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Extended Abstract

Improving the Shelf-Life of Fruits Using Chitosan and Chitosan-Based Glycodynamer Coatings †

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The study aims to develop an edible bioactive coating in the form of a chitosan glycodynameric film, which is intended to protect fresh fruits (berry fruits, apples), during storage. A solution of 2% chitosan in acetic acid (0.7%), was cross-linked with 1% citral prepared in ethanol, generating a glycodynameric structure [1]. The citral solution was added to chitosan under continuous magnetic stirring at 55 °C. The glycodynameric feature (reversible/dynamic covalent bonds) is determined by the competition between the imine formation (amino groups of chitosan–aldehyde group of citral) with citral aliphatic side chains' self-organization into supramolecular layered architectures [2]. The resulted glycodynameric structures combine excellent mechanical properties with stimuli-controlled transitions [3]. Two types of film coating were applied on berry fruits, chitosan coating and glycodynamer coating. The fruits with and without coating, the chitosan and the glycodynameric films were characterized by FTIR spectroscopy. The decay of strawberries was reduced significantly when berries were either coated with chitosan (reference control) or with glycodynameric coating. The early signs of mold development on strawberries appeared after 9 days of storage at room temperature. Both the chitosan and the glycodynameric coating reduced the fungal decay, the glycodynamer being more efficient, probably due to the presence of citral. The FTIR spectral bands characteristic to chitosan and glycodynamer were observed on the surface of fruits, but the glycodynamer stability, in time, needs to be optimized. In conclusion, our study indicates that preservative coating based on glycodynamers has a potential to prolong storage life and control the fungal decay of fruits. Further studies with other fruits and different glycodynamers are needed.

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