

UF research begins to unlock 'formulas' for taste, aroma appeal of tangerines

March 20 2012, by Mickie Anderson

(PhysOrg.com) -- University of Florida researchers are working to speed up their ability to create new tangerine varieties by pinpointing the compounds that make them taste and smell the way they do.

In the last decade, Florida fresh [citrus growers](#) have lost valuable ground to [producers](#) in California and [Spain](#) who've enjoyed success with seedless Clementine varieties, such as the "California Cutie." Grown in Florida, the same varieties have more seeds than consumers like.

But UF researchers at the Institute of Food and Agricultural Sciences believe their work is laying the foundation for Florida citrus producers to regain that lost ground.

"What we really want is to have a tree that's disease free or disease resistant for growers but also one that produces a lot of fruit, has fruit that looks good, peels easy, is seedless and tastes so good that people have to come back and get more," said Fred Gmitter, a UF citrus breeder based at the university's Citrus Research and Education Center in Lake Alfred.

From 2005 to 2009, the value of Florida's tangerine crop dropped from \$52 million to \$43 million — while tangerine consumption nationwide was on the rise, said UF citrus economist Tom Spreen, who is also an IFAS faculty member.

To offset that shift, Gmitter and his fellow scientists at the Citrus REC

have been documenting the precise volatile compounds that account for specific flavors and aromas in tangerine. Much has been studied about such volatiles in orange, but only recently have researchers turned their attention to tangerine.

In the current issue of the *Journal of the Science of Food and Agriculture*, the team, which includes former UF horticultural sciences graduate student Takayuki Miyazaki, U.S. Department of Agriculture scientists Anne Plotto and Elizabeth Baldwin, and UF food science expert Jose I. Reyes-de-Corcuera, described their findings, which boil down to this: tangerine flavor is highly complex and not the product of just one compound.

Researchers used a gas-chromatography-olfactometer, which analyzes and separates various components of tangerine aroma, to log their sniff-test reactions to each.

In five tangerine hybrids, the team found 49 aroma compounds.

Much like wine connoisseurs, their descriptions ranged from “sulfury” to “woody/spicy” and even “metallic/rubber.”

By singling out each of the volatiles that humans can sense, Gmitter said he gets an assessment of what’s desirable in a tangerine and what isn’t, critical base information for breeders.

Surveys from around the country have shown that citrus consumers above all else want fruit that tastes good—even more so than seedless or easy-to-peel varieties, he said.

“I want to understand the genetics that lay underneath all of this stuff, so we can develop molecular markers, and then we can select seedlings at a very young age that we think should have good flavor attributes,” he

said.

Being able to select those seedlings as early as possible is important, he said.

“If I make a cross and I plant 100 trees and only three are going to have really good flavor, I’m spending a lot of money and a lot of land and a lot of time to grow 97 trees that are absolutely useless,” he said.

Knowing the [compounds](#) responsible for flavor and aroma means being able to plant and test more trees that are more likely to produce superior fruit.

And winning back the state’s tangerine-market edge would be a boon, said Spreen, the citrus economist.

“This could potentially really be a big help to the state’s [citrus](#) industry,” he said.

Provided by University of Florida

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