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Utilization of Food Waste for Packaging

Dr. Mohamed A. Gedi

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.

Petro-based plastics: where are we now?

❑ Typical materials include:

- Polyethylene (PE),

- High Density Polyethylene (HDP)

- Polystyrene (PS)

- Polyethylene terephthalate (PET)

- Polyvinyl chloride (PVC)

- Poly carbonate (PC)

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Treasure, Not Trash

Biodegradability

Food Packaging Materials

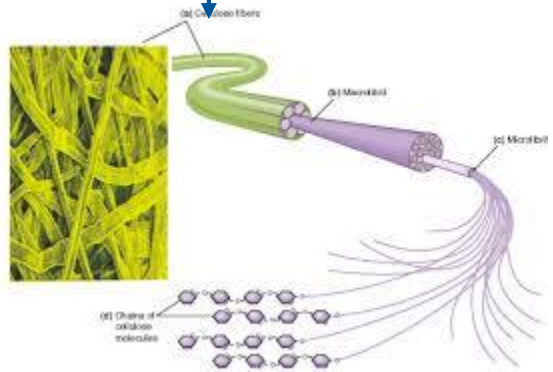
Non-Biodegradable (Eco unfriendly)

Biodegradable (Eco friendly)

Biodegradable Biopolymers

e.g.

Cellulose (bio-fibre)
Polysaccharides
Proteins



Biodegradable Polymers

e.g.

Polycaprolactone,
Polyhydroxybutyrate
Vinyl alcohol

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Sugar-cane by-products

Sugar Cane

Bagasse

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Palm leaf for food containers

Palm Leaf

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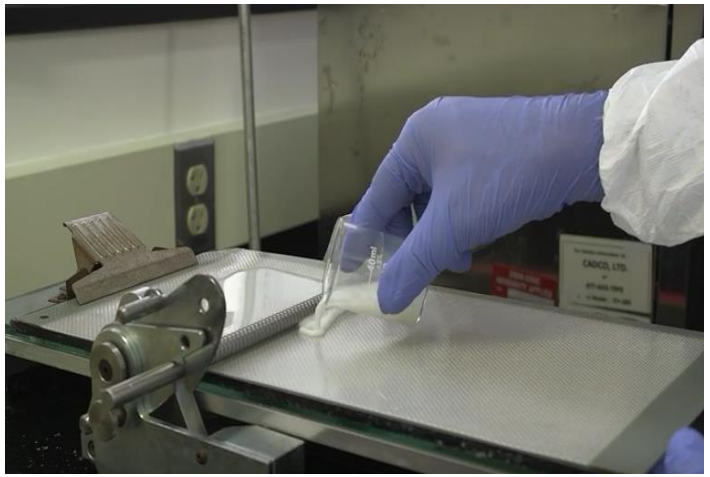
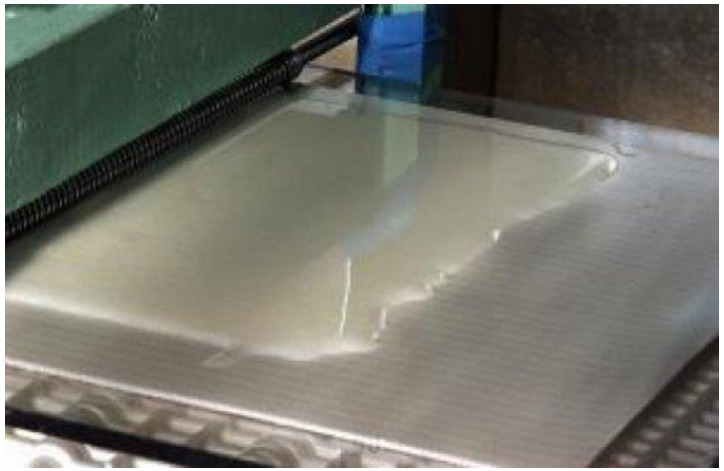
Bio-plastics from Whey Protein Films





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Bio-plastics from Shrimp Shells

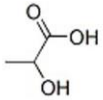
Shrimp Shell

Bio-plastics

Bio-plastics from food waste/corn

Food Waste

Lactic Acid Fermentation



Lactic Acid

Poly-Lactic Acid

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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

Boniface J. Tiimob†, Gregory Mwinyelle‡, Woubit Abdela‡, Temesgen Samuel‡, Shaik Jeelani†, and Vijaya K Rangari*†

