

Title            Seasonal variation of volatile composition of 'Marion' and 'Thornless Evergreen' blackberries and their contribution to the aroma

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Citation        Book of Abstracts, 2004 IFT (Institute of Food Technologists) Annual Meeting and Food Expo, 13-16 July 2004, Las Vegas, Nevada, USA. 321 pages.

Keyword        blackberry; volatile compound

### **Abstract**

In the Pacific Northwest of the United States, 'Marion' and 'Thornless Evergreen' are the most important trailing blackberry cultivars. This study investigated the seasonal variation of volatile composition of 'Marion' and 'Thornless Evergreen' blackberries and their contribution to aroma using gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS). The fruit from three seasons, year 2002, 2001 and 1999, were extracted by pentane and ethyl ether (1:1). Internal standard was added in pureed fruit extraction. 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/FID for qualitative analysis and Agilent 6890 GC/MSD for identification. A total of 106 volatiles were qualified in the two blackberry cultivars. In general, some variations were observed in the three seasons, nevertheless, the volatile profile of two cultivars showed genetically determined patterns. Based on total percentage of FID area, the 'Thornless Evergreen' contains significantly more alcohols, hydrocarbons, and phenols than 'Marion', while 'Marion' contains more acids and esters. When comparing the absolute concentration of volatiles, 'Thornless Evergreen' contains more volatiles than 'Marion' in every chemical class except acids. The most abundant volatiles in 'Marion' were ethanol, acetic acid, hexanoic acid, linalool, 2-heptanol, ethyl acetate and 2-methylbutanoic acid. In 'Thornless Evergreen', the most abundance volatiles are 2-heptanol, ethanol, 2,3 butanediol, hexanol,  $\alpha$ -pinene, octanol, nopol, p-cymen-8-ol and ethyl acetate. The total volatile of 'Thornless Evergreen' is about three folds of that of 'Marion'. The results support the hypothesis that the aroma of blackberry is a mixture of volatiles is a mixture of volatiles in certain proportions. The fact that 'Thornless Evergreen' contains more alcohols and hydrocarbons might explain the green and heroaceous odor. The more esters that 'Marion' possessed could contribute to its intense floral and fruity aroma.