



ASSOLOMBARDA

Imballaggi alimentari e per la cosmesi

Luigi De Nardo - Professore ordinario, Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta" del Politecnico di Milano

13 novembre 2020



POLITECNICO
MILANO 1863

Imballaggi alimentari e per la cosmesi

Alcuni risultati di ricerca

Prof. Luigi De Nardo



Luigi De Nardo

Professore di Scienza e Tecnologia dei Materiali
Politecnico di Milano

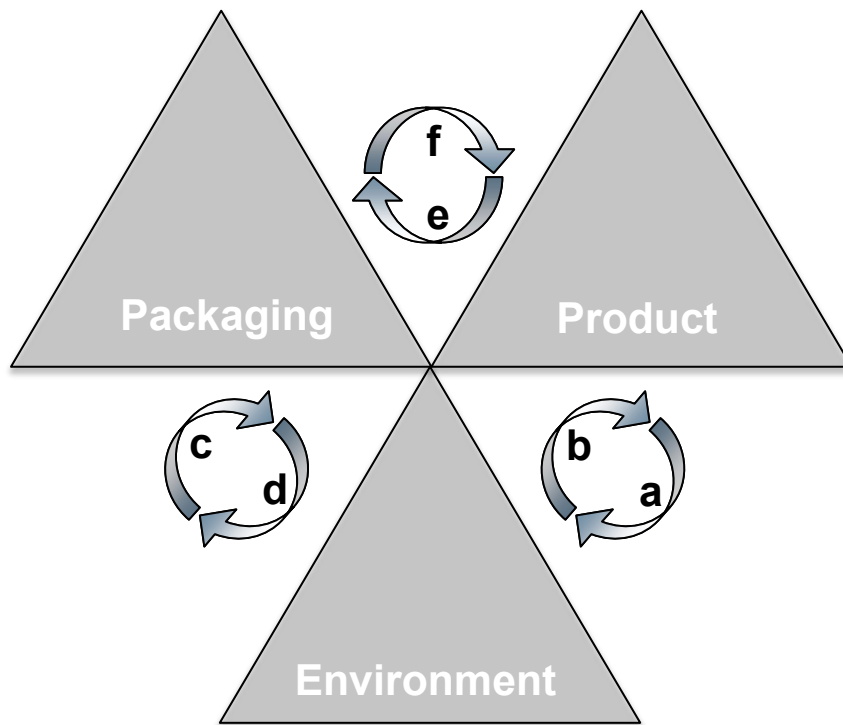
- ✎ Coordinatore del Corso di Laurea Magistrale in Food Engineering
- ✎ Membro del CDA Fondazione Politecnico di Milano
- ✎ Membro del CDA del Consorzio Nazionale di Scienza e Tecnologia dei Materiali (Firenze)

Contatti

Luigi.denardo@polimi.it
+39-346-7021506

Perché non è una soluzione semplice?

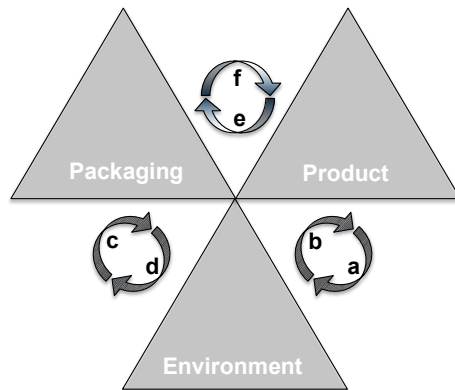
Requisiti tecnologici



- a) **Product** → **Environment** (e.g. loss of volatile components but also human interactions!)
- b) **Environment** → **Product** (e.g. chemical/biological contamination)
- c) **Packaging** → **Environment** (disposal of packaging waste)
- d) **Environment** → **Packaging** (light, air, micro-organisms on package performance)
- e) **Product** → **Packaging** (scalping)
- f) **Packaging** → **Product** (e.g. migration)

Perché non è una soluzione semplice?

