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	3/31/11

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

Chemical and sensory analyses of second Valencia harvest, use of e-tongue and nose to discriminate HLB juice

TITLE and CONTACT INFORMATION

Proposal Title Effects of HLB on quality of orange juice and identification of HLB-induced chemical signature in fruit juice and leaves

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Organization USDA-ARS Citrus & Subtropical Prod Lab	*Total Direct Funds (current year)* $87,067

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

Panelist could detect bitterness in HLB juice even though the levels of the bitter compounds were below their reported thresholds in most cases. Use of electronic nose and electronic tongue on processed orange juice samples was conducted on both Hamlin and Valencia juices from the last year. The juice had been frozen and was thawed for testing. The effect of nutritional spray systems (Keyplex, Diamond R and the Maury Boyd cocktail) were also investigated as it seems many growers are going to this system rather than scouting and removing trees. These nutritional programs are reported to reverse HLB symptoms on the tree but it is not known if they reverse symptoms on the fruits. So samples will be collected from healthy and HLB-affected trees from conventionally sprayed groves and those using the above nutritional sprays and analyzed for chemical and sensory differences. The data will be reported in the final report.

There are differences in the volatile profile and in sensory perception of odors between healthy and HLB fruit juice, however the differences are much more subtle than the differences in taste. Differences in taste do correlate with limonin and nomilin values and lower sugars in both asymptomatic and also higher acids in symptomatic fruit, but more so overall in symptomatic fruit. The levels of limonin and nomilin, however, are generally below reported thresholds, even in Hamlin juice which has much higher limonin and nomiln levels than does Valencia, and even early in the season when these values are highest for both varieties. Threshold tests were done in several model juices and in Valencia juice for limonin and nomilin separately and together as well as in the presence of added sugar or acid. The values of limonin at which panelists could detect the compound were 2.32 ppm and nomilin 1.73 ppm in orange juice which was half the level of detection in model juices. When the compounds were tested together, their odor threshold was 1.89 ppm, which explains why bitterness can be detected in HLB juice. We were also interested in how much really bad symptomatic HLB juice could be blended with healthy juice before panelists could distinguish a difference. This was tried in both Hamlin and Valencia juices and determined to be around 25% of symptomatic juice in healthy juice for panelists to detect a difference in both varieties.

Since the differences in aroma profiles between HLB and healthy juice are significant by not dramatic and the corresponding olfactory experience resulting in only subtle differences,it was not surprising that the enose was not as good as the etongue at separating HLB uice from healthy juice. It did, however, separate the juices, but with some overlap of some samples. Conversely, the etongue did clearly separate all HLB juices from healthy juice, even for HLB and healthy juices from the nutritional programs. The etongue also separated the different nutritional treatments from each other and from the conventional spray treatments. This instrument could be a useful tool for discrimination of juice samples based on quality.