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Innovative Packaging and edible coatings to guarantee post-harvest Durability of Mediterranean fruits and vegetables production

Emballages innovants et enrobages comestibles pour garantir la durabilité post-récolte de la production de fruits et légumes méditerranéens

MatBio

Context

- **30-60% of fruits and vegetables are wasted** every year[1].
- European legislation is evolving towards **ban of single-use plastics**[2].
- **Edible coatings** are growing as plastic packaging alternatives to enhance fruits and vegetables quality[3].
- This research is part of PRIMA project **DurInnPack**, regrouping eight partners from the Mediterranean basin.

References
[1] FAO (2015). Global Initiative on Food Loss and Waste Reduction.

[2] Regulation (EU) 2025/40

[3] Martins, V. F. R. et al. (2024). Recent Highlights in Sustainable Bio-Based Edible Films and Coatings for Fruit and Vegetable Applications. Foods, 13(2). https://doi.org/10.3390/foods13020318

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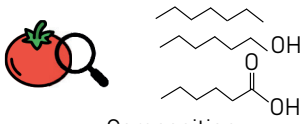
Objectives

- Understand **the surface and adhesion properties** between the edible coating and the fruit.

- Understand the **parameters impacting** these properties.



Composition, Morphology…

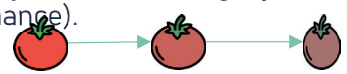
Viscosity, Surface tension, Drying…

- Assess the **evolution** of the fruit surface and edible coating properties **over shelf-life** and its impact on the **coating durability** (adhesion, integrity, performance).

Time

T°C

RH



Change in **fruit** composition, texture, surface energy

Change in **edible coating** mechanical properties

Methods

1 Fruits with different surface properties

Characterization over time

- Surface structure/morphology
- Surface composition
- Surface free energy

2 Edible coating → Biopolymers from waste sources

MATRIX
Cellulose + CNF
Chitosan + CNF

+

FUNCTIONAL ADDITIVES
Essential oils and phenolic compounds

Characterization

- Viscosity
- Composition
- Surface tension

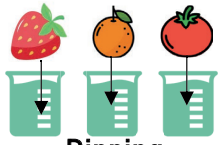
Characterization over time

- Thermal properties
- Mechanical properties
- Barrier properties

3 Coated fruits

Spraying

or



Dipping

Characterization over time

- Coating adhesion
- Film forming properties
- Durability of the coating