



University of
Nottingham

UK | CHINA | MALAYSIA

Utilization of Food Waste for Packaging

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Food Packaging: where are we now?

Rigid:

- ✓ Glass
- ✓ jars
- ✓ Cans
- ✓ wooden boxes
- ✓ plastic boxes

Flexible:

- ✓ plastic films
- ✓ vegetable fibres
- ✓ Foil
- ✓ paper

The type of material (e.g. plastics) used depends on the final application, which may be:

- bottles
- containers
- films
- coatings.

In order to produce these structures monomers are polymerized through addition or condensation polymerization processes.



Where are we now ?

- Typical materials include:



- Polyethylene (PE),
- High Density Polyethylene (HDP)
- Polyethylene terephthalate (PET)
- Polyvinyl chloride (PVC)

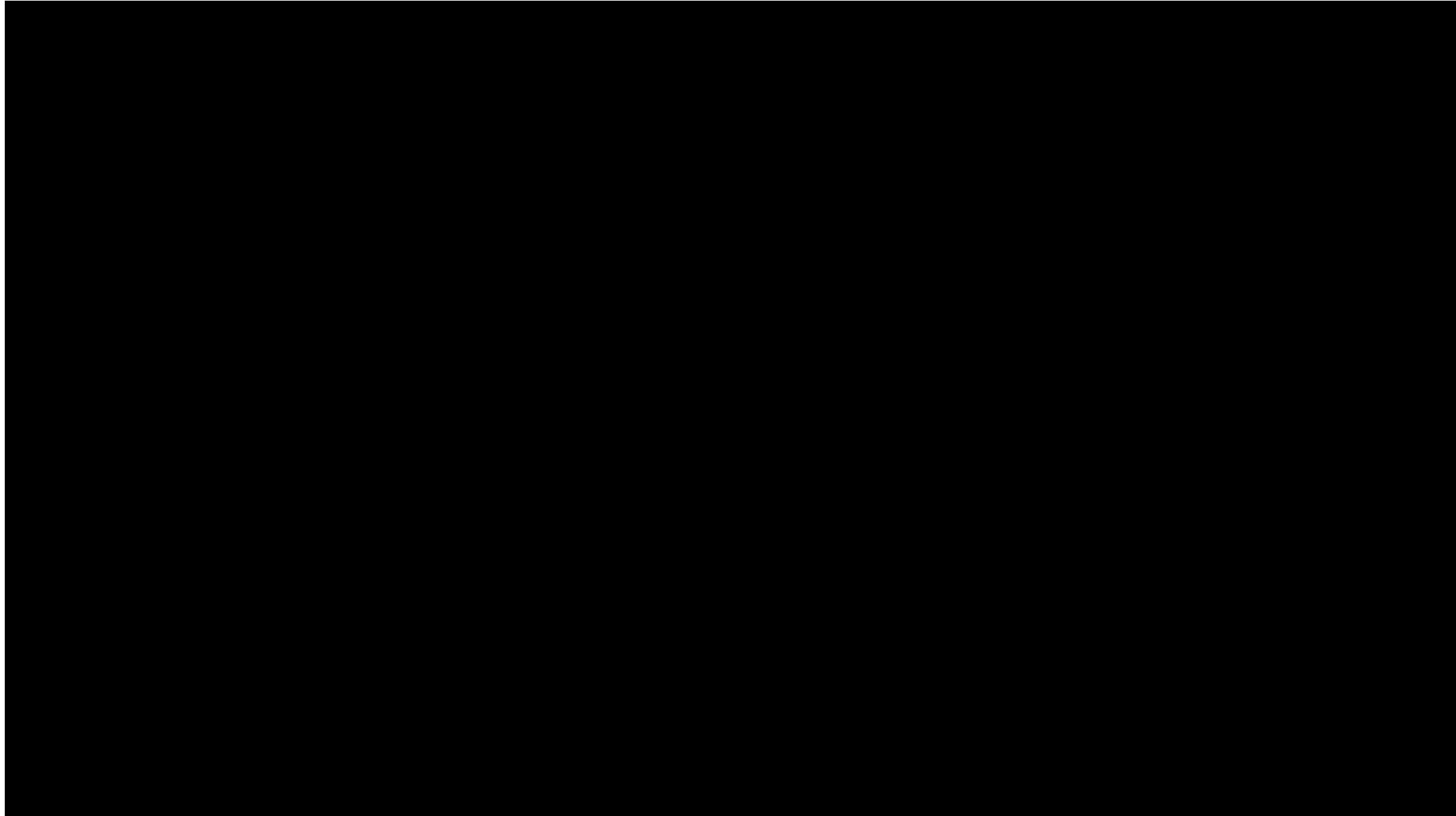


- Polystyrene (PS)
- Poly carbonate (PC)



