Chitosan as an Eco-Friendly Biopack

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Today, people in some countries eat little fruits and berries because of their short shelf lives and transportation technology imperfections. Natural polymers are known to be used as "edible" coatings to prevent product spoilage. So we decided to explore chitosan's properties as a natural preservative. We chose chitosan for being a product of secondary processing of food waste, such as arthropod exoskeletons or mycelium of fungi-producers used in biotechnological production. Solutions of chitosan (molecular weights of 38.7-1,200kDa) of various concentrations and solution mixtures of high- and low-molecular chitosan were prepared in certain ratios. We formed films on the surface of slides and on grapes (as a model of perishable fruit). We explored the films under a microscope; the dynamics of grapes quality were photodocumented during 30 days. We evaluated antibacterial activity of chitosan in the test system using the paper-disc method. Uniformity of the films increased in direct proportion to the molecular weight, and antibacterial activity increased in inverse proportion. Thus, high-molecular chitosan (1,200kDa) proved to be the best film-former, while low-molecular chitosan (38.7kDa) showed the best antibacterial properties. Films obtained by mixing chitosan of different molecular weights have better preserving properties than the original chitosan coating. The results showed that chitosan coatings can increase fruit shelf life and thus reduce losses during transportation. Also, films are inert to the body and environmentally-friendly since they can be disposed of by soil microflora. The use of the proposed conservation method will increase the availability of fruits and berries for northern regions.

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