# EDIBLE FILMS AND COATINGS FOR THE PRESERVATION OF MINIMALLY PROCESSED FRUITS

## Abstract

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As consumers are more aware of the importance of healthy eating habits and have less time for food preparation, the production of minimally processed fruits is increasingly more relevant from the food processor's perspective. Developing minimally processed, ready-to-eat fruits is a difficult task since fresh-cut products are vulnerable to faster deterioration as the fruit's natural protective skin is removed resulting in damage to cells and tissues, causing degradation in the color, texture, and flavor of fruits; increasing weight loss and promoting conditions for microbial growth. Edible coatings can be used to help in the preservation of minimally processed fruits, providing a partial barrier to moisture, oxygen and carbon dioxide, improving mechanical handling properties, carrying additives such antimicrobials, delaying ripening, changes in color and texture decay, reducing water loss, and even contributing to the production of aroma volatiles. In this dissertation the use of edible coatings was investigated as a way to preserve the quality of fresh-cut fruits, with emphasis on preserving fruits produced in the state of Washington (apples and pears). The ability of methylcellulose and methylcellulose-stearic acid coatings to preserve the quality of Anjou pear wedges was assessed, alone or in combination with some additives (ascorbic acid, calcium chloride, and sorbic acid).

The use of edible coatings and additives delayed browning when compared to control samples. A production of hexyl acetate a typical aroma compound on pear, was found on those pear wedges coated with the methylcellulose-stearic acid presumably due to the ability of pear wedges to metabolize stearic acid, a fatty acid included in the coating formulation. A development and characterization of alginate films with the objective of using them in minimally processed fruits was completed. It was found that alginate films formed strong insoluble films under high relative humidity, with the ability to work as barrier to water vapor and with good mechanical properties under high relative humidity. Alginate coatings were then investigated for their ability to preserve the quality of fresh cut Gala apples. Alginate coatings prolonged the quality of cut apples reducing weight loss, surface browning and texture decay. It was also demonstrated that the studied coatings did not cause anaerobic respiration. A production of volatile compounds characteristic of the aroma of apples were synthesized by the fruit using precursors included in the coating formulation.