DECAY CONTROL DURING REFRIGERATED, ULTRA-LOW OXYGEN STORAGE FOR DISINFESTATION OF MEXICAN FRUIT FLY

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Quarantine against the importation of fresh grapefruit from areas where fruit flies are endemic can restrict the movement of grapefruit in domestic and international markets. Adult fruit fly females oviposit in developing or mature fruit, and larvae feed and develop in the fruit pulp. Fruit grown in fruit fly-infested areas must be subjected to some type of disinfestation treatment prior to marketing to prevent inadvertently introducing a new fruit fly population into a virgin geographic area. Refrigerated storage of grapefruit in ultra-low oxygen for up to 21 days has been shown to provide quarantine security against third instar larvae of *Anastrepha ludens.*

Infection of grapefruit by *Penicillium digitatum* results in green mold, a predominant postharvest disease of citrus. Spores of this fungus are ubiquitous in citrus -growing areas and in the fruit-handling environment. Initial infection of the fruit occurs prior to or after harvest via wounds in the fruit peel. Decay progresses most rapidly at ambient temperature of 24C and more slowly at temperatures above 30C or below 10C. Commercial decay control measures commonly include careful handling to minimize fruit injury, pre and postharvest use of fungicides, postharvest disinfectants, and temperature management. Resistance of *P. digitatum* to fungicides has been reported, particularly to the benzimidazoles.

Lesions on grapefruit developing from wounds inoculated with a spore suspension of *Penicillium digitatum* developed less rapidly during refrigerated storage when the fruit was stored in ultra-low levels of oxygen than when fruit were stored in air. Lesion diameter during storage increased directly in relation to the percent oxygen in the storage atmosphere. Results of this research demonstrate that development of green mold on grapefruit caused by *Penicillium digitatum* is inhibited by storage under similar conditions that provide quarantine security against the Mexican fruit fly.

Advantages: Concomitant insect and pathogen control. No chemical residue. Environmentally friendly. Can be applied in-transit during marine shipment.

Implementation problems: Technology for generating the required ultra-low oxygen inside marine containers is currently not available. Range of commodity tolerance may be limited.