coatings

Article

Shelf-Life Extension and Quality Changes of Fresh-Cut Apple via Sago and Soy-Oil-Based Edible Coatings

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Abstract: In-demand fresh-cut fruits are highly perishable and require shelf stability. Starch, such as sago, is a naturally available polysaccharide with good gas barrier properties. The study aimed to develop an edible coating and examine the effect of its application on the quality parameters of fresh-cut apples. The coating solution was prepared with sago and soy oil in concentrations of 3, 4, and 5% and 0, 0.25, and 0.50%, respectively. Lecithin (0.50%) was used as an emulsifier and glycerol (1.5%) as a plasticizer. Coated fresh-cut apples were evaluated for physicochemical properties (TSS, pH, non-enzymatic browning index, moisture content, weight loss, headspace gas, and color attributes) during a 12-day shelf-life study at 4 °C. Sensory analysis was also performed to assess consumer acceptability, and microbial analysis to investigate its inhibiting effect against yeast and mold. Compared to the control, developed coatings reduced browning, respiration rate, moisture, weight loss, and microbial load in fresh-cut apples. The study indicates that the blend of 5% sago and 0.5% soy oil produced the best coatings which were most effective for retaining the original quality attributes and in extending the shelf life of apple slices for 12 days in storage at 4 °C.

Keywords: fresh-cut apples; sago; soy oil; edible coating; minimal processing

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1. Introduction

In recent years, there has been a significant increase in the consumption of fresh-cut fruits and vegetables. This trend is attributed to the low caloric content of these foods, which makes them a key element of a healthy, balanced diet [1]. Major factors driving this demand include heightened health awareness, busy lifestyles, and increased consumer purchasing power, all of which contribute to the growing preference for minimally processed foods [2]. As consumers become more aware of the advantages of healthy eating and have less time for food preparation, the production and economic value of fresh-cut fruits have become crucial for food processors [3,4].

Fresh-cut fruit, despite its nutritional benefits, is inherently delicate. Peeling or cutting the fruit can cause moisture and nutrient loss, accelerate enzyme activity, lead to changes in color and texture, promote microbial growth, and result in weight loss, all of which contribute to a decrease in product quality [4]. Various methods have been developed to mitigate these issues, including low-temperature storage, high relative humidity, and modified atmosphere packaging. Key quality factors for marketable fresh produce include appearance, texture, color, flavor, nutritional value, and microbial safety. Although minimal processing can shorten the shelf life of fresh produce, further research is needed to evaluate the effectiveness of postharvest techniques, such as modified atmosphere packaging and dipping treatments, in delaying softening and browning [5].