

Title Effect of cultivar and maturity change on blackberry polyphenolic composition and antioxidant properties

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Abstract

Blackberries are a rich source for anthocyanin pigments and polyphenolics and have been shown to have high antioxidant properties. The interest in the use of blackberries as sources for natural colorants, nutraceuticals, and functional food, prompted this investigation on the effect of maturity and cultivar on their concentrations and distribution. The objectives of this study were to determine the polyphenolic composition and antioxidant properties of 11 blackberry cultivars, selected for their genetic diversity and commercial importance. Marion and Evergreen blackberries, the two dominant commercial varieties in the Pacific Northwest, were chosen for investigation of three maturity stages (part-red-part-black, ripe, and over ripe). Berries were liquid nitrogen powdered and acetone/chloroform extracted. Polyphenolics and anthocyanins were separated by reverse-phase HPLC. Determination of total acidity, total anthocyanin content, total phenolic content, and Oxygen Radical Absorbing Capacity (ORAC) were also performed. Our results showed that total anthocyanins for the 11 cultivars ranged from 131-256 mg/100g ($\mu=198$), total phenolics from 682-1056 mg GAE/ 100 g ($\mu=900$), and ORAC from 37.6-75.5 mmolTE/ g ($\mu=50.2$). Four blackberry cultivars were found to be higher in total anthocyanins and total phenolics than Marion and Evergreen. The anthocyanin pigments change tremendously with ripening. Total anthocyanins increased from 74.7 to 317 mg/100 g from partial ripe to over ripe for Marion, and from 69.9 to 164 mg/100 g for Evergreen. However, findings show that total phenolics and antioxidant properties were less affected by maturity change. These results confirm that blackberries are a good source of natural antioxidants and colorant. Although Marion and Evergreen blackberries were still an excellent source for antioxidants, these studies showed the potential for obtaining new cultivars with higher pigment and phenolic content through classical plant breeding. In addition, findings on the effect of maturity can be used as a guideline for material screening by juice industries.