



VII INTERNATIONAL SEMINAR

BIOPOLYMERS AND SUSTAINABLE COMPOSITES

4-5 MARCH 2020



BIO-BASED INDUSTRIES
Joint Undertaking
www.bbi-europe.eu



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Testing capabilities of TEKNIKER in food packaging

<http://Biosmart-Project.eu>

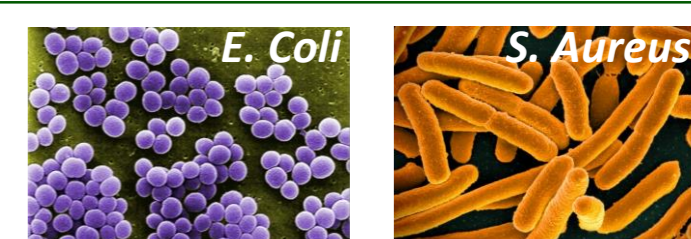
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BIOSMART project is developing **smart bio-based biodegradable and/or compostable packages** to meet the needs of both fresh and pre-treated **food applications**. The project encompasses an approach for selectively integrate different technologies such as super-hydrophobic surfaces, micro-encapsulated phase change materials, barrier coatings, sensor devices and new bio-active antimicrobial and antioxidants agents, into fully bio-based multilayer flexible and rigid plastic packages.

One of the roles of TEKNIKER in the project remains in **characterizing key materials properties of the new developed BIOSMART solutions**. A summary of the activities carried out is presented here.

SURFACE ANTIMICROBIAL PROPERTIES

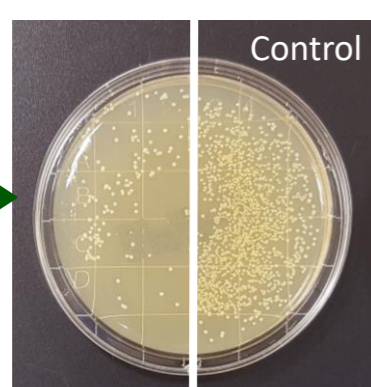
Tests according to standards and modification of test methodologies based on samples characteristics.



1) TOUCH-TRANSFER ASSAY

Repealing properties of the materials against bacteria. Ability to avoid bacterial contamination.

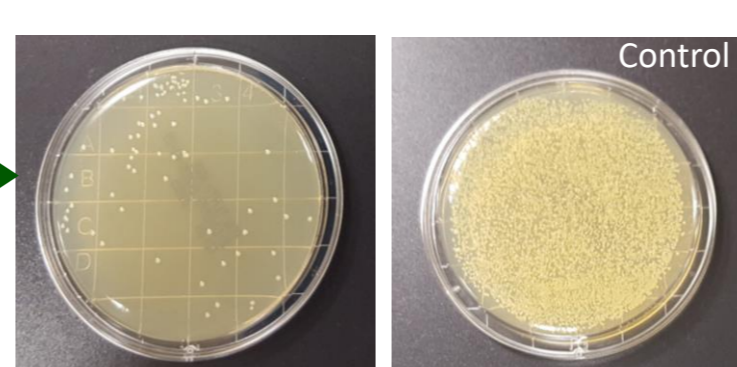
Less bacterial contamination



2) ADHESION ASSAY

Anti-adhesion properties of the materials. Ability to inhibit bacterial adhesion.

