

Using “In Store” Consumer Tests to Understand Fresh Fruit Consumer Acceptance

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Abstract

Cultivar segregation according to their organoleptic perception was achieved by using trained panel and principal component analysis of 27 peach, 28 nectarine and 12 plum cultivars, respectively, as a part of our three year program to develop minimum quality indexes. Source significantly affected cultivar ripe soluble solids concentration (RSSC) and ripe titratable acidity (RTA) but, it did not affect sensory perception of sourness and aroma by the trained panel. Based on this information, cultivars were consistently clustered in organoleptic groups with dominant perception of sweetness, sourness, aroma and flavor (peach, plum, or nectarine). This preliminary work demonstrated that high consumer acceptance was attained on ripe cultivars with stronger sensory characteristics than traditional ones without any specific sensory characteristic (balanced group) or cultivars in the sour group. Thus, developing and releasing new cultivars with specific sensory characteristics, low acid and free of chilling injury are desirable to increase consumption. However, proper postharvest temperature management and fast marketing within the market life of each cultivar are requirements to allow consumers to perceive the flavor potential of each cultivar.

INTRODUCTION

In our previous work we have consistently segregated peach, nectarine and plum cultivars into organoleptic groups. This trained panel sensory work was triggered by the ready availability of cultivars with different flesh colors, flavors, soluble solids concentrations (SSC), and titratable acidities (Neri et al., 1996; Byrne, 2003; Hilaire, 2003). Principal component analysis was used to segregate cultivars into different organoleptic groups. The perception of the four sensory attributes was reduced to three principal components that explained a high percentage of the variation in the sensory characteristics of the cultivars tested (Crisosto and Crisosto, 2006; Crisosto et al., 2007). As cultivars were segregated in different groups with strong perception of sourness, aroma/ flavor (peach, plum, or nectarine), sweetness, or with a lack of them (balanced) we decided to check if consumer acceptance was different among cultivars representing these established organoleptic groups. In these three commodities, consumer acceptance was higher in cultivars that had a dominant organoleptic characteristic than cultivars representing the balanced-traditional group.

MATERIALS AND METHODS

“In store” consumer tests were conducted on ‘Ivory Princess’ (aroma, white flesh peach); ‘Honey Kist’ (sweet, low acid, yellow flesh nectarine); ‘Spring Bright’ (balanced, moderate acid, yellow flesh nectarine); ‘Blackamber’ (sour, high acid plum); ‘Fortune’ (aroma, moderate acid plum); and ‘October Sun’ (sweet, low acid pluot) because of their differences in organoleptic characteristics reported in our previous work (Crisosto and Crisosto, 2006; Crisosto et al., 2007). Fruit were collected from trees of each cultivar grown under standard commercial practices at the Kearney Agricultural Center (Parlier, CA). Fruit were harvested at their ideal commercial maturity based on previously published work (Crisosto et al., 2004a, b). Harvested fruit were commercially handled

and forced-air cooled to 0-1°C (within 12 h of picking) with an air flow of 0.5 L per minute per kilogram of fruit using a portable cooling tunnel and stored at 0°C up to 7 days prior to ripening. For each sample, the consumer was asked to taste it, then to indicate if he/she “likes”, “neither likes nor dislikes”, or “dislikes” the sample. Then the consumer was asked to indicate his/her degree of liking/disliking: slightly, moderately, very much, or extremely. The consumer’s response was recorded using a 9-point hedonic scale (1-dislike extremely to 9-like extremely). Consumer acceptance was measured as both degree of liking (1-9) and percentage acceptance. Percentage acceptance was calculated as the number of consumers liking the sample (score >5.0) divided by the total number of consumers within that sample (Lawless and Heymann, 1998).

RESULTS

Consumer acceptance calculated as the number of consumers liking the sample varied among the tested cultivars (Table 1). ‘Spring Bright’ nectarine, a good representative of the balanced group, had a degree of liking of 6.9 and 712% consumer acceptance. ‘Blackamber’, a high acid cultivar in the sour group, had the lowest degree of liking (6.3) and consumer acceptance (62%), while ‘Fortune’ plum and ‘Ivory Princess’ peach, representatives of the aroma group, reached about 80% consumer acceptance with a degree of liking near 7.2. Finally, ‘Honey Kist’ and ‘October Sun’, in the sweet and flavor groups, reached the highest consumer acceptance (88%) with a degree of liking of 7.5.

This preliminary work points out that the presence of a strong sensory characteristic such as aroma (peach, plum or nectarine), flavor (peach, plum or nectarine), or sweet that is perceived by consumers results in high consumer acceptance. However, cultivars which lack strong sensory characteristics (balanced) or with a strong sour characteristic appear to have lower consumer acceptance than cultivars with a characteristic flavor/aroma. It is important to point out that these preliminary “in store” consumer tests were carried out in a specific and limited consumer population. Thus, we should pursue testing the role of the ethnicity in consumer acceptance using large and diverse populations. This new information may help marketing by matching organoleptic groups (flavor code) with consumer acceptance according to ethnic background.

As new cultivars with strong characteristic flavors/aromas are becoming commercially available, consumer acceptance can increase in the near future. Although it is important to point out that flavor potential should be protected during postharvest handling by proper temperature management and fast marketing within the market life of each cultivar (Crisosto et al., 1999).

FINAL COMMENTS

- Higher consumer acceptance was attained on ripe cultivars with a predominant flavor than on traditional ones. Thus, developing and releasing new cultivars with a characteristic flavor component and free of chilling injury are desirable to increase consumption.
- Intensive research to identify important sensory attributes of cultivars, and “in store” consumer acceptance should be pursued.
- The role of orchard factors including ideal maturity should be studied further to assure maximum flavor potential for the consumer.
- Correct postharvest temperature management and fast marketing within the market life of each cultivar are requirements to allow consumers to perceive the flavor potential of each cultivar.

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Tables

Table 1. Consumer acceptance of different ripe tree fruit cultivars harvested at their ideal commercial maturity according to their organoleptic group.

Cultivar	Organoleptic group	Degree of liking (1-9) ¹	Acceptance (%)
Ivory Princess	Aroma	7.3	80
Honey Kist	Sweet	7.5	88
Spring Bright	Balanced	6.9	71
Fortune	Aroma	7.2	80
October Sun	Sweet and plum flavor	7.8	90
Blackamber	Sour	6.3	62

¹Degree of liking: 1=dislike extremely, 2=dislike very much, 3=dislike moderately, 4=dislike slightly, 5=neither like nor dislike, 6=like slightly, 7=like moderately, 8=like very much, and 9=like extremely.

