COOPBOX experience in bio-based packaging: From **PLA** to the **GLOPACK** project

Residual Biomasses for Eco-compatible and Sustainable Food Packaging

Trieste. 12-settembre-2019

Dott. Silvia Codelupi PhD.

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Agenda

1. **COOPBOX**, company description
2. Food packaging: THERMOFORMED trays
3. Biodegradable food packaging
4. **PLA**
   a) Short shelf life application
   b) Long shelf life application
5. **GLOPACK Project**
6. Conclusion

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COOPBOX Group SPA

Italian food-packaging manufacturer

Production plants:
ITALY (Reggio Emilia & Matera)
SLOVAKIA

Logistics centre:
FRANCE

300 EMPLOYEES
5 people in the R&D team

R&D centralized in the headquarter of Reggio Emilia

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COOPBOX Group SPA

Raw Materials

EXTRUSION

THERMOFORMING

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Thermofromed Trays

- Foamed XPS trays and rigid PET trays
- Different food applications

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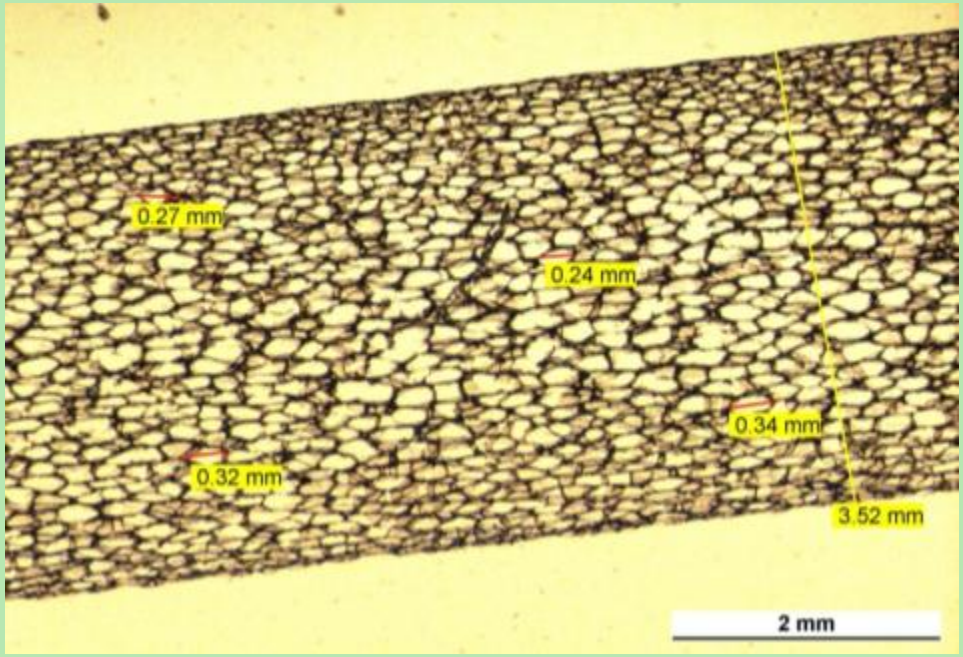
Thermofromed Trays