Requisiti normativi nella cosmesi

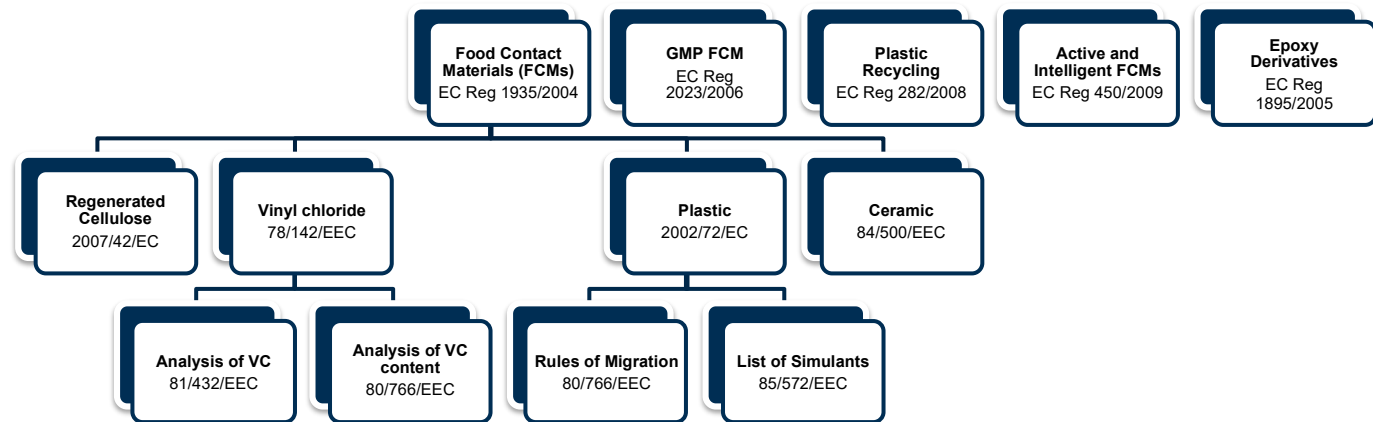
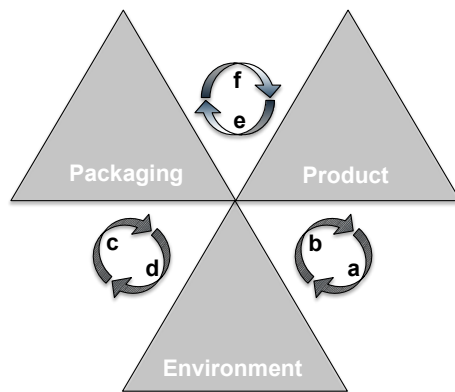


 **Cosmetic products**

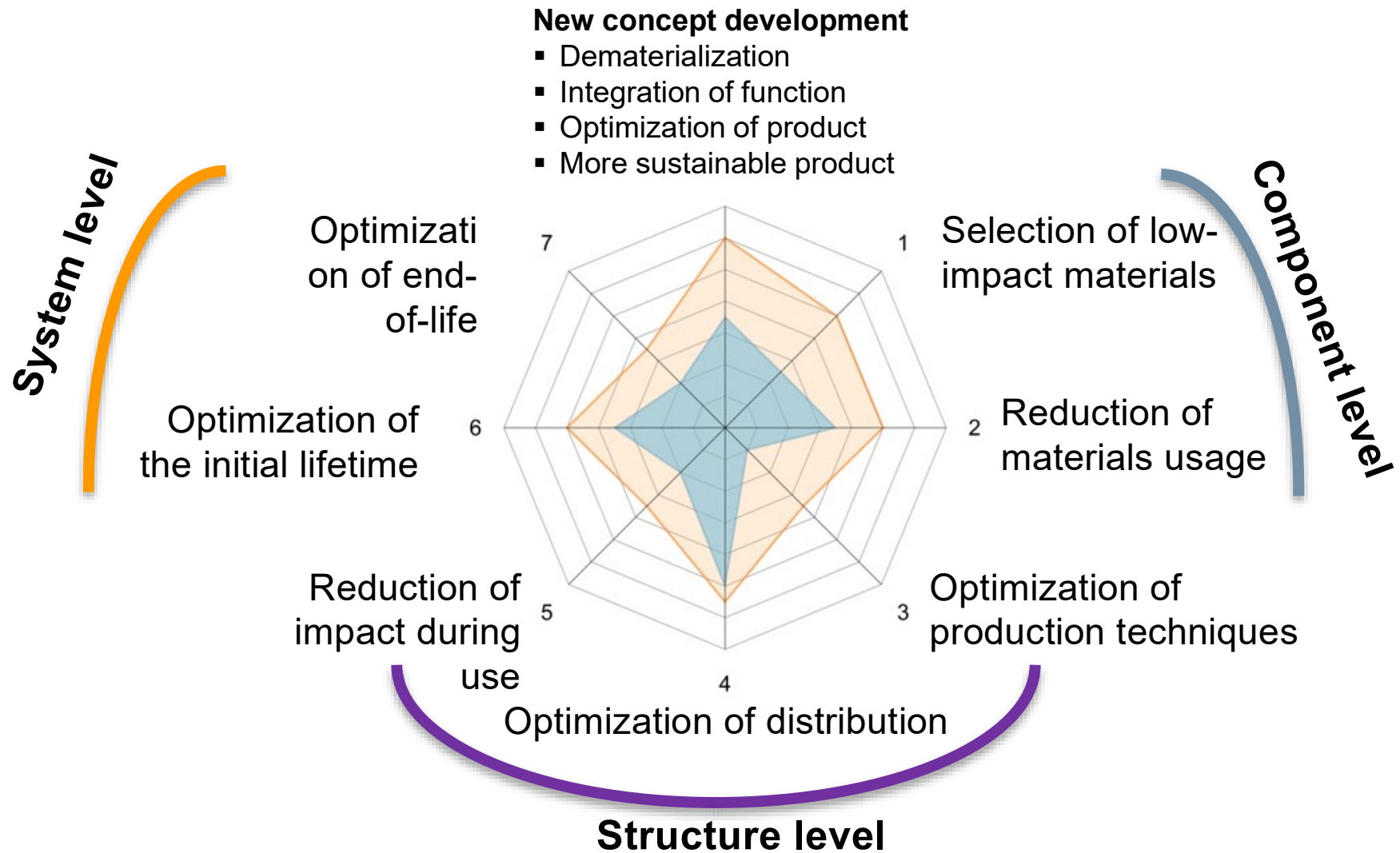
Today	Tomorrow
SAFETY	
<p> Obligation for a manufacturer to prepare an information file on its product with a safety assessment</p>	<p> Clearer requirements for safety assessment, e.g. new obligation to include reasoning leading the safety assessor to a particular conclusion</p>
ON THE LABEL	
<p> Name and address of the manufacturer or the person responsible for marketing the product</p> <p> Date of minimum durability or  period when product is safe after opening</p>	<p> Name and address of a responsible person for compliance with the rules. Clear outline of obligations</p> <p> Pictogramme indicating the date of minimum durability or  period when product is safe after opening</p> <p> All nanomaterials are to be indicated in the list of ingredients. Their names are followed by "nano" e.g. Titanium Dioxide <nano></p>
NOTIFICATIONS	
<p> Manufacturer notifying information on its product to each EU country, e.g. for purpose of medical treatment</p>	<p> Faster notification through the Cosmetic Products Notification Portal. Information can be retrieved within seconds by anti-poison centres in EU-28</p>
CLAIMS	
<p> General requirements in line with the legislation on unfair commercial practices</p>	<p> Additional common criteria for claims which may be used on cosmetics. Possibility for national authorities to verify claims e.g. if claim says "48h efficacy", it has to be proven scientifically</p>
SERIOUS UNDESIRABLE EFFECTS	
	<p> Obligation for a responsible person and/or distributor to inform national authorities.</p> <p> Obligation for EU countries to share information (also coming from users and health professionals)</p>