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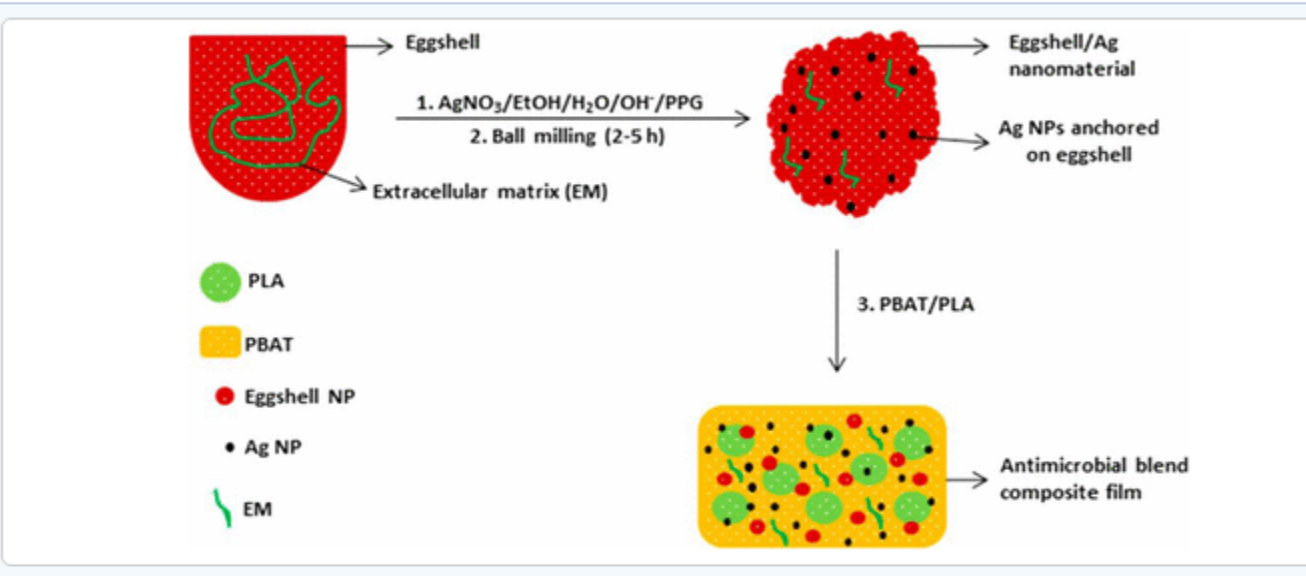
Abstract



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.

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Bio-plastics composability

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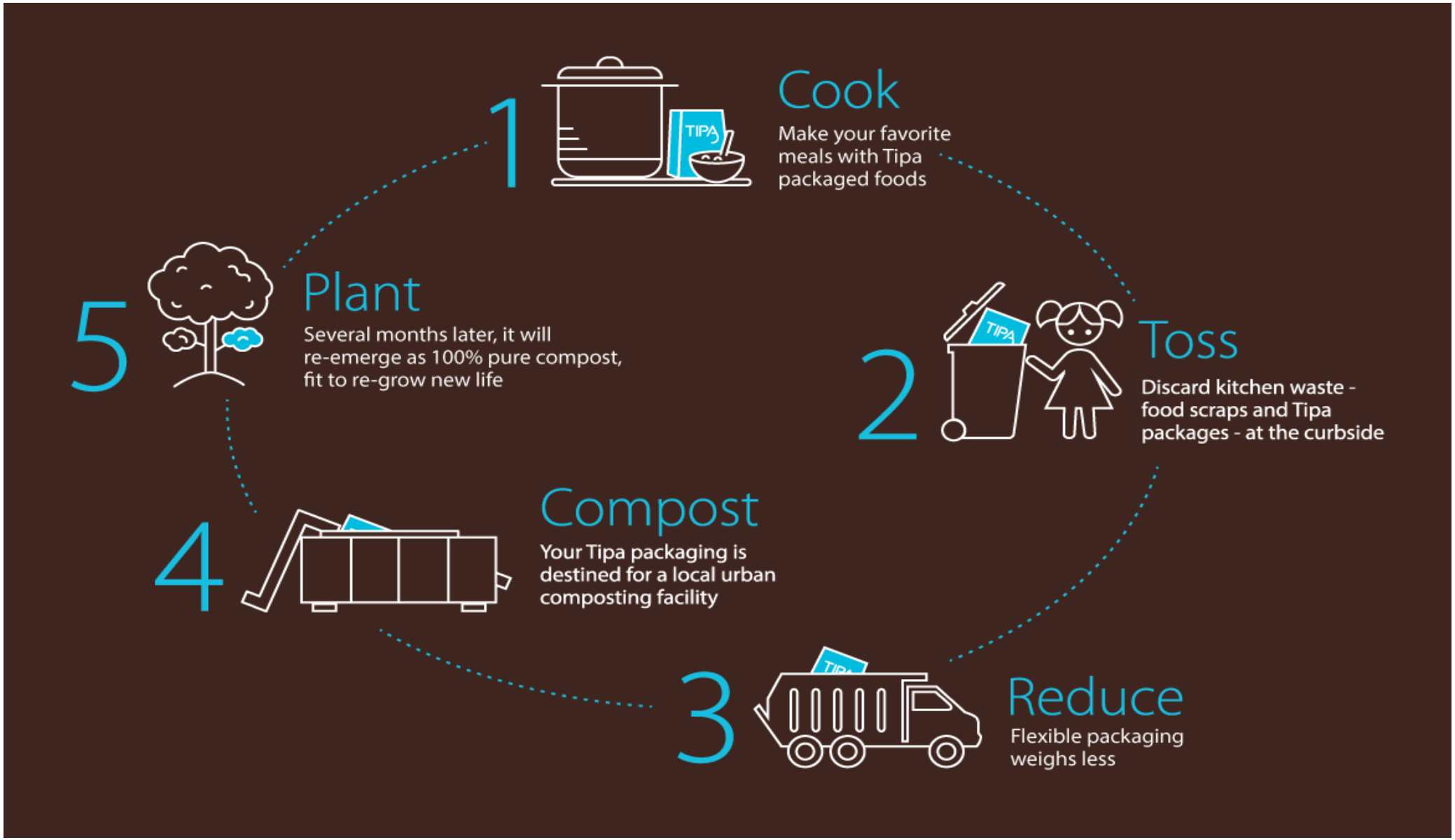
Compost Cycle



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.parksideflex.com/…Chesterfield/Sheffield/Bradford.