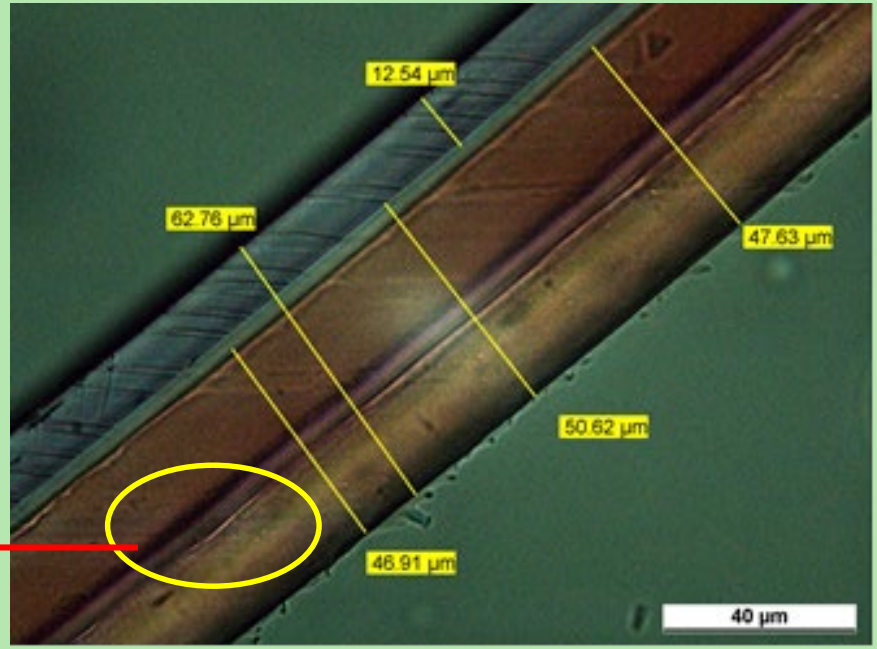


MATERIAL SECTION

Foamed Structure:
Total Thickness: 3-4 mm
Alveolar structure
Cell Size: 0,3 – 0,5 mm

Rigid Structure:
Total Thickness: 50 – 800 µm
Different layers, different polymers

EVOH.
Gas barrier properties



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Biodegradable Food Packaging

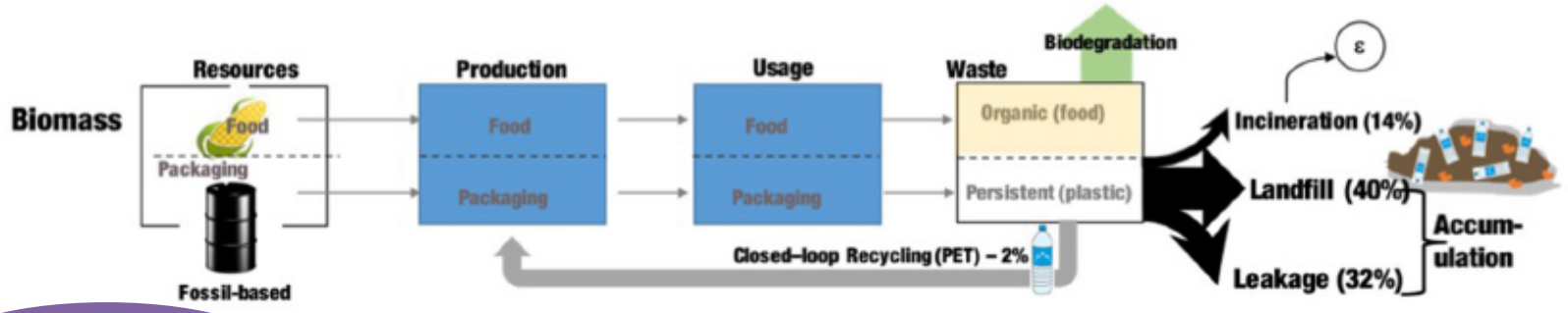

FIGURE 6 | Current linear status of today's food packaging economy [data from (13)].

Citation: Guillard V. et al. (2018)
The Next Generation of Sustainable Food Packaging to Preserve Our Environment in a Circular Economy Context.

Recycling is improving but it's not possible to prevent leakage from the stream. Plastics accumulate in the environment.

