Climate Effects on Anthocyanin Accumulation and Composition in the Pomegranate (Punica granatum L.) Fruit Arils

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Abstract

Worldwide pomegranate (Punica granatum L.) production has expanded greatly due to recent evidence on the fruit health attributes. The fruit’s unique red color, conferred by anthocyanins, is an imperative sensory quality. Climate effects on the fruit’s internal color were reported earlier. The present study investigated the influence of a wide range of temperature regimes (−7-40 °C) on pomegranates’ aril anthocyanins. The study included two deciduous and two evergreen accessions as well as desert and Mediterranean orchards. RP-HPLC analysis of the arils’ anthocyanins revealed mono- and diglucosylated delphinidins and cyanidins as the major anthocyanins and pelargonidins as minor components. Anthocyanin accumulation changed inversely to the season’s temperatures. Cyanidins were generally more abundant but delphinidin accumulation was enhanced in cooler season. Monoglucosylated anthocyanins prevailed at cooler temperatures and
subsided during seasonal warming with a concomitant increase in diglucoside proportion. The findings can benefit breeding and agricultural efforts to enhance pomegranate quality, especially in the face of “global warming”.