

Investigating the Synergistic Antimicrobial Potential of Ginger
Extract Incorporating with Different Biopolymer Coatings for
Preservation of Tomatoes



by

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ABSTRACT

Tomatoes are highly perishable fruits susceptible to postharvest deterioration, compromising their quality and marketability. This research investigates the efficacy of natural biopolymer coatings in preserving tomato quality attributes and controlling disease development during storage and marketing. Two different biopolymers such as maltodextrin and pectin have been explored for their ability to extend shelf life and enhance postharvest quality. This study evaluates the impact of these biopolymers on key quality parameters including weight loss, firmness, color change, pH, titratable acidity (TA), and total soluble solids content (TSS), Ascorbic acid content, Lycopene content, disease severity (DS), disease incidence (DI) and marketability. Furthermore, the research assesses the coatings' effectiveness in inhibiting common postharvest pathogens. Through a series of storage simulations and marketing condition simulations, including temperature and humidity fluctuations and handling stress, the study aims to provide comprehensive insights into the practical applicability of natural biopolymer coatings in the tomato supply chain. The findings of this research contribute to the development of sustainable and eco-friendly strategies for enhancing tomato shelf life, ensuring the quality, and reducing postharvest losses in the agricultural industry.

Results indicate that natural biopolymer coatings significantly influence the postharvest quality and disease resistance of tomatoes. Pectin coatings incorporated with ginger extract, in particular, demonstrated remarkable efficacy in maintaining firmness, color change, and vitamin C content compared to other treatments including maltodextrin. Moreover, these coatings exhibited significant antimicrobial activity. The findings suggest that biopolymer coatings offer a promising eco-friendly solution for extending the shelf-life of tomatoes while ensuring their quality and safety during storage and marketing. Further optimization of coating formulations and application methods could enhance their commercial potential in the fresh produce industry.

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