Closed loop recycling is a transition technology toward a real packaging circular economy

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Biodegradable Food Packaging

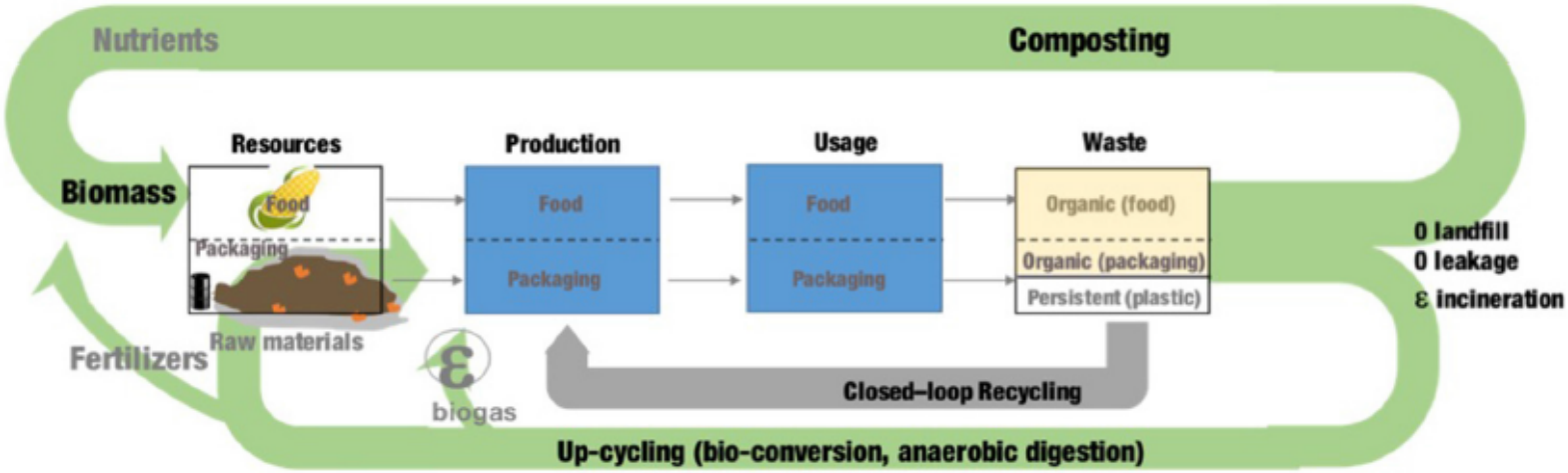

FIGURE 7 | Unlocking the circular economy potential of the food packaging chain, a prospect for the future.

A naturally biodegradable bio-packaging increases end of life options and avoids accumulations in the environment

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Biodegradable Food Packaging

Bio-based polyester

PLA: polylactic acid

Biodegradable and industrially compostable

Compostable EN13432:2000

PHAs: Polyhydroxyalkanoates

PHAs → PHB; P(HB-co-HV); P(HB-co-HHx)

Naturally biodegradable (home compostable)

HOME OK compost

Naturally biodegradable polymer

Fully biodegradable in natural land conditions or home composting conditions as opposed to industrially compostable materials

Citation: Guillard V. et al. (2018)

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PLA packaging

Naturalbox, patented in 2005, was the world's first line of "green" trays in PLA (polylactic acid) obtained only from renewable feedstock that, after use, completely decompose into carbon dioxide, water and biomass.

Naturalbox has been available in expanded PLA and in the rigid, transparent PLA version.

Biodegradable and industrially compostable (UNI EN 13432)

NATURAL box

First commercially available PLA FOAMED TRAY (90gr/l)

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PLA packaging

Transparent rigid PLA and XPLA packaging show the same packaging performances

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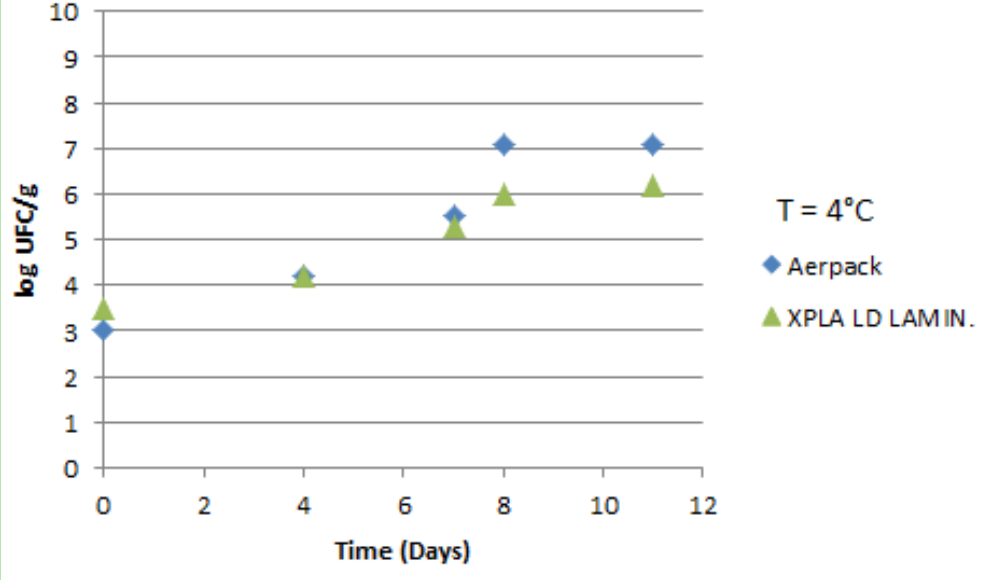
PLA packaging

Fresh Red Meat packaging:

- **Application with short shelf life (12 days)**
- **Very good performaces of PLA packaging in comparison with barrier XPS trays**

Mesophilic Aerobic Bacteria growth during time



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PLA packaging

Fresh Filled Pasta packaging:

- Transparent & Foamed laminated PLA trays
- Top sealing PLA film with barrier coating
- Fresh pasta filled with meat, vegetables and cheese

Starting gas mixture: 70/30 N2/CO2

%O2 rises inside packaging and supports th
of aerobic bacteria

% CO2 too low to guarantee bacteriostatic e
CO2 leaks from the packaging and CO2 absc
the food

Standard barrier XPS: 45 days

PLA trays: 22/32 days (depending by the water activity of the pasta filling)

10 days of shelf life difference!! Not good solution

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PLA packaging

MARKET ACCEPTANCE OF PLA PACKAGING

Positive feauteres:

- No problem with standard packaging equipments (stretch and top sealing machines)
- Good preservation of food with short shelf life

Negative feauteres:

- Not suitable for long shelf life food packaging applications
- Too high final price (4x in comparison with standard XPS)
- Hard to communicate to the final consumer the different end of life of this tray in comparison with standard packaging

Too many issues for an extensive market acceptance

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GLOPACK project

Granting society with LOw environmental impact innovative PACKaging

Period: June 2018 – May 2021

Coordinated by: UNIVERSITÉ DE MONTPELLIER

Aims:

1. **BIO-CIRCULAR PACKAGING** Naturally biodegradable materials from agro-food residues conversion
2. **ACTIVE PACKAGING** Oxygen scavanger and antimicrobial emitter
3. **INTELLIGENT PACKAGING** to track food quality during storage

