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Whey protein isolate edible film: a carrier for probiotic bacteria

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Abstract

The use of edible films formulated with bioactive compounds in food products in order to convey new functionalities or extend shelf-life opens new possibilities as support for functional lactic acid bacteria. Thus, active coatings can be obtained by immobilization of the microorganisms in the film, which when in contact with food, will enable the release of microbial bioactive principles and/or after ingestion can directly exert functionality in the human body. Such action may include specific health benefits, such as modulation of the intestinal microbiota that may provide protection against gastrointestinal disorders. Probiotics, when delivered via food or supplement-like forms may contribute to such modulation if their survival and stability is assured until their reaching of the gastrointestinal tract.

In this work the main objective was to study the stability of probiotic microorganisms, viz. *Bifidobacterium animalis ssp. Lactis* BB-12® and *Lactobacillus casei* 01, in edible films based on whey proteins for coating food products and improving their quality and safety.

The selected probiotics at 109 CFU/g of film were incorporated in whey protein-based films to obtain stable edible films to be later applied in food products to provide them antimicrobial protection or make them carriers of viable probiotic bacteria. Films solutions were produced, dried and stored for 60 days to assess stability through the determination of viable cell numbers and physical properties namely color, aw, thickness and weight.

The results demonstrated the stability of probiotics in edible films for 60 days at 23 and 4 ^{o}C. A loss of viability of ca. 3 log cycles (reaching 106 CFU/g film) was observed until the end of storage at both temperatures. Nevertheless, the final viable cell numbers achieved are still within the minimum threshold necessary for intended biological function in the human body. Physical properties of films did not change throughout storage period.

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