Florida Citrus Advanced Technology Program

QUARTERLY & FINAL REPORTS: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

Instructions Complete the fields based on your project specs. When finished, save the form to your local disk using a unique name. Then, go to **http://research.fcprac.com**, and log in with your user name and password using Researcher Login in the lower left. Find this project title and click on **Submit a Report**. Update your profile information if needed, then upload this report as directed.

2009-2010 REPORT	CATEGORY (drop-down)	TODAY'S DATE (m/d/yr)
● *Quarterly Report* ○ *Annual Report* ○ *Final*	Other	1/14/10

WHAT IS THE "HEADLINE" FOR THIS REPORT (e.g. a one-sentence "newspaper headline" describing what you accomplished)

TITLE and CONTACT INFORMATION

Proposal Title Combating symptom development in fruit from Huanglongbing-infected citrus trees: A sensory, metabolite and physiological approach

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Organization UF/IFAS CREC	*Total Direct Funds (current year)* $179,153

REPORT UPDATE (650 words; provide details about your headline)

Sensory impacts and flavor and aroma changes in HLB fruit: Harvested symptomatic, asymptomatic and health Hamlin fruit from this season are being juiced and samples collected for analysis and sensory impact. Data from last harvest indicated that esters responsible for the fruity, sweet aroma in OJ were significantly lower in symptomatic juice. Esters such as ethyl butyrate and ethyl-2-methyl butyrate were 20-50% lower in symptomatic juice compared to control juice. Important aldehydes such as hexanal were 50% lower in symptomatic fruit. Alcohols on the other hand were generally higher in symptomatic fruit. Linalool, responsible for the fruity, citrus aroma in OJ was 45% higher in symptomatic fruit. Although there was little difference in juice flavor volatiles between healthy or asymptomatic fruit, aroma volatiles in juice from symptomatic fruit were out of balance compared to that of healthy juice. Flavanone glycoside concentrations were 35% higher in HLB symptomatic juice. Control juice generally had the lowest level of FG concentrations for the three major FG's in OJ. Thermal pasteurization did not make a consistent difference in FG concentrations when compared to the unpasteurized juice. Six major methoxylated flavones were determined using HPLC. Concentration patterns mirrored that of the flavone glycosides; symptomatic fruit contained higher concentrations than control fruit and HLB asymptomatic juice concentrations were generally intermediate. Pasteurization did not appear to significantly alter methoxylated flavone concentrations. Phytohormone changes in HLB fruit: A third and fourth biological replicate data set for ethylene production in immature Valencia fruit were obtained. Production of ethylene by healthy fruit was higher than in symptomatic (SYM) and asymptomatic (ASYM) fruit. Contrary to mature fruit, juice vesicle ethylene production from healthy, asymptomatic and symptomatic immature fruit was not different. Yield, peel color, fruit size and seed abortion in HLB frut: Preliminary transcriptomic work indicated Hamlin fruit had numerically greater but similar changes compared to Valencia. In Valencia, over 1100 (3.6%) and 1900 (6.3%) ESTs in vascular tissue (VT) below the calyx abscission zone and fruit flavedo (FF), respectively, significantly changed in SYM and ASYM tissues compared with healthy tissues in response to HLB infection. When SYM and ASYM tissues were compared, only 186 (0.6%) and 239 (0.8%) ESTs were differentially expressed in VT and FF, respectively. Compared with healthy juice vesicle (JV), 1701 (5.6%) ESTs changed in SYM JV, while only 18 (0.06%) ESTs changed in ASYM JV. 1425 (4.7%) ESTs expressed differently between SYM and ASYM JV. The results show that HLB causes significant changes in SYM and ASYM VT and FF. Development of SYM JV was impacted by infection while only minor changes were measured in ASYM JV. These results are in line with field observations; Hamlin is more reactive to HLB than Valencia, and ASYM juice quality is not significantly impacted. We reported last quarter that iodine staining revealed high starch content in flavedo from healthy fruit but not in SYM or ASYM fruit. Additional biological replicates this quarter confirmed this result. Electrolyte leakage and lipid peroxidation increased 2-fold in SYM FF compared with healthy FF. Fruit nutrient analysis was performed on Valencia and Hamlin tissues. Data are currently being compiled. Results from two groves sites indicated that size distribution of fruit from HLB-infected and healthy trees are normally distributed, but those from HLB-infected trees are skewed to the smaller sizes. Extension and education: We prepared and presented an extension tabletop display at the Citrus Processors and Subtropical Technology Conference in Lake Alfred on October 22, 2009, and presented HLB fruit size data at Ryan Atwood and Oswalt's OJ meetings on October 27, 2009 and January 6, 2010.