Peach Lexicon and a Look into Deeper Quality Analyses

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Introduction

The variability in sensory characteristics for peach are not well understood and a standard vocabulary/lexicon for discerning those differences has not been developed.

- Establishment of a lexicon could provide a basis for the evaluation of fruit quality including peaches during pre-harvest, post-harvest, and commercialization of varieties.
- It would allow comparison among varieties currently available and create a database to be used in breeding applications.[1]

Fruit quality is generally measured by either instrumental methods or sensory evaluation methods.[2,3] The peach lexicon will help researchers understand the sensory characteristics of various cultivars peaches. This information could then be integrated with physical and chemical characteristics, and consumer acceptance to develop a full quality index for peaches.

Objective

To develop a universal lexicon for peaches to be used for descriptive analysis, with emphasis on mature, fresh fruits.

Materials and Methods

- Six trained panelists evaluated 52 commercial peach varieties grown in the southeastern United States.
- Attributes were developed under appearance, aroma & flavor, textures, feeling factors, basic tastes, and aftertastes.
- Attributes were then collectively defined and referenced on a 0 to 150-point scale for no presence to highly present.
- Lexicon with terms, definitions, and references was developed during 9 weeks.
- Panelists met for a three-hour session each week.

Figure 1. The panel at work; Example of a served sample

Results

Table 1. Peach lexicon with definitions and references for the descriptive attributes

Attribute	Definition	Reference
	APPEARANCE	
Blush/Redden	Degree of overall redness within flesh.	Light blush=20; Peach rings=75; Heavy blush=110
	AROMA and FLAVOR	
Peach identity	Aroma associated with whole fresh peaches. & flavor associated with peaches.	MP1= 40(aroma), 50(flavor); PE2=90(aroma), 25(flavor); Peach essence=130(aroma), 110(flavor)
Apple	Aroma associated with the flesh of green apples.	Fresh apple =35 (Granny Smith, 22°C)
Apricot	Distinct flavor associated with apricots.	Generic Unpeeled Canned Apricot = 60
Cherry	Aroma associated with almonds and cherries & distinct sweet, fruity flavor associated with cherries.	Almond extract 10:1 =40(aroma); Very Cherry Jelly Bellys = 45(flavor)
Citrus[2]	Aroma associated with freshly cut citrus fruits, such as oranges & a blend of flavors associated with citrus fruits such as orange, lemon, and lime.	Sprite=40(aroma), 65(flavor); Orange extract (2:1)=60(aroma); Orange extract (1:1)=100(aroma); Lemonade=75(flavor, Simply Lemonade)
Floral	A sweet, light, slightly perfumery aroma associated with flowers.	Chamomile=20; Jasmine tea=75
Fruity	Aroma associated with a blend of fruits.	1:1 Peach Nectarine water=35; Peach Nectarine water =65 (source); Grape juice=90 (Welch's brand)
Melon	Aroma associated with fresh melon	Honeydew =40 (sliced 1"X1")
Plum	Distinct flavor associated with fresh plums.	Plum Jam = 25 (generic)
Sweet aromatic	Aroma associated with sweet material such as caramels.	Sweet tart=40; Caramels =90 (Kraft individually wrapped caramels)
Tart	Flavor associated with a combination of astringent and sour flavor.	One Smartie = 40; Two Smarties=80; Three Smarties=120
Green	Aroma associated with green or under-ripe fruit & flavor associated with unripe fruits.	Green banana =60(aroma), 50(flavor); Fresh parsley water=100(aroma), 90(flavor)
Fermented	A combination of aromas that are sweet, slightly brown, overripe, somewhat sour and associated with fermented fruits.	Dried peaches =110 (Sun-maid dried peaches)
Musty	Aroma associated with rotting peach, also with roots and wet soils.	MP1=25 (see peach identity for preparation); Fresh beets =40 (Diced 1x1")
Over-ripe	Flavor associated with over-ripe fruit.	Over-ripe banana =45 (ripe banana left at room temperature (72 degree F) for 7 days)
Bitter	The taste on the tongue associated with bitter agents such as in a caffeine solution.	Bitter 20 (0.05% caffeine solution); Bitter 50 (0.05% caffeine solution); Bitter 100 (0.15% caffeine solution)
Sour	The taste on the tongue associated with acid solutions such as citric acid.	Sour 20 (0.05% citric acid solution); Sour 50 (0.08% citric acid solution) ; Sour 85 (0.15% citric acid solution)
Sweet	The taste on the tongue associated with sucrose solutions.	2% sucrose solution = 20; 5%. Sucrose solution = 50; 10% sucrose solution = 100; 16% sucrose solution = 150
	TEXTURE	
Crispiness	The high pitch sound made during the first incisor bite.	Cracker=30; Potato chips =105 (Lay's potato chips)
Crunchiness	A low pitch sound made during first molar bite of flesh and skin.	Fresh apple=30 (Green Granny Smith apples, sliced); toast=105
Fibrousness	The amount of stringy fibers in sample after first five bites.	Applesauce=35; Two pineapple tidbits=100 (Generic brand, 1"x0.5")
Firmness	Force to compress sample between tongue and palate. (flesh only)	Cream cheese =30 (Philadelphia, at room temperature); Ripe banana=50; Honeydew melon=130
Juiciness	Amount of moisture released after chewing 2 pieces of pineapple tidbits two times.	Pineapple tidbits =60 (Generic brand, 1"x0.5")
Mealy	Amount of crumbly fruit flesh, a meal or grainy feeling on tongue and palate.	Applesauce=25 (Generic brand, no sugar added); Stovetop Oatmeal=100 (Quaker Oats, cooked to stovetop directions)
Melting	Degree to which flesh of sample dissolves in mouth.	Wilton white Chocolate = 30; Cream cheese=100 (Philadelphia brand) Cotton candy (bite size)=130(Fun Sweets LLC)
	FEELING FACTORS	
Astringent	The puckering or drying sensation on the mouth or tongue surface.	Astringent 20 (0.001%, alum in deionized water); Astringent 50 (0.001%, alum in deionized water)
Fuzzy	A sensation on the lips and tongue caused by peach fuzz.	Blue flannel=25 (100% cotton flannel fabric); Fleece=50 (Fleece Yarn, 97% acrylic, 3% polyester); Tennis ball=75 (Wilson)
Toothetch	A sensation of abrasion and drying of the surface of the teeth.	Tomato juice=25 (generic brand, no sugar added); Peach Nectarine water =100
	AFTERTASTES	
Bitter	The amount of bitter, caffeine like, taste left on the palate after expectoration	Bitter 20 (0.05% caffeine solution); Bitter 50 (0.05% caffeine solution); Bitter 100 (0.15% caffeine solution)
Peach	The amount of distinct peach flavor left on the palate after expectoration.	Peach Nectarine water =35
Sour	The amount of sour, citric acid like, taste left on the palate after expectoration	Sour 20 (0.05% citric acid solution); Sour 50 (0.08% citric acid solution) ; Sour 85 (0.15% citric acid solution)
Sweet	The amount of sweet taste, as made with sucrose solutions, left on the palate after expectoration	2% sucrose solution = 20; 5%. Sucrose solution = 50; 10% sucrose solution = 100; 16% sucrose solution = 150

