

Thesis Title Anti-fungal Packaging Fortified with Clove Essential Oil for Prolonging Shelf Life of ‘Beauty Seedless’ Grapes

Author Siriporn Luesuwan

Degree Master of Science (Postharvest Technology and Innovation)

Advisor Asst. Prof. Wirongrong Tongdeesoontorn, Ph. D.

Co-Advisor Asst. Prof. Matchima Naradisorn, Ph. D.

ABSTRACT

Fungal growth in table grape (*Vitis vinifera* cv. Beauty seedless) triggered by *Botrytis cinerea*, *Penicillium* spp., *Aspergillus* spp., and *Rhizopus stolonifera*, deteriorates quality during postharvest storage. Sulfur dioxide fumigation or chemical-based antifungal pads that have been employed in grapes may affect consumer health. Considering the safety aspects, this research aimed to develop a hazard-free antifungal packaging embedded with essential oil (EO) to alleviate the fungal decay of table grapes. The various levels of EOs (0.5-5% v/v) from clove, cinnamon, thyme, peppermint, lemon, bergamot, ginger, spearmint, and lemongrass were tested against *Aspergillus* sp. The results attained in radial growth, disk diffusion method, minimal inhibitory concentration, and minimal fungicidal concentration revealed that 1% clove essential oil (CEO) showed higher efficacy against *Aspergillus* sp., compared to the untreated control and other treatments. CEO at 1% level exhibited pleasant odor intensity in table grapes than the other EOs. Active polyvinyl alcohol (7% PVA) film with 1% CEO resulted in lower weight loss, disease severity, and table grapes berry drop than the control and other treated samples. Additionally, the acceptance score in the table grapes sample wrapped with PVA film containing 1% CEO was augmented. Therefore, PVA film

with 1% CEO retarded the fungal growth and prolonged shelf-life of table grapes during storage of 21 days at 13 °C and 75% RH.

Keywords: Antifungal Packaging, Deterioration, Eco-friendly, Essential Oil, Pathogenic Fungi, Quality, Table Grape, Shelf-life