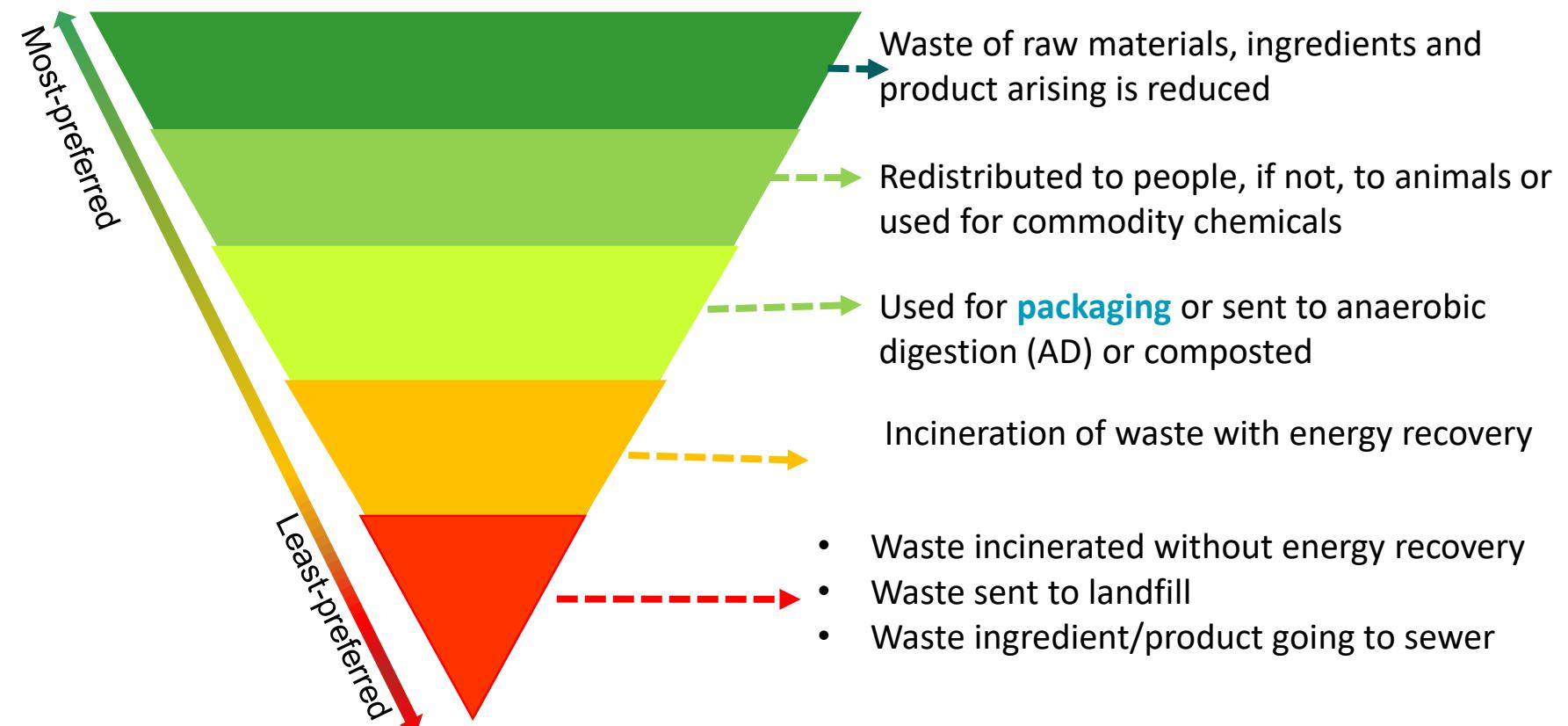


Wake up call



Open two locks with one key

- Annually 7.5Mn tonnes of food goes to landfill in England
- this could be turned into soil enriching compost
- and at the same time remove food contamination from the plastics recycling waste stream, double benefit





Treasure, Not Trash





Sugar-cane by-products



Sugar Cane



Bagasse





Properties of packaging material from bagasse, a sugar cane by-product:

- ✓ low carbon
- ✓ good insulator/poor conductor
- ✓ remains rigid at higher temperatures
- ✓ unlike Cpet it does not melt.