Perché non è una soluzione semplice?

Requisiti normativi in ambito alimentare



Una transizione sostenibile (nel breve termine)



Una transizione sostenibile (nel breve termine)

PLASTIC PACKAGING SUSTAINABILITY ALONG PRODUCTION CHAIN



Resources, Conservation and Recycling
Volume 151, December 2019, 104475

Una transizione sostenibile (nel breve termine)

Component level

1. Selection of low impact materials

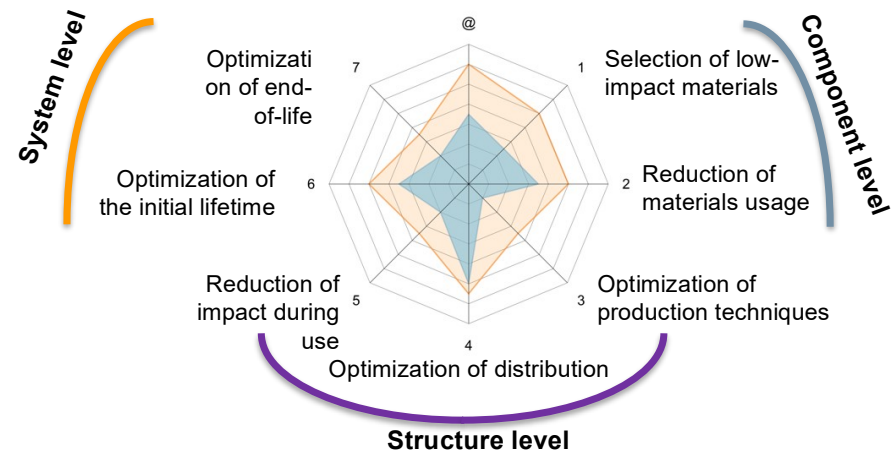
- ↘ Renewable materials
- ↘ Lower energy content materials
- ↘ Recycled materials
- ↘ Recyclable materials

2. Reduction of materials usage

Product system level

7. Optimization of end-of-life

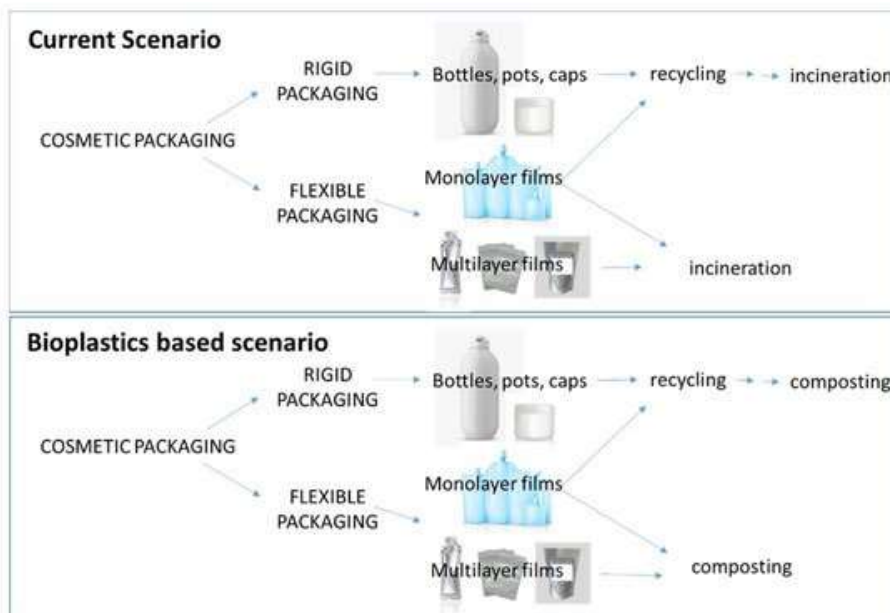
- ↘ Reuse of product
- ↘ Recycling of materials
- ↘ Safe composting



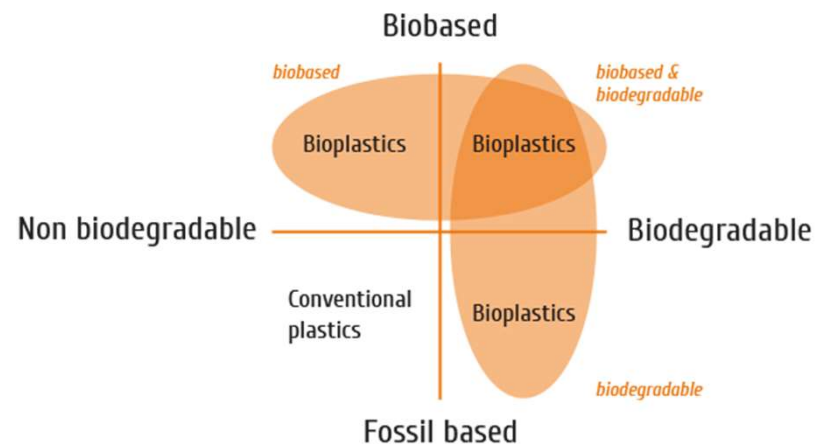
Una transizione sostenibile (nel breve termine)

@PoliMI we study

- ↳ the integration of new classes of materials in products
- ↳ By evaluating pros and cons along the overall life cycle of the product

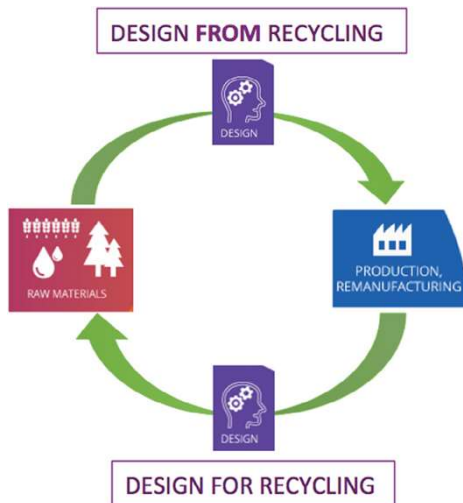


Cosmetics 2019, 6(2), 26



Toward mono-material packaging enabling 3R's @PoliMI

Supporting innovation via materials selection



ecomcompact
PATENTED

Premio Speciale nella sezione **Ambiente**

WINNER
OSCAR DELL'IMBALLAGGIO™
BEST 2020
PACKAGING
promosso da ISTITUTO ITALIANO IMBALLAGGIO

LUMSON
COSMETIC PACKAGING INDUSTRIES

The advertisement features a photograph of several black, circular cosmetic containers, some closed and some open, showing a light-colored powder inside. The containers are arranged on a white surface with soft shadows.

UNIONE EUROPEA
Fondo europeo di sviluppo regionale

Regione Lombardia

fesr

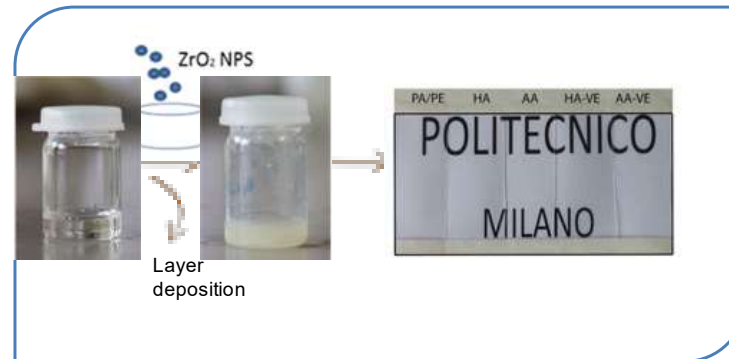
POR FESR 2014-2020 / INNOVAZIONE E COMPETITIVITÀ

Toward mono-material packaging enabling 3R's @PoliMI

Functional layers and coating development

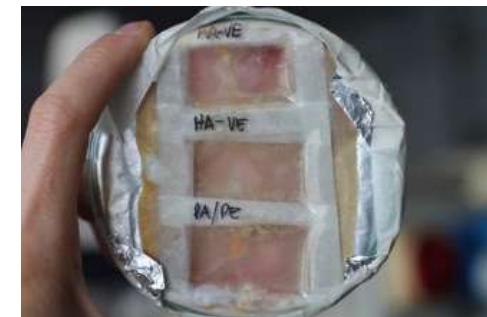
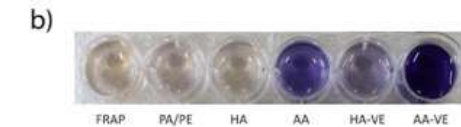
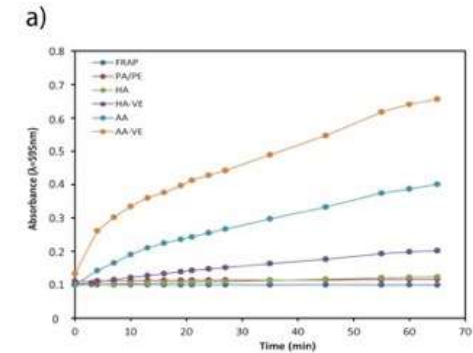
Ultrathin packaging layers

- ↳ high barrier properties
- ↳ enabling **mono-material approach**



Design of multilayer barrier systems for

- ✓ Antibacterial properties
- ✓ Barrier properties to Oxygen
- ✓ Antioxidant properties

