

Title Metabolic characterization of tomato fruit during preharvest development, ripening, and postharvest shelf-life

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Abstract

Tomato is an important crop in terms of its economic and nutritional value. Tomato fruit quality is a function of metabolite content, which is prone to physiological changes related to fruit development and ripening. The aim of this work was to use a metabolomic approach to characterize compositional changes (sugars, acids and amino acids) of tomato during preