

Microsatellite-Based Fingerprinting of Western Blackberries from Plants, IQF Berries and Puree

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Abstract

The blackberry industry needs a reliable method to ensure trueness-to-type of blackberry products. Microsatellite markers or simple sequence repeats (SSRs) are ideal for cultivar fingerprinting, paternity testing and identity certification. Fingerprinting is valuable for variety identification, quality control and as a legal method to protect against infringement by competitors. The objectives of this study were to develop a DNA extraction protocol and SSR-based identification for individually quick-frozen (IQF) 'Marion' and 'Kotata' whole berries and concentrate and to generate genetic fingerprints for 16 important western blackberry cultivars. IQF berries and frozen concentrate of 'Marion' and 'Kotata' were generously provided by reliable commercial sources. The FAST ID Kit worked better than two other DNA extraction methods for isolating DNA from IQF berries and from frozen and thawed concentrate. Out of twenty-nine SSRs tested, ten polymorphic SSRs differentiated between 'Marion' and 'Kotata' leaves and were chosen for subsequent analyses. SSR-based fingerprinting of individual IQF berries (using the receptacle for DNA extraction) revealed a mixture of 'Kotata' and 'Marion' berries in the commercial 'Marion' bag while fingerprinting of frozen 'Marion' concentrate identified 'Kotata' in the small frozen puree sample evaluated and possible contamination from seed DNA. The ten SSRs differentiated between each of the 16 western cultivars included in this study. In fact, one SSR marker, *Rubus* 275a was sufficient to distinguish these 16 cultivars. In summary, blackberry can be reliably identified with SSR markers, using leaves and frozen berries as sources of DNA. Fingerprinting from concentrate does not appear reliable for identity certification due to possible contamination from seed DNA.

INTRODUCTION

Blackberry, an aggregate fruit of *Rubus* species subgenus *Rubus* in the Rosaceae family, has long been a favorite wild fruit. *Rubus* species are native to several countries where they are picked for personal or commercial use. The US is the leading producer of cultivated blackberries in the world. Oregon dominates the US production and the Corvallis-based breeding program is the oldest continuously active blackberry breeding program in the world (Clark et al., 2007). Most of the cultivars released from that program and grown for the processing industry are of the trailing type. They are largely derived from the western dewberry (*Rubus ursinus* Cham. & Schl.), but have several other species in their background. Over 95% of the blackberries in Oregon are harvested for processing, most commonly as individually quick-frozen (IQF) or pureed product. In 2008, Oregon produced 39.2 million pounds of blackberries valued at 3.8 million dollars as fresh fruit and 19 million dollars in processed products (USDA-NASS, 2009). Over 4000 acres of this production is in the cultivar Marion, believed to

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