



DEVELOPMENT OF A NEW BIODEGRADABLES PACKAGING WITH BARRIER PROPERTIES FOR CHEESE AND FRESH PASTA

OBJECTIVE

Development of innovative high barrier fully biodegradable and recyclable, multilayer and transparent structure for packaging food products (fresh pasta and different types of cheese) that require customized Modified Atmosphere (MAP) by combining at least two different biodegradable thermoplastic materials, polylactic acid (PLA) and polyvinyl alcohol (PVOH), with different chemical structure and properties.

To increase the low moisture barrier of PLA, a biodegradable coating based on natural waxes will be developed

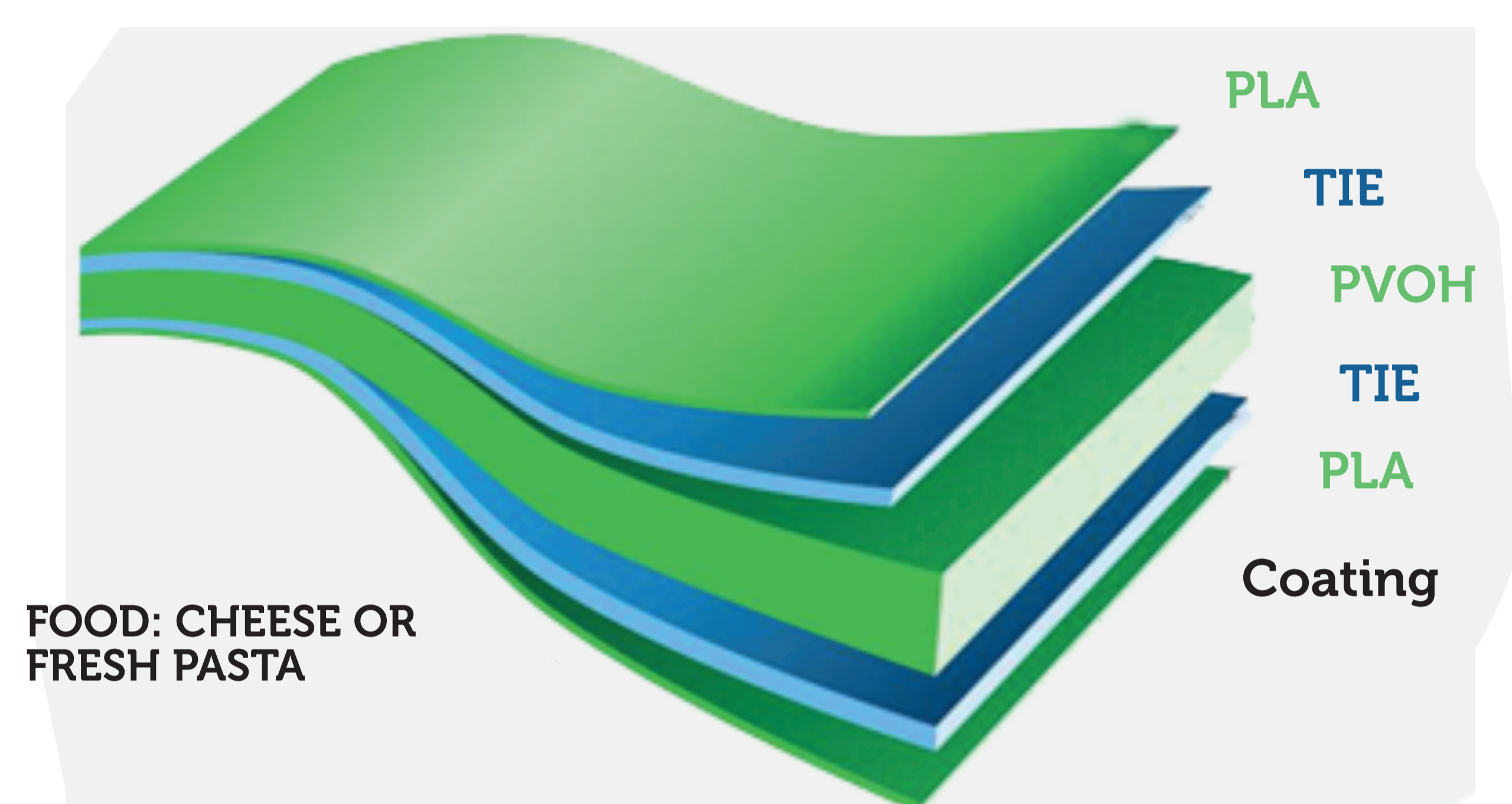
to cover the inner layer of the multilayer structure. Besides, it will provide protection against bacteria and fungus.

