

Edible Films and Coatings Applied in the Food Industry

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Nowadays, there is a global problem regarding the consumption of petroleum-derived packaging materials because they are consumed in large quantities. These materials have the disadvantage of not being biodegradable, generating a serious problem in terms of environmental pollution. Alternatively, edible and packaging coatings have been developed in recent years, which can be created from biopolymers, such as proteins [1–3], carbohydrates [4–6], lipids [7,8] or a mixture of them [9–11].

An enormous benefit is that these compounds can be obtained from food industry by-products, such as milk whey proteins, pectins from the peels of *Citrus* fruits or chitosan from shrimp shells, achieving a further reduction in the waste generated by the industry.

This packaging material can be produced using different techniques. For films, the casting method is usually preferred, which consists of solvent evaporation from a film-forming solution [12–14] while, for the edible coatings, they can be produced by dipping a food sample in a coating solution [15–17] or spraying the solution onto the food surface [14,18,19].

Edible films have the disadvantage that they are difficult to apply to the food surface due to their poor barrier and mechanical properties, so they are normally used as an “extra” layer on the packaging. Instead, edible coatings are applied directly to the food surface, creating a barrier that protects the product against environmental conditions [3,14].

However, edible films and coatings have demonstrated their ability to extend the shelf-life of different products while protecting from bacterial growth, reducing the fat uptake of frying products and reducing the exposition to environmental conditions when applied to fruit [20–23], vegetables [24–26], meat [27,28], fish [29,30], cheese [31–33] and/or snacks [34–36].

Moreover, these materials can act as active or intelligent packaging. Active packaging can be defined as a material with the ability to enhance food shelf-life or improve other characteristics, such as the sensory properties or the product safety, by adding active components, such as antioxidants, vitamins or antimicrobials, that are released into the product in a controlled manner [13,37,38]. Conversely, intelligent packaging is designed using indicators that change when there are alterations in some food qualities, such as freshness and quality, providing information about the product during the storage [38–40].

In conclusion, edible films and coatings are an excellent alternative for the food industry, demonstrating good results in improving the shelf-life of different food products. Additionally, they have the advantage of being developed from natural polymers so they can be considered to be biodegradable and non-toxic. There is a growing market in terms of demand for environmentally friendly packaging materials; however, it is necessary to continue studying and improving their mechanical and permeability properties, so that they can be applied to a larger range of products and at low cost.

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