METHYL IODIDE/HEAT ON POSTHARVEST FRUIT QUALITY/PHYTOTOXICITY

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Methyl bromide (MB) is a universal fumigant of choice for postharvest disinfestation of quarantine insects until recently when it has become a prime target compound slated for phase-out because it is a stratospheric ozone depletor. Methyl halides such as MB and methyl iodide (MI) occur naturally in the atmosphere especially in coastal regions where certain flora favor their production (Li *et al.*, 2001). Among the halides, MI is rapidly photo-decomposed by UV-light and persists only a few days in the environment. In contrast, MB persists with a lifetime of 0.7 to 1.0 year. Therefore, although MI is highly reactive and possesses similar lethality for organisms, it lacks the undesirable property of stratospheric ozone destruction caused by MB. Claypool and Vines (1956) tested MI on a number of fresh fruit commodities grown in California. They showed that MI used at a rate of 16 g/m^3 for 2-h did not have a phytotoxic effect on most fresh fruit tested, but MI dosage of 32 g/m^3 for 4-h caused severe injuries. Aung *et al.* (2001) used MI at 20 g/m^3 for 2-h on late-season coastal lemons for disinfesting California red scale but the fruit sustained unacceptable rind injury. However, when MI fumigation was immediately followed by a forced aeration of 3.5 liters of air per min. at 21°C for 24-h, fruit phytotoxicity was greatly reduced. This observation was subsequently confirmed when several MI dosages of 24, 28, and 32 g/m^3 and forced aeration were tested on lemons harvested seasonally (early, mid, and late) from the desert and coastal regions.

Heat has long been used for pest disinfection and disinfestations, but it is critical that the heat application does not damage the quality of the fresh fruit commodities. We have examined the influence of a heat disinfestation treatment and generally-recognized-as-safe (GRAS) compounds on the soluble sugar changes of stonefruit cultivars. The cultivars tested showed different sugar composition and heat sensitivity and the peel was more affected than the flesh tissues. The presence of GRAS compounds has a differential effect on the contents of the sugars. The results of sugar changes in response to heat and GRAS compounds indicate the sugars play an important cellular role in the adjustment of stonefruit tissues to heat stress and in the maintenance of stonefruit quality.

REFERENCE:

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