

Title Genomic tools for the discovery of gene affecting the quality of agricultural produce
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Abstract

Many of the quality traits of agricultural produce are determined by the presence of low molecular weight metabolites that impart color, texture and taste properties to the produce. Pigments, such as the carotenoids, anthocyanins and betacyanins are important determinants of color properties and produce appearance. Sugars, acids and bitter compounds impart specific taste properties to produce while organic volatiles impart the aroma and full flavor of spices, flowers, vegetables and fruits. Modern genomic and biotechnological methodologies have been applied to study the formation of such compounds, insighting into the complexity of many of the biosynthetic pathways and their physiological and molecular regulation. Many of the genes involved in the formation of such compounds have been isolated using genomic methodologies. Bio-informatic assignments are key in elucidating the putative roles of the novel genes based on functions of known similar genes and in their expression patterns. The final confirmation of the identity and function of a putative gene is usually performed by its functional expression in heterologous or homologous systems utilizing gene silencing or overexpression methodologies. We have initiated genomic projects aimed at isolating and characterizing key genes involved in the formation of mono- and sesquiterpenes, as well as volatile ethers and esters that are prominent in the fragrance of roses, the full flavor of melons, and components of the essential oil of sweet and lemon basil. These genes have been used through genetic engineering in attempts to improve the often-lacking aroma characteristics of tomato as well as other fruits, vegetables and flowers.