CAN CROPS GROWN IN TEMPERATE CLIMATES HANDLE HEAT DISINFESTATION

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With the anticipated loss of methyl bromide for use as a fumigant and the world-wide trend away from chemical usage, there is an urgent need to develop alternative nonchemical disinfestation treatments for horticultural produce. Such treatments must control the quarantine pest of concern without detrimentally affecting the quality of the commodity.

Heat treatment has been successfully used for the control of fruit fly in tropical crops such as mango and papaya. A typical hot air treatment is that developed for the control of the fruit fly species *Bactrocera melanotus* and B. *xanthodes* in Cook Island papaya. A treatment which brought fruit center temperature to 47°C and held it for 20 min was found to give effective control (Waddell et al., 1997) and was tolerated by Waimanalo papaya fruit, although a post-treatment immersion in fungicide was required for the control of rots (Lay-Yee et al., unpublished).

Relative to tropical crops, fruit grown in a temperate climate experience cooler temperatures during growth and development. This may in turn impact on their heat tolerance and thus their sensitivity to heat disinfestation treatments. We have examined the response of a number of horticultural crops including apples, stonefruit, avocados, and persimmons, grown under temperate conditions, to heat treatments ranging from 35 to 60°C. Fruit response varies depending on the crop concerned, the temperature and duration of treatment as well as mode of application of heat, e.g. hot air vs hot water. Heat damage typically is manifested as browning of the surface of the fruit, uneven ripening and breakdown of fruit flesh. Some beneficial effects of heat treatment were also observed eg. reduction in susceptibility to chilling injury in avocado and persimmons.

The response of certain crops to heat treatments which show potential as disinfestation treatments, and the effect of pretreatments on this response will be outlined. Also, the impact of temperature history of fruit in the field on its response to postharvest heat treatment will be discussed.

Reference

Waddell, B.C., Clare, G.K., Petry; R.J., Maindonald, J.H., Purea, M., Wigmore, W., Joseph, P., Fullerton, R.A., Batchelor, T.A., Lay-Yee, M. 1997. Quarantine heat treatment for *Bactrocera melanotus* (Coquillet) and B. *xanthodes* (Broun)(Diptera: Tephritidae) in Waimanalo papaya in the Cook Islands. *In:* Proceedings of the Regional Symposium on the Management of Fruit Flies in the Pacific, Nadi, Fiji, 28-31 October, 1996.