POSTHARVEST QUALITY/PHYTOTOXICITY OF FRESH COMMODITIES SUBJECTED TO MB ALTERNATIVE TREATMENTS

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The postharvest quality of fresh commodities is of paramount importance for consumption and successful competition in the domestic and global marketplace. However, the maintenance of commodity quality demands constant vigilance because of their perishable nature, horticultural diversity, biology/biochemistry, utility and market/consumer preferences. Furthermore, the imposition of regulatory quarantine disinfestation treatments by various trading countries to exclude alien pests/diseases adds another constraint to the already complex task of quality maintenance. Since the inception of the MB ban, efforts have been ongoing in searching both chemical and non-chemical MB alternatives for postharvest fresh commodities.

Methyl iodide (MI) was reported as a fumigant lethal to several insects including codling moth larvae and with no known toxic effects on plants at the concentrations tested (Lindgren, 1938). More recently, Ohr *et al*. (1996) demonstrated MI to be an effective preplant soil fumigant, but its efficacy/phytotoxicity on postharvest fresh commodities are unknown. We tested MI at 10-60 mg/liter and found rates > 25 mg/liter efficacious against California red scale on lemons and codling moth eggs of nectarine, but these results were accompanied by significant fruit injury. However, use of forced aeration at 3.5 standard liter/min. of the fruit soon after fumigation significantly reduced phytotoxicity (Aung *et al.*, 2001). Work is continuing with determining the effects of MI and post-aeration on several major commodities to establish efficacy and degrees of phytotoxicity.

Hot water-dip treatment for pest disinfestations of stone fruit often caused unacceptable commodity injury, and generally-recognized-as-safe compounds were used to alleviate fruit phytotoxicity. Sodium chloride, sucrose, and jasmonic acid added to the hot water-dip reduced the severity of heat injury to the fruit and increased the content of sorbitol and raffinose in the fruit peel. It was surmised that the sugar changes acted as osmoprotectant and lessened cellular membrane injury by impeding water entry or loss, and preventing enzyme(s) inactivation.

Fresh commodities subjected to regulatory quarantine treatments involving fumigants or heat for pest disinfestation oftentimes sustain injuries, and biochemical indicators are needed to gauge or predict injury. Glutathione, a key

antioxidant, was altered in the lemon flavedo following treatment with fumigants. The decrease in glutathione levels was correlated with injury for MB but not for sulfuryl fluoride which suggested different mechanisms for commodity injury. Thus, monitoring/measuring the glutathione levels could provide a means to assess commodity injury or quality.

References

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