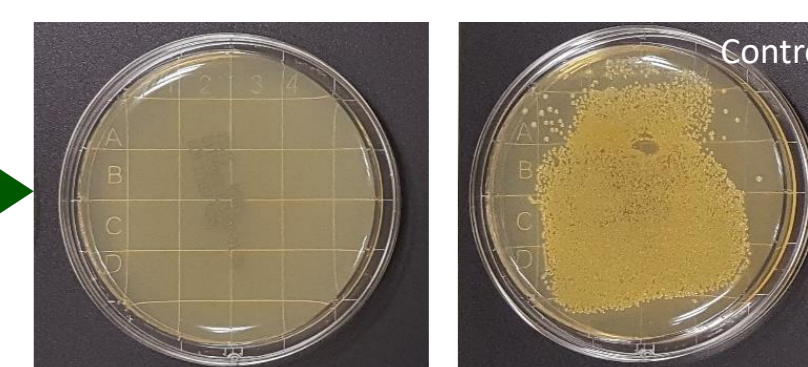
Less bacterial adhesion



3) VIABILITY ASSAY

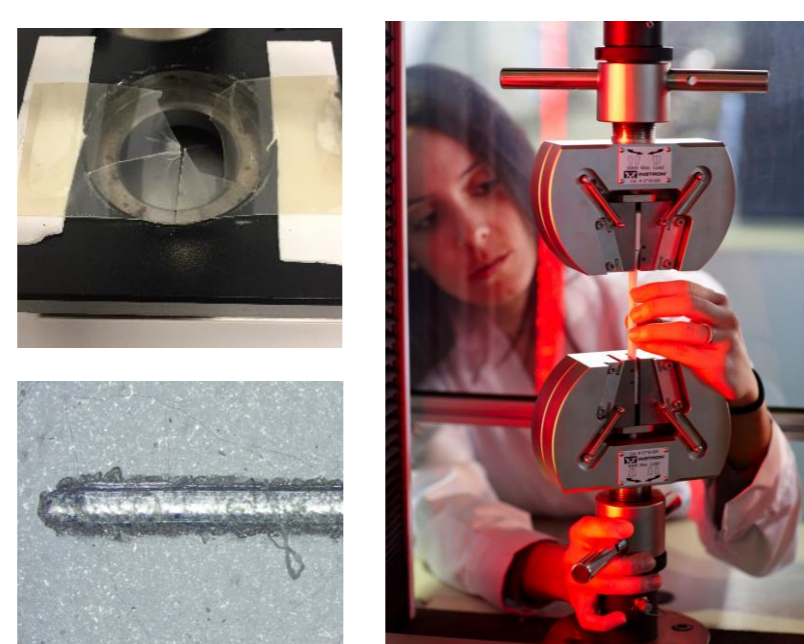
Bactericidal properties of the materials. Ability to kill bacteria.