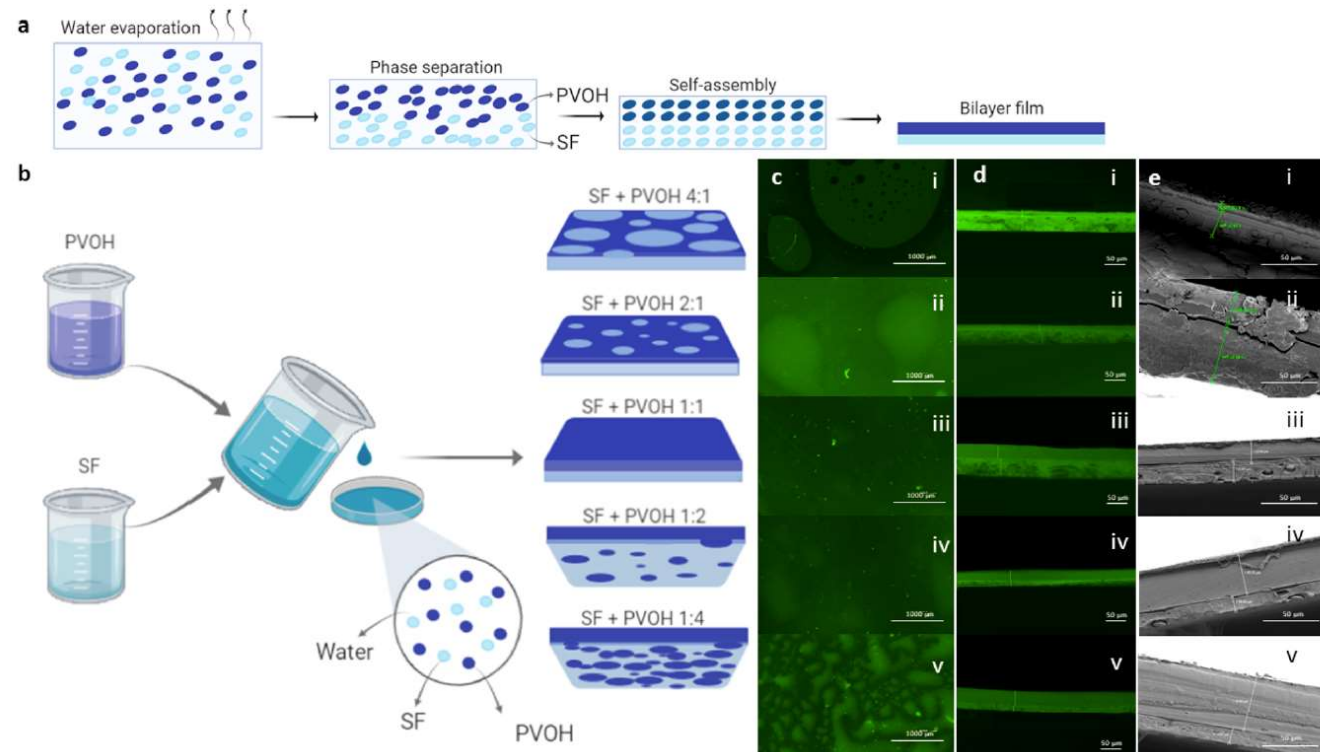


High-barrier films to preserve product shelf-life

Edible coatings for shelf-life extension and sustainability

Silk Fibroin Coatings

Edible coatings
from biomass
feedstocks



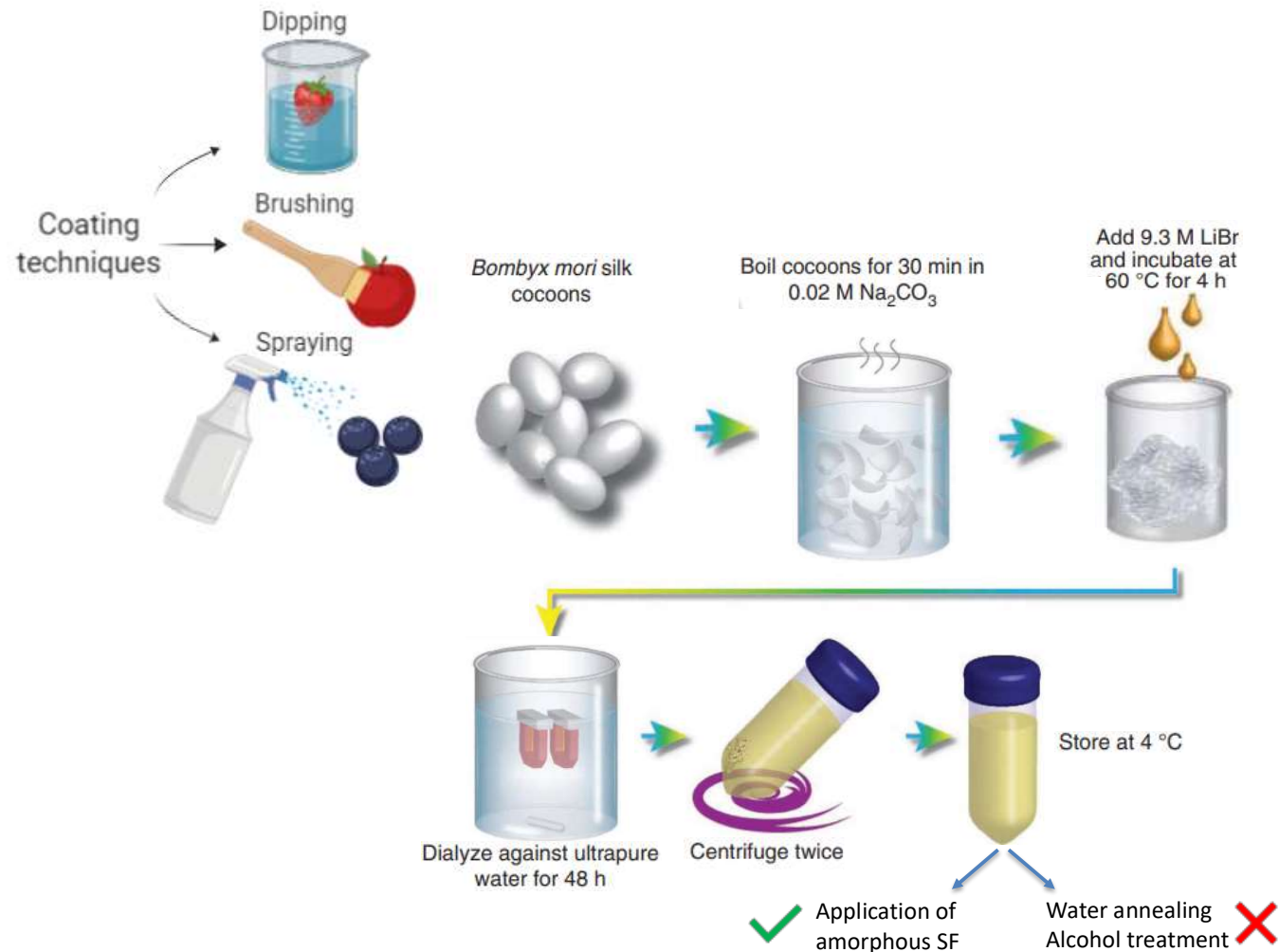
ACS Sustainable Chem. Eng. 2020, 8, 14312–14321

