

Title Impact of growing environment on 'Chickasaw' blackberry aroma evaluated by aroma extract dilution analysis

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Abstract

Blackberries are a native plant grown in many areas of the United States and adapted to a wide range of environments. Fruit flavor is mainly formed during the brief ripening period, and influenced by internal and external factors. 'Chickasaw' blackberry is a high quality, productive blackberry cultivar which was first developed in Arkansas. Comparing the 'Chickasaw' blackberries planted in Arkansas and Oregon, the aromas of the two fruit are significantly different in the intensity of fruity, floral, green, herbal and sweet. Study was stimulated to identify and compare the most potent odorants in the 'Chickasaw' blackberries grown in Arkansas and Oregon State using the aroma extract dilution analysis (AEDA) technique and elucidate the influence of growing environment on aroma quality. 1.5 kg. fruit from each growing region were extracted by pentane and ethyl ether (1:1). The volatile compounds were recovered by using solvent assisted flavor extraction (SAFE) under vacuum. The SAFE extract was concentrated, and injected to HP 5890 GC/ Olfactometry to determine the flavor dilution (FD) factors using AEDA technique. An Agilent 6890 GC/ MSD was used for identification. Analysis was performed on both polar and non-polar columns. About sixty aromas were identified by mass spectrometry and retention indices. The major aroma compounds identified in 'Chickasaw' blackberries were ethyl butanoate, methional, ethyl hexanoate, linalool, and phenylethyl alcohol. Comparison of the two fruit shows both have comparable numbers, but have difference in aroma impacts, as measured by flavor dilution (FD) factors. These data show that there are no impact compounds characteristics of 'Chickasaw' blackberries, and that the differences between the two fruit are quantitative rather than qualitative. These results suggest that the flavor can be directly affected by growing environment. When the same cultivar of blackberry is grown in different environment, the flavor of the fruit changes.