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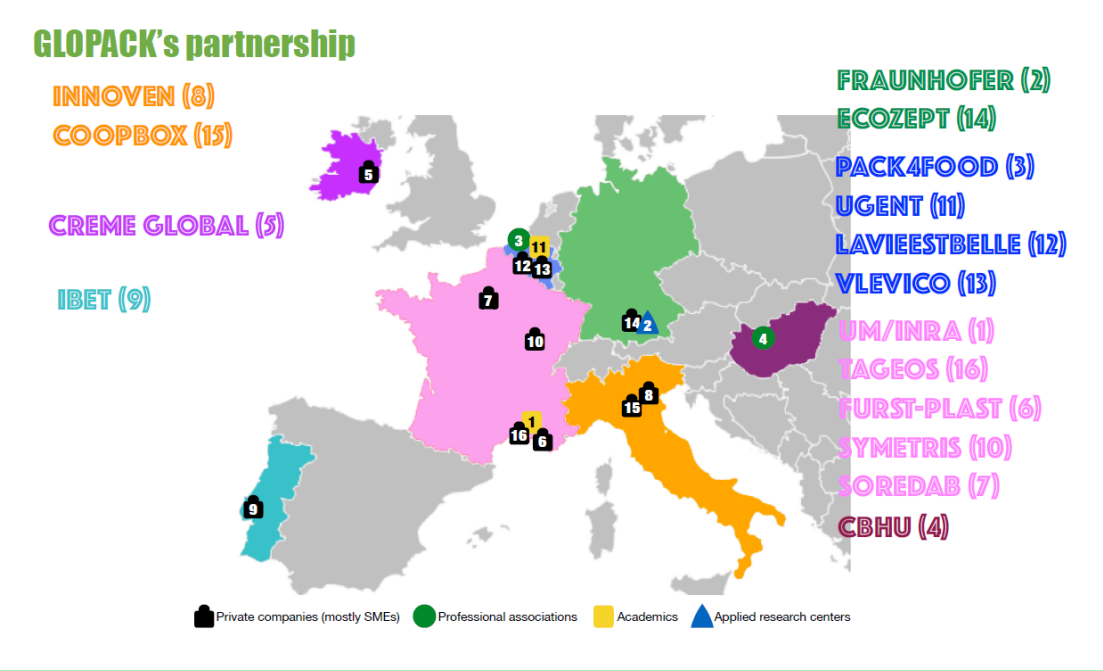
GLOPACK project

GLOPACK's ambitions for food-packaging:

- Bio source
- Usage Benefit (active and intelligent properties)
- End of life (naturally biodegradable)



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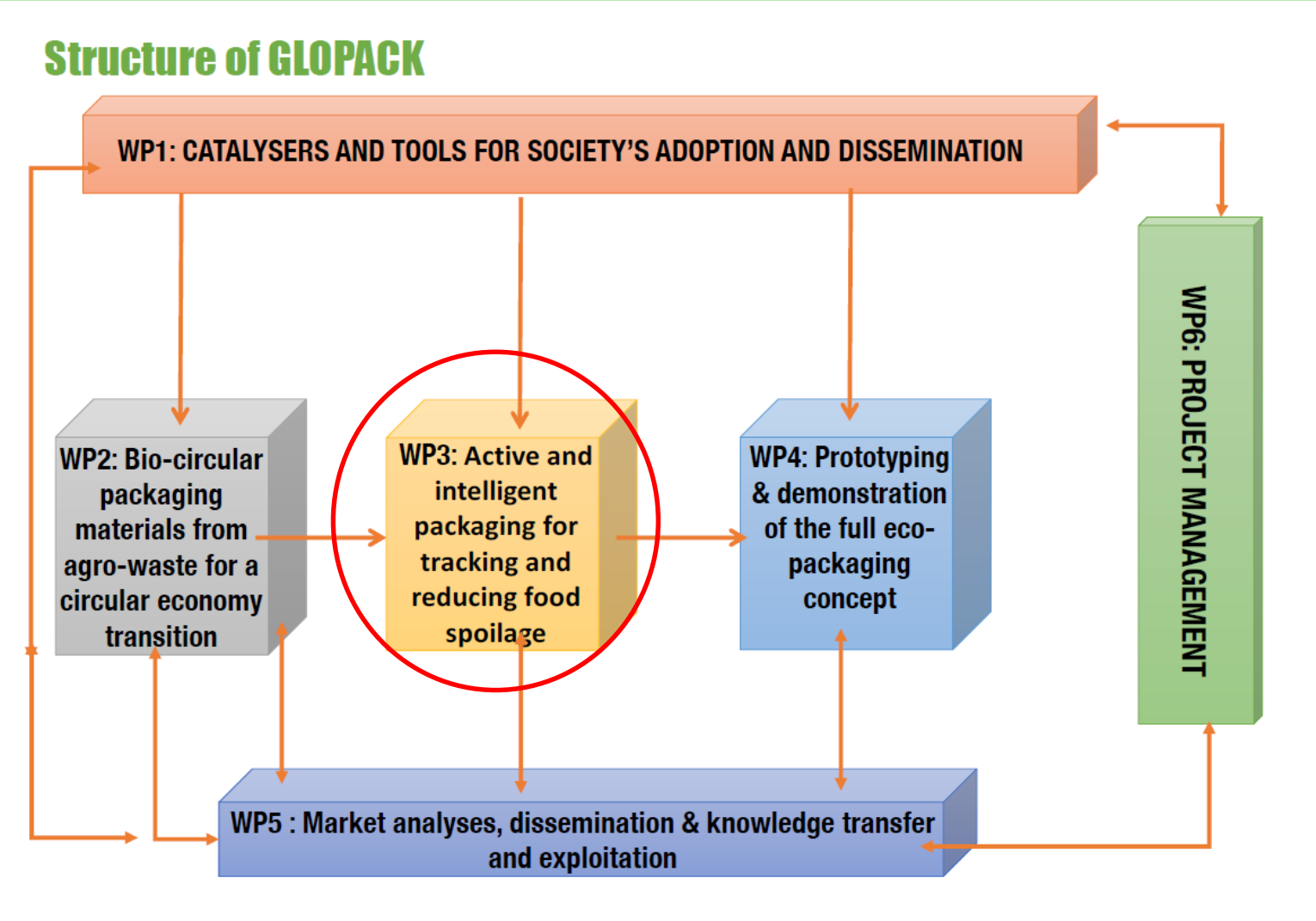
GLOPACK project



