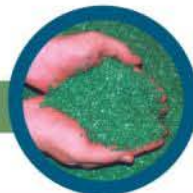
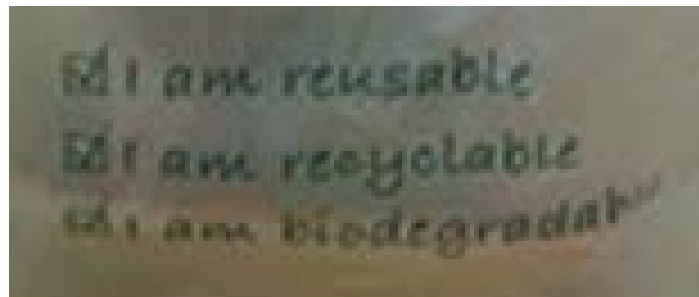


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Terminologies

- *'Biocompostable'*
- *'Fully biodegradable and 100% compostable'*
- *'Reusable, Recyclable, Biodegradable'*



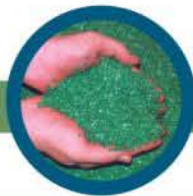
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Terminologies

Oxo-degradable plastic

- It is **NOT** a bioplastic;
- It is a plastic that contains **additives** to help break down faster than a normal plastic;
- It will only biodegrade after the additives' effect;
- Claimed to be transformed into H₂O and CO₂.



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Terminologies

Oxo-degradable plastic

- *'Oxo-biodegradable'*
- *'Totally degradable'*
- *'100% degradable'*
- *'Biodegradable'*
- *'BIO'*



BIO-POLYTHENE
Photo degradable polythene made in the UK
This bag contains DEG 68 UK degradable additive.

biothene

Environn

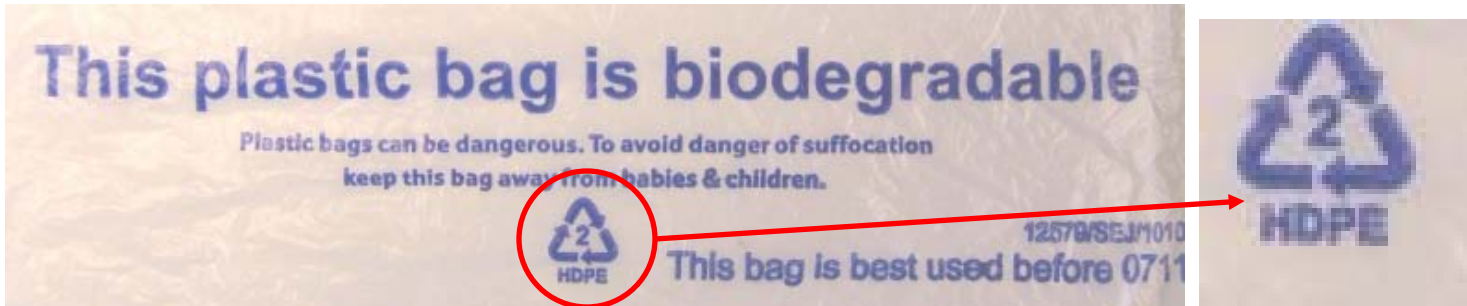
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12578/SE11010

This bag is best used before 0711

Terminologies



Degradable carrier bags

We recognise that many of our bags may go to landfill, so we have made our carrier bags biodegradable. This means that they break down into water, carbon dioxide and biomass, which have minimal impact upon the environment. This process normally takes 20-36 months from manufacture. All our carrier bags have a best before date to give customers an idea of how long they will be fit for use. If you have a bag which starts to lose its strength before this date, you can return it to us.



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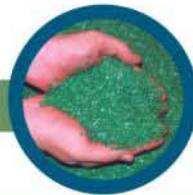
Business Line

Applications

The most common market for bioplastics today is **packaging**. Existing applications include:

- shopping bags;
- waste collection bags;
- food /drink packaging.

Various applications in other sectors are currently under development especially in the automotive and electronic sectors.