Bactericidal



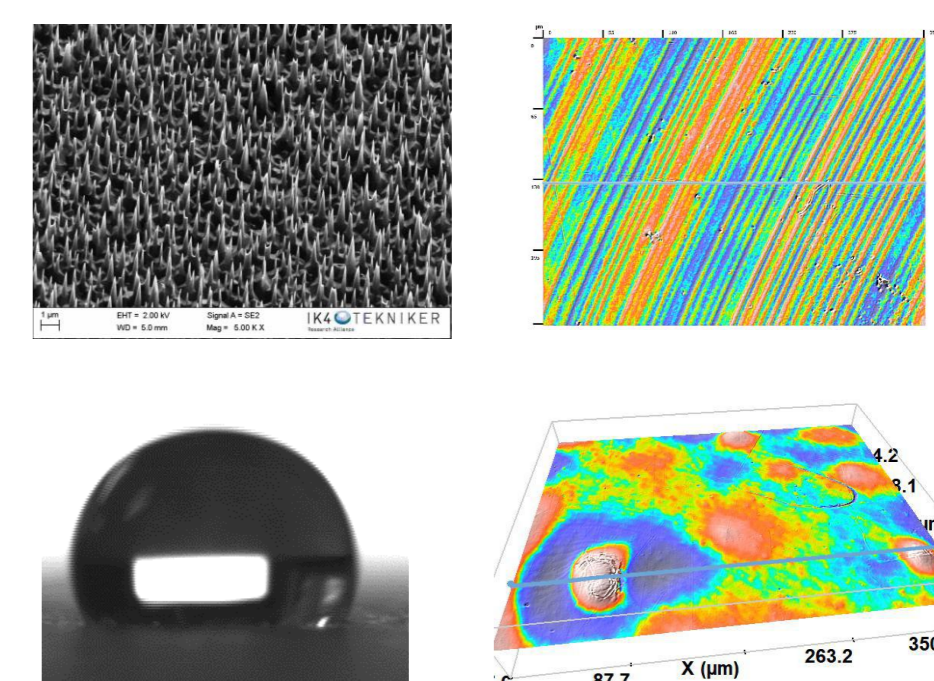
MECHANICAL PROPERTIES

- ✓ Tensile properties
- ✓ Compression
- ✓ Tearing
- ✓ Impact
- ✓ Hardness
- ✓ Scratch



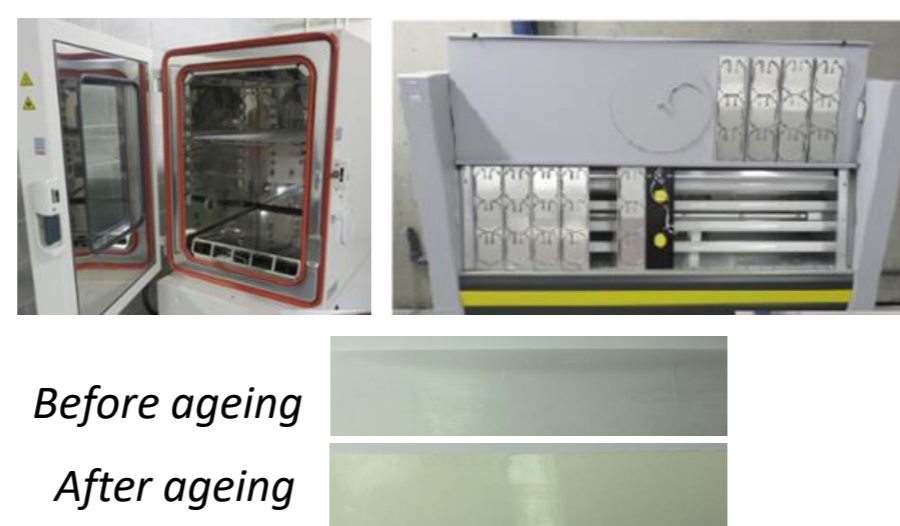
SURFACE PROPERTIES

- ✓ 2D and 3D texture
- ✓ Roughness
- ✓ Wettability
- ✓ Gloss
- ✓ Colour
- ✓ Friction
- ✓ Wear resistance



AGEING

- ✓ Climatic chambers
- ✓ UV/Condensation chamber
- ✓ Humedostatic chamber
- ✓ Immersion chamber
- ✓ Salt spray



BIDEGRADABILITY AND TOXICITY IN AQUATIC MEDIUM

1) BIODEGRADABILITY

Determination of biodegradability grade of materials.

Ready biodegradability (aerobic biodegradation):

- OECD 301F (Oxygen consumption)
- OECD 301B (CO₂ evolution test)

Inherent biodegradability

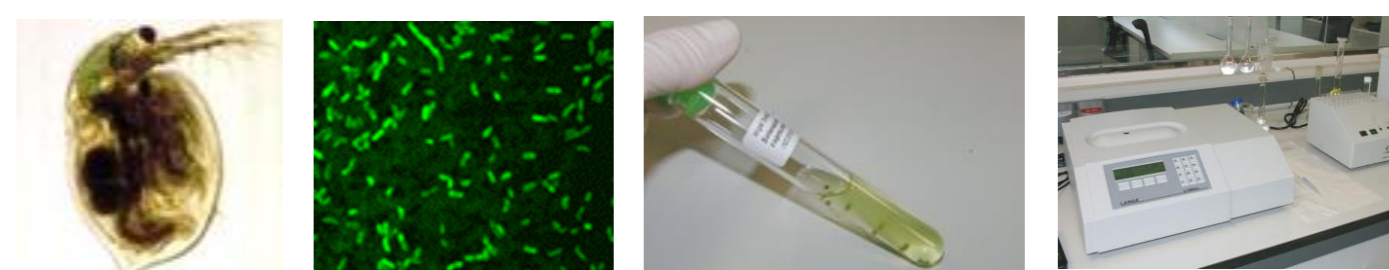
- OECD 302B (Zahn-Wellens Test)