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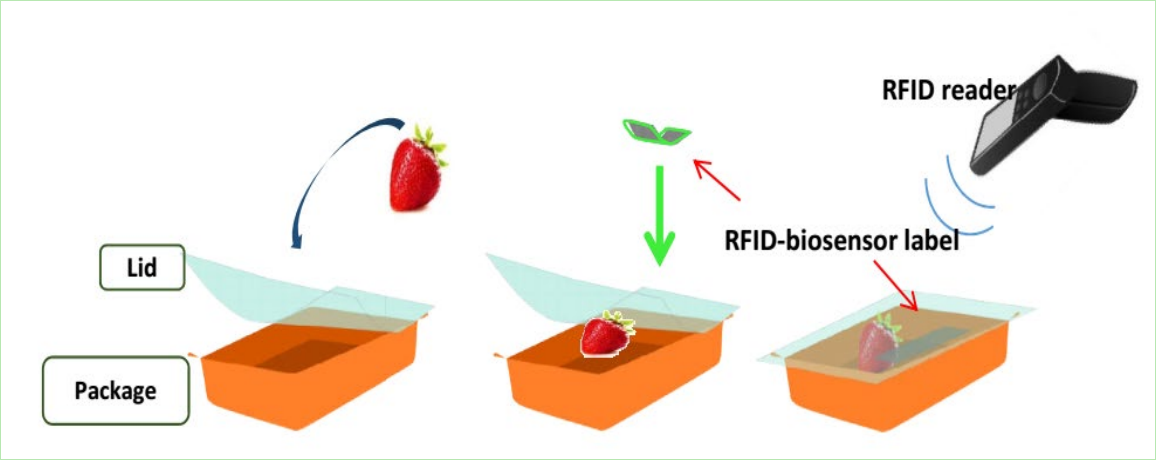
GLOPACK project. WP3

- Fresh cheese → Injection tray → Antimicrobial emitters → RFID
- Fresh meat (poultry and beef) → Thermoformed tray → O2 scavang. → RFID
- Ready to cook vegetables product (falafel) → Thermoformed tray → Antimicrobial emitters → RFID



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GLOPACK project

Stakeholder Platform

Members will receive early access to the project results therefore they are requested to sign a NDA, which covers confidentiality and intellectual property issues.

In their application the SP members are kindly asked let us know:

–Name of your organization,

–Contact details of the responsible people who will proceed with the Non-disclosure Agreement,

–Contact details of the participant, who will represent the organisation in the SP.

Dr.András Sebők, Campden BRI Hungary
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www.glopack2020.eu

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