

Laser etching safe alternative for labeling grapefruit

November 3 2009



This image shows laser etching on lemons and limes. Credit: Photo courtesy of Sunkist

Laser labeling of fruit and vegetables is a new, patented technology in which a low-energy carbon dioxide laser beam is used to label, or "etch" information on produce, thereby eliminating the need for common sticker-type labels. The technology has been licensed for use on a variety of fruits and vegetables and is being used in New Zealand, Australia, and Pacific Rim countries. It has been approved in Asia, South Africa, Central and South America, Canada, and the European Union. The U.S. Food and Drug Administration (FDA) is in the final stages of approving the use of laser etching in the United States.

A research study aimed at investigating water loss, peel appearance, and potential decay in laser-labeled grapefruit was published recently in

HortTechnology. "Little information is available on the impact of this new technology on the overall quality of labeled produce, especially its effect on water loss and decay during prolonged storage", said Dr. Ed Etxeberria, who headed the research team comprised of scientists from the University of Florida and the USDA Agricultural Research Service (USDA-ARS).

"In Florida, grapefruit represents 43% of the citrus fresh market. Grapefruit require extended storage, especially when transported to international destinations. This study determined the effects of laser labeling on water loss and decay susceptibility during prolonged storage", Etxeberria explained.

During commercial production, citrus [fruit](#) is waxed before being labeled, packed, stored, and transported. Whereas common sticker-type labels do not deteriorate during storage, researchers postulated that water loss resulting from laser etching may distort the physical appearance of the fruit's surface, making it less effective and appealing. "The pinhole depressions applied after washing and waxing disrupt the natural cuticular barrier and the protective commercial wax cover, seemingly creating open cavities that would allow for increased water loss and facilitating the entrance of decay organisms. These etched surfaces can promote water loss and may increase the number of entry sites for decay-promoting organisms", the researchers said.

'Red Ruby' grapefruit that had been washed and waxed with carnuba containing 15 ppm thiabendazole (following established commercial practices) was used in the study. Water loss from etched surfaces was measured, and the effect of waxing on reducing water loss from etched fruit surfaces was investigated using nine different waxes. Laser-labeled fruit stored at 10 °C and two relative humidities (95% and 65%) for 5 weeks showed no increase in decay compared with nonetched control fruit, suggesting that laser labeling does not facilitate decay. This was

confirmed by experiments where *Penicillium digitatum* spores were coated on fruit surfaces before and after etching. In either case, no decay was observed.

The researchers concluded that, when compared with sticker-labeled fruit, laser etching provides a relatively tamper-free labeling method, while "the fruit quality remains high as the invasion of the epidermis does not incite decay, provide an avenue for food pathogens, and water loss is easily controlled. The technology will offer the grapefruit industry a safe alternative to adhesive sticker labeling without enhancing decay susceptibility."

Source: American Society for Horticultural Science

Citation: Laser etching safe alternative for labeling grapefruit (2009, November 3) retrieved 30 April 2024 from <https://phys.org/news/2009-11-laser-etching-safe-alternative-grapefruit.html>

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