2) ECOTOXICITY

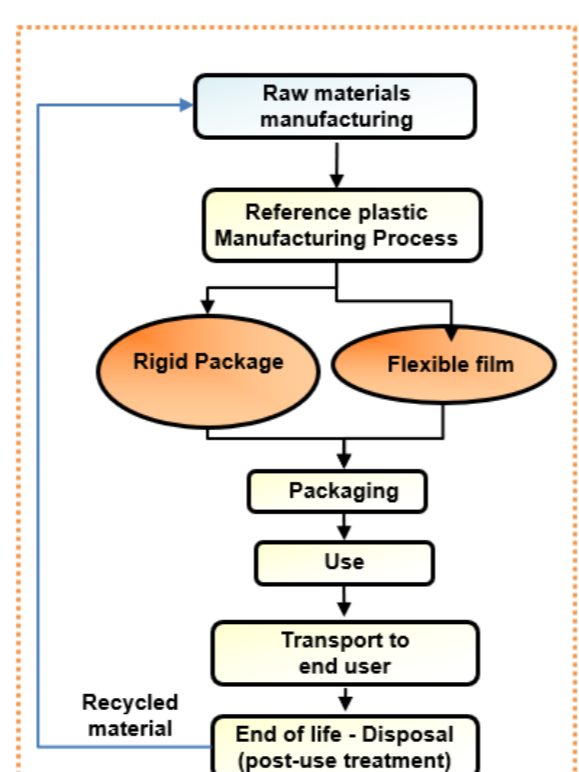
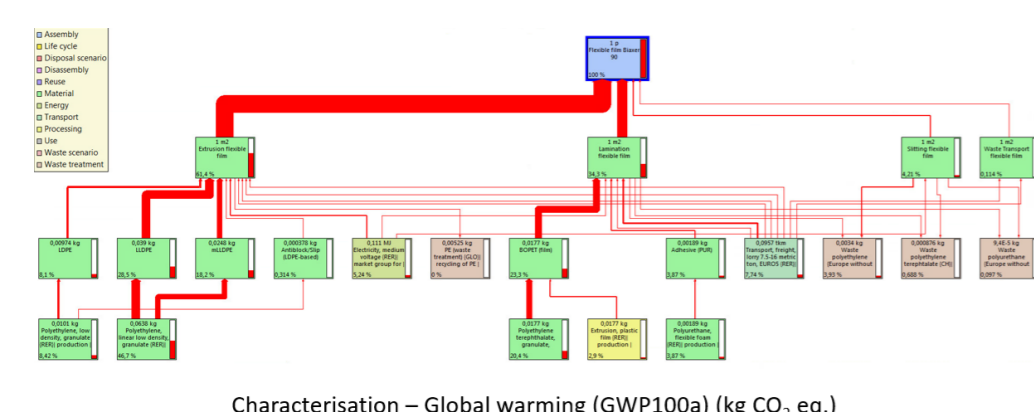
Determination of effective concentration of material at which 50% of the population is affected

- Luminiscent bacteria, Vibrio Fischeri test, EN ISO 11348-2
- Alga growth inhibition test, OECD 201
- Daphnia sp., Acute Immobilisation Test, OECD 202



LIFE-CYCLE ASSESSMENT (LCA)

Determination of the environmental impacts associated with all the stages of the life-cycle of packaging.



Characterisation – Global warming (GWP100a) (kg CO₂ eq.)