



Development and application of a new Edible Coating on fruits and fresh-cut fruits

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This PhD project aims to extend the shelf life of fruits, considering the use of waste materials from food production chain to develop new Edible Coatings. Novelty is the use of edible coatings on whole fruit, on interaction with 1-MCP, and fresh cut fruit. Therefore, it was decided to develop a coating using crop residues of *Posidonia oceanica*, a Mediterranean seagrass widely spread on the coasts of Sicily, which is responsible for accumulation of biomass on the beaches.

1-MCP

1-MCP is an antagonist of ethylene gas; this antagonism is carried out by the occupation of the ethylene receptors, present on the surface of the fruit. In this way, the ethylene is no longer able to bind, causing the interruption of the biosynthesis until such receptors will not be restored. The affinity of 1-MCP for the ethylene receptors is about 10 times greater than hormone.

Edible Coating

The edible coatings are thin layers of biopolymeric material, based on polysaccharides, proteins, lipids or blend of these components. These films act as barriers against moisture, oxygen, carbon dioxide and solutes that migrate from the food; reduce microbial growth, oxidative and browning processes allowing the increase of shelf-life.

The main objective is to extend the shelf-life of whole and fresh-cut fruits.



Currently, few studies have been carried out on *Posidonia oceanica*, no one about developments of edible films. This seagrass has a good content of phenolic compounds used by the plant as a defense system against predators, competitors and pathogens.

EXPECTED RESULTS

The interaction of 1-MCP with ECs would allow a more efficient use of the two instruments. An increase in efficiency could have a positive impact on extending the shelf-life of fruits, increasing their aptitude to commercialization.

Development of a new Edible Coating, using *Posidonia oceanica* as a source, it could allow the valorisation of a species that is often a problem of cleanliness and hygiene of the Sicilian beaches.

The extraction of inositol from the stems of artichoke, a waste of artichoke market product, it could limit the problem of excessive production of biomass and subsequent disposal problem.

Finally, inositol may have a beneficial effect on fresh-cut fruits, increasing the nutraceutical characteristics.

MILESTONES

- **Application of EC and interaction with 1-MCP.** Whole fruits of peach will be treated with 1-MCP and covered with EC based on *A. arborescens*.
- **Development of a new EC.** Will develop a new edible film using, as a source, *P.oceanica* endemic seagrass of the Mediterranean area.
- **Application of the new EC on whole and fresh-cut fruits.** On whole and fresh-cut fruits of peach, will be treated with new and *A. arborescens* ECs.
- **Optimization of the new EC.** The new EC will be optimized with use of antioxidants and antimicrobial compounds derive from waste of food production chain (ex. inositol by stems of *C. scolymus*; essential oils extracted from leaves of *M. communis*).
- **Application of the new optimized EC.** Optimized EC will be applied on whole and fresh-cut fruits, to test its efficiency on the extension of shelf-life, in relation to antioxidant and antimicrobial added component.



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