

# Development of New Competitive and Sustainable Bio-Based Plastics

**NewPack**  
New BioBased-Film for Packaging

## Active coating

Direct inclusion of active agents into food products can reduce their activity because the food components can interfere or reduce their efficiency. Furthermore, some active compounds exhibit strong flavour/colour which may change the organoleptic properties of the food products. Therefore, active films/coatings are a promising way to get a slow and controlled migration of active compounds to the surface of foods and enable continuous effect on the food surface during extended storage, which may act as additional hurdles against food spoilage (Belan et al., 2019).

The objective of the work conducted in deliverable D3.5 within NewPack project is to achieve the formulation of the coating to be applied in the PHB/PLA films.

Olive leaf and citrus extracts have been tested for inclusion to obtain an active coating as an alternative to direct additives of PHB/PLA blends before film extrusion. Encapsulation trials were also performed to allow the incorporation of some extracts into coatings.

Several biopolymeric coatings have been tested together with some commercial food grade varnishes. Concentration of the extracts to be incorporated in the coating was selected based on the results of antimicrobial tests performed in a previous task.

For the best obtained active coatings from the point of view of solution transparency and extract solubilization, an application test was carried out on the surface of a plastic film. The selected formulations showed the formation of homogenous coatings with good adhesion on the surface. Encapsulation seems to be a good alternative to improve the solubility of the extract, which allows a better incorporation on the coating (Figure 1).



**Figure 1:** Aspect of active coatings with one encapsulated extract applied on a plastic surface

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Development of coating formulations and application through electrospinning technique was also explored as a potential and promising strategy to have at the same time extract encapsulation and coating deposition (Figure 2).



**Figure 2:** Solubilized blend electrospun on a film

The coatings produced at this stage are being analyzed in terms of migration and antioxidant / antimicrobial potential to contribute to the identification of the formulations of active coatings to be applied on the PHB/PLA films.

#### References:

Belan, D.L., Mopera, L.E., Flores, F.P. (2019). Development and characterisation of active antioxidant packaging films. *International Food Research Journal*, 26(2), 411-420.

#### Disclaimer

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