The differences of permeability between traditional high barrier plastic packaging materials (combinations of polyolefins, EVOH, polyamides) and BIO4MAP's ones (PLA and PVOH), require optimization and adjustment of the current combination of gases used to obtain fully biodegradable packages that give similar shelf-life for the food products studied.

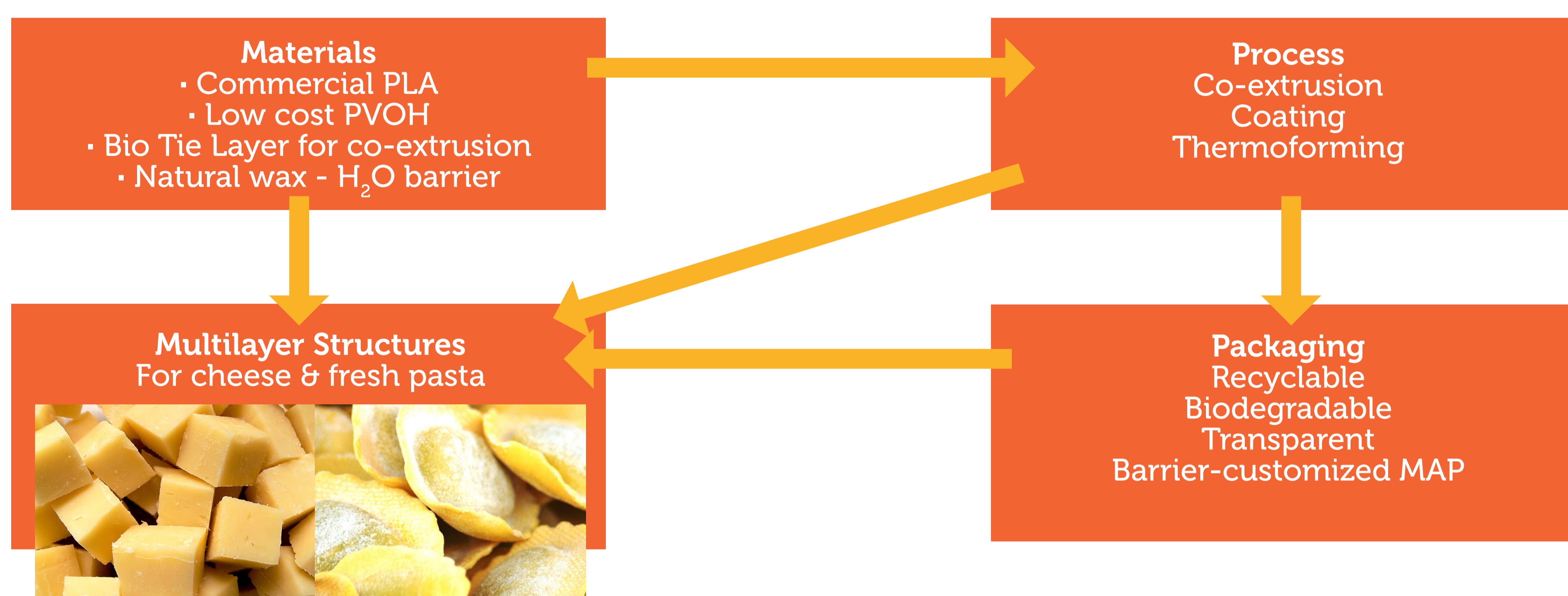
BIO4MAP provides environmentally friendly solutions:

1. The new packages will allow the **easy recyclability of PLA** due to the effortless separation between PVOH and the PLA (PVOH is soluble in water),
2. the new packages will be **fully compostable** in conditions according to the standard UNE-EN 13432 and
3. use of agricultural waste (leaves, greenery) as a raw material source for wax based coating production.

