POSTHARVEST FRESH COMMODITY QUALITY/PHYTOTOXICITY AFTER ALTERNATIVE MB TREATMENTS

David M. Obenland, L. H. Aung and J. F. Jenner
USDA, ARS, Postharvest Quality and Genetics Research Unit
2021 S. Peach Avenue, Fresno, CA 93727, U.S.A.

The maintenance of fresh commodity quality is of vital importance to enhance product sale and for successful competition in a global market. Furthermore, the imposition of regulatory quarantine treatments of fresh commodities for pest disinfestation cause injury to the commodities which must be minimized. It is, therefore, essential to develop efficacious quarantine treatments which do not adversely damage fresh commodity quality or increase decay in postharvest storage. Various approaches are been investigated for minimizing quarantine-induced phytotoxicity to fresh commodities. Manipulating the postharvest environment of citrus to enhance the natural resistance to stress by curing/conditioning has shown to lessen peel injury induced by regulatory cold treatments (Houck *et al*., 1990). Recently, conditioning of lemons at 15°C for 3 days before methyl iodide fumigation lessened lemon peel injury. Conditioning was found to alter soluble sugars changes of the lemon peel which may be involved in moderating stress and protecting cellular membranes (Aung *et al*., 1998). Additional study is being conducted to evaluate the influence of fruit maturity and origin on treatment effectiveness in order to increase the reliability and general applicability of conditioning in lessening citrus phytotoxicity.

We have previously reported (Obenland, 1997) that nectarines apparently tolerate high temperature forced-air (HTFA) treatment designed to disinfest the fruit of Mediterranean fruit fly. In continuing studies during the 1998 season, additional cultivars of nectarines and peaches were tested to examine the effect of HTFA on the market life of the fruit. Preliminary results indicate that under conditions favorable for the development of internal breakdown, such as storage of a susceptible cultivar at 5°C, HTFA treatment acts to accelerate the development of the disorder.

A difficulty in HTFA treatment of both navel and Valencia oranges is that the treatment often causes the fruit to taste poorly. Volatile components are important to the flavor of oranges and were measured after HTFA treatment to evaluate their potential usefulness as markers of HTFA injury to the fruit. Based upon abundance, reproducibility and ease of identification, pinene, myrcene, limonene and decanal were chosen for quantification. Heat treatment was found to significantly reduce the amount of these volatiles present. Monitoring fruit volatiles may offer a sensitive means of detecting the onset of injury, and serve as a guide to attenuate the heat treatments so that the flavor of the fruit is not adversely affected.

References

Aung, L. H., Obenland, D. M. and Houck, L. G. 1998. Conditioning and heat treatments influence flavedo soluble sugars of lemon. J. Hort. Sci. & Biotechnology 73, 399-402.

Houck, L. G., Jenner, J. F. and Mackey, B. E. 1990. Seasonal variability of the response of desert lemons to rind injury and decay caused by quarantine cold treatments. J. Hort. Sci.65, 611-17.

Obenland, D. M. 1997. Nectarine quality following a forced-air heat treatment for fruit fly disinfestation. Annual International Res. Conf. on MB Alternatives and Emission Reductions, San Diego, CA, 116-1.