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Thymus Capitatus Essential Oil and Edible Chitosan Coatings' Impact on Strawberry (*Fragaria X Ananassa*) Shelf Life in Cold Storage

Charlotte Clark*

Department of Genetics, Memorial University of Newfoundland, St. John's, Canada

Introduction

Strawberries (*Fragaria x ananassa*) are a beloved fruit cherished for their vibrant color, succulent taste, and rich nutritional profile. However, their high perishability poses a significant challenge for storage and distribution. In recent years, researchers have explored natural preservation methods to extend the shelf life of strawberries without resorting to synthetic chemicals. This article investigates the combined effects of Thymus capitatus essential oil and edible chitosan coatings on the post-harvest quality and shelf life of strawberries during cold storage.

Description

Strawberries are highly susceptible to moisture loss, fungal growth, and microbial contamination. Their delicate structure and high water content make them particularly vulnerable to rapid deterioration, even under refrigeration. Prolonging their shelf life while maintaining quality attributes is a critical endeavor for both producers and consumers. Thymus capitatus, commonly known as Spanish oregano, is renowned for its potent antimicrobial properties. The essential oil extracted from Thymus capitatus contains active compounds, such as thymol and carvacrol, which exhibit strong antifungal and antibacterial activities [1].

These properties make it a promising candidate for natural food preservation. Chitosan, derived from chitin found in crustacean shells, is a biodegradable polymer with excellent film-forming properties. When applied as a coating, chitosan creates a protective barrier on the surface of strawberries, reducing moisture loss and minimizing the risk of microbial contamination. Its biocompatibility and safety for consumption make it an ideal choice for edible coatings. Thymus capitatus essential oil and chitosan coatings operate synergistically to inhibit microbial growth on strawberry surfaces. The antifungal and antibacterial properties of thymol and carvacrol complement the protective barrier created by chitosan, resulting in a formidable defense against spoilage-causing microorganisms [2].

Chitosan coatings act as a semi-permeable membrane, reducing water vapor transmission and minimizing moisture loss from the strawberries. This is crucial in maintaining their firmness, texture, and overall visual appeal during storage. Studies suggest that the combined treatment of Thymus capitatus essential oil and chitosan coatings helps preserve the antioxidant activity of strawberries. Antioxidants play a key role in preventing oxidative degradation, which can compromise both the sensory attributes and nutritional value of the fruit [3]. The application of Thymus capitatus essential oil and chitosan coatings has been shown to mitigate nutrient loss in strawberries. Essential vitamins, such as vitamin C, and minerals remain more stable in treated fruits, contributing to their overall nutritional integrity [4].

Both Thymus capitatus essential oil and chitosan are natural compounds with a long history of safe use in food applications. However, it is essential to ensure that any treatment complies with regulatory standards for food safety and quality. Adhering to recommended application concentrations and following established guidelines is crucial in guaranteeing consumer safety [5].

Conclusion

The combined application of Thymus capitatus essential oil and edible chitosan coatings presents a promising approach to prolonging the shelf life of strawberries during cold storage. By harnessing the natural antimicrobial properties of Thymus capitatus essential oil and the barrier-enhancing capabilities of chitosan, this method addresses the challenges of strawberry perishability. Furthermore, the retention of antioxidant activity and nutritional value underscores the potential benefits for both consumers and producers. As research in this field continues to advance, the integration of Thymus capitatus essential oil and chitosan coatings holds significant promise in revolutionizing post-harvest preservation practices, ensuring the availability of high-quality, safe, and nutritious strawberries for consumers around the world.

Acknowledgement

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Conflict of Interest

None.

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***Address for correspondence:** Charlotte Clark, Department of Genetics, Memorial University of Newfoundland, St. John's, Canada; E-mail: charlotteclark@mun.ca*

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