BIO4MAP project aims to achieve the following structure by using co-extrusion and coating process:



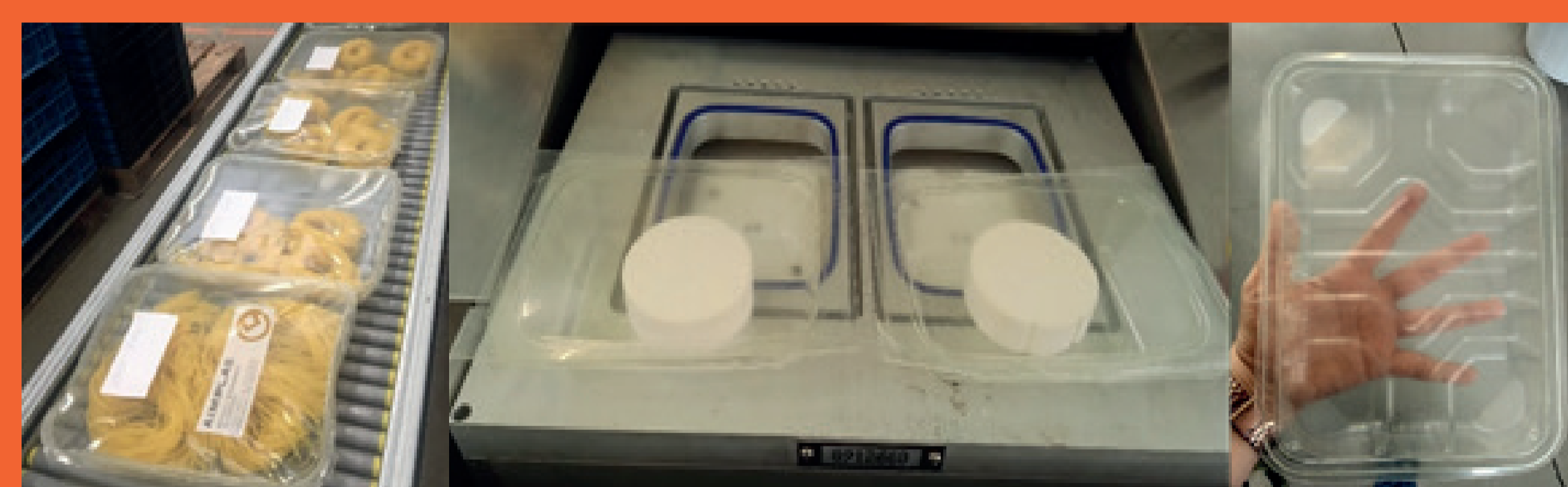
Development scheme



Multilayer processing at Industrial level



Packages developed



Wax coating process



Final properties

- Low cost PVOH for co-extrusion purpose with good gases barrier.
- Biodegradable tie layer compatible with PLA and PVOH suitable for co-extrusion technologies.
- Wax coating to protect from the humidity.
- Suitable mechanical properties for the final applications.
- The new development fulfil the barrier requirements defined: the oxygen gas transmission of the final package was 0.022 cm³/(tray*day*bar) and the water vapour transmission was 1,39 g/(m²*d). This values are below the required value of 2 cm³/(tray*day*bar).
- The values of the global migration was 2.2 mg/dm², below of the maximum allowed (10mg/dm²).
- According to the compostability and biodegradability test, the new package fulfil the standard EN 13432.
- The new package are fully recyclable.
- The total carbon footprint of BIO4MAP packages is about 29% lower than in conventional packages when the end of life is incineration with or without energy recovery.
- The new packages are cost competitive. Optimising the total thickness of the package and each layer to adjust the requirements with the materials cost, it is possible to achieve a reduction up to 25 % in the final cost.
- All materials and additives used are food contact approval and fulfil the regulatory and safety issues.

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