

Proposal - Pear Research Review, 2000

TITLE **Effect of solution temperature on calcium infiltration in Anjou pear**

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JUSTIFICATION

High levels of calcium in fruit tissue has been correlated with increased storage life of many crops. Calcium may bind to pectic substances in cell walls. Apple cells with a high concentration of calcium in their walls are more resistant to maceration by polygalacturonases than those with a low concentration (Conway et al, 1988). Vacuum infiltration has been shown to be an effective method for moving calcium into fruit (Conway et al, 1999).

Immersion of warm fruit in cold water through hydrocooling was identified as an efficient mechanisms for inoculating tomatoes with the soft rot pathogen, *Erwinia carotovora* (Bartz & Showalter, 1981; Bartz, 1982). A partial vacuum is created within the fruit as it cools and this vacuum can draw substances into the fruit through natural opening such as lenticels. It is likely that calcium could be moved into fruit by hydrocooling. However, it is clear that adequate water sanitization measures must be taken to assure that they and potential human pathogens are eliminated from water used in hydrocoolers. Sodium hypochlorite used for this purpose caused fruit burn on Anjou pears (Pat Barnett, personal communication). Sodium ortho-phenylphenate (SOPP) applied as a drench effectively reduced gray mold incidence in Anjou pears and may be able to be used to sanitize water for this application.

OBJECTIVES

This trial is to determine if calcium can be incorporated in pear flesh through a hydrocooling system and assess the safety of using SOPP in a hydrocooler to prevent decay.

PROCEDURE

Three single bin replicates of Anjou pear fruit each will be treated in a hydrocooler at harvest and before any cold treatment (i.e., warm fruit). Treatments will be either plain water, SOPP (800 ppm), or calcium chloride (440 ppm and 4400 ppm). Fruit will be treated for about ½ hr.

After treatment, all fruit will be placed in CA storage at the Stemilt Research CA facility under standard CA conditions. Fruit will be assessed for calcium concentration in the outer 4 mm of fruit flesh under the peel 1 hour after treatment and after 3 months of storage. Incidence of damage to the fruit from phytotoxicity will be assessed.

LITERATURE CITED

Bartz, J. A. 1982. Infiltration of tomatoes immersed at different temperatures to different depths in suspensions of *Erwinia carotovora* subsp. *carotovora*. Plant disease 66:302-306.

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- Conway, W. S., Gross, K. C., Boyer, C. D., and Sams, C. E. 1988. Inhibition of *Penicillium expansum* polygalacturonase activity by increased apple cell wall calcium. *Phytopathology* 78:1052-1055.
- Conway, W. S., Janisiewicz, W. J., Klein, J. D., and Sams, C. E. 1999. Strategy for combining heat treatment, calcium infiltration, and biological control to reduce postharvest decay of 'Gala' apples. *Hortscience* 34:700-704.