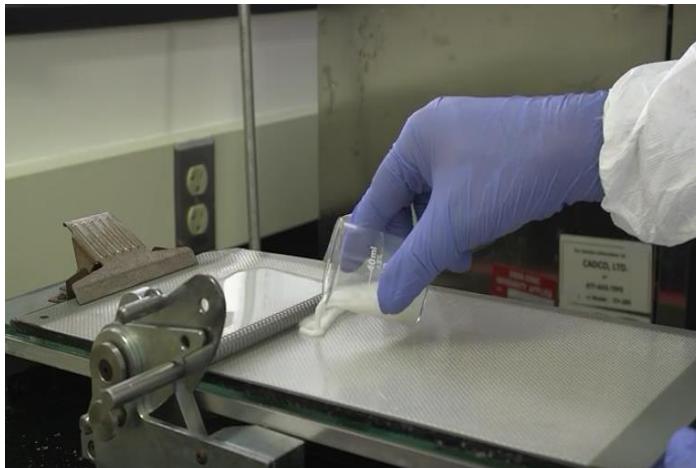
Palm leaf for food containers

Palm Leaf





Bio-plastics from Whey Protein Films





Bio-plastics from Shrimp Shells



Shrimp Shell

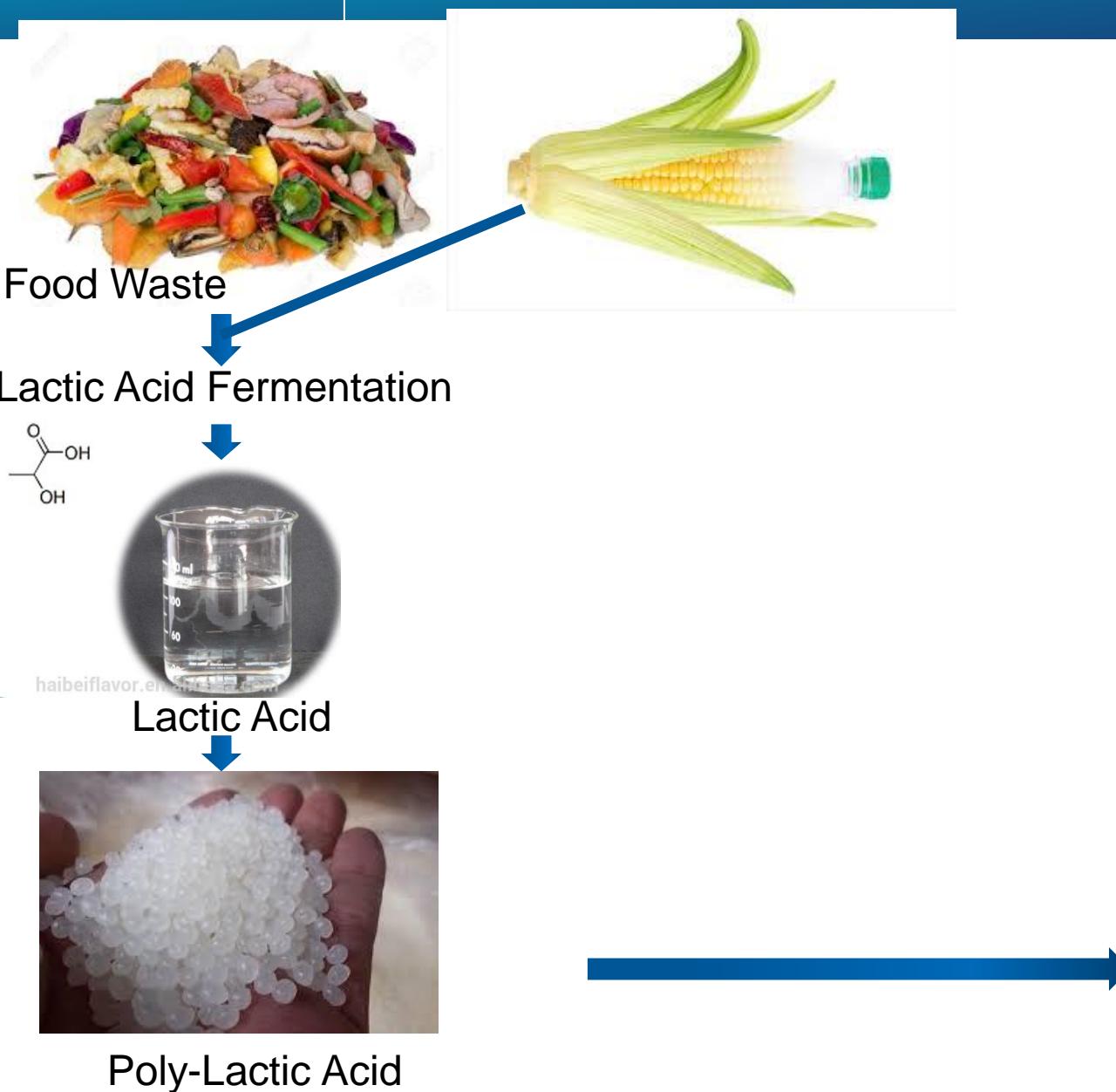


Bio-plastics





Bio-plastics from food waste/corn





Egg Shell blend with bioplastics (PLA)



