Title Glutathione concentration and phytotoxicity after fumigation of lemons with methyl iodide

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Abstract

Methyl bromide and its proposed replacement methyl iodide are effective quarantine fumigants, though there are phytotoxic effects for some commodities. A decrease in the level of glutathione, an important cellular protectant, has been noted in grapes and other fresh produce after fumigation with these methyl halides. In these experiments, commercial lemons were treated with methyl iodide at 28 g m^{-3} for 2 h at 21 °C then were forcibly aerated for 2 or 24 h at 30 °C. Total and oxidized glutathione concentrations were determined enzymatically immediately after aeration and after 3 weeks storage at 5 °C. Total glutathione content was substantially reduced in comparison to controls after fumigation and 2 h aeration, but recovered considerably during a 24 h forced aeration. After 3 weeks storage, fruit subjected to a 24 h aeration had glutathione levels equivalent to those of the controls while those given a 2 h aeration had lower levels of total glutathione. This is the first demonstration of recovery of glutathione concentrations in a fresh commodity after methyl halide fumigation. Also, after 3 weeks storage, phytotoxicity in fruit given a 2 h aeration was high whereas fruit given a 24 h aeration had less injury. Fruit given a 30 °C aeration had less injury than that given a 21 °C aeration in earlier work.