Sensory, Health and Quality Evaluation of Two Blackberry (Rubus subgenus Rubus) Cultivars from Arkansas and Oklahoma

Richelle A. Stafne1, William G. McGlynn, Eric T. Stafne, Edralin A. Lucas, and John R. Clark

1Department of Horticulture and Landscape Architecture, Oklahoma State University, Stillwater, OK 74078
2University of Arkansas, Fayetteville, Arkansas 72701

Abstract

Blackberries are a popular culinary fruit used both in fresh and processed food products, including wine. The blackberry has received attention for its health benefits, in particular by its phenolic, flavonoid and anthocyanin content. However, differences in blackberry cultivars and growing location may result in different concentrations of these compounds. Additionally, differences in sensory properties such as seediness, juiciness, sweetness, acidity and flavor may impact consumer satisfaction. Thus, sensory evaluation offers a method to help characterize the variance in these important traits.

Objective

The objective of this study was to determine differences in sensory, health and quality properties of two commonly grown blackberry cultivars in Oklahoma and Arkansas. Results could allow for improved cultivar selection for making blackberry wine.

Materials and Methods

Six blackberry cultivars were hand-harvested in summer 2008 from the University of Arkansas Fruit Research Substation in Clarksville, Arkansas and a commercial blackberry farm in Broken Arrow, Oklahoma. Berries were frozen immediately after harvest for future analysis at Oklahoma State University (OSU), Stillwater. In fall 2008 and winter 2009, berries were analyzed for soluble solids, weights and dimensions, pH, titratable acidity (as citric acid), antioxidant potential (defined as total phenolic, flavonoid and anthocyanin content), color of berry juice, sweetness, acidity and flavor. Soluble solids averaged 9.5% for ‘Ouachita’ from both locations and 10.5 and 12.2% for ‘Apache’ from Oklahoma and Arkansas, respectively. Mean berry weight (g) was 2.6 for Oklahoma ‘Ouachita’, 4.2 for Arkansas ‘Ouachita’, 4.8 for Oklahoma ‘Apache’, and 5.8 for Arkansas ‘Apache’. Blackberry juice pH showed similar results, with Oklahoma ‘Ouachita’ pH of 3.7 and 3.1 for others. Titratable acidity (%) for Oklahoma berries was 1.48 for ‘Ouachita’ and 1.12 for ‘Apache’, and 1.38 for ‘Ouachita’ and 1.38 for ‘Apache’ from Arkansas berries. Comparing overall antioxidant potential, ‘Ouachita’ berries had lower content for phenolics and anthocyanins as compared to ‘Apache’. By location, antioxidant potential results were significantly higher for blackberries grown in Arkansas, ‘Ouachita’ and ‘Apache’ from Arkansas and Oklahoma ‘Ouachita’ berries showed higher total phenolics compared to Arkansas ‘Apache’, which had higher flavonoids and anthocyanin content than the Oklahoma ‘Apache’. Results of the sensory panel indicated blackberry cultivar had a significant effect on sweetness, acidity and flavor, but growing location was not significant when averaged over both cultivars. However, ‘Apache’ blackberries from Oklahoma were significantly sweeter than ‘Apache’ berries from Arkansas while ‘Ouachita’ berries from Arkansas had significantly greater ratings for sweetness and acidity than ‘Ouachita’ from Oklahoma. When we compared results for sweetness, acidity and flavor of berries harvested in Oklahoma, ‘Apache’ had significantly higher ratings than ‘Ouachita’. These results should help growers decide which blackberry cultivars perform better in their specific growing area, whether in Arkansas or Oklahoma. Additional evaluation including some production and antiooxidant properties is needed to determine antioxidant potential of these cultivars.

Introduction

Blackberries are a popular culinary fruit used both in fresh and processed food products, including wine. The blackberry has received attention for its health benefits, in particular by its phenolic, flavonoid and anthocyanin content (Kao et al., 2007). Differences in blackberry cultivars and growing location may result in different concentrations of these compounds. Additionally, differences in sensory properties such as seediness, juiciness, sweetness, acidity and flavor may impact consumer satisfaction. Thus, sensory evaluation offers a method to help characterize the variance in these important traits.

Conclusion

Sensory evaluation for sweetness appears to be related to soluble solids content. Some location differences exist that may help growers decide which blackberry cultivars perform better in their specific growing area, whether in Arkansas or Oklahoma. Additional evaluation including some production and antioxidant properties is needed to determine antioxidant potential of these cultivars.

Literature Cited