Edible coatings for shelf-life extension and sustainability

Silk Fibroin Coatings

Edible coatings
from biomass
feedstocks

The application of
an edible coating
represents a route
to **extend crop
freshness** by
providing a
modified
atmosphere

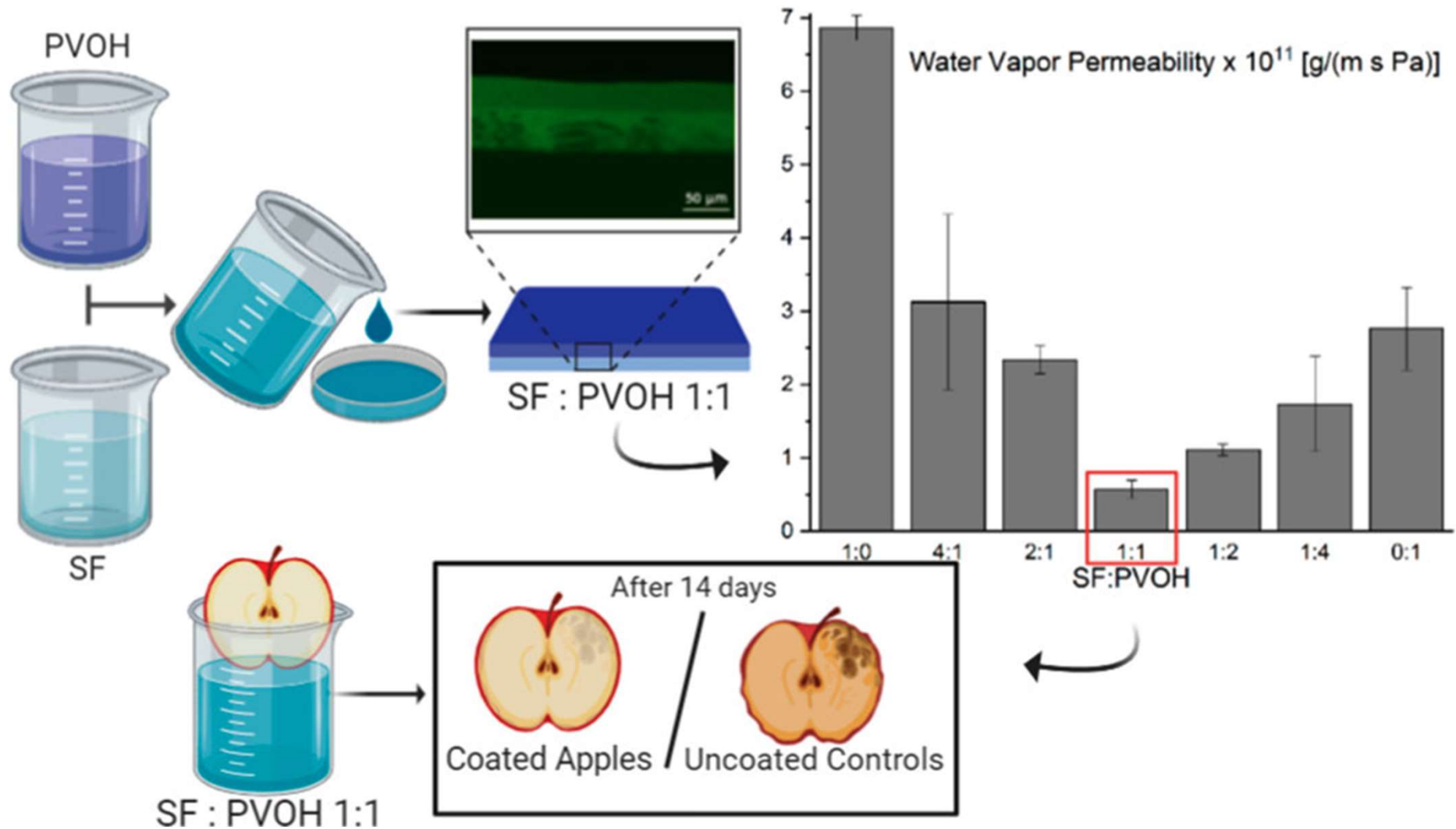


Adapted From (Rockwood et al. 2011)