[1]*Attribute in italics are present in less than 30% of varieties and considered unique*

[2]*Aroma of attribute is unique, flavor is considered common*

Results

	Springflame	Majestic	Springprince
Appearance	Blush		Blush
Aroma	Peach, *Cherry	Peach, Green, *Floral, Citrus, Fruity, Sweet	Peach, Green, Melon, Sweet
Texture	Firmness, Crispness, *Crunchiness, Juiciness, Melting	Firmness, Fibrousness	Firmness, Crispness, Juiciness, Melting
Feeling Factors			Toothetch, Astringent
Flavor	Tart, Sour	Tart, Sour, Sweet	Peach, Citrus, *Apricot, Tart, Sour, Sweet
Aftertaste	Sour		Sour
**Asterisk represents unique attributes (present in less than 30% of the 25 varieties evaluated for presence and absence of attributes*			
Characteristics	Non-melting Standard acidity	Melting Standard acidity	Non-melting Standard acidity
Photograph			

Figure 2. Example of common & unique attributes in 3 peach varieties

Key findings

- Thirty-three attributes were developed to describe the attributes of fresh peaches: blush of flesh, 11 aromas & flavors including three basic tastes, 7 textures, 3 feeling factors, and 4 aftertastes.
- Peach identity, melon, fruity, and sweet were the most common aroma attributes found in varieties evaluated.
- Flavors were mainly represented by peach identity, citrus, fruity, tart, sour, and sweet as the most common.
- Major texture terms included firmness, crispness, juiciness, melting, and fibrousness; these are associated with melting and non-melting flesh type.

References

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3.Crisosto CH & Crisosto GM. 2005. Relationship between ripe soluble solids concentration and consumer acceptance of high and low acid melting flesh peach and nectarine (*Prunus persica* L. Batsch) cultivars. Postharvest Biol Technol 38: 239-46.

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