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7. Title

Postharvest Technologies for Extending Market Life and Analyses of Nutritional Quality of Horticultural Crops

12. Investigator Name(s) (Last Name and Initials)

Picha, D. H.

20. Termination Date 09/30/2013	40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011

Outputs:

The research information from project activities was disseminated to sweet potato and citrus growers, producer organizations, and agro-processors with presentations at several state and national horticulture industry meetings. The postharvest citrus research results were also published in a scientific journal.

Outcomes/Impacts:

New packaging and storage procedures were developed that extend the market life of Louisiana satsumas and navel oranges. The marketable life of unwrapped Owari satsuma fruit was only 2 wks under simulated retail supermarket conditions of 21 degrees C, 40 percent relative humidity, with an average fruit weight loss of 22.7 percent. In contrast, individual packaging of Owari satsumas in heat-shrinkable polyolefin film provided a fruit market life up to 18 wks at 21 degrees C, with weight loss averaging 7.5 percent. The market life for shrink-wrapped Owari satsumas stored at 4 degrees C was extended to 20 wks, with only 2.0 percent weight loss. This compared to 6 wks market life for unwrapped satsumas at 4 C, with a weight loss of 18.9 percent. Extending the marketing period and adding product value with shrink-wrap packaging allows producers to obtain higher market prices and have a longer time frame in which to sell their product, which helps the entire citrus industry generate more revenue. Research activities developed a protocol of using hot water submergence plus bio-control agents to significantly reduce the incidence and severity of the major postharvest disease Rhizopus soft rot of sweet potatoes. Sweet potato roots were submerged in 48, 50, 52, and 54 degrees C hot-water baths for 2 to 30 min. The most effective water bath treatments were 10 and 15 minute durations at 52 degrees C, which decreased the soft rot incidence to 28 percent and 16 percent, respectively. Additionally, sweet potatoes were treated with bio-control agents (Bacillus subtilis) alone and in conjunction with submergence in hot-water. After 52 degrees C water submergence for 2 minutes, B. subtilis reduced the amount of soft rot to zero, which was equivalent to sweet potatoes treated with fungicides. Hot-water baths, especially in conjunction with bio-control agents, may be useful as part of an integrated program to manage Rhizopus soft rot without relying on prophylactic use of synthetic fungicides. As the demand for reduced-pesticide and organic sweetpotatoes increases, there is a need for non-chemical control protocols for control of postharvest diseases. Modifications to atmospheric carbon dioxide and oxygen concentrations were evaluated for their effect on the in-vitro growth and development of both Penicillium and Rhizopus stolonifer, common fungal diseases that may cause significant postharvest losses of sweet potatoes. Decreasing the atmospheric oxygen concentration to 3 percent did not significantly reduce the vegetative growth or sporulation of either Penicillium or R. stolonifer. However, increasing the concentration of carbon dioxide above 20 percent significantly reduced the vegetative growth and sporulation of both fungi; with 60 percent carbon dioxide concentration providing the greatest fungal growth suppression. High concentrations of carbon dioxide show promise as a fungistatic control of both Penicillium and R. stolonifer.

Publications:

Picha, D.H. and M. S. Bowen 2011. Quality and Market Life of Individually Shrink-Wrapped Satsuma Mandarins. HortScience 46(9):231.

Participants:

D. H. Picha (PI), LSU AgCenter.

Target Audiences:

Louisiana horticultural industry and food processors.

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date