

Microbial, Physical and Mechanical Properties of Chitosan-Based Edible Films Incorporated with Thyme and Clove Essential Oils

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The use of edible films to release antimicrobial constituents in food packaging is a form of active packaging. There are many studies about antimicrobial properties of spice extracts; however their application to edible films is limited. In this study chitosan-based edible films containing thyme and clove essential oils were prepared at 0.5, 1 and 1.5 percent v/v. Antibacterial properties of edible films were tested against five strains of Gram-positive and Gram-negative bacteria. Physical and mechanical properties of films including humidity content, water vapor permeability, tensile strength and elongation at break were measured. Films containing thyme essential oil showed larger inhibitory zones ($p < 0.05$) compared to those of containing clove essential oil. Films were more effective against Gram-positive bacteria than Gram-negative ones. Incorporation of essential oils increased water vapor permeability of chitosan-based films. Incorporation of essential oils decreased tensile strength of films. Films containing thyme essential oil showed larger reduction in tensile strength property compared to those of containing clove essential oil.

Key words: Edible film, Chitosan, Thyme, Clove

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