Preharvest Fruit Drop and its Implications for Flavor of Oranges

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Fruit drop experiment
Shake trees – collect dropped fruit
- Healthy trees not shaken
- Healthy trees shaken
  - Fruit that fell off
  - Fruit that remain on tree

Harvest fruit that remain on trees after shaking
- HLB trees shaken
  - Fruit that fell off
  - Fruit that remain on tree

Comparison of Chlorophyll a and Chlorophyll b values between dropped and retained fruit

Wei Zhao

Difference in calyx abscission zone of HLB-affected fruit between the dropped and retained fruit when shaking the tree.

Wei Zhao
Quality aspects for orange juice

Sensory/health characteristics
- Color
- Sweetness
- Sourness
- Bitterness
- Astringency
- Aroma
- Off-favor
- Mouthfeel
- Nutrition/health benefits

Chemical/physical/microbial characteristics
- Carotenoids
- Sugars
- Acids
- Limonoids/Flavonoids
- Phenolics
- Volatiles
- Microbial compounds
- Viscosity/pectin
- Vitamin C, folic acid,

Quality aspects for OJ juice affected by HLB

Sensory/health characteristics
- Color
- Sweetness
- Sourness
- Bitterness
- Astringency
- Aroma
- Off-favor
- Mouthfeel
- Nutrition/health benefits

Chemical/physical/microbial characteristics
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Tree Ground or Cling/Drop Hamlin, December - DFC
Comments for shipping trays specified the orange juice as slightly more bitter, more astringent, more sour, and less than that of the even-harvested fruit.

Tree Ground or Cling/Drop Hamlin, January - DFC
For year one HLB trees, "DFC Ground" samples were considered more bitter than "DFC True" samples, but not significantly. Some "DFC True" samples were considered having more astringent than the "DFC Ground" samples. In year two, differences were noted in the sample and probability in the majority of differences and Table 3.

Tree Ground or Cling/Drop Hamlin, December - Trained panel

Trained panel (Anne Plotto)
- Rated flavor descriptors: orange, grapefruit, fruity-non-citrus, orange peel, green, stale, oxidized oil and typical HLB off-flavor
- Rated taste descriptors: sweetness, sourness, umami, bitterness and metallic
- Rated mouthfeel descriptors: body, tingling, astringent, and burning
- Rated after-taste descriptors: after-bitter, after-astringent and after-burning

Paperback: 2
The PCA plot clearly shows separation between healthy and HLB samples along the first dimension (90.3%), with orange flavor, sweetness and fruity non-citrus flavors describing healthy samples.

Measure chemical, biochemical and physical characteristics

- Sugars and acids, Refractometer and HPLC
- Limonoids and flavonoids, HPLC-MS
- Aroma volatiles, GC-MS
- Microbial populations, qPCR
- Measure pathogen DNA, qPCR

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Conclusions

- Juice from HLB fruit were perceived to have lower flavor quality
- Juice from dropped HLB fruit had the lowest quality
- There was not much difference in sugars and acids
- HLB juice had higher levels of bitter limonids
- Dropped fruit had higher HLB and Diplodia titers