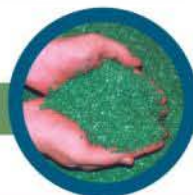


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Applications

Innocent, 2007 - PLA bottle



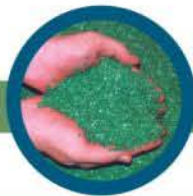
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Applications

Innocent, 2007 - PLA bottle

- *“Totally compostable”;*
- *“100% renewable source”*
- Ended up in the plastic stream, contaminating the PET
- Negative press
- Moved back to PET, this time 100% rPET



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Applications

Belu water – PLA bottle

- *'UK's first biodegradable and compostable plastic bottle'*
- *'Can be commercially composted back to soil in 12 weeks' (...)*
- Contaminated PET stream
- Not collected for composting



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Applications

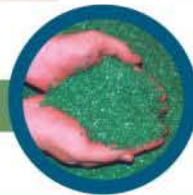
Coke PlantBottle – PET

- Not biodegradable/compostable
- Fully recyclable



up to **30%** plant-based
100% recyclable bottle

redesigned plastic,
recyclable as ever.



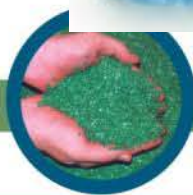
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Applications

Volvic plant-based bottle

- 20% PET from sugar cane.



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Applications

PepsiCo plant-based bottle

- PET 100% from renewable sources;
- Using PepsiCo own residue.

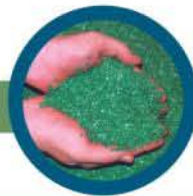


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Applications

Procter & Gamble – HDPE sugar cane



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Disposal Options

If a 'bioplastic' looks like a plastic, behaves like a plastic and/or is used for similar applications, it is likely that it will be treated as plastic...



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Disposal Options



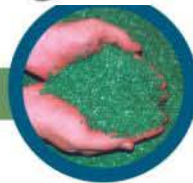
RECYCLING



COMPOSTING

ANAEROBIC DIGESTION

LANDFILL / EfW



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Disposal Options

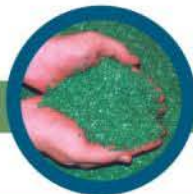
Recycling

PLA (e.g. bottles)

- Will contaminate plastic stream;
- Can be removed by optical sorting (NIR)
- NIR not always used (e.g. manual sorting)

Other compostable packaging

- Will contaminate plastic reprocessing
- If film/bag, will be classed as contamination



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Disposal Options

Recycling

Bio-based bottles

- Likely to be fully compatible with bottle recycling.

Oxo-degradable

- If bag/film, likely to be classed as contamination;
- Could affect the quality of recycled material.



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Disposal Options

Composting

Compostable/PLA

- If bottle shape, could be confused as plastic and classed as contamination;
- Commercial composting plants may operate retention times shorter than specified by the standards;
- Majority not suitable for home composting.



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Disposal Options

Composting

'Bio-based' bottles

- Not suitable for composting.

Oxo-(bio)degradable

- Could be considered as contamination.



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Disposal Options

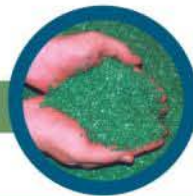
Anaerobic Digestion

Compostable bags

- Issues to biodegrade through AD.

Oxo-(bio)degradable

- May not break down under anaerobic conditions.



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Disposal Options

Landfill

PLA/Compostable packaging

- Will it biodegrade under landfill anaerobic conditions? If yes – methane.

Oxo-(bio)degradable

- Will it degrade under anaerobic conditions? If so, it will generate methane.



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Disposal Options

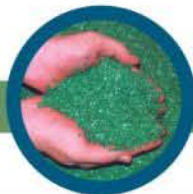
EfW

PLA/Compostable/Bio-based bottles

- Applicable to all types of bioplastic.

Oxo-(bio)degradable

- Recommended by DEFRA as most suitable treatment option.



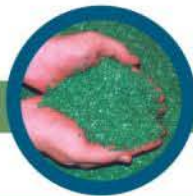
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Final Message

RECOUP support new developments in the plastic industry and recommend you **do your homework** if you want to get involved with bioplastics:

- understand the recyclability of your product;
- understand the current market for the “oil-based counterpart”;



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Final Message

- If it is a compostable bioplastic, call it **compostable**;
- If it is bio-based, call it **recyclable**;
- Stop creating “green names” that only confuse people, like *“100%fully(oxo)biocompostabledegradable” plastic.*



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Thank you

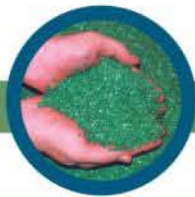


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