

8.2 Effect of Greening Plant Disease (Huanglongbing) on Orange Juice Flavor and Consumer Acceptability

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Oranges (Citrus sinensis) were collected at six harvest dates during the 2007-2008 season in order to determine the effect of greening, a citrus plant disease, on juice quality and consumer acceptability. Greening (also known as Huanglongbing, HLB) is known to adversely affect citrus production and tree health, as well as fruit morphology, however the impact of this disease on the quality of juice expressed from affected fruit has not been widely reported in the scientific literature. The objective of this work was to determine the acceptability of juice expressed from fruit harvested from greening-affected trees and to collect descriptors to be subsequently used in a descriptive sensory panel in order to more fully understand the flavor of greening-affected orange juice.

Fruit were harvested on six harvest dates, with three harvests during the mid-season orange period and three during the Valencia orange harvest. The following categories of fruit were collected during each harvest period by a citrus horticulturalist with expertise in the identification of greening disease in the field: greening-affected fruit (misshapen/deformed); non-affected fruit from greening-affected trees and control fruit from non-affected trees. Juice was expressed from each category of sample, and was analyzed for routine quality parameters. The juice was then frozen in suitable containers and stored until sensory analysis.

For each of the six harvest dates, consumer panels (n=100) evaluated the juice hedonically for overall acceptability, orange flavor and sweetness. Significance comparisons were determined within each fruit variety/harvest date. For all six panels, juice expressed from greening-affected fruit was always significantly less acceptable (P<0.05) than juice from control fruit. Juice from greening-affected fruit was rated as significantly less sweet and significantly lower in orange flavor than juice from control fruit for all six panels (P<0.05). Juice expressed from visually normal fruit from affected trees generally fell between control juice and greening-affected fruit juice in terms of overall acceptability, sweetness and orange flavor. The differences among the three sample types were not always significant for all six harvest dates, except for Valencia juice overall acceptability. Descriptors most often used to describe juice expressed from greening-affected fruit include bitter, metallic, acidic, general off-taste and watery. This information will be used to develop a trained descriptive panel to further characterize greening-related juice quality, and to potentially identify specific chemical components leading to the observed flavor differences. As juice from greening-affected trees can enter the juice processing stream, it is important to characterize the potential flavor impact of such a scenario.