“Adding eggshell nanoparticles to a bioplastic increases the strength and flexibility of the material” (Vijaya Rangari/Tuskegee University, 2016)

Nanoengineered Eggshell–Silver Tailored Copolyester Polymer Blend Film with Antimicrobial Properties

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J. Agric. Food Chem., 2017, 65 (9), pp 1967–1976

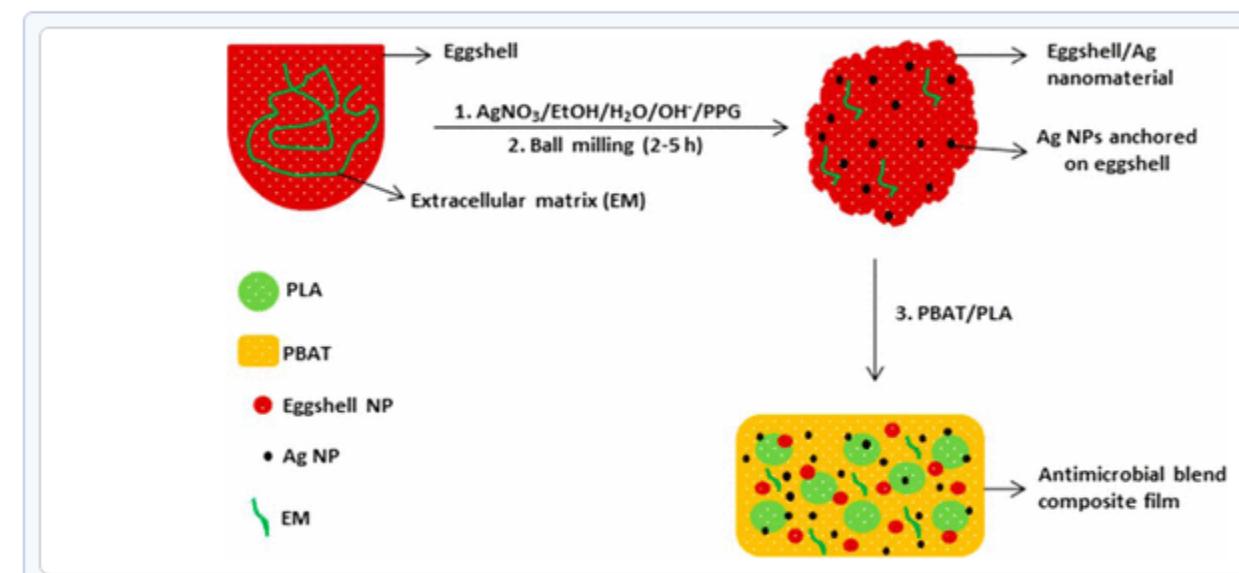
DOI: 10.1021/acs.jafc.7b00133

Publication Date (Web): February 16, 2017

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Abstract





Bio-plastics from potato peels



TIPA : “Our bio-plastic is good as plastic” in terms of

:

- ✓ Shelf life and durability
- ✓ Transparency
- ✓ Printability
- ✓ Flexibility



UK launch for plastic packaging that can be 'thrown away like an orange peel'

By Jenny Eagle

28-Jun-2016 - Last updated on 30-Jun-2016 at 08:18 GMT

1 COMMENT



TIPA biodegradable plastic decomposes like orange peel when thrown away



Bio-plastics

PepsiCo aims to convert potato waste into crisp packaging

By Jane Byrne

11-Oct-2010 - Last updated on 14-Oct-2010 at 15:12 GMT



PepsiCo UK is researching the feasibility of converting potato peel waste into crisp packaging and estimates a two year timeframe before market introduction.



