

## Relationship Between SSC/TA Ratio and Acceptability of Navel Orange

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During the second year of this project, we continued the work initiated last year. This project uses the sensory panel volunteers at the UC Kearney Ag Center to evaluate early season navel oranges with the intent to develop a database of the relationship between SSC/TA ratio, volatiles, and acceptability of navel orange fruit. Additionally, during this year we explored the relationship between fruit handling practices, waxes and fruit acceptability following storage.

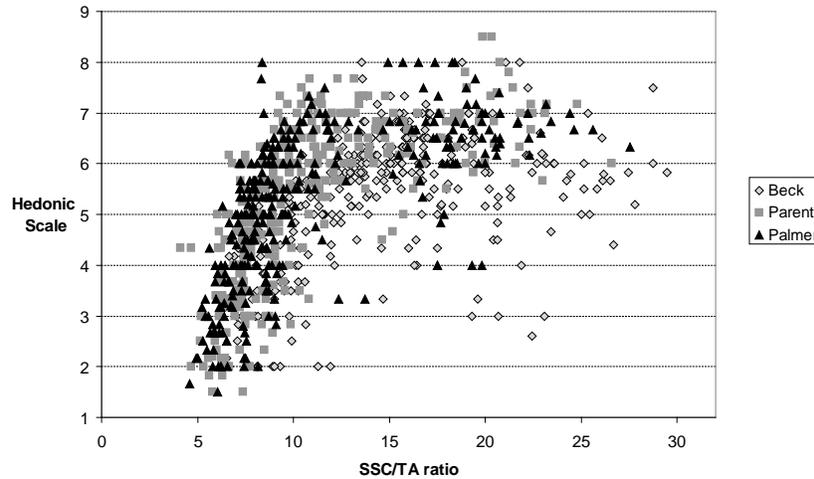
**The relationship between sensory evaluation and SSC/TA:** This work was completed in March 2005. Figure 1 presents the data showing the relationship between SSC/TA vs. the hedonic rating for the UC-KAC volunteer panel. We also collected similar data using a volunteer panel from the Sunkist sales office in Visalia.

The trends are similar to what was observed in the project's first year with the exception of the Beck Earli. Rating of the Beck Earli tailed off in later evaluation dates most likely due to granulation which developed in the fruit. The data from the Sunkist panel show the same general trends as the UC-KAC panel.

The 2-year data set indicates that there is a strong relationship between the sensory rating of the fruit and BrimA. BrimA is a measurement of the Brix content of the fruit but corrected for the citric acid content of the sample. The use of BrimA rather than SSC or SSC/TA was proposed recently in the food science literature. We are continuing to work with this data set in order to provide a meaningful interpretation of our results to the citrus industry.

In conjunction with this work, we initiated a study to examine changes in navel orange volatiles during fruit maturation. Table 1 presents the general trends that he observed. (We are currently collecting a second season of data to confirm these findings.)

**Postharvest handling and changes in volatile profiles and sensory perception:** This objective was divided into several components. Question 1 – What happens to fruit quality as assessed by volatiles and sensory panels when fruit are run over a commercial line? In order to address this objective we worked with Julie Doctor from Sunkist Research. Fruit were obtained from commercial packinghouses in the Tulare County area two times during the harvesting season (test 1 fruit were obtained and run during the week of January 10, and fruit from test 2 during the week of March 7). Fruit from 3 grower lots were obtained each time. Fruit were sampled at the bin, after washing, after waxing and at the point of packing. Fruit were presented to volunteer panelists after 0, 3 or 6 weeks of storage.



*Figure 1. The relationship between SSC/TA and Hedonic score. Data collected using fruit harvested from the navel strain trial at the UC Lindcove REC. Volunteer panelists from the UC-KAC participated in the project from late September 2004 through March 2005.*

The panelists rated fruit that had been through the packing process slightly less likeable to eat overall, with a flavor that was less rich than fruit that had not been run over a packing line. Storage acted to enhance these differences. Volatiles, most notably ethanol, were altered in amount by the packing process and likely contributed to the flavor changes.

Question 2 – There are many waxes and manufacturers; we should compare volatile/sensory based on wax type and manufacturer: For this test we harvested Lane Late navel orange fruit from UC-Lindcove REC and worked with different wax manufacturers (Decco, FMC, Pace, Fruit Growers). We ran the fruit over the packline at Lindcove. Fruit were either coated with shellac or carnauba wax (with Imazalil). Fruit were presented to volunteer panelists after 0, 3 or 6 weeks of storage. Panelists did not report any consistent differences in how well they liked eating the fruit due to wax type (shellac or carnauba) or manufacturer.

Table 1. Trends in volatile amount during navel orange maturation.

Volatile name (characteristics)		
Increasing	No Change	Decreasing
sabinene (warm, peppery)	alpha-pinene (pine-like)	4-terpineol (woody, earthy)
1-octanal (soapy)	gamma-terpinene (lemony)	acetic acid (pungent)
2-hexenal (banana-like)	beta-myrcene (musty)	unknown 3
unknown 7*	decanal (beefy, musty)	alpha-terpinolene (citrus)
trans-caryophyllene (spicey)	octanal (tallowy, citrus-like)	n-heptanal (oily, fatty)
	linalool (floral, citrus)	Z-citral (lemony)
	unknown 1*	carvone (caraway)
	limonene (citrus-like, fresh)	E-citral (citrus-like)
	unknown 2*	citronellyl acetate (rosy)
	2,4-decadienal (citrus)	unknown 4
		neryl acetate (fruity)
		undecanal (pleasant)
		unknown 5
		unknown 6
		methyl geranate (fruity)

\* unknowns are compounds that have yet to be identified.

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