ACS Sustainable Chem. Eng. 2020, 8, 14312–14321

Edible coatings for shelf-life extension and sustainability

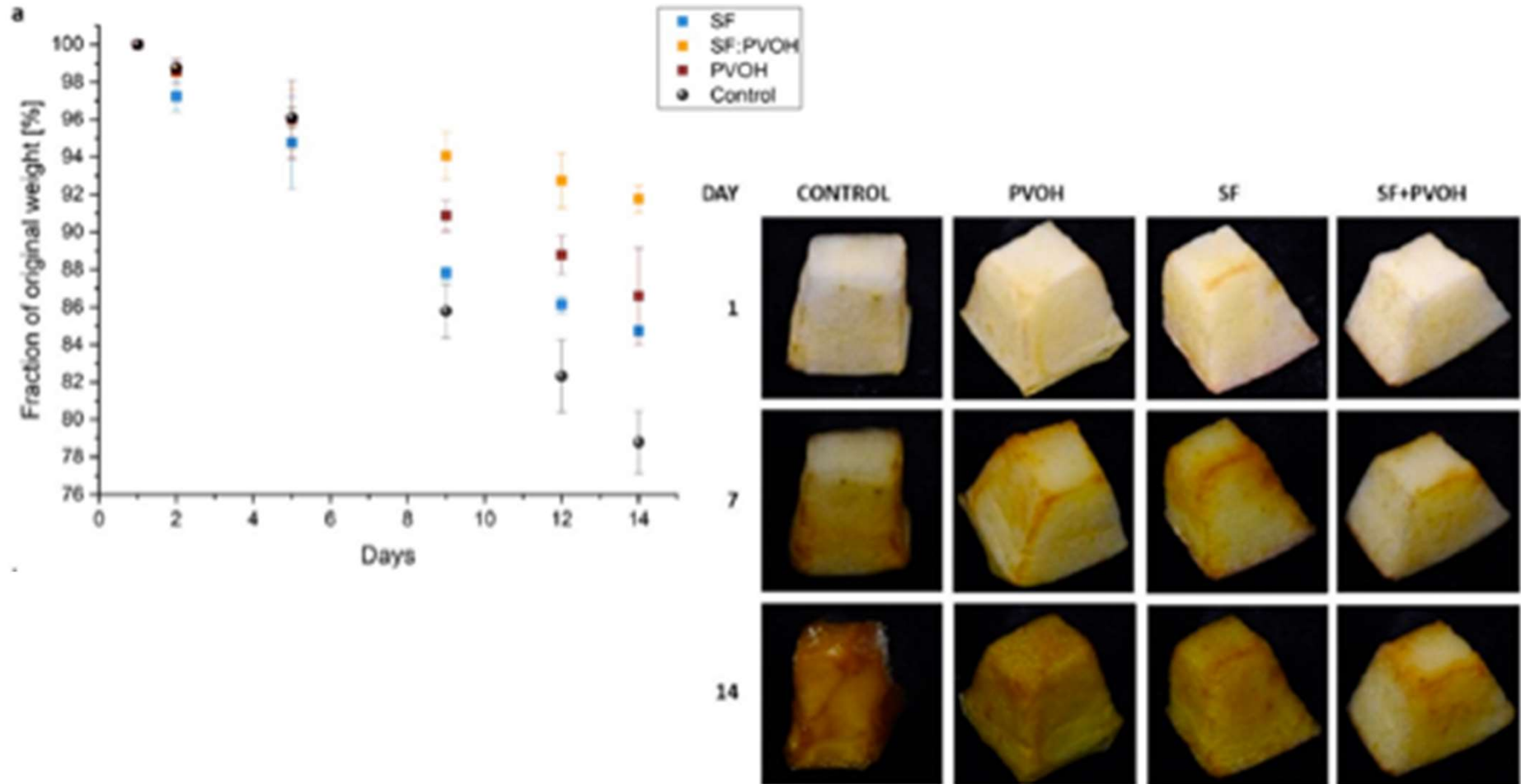
Silk Fibroin Coatings



ACS Sustainable Chem. Eng. 2020, 8, 14312–14321

Edible coatings for shelf-life extension and sustainability

Silk Fibroin Coatings



ACS Sustainable Chem. Eng.
2020, 8, 14312–14321

Conclusioni

There is a material (and a technology) that fits all of your design requirements

- ✎ But, a responsible and sustainable use allow the correct perspective of their use in an industrial and fashion product

There is plenty of materials (and technologies) allowing new design

- ✎ But get back to your project and its requirement
- ✎ The center is the product and its perceived value by the customers!

GRAZIE!



Luigi De Nardo ringrazia

Tutti voi per l'attenzione!

Finanziatori



Contatti

Luigi.denardo@polimi.it

+39-346-7021506