Bio-plastics compostability



**100%
COMPOSTABLE
FLEXIBLE PACKAGING
RENEWABLE / BIO-BASED SOURCES**



Remains of the
package in industrial
composting
conditions after
3 weeks



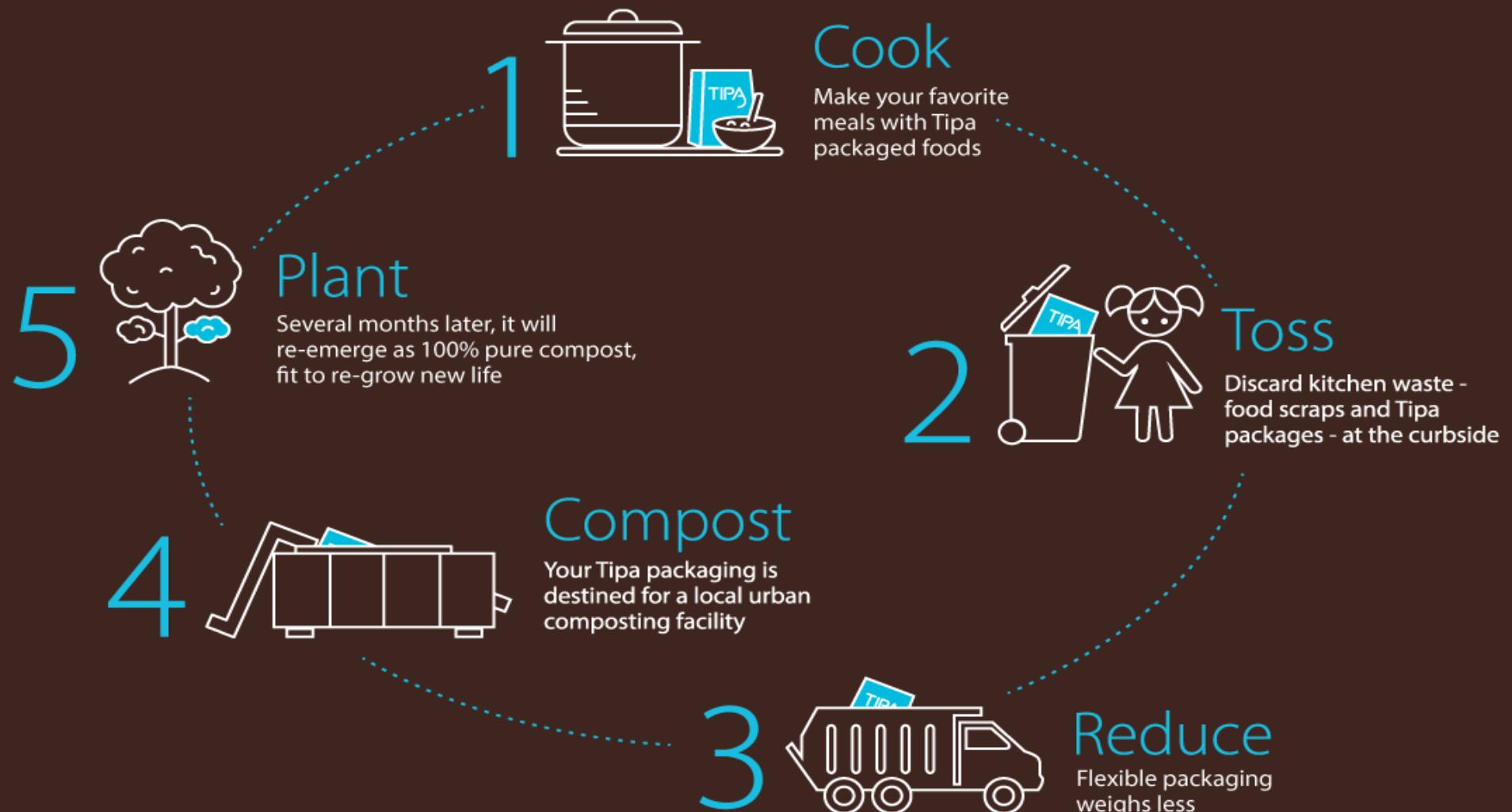
Remains of the
package in industrial
composting
conditions after
6 weeks



Remains of the
package in industrial
composting
conditions after
8 weeks



Compost Cycle



Packaging Suppliers/ manufacturers (Using Food Waste)

Where are they?

- i. Biopac: <http://www.biopac.co.uk/>Worcestershire.
- ii. Comp bio: <http://www.comp-bio.co.uk/>Glastonbury.
- iii. VaioPak Group Limited: <http://www.vaiopak.co.uk>Cambridgeshire.
- iv. Vegware: <https://www.vegware.com/>Edinburgh/Bristol.
- v. KCC : <http://www.k-c-c.co.uk/>Eastleigh, Southampton.
- vi. Parkside: <http://www.parksidedeflex.com/> ...Chesterfield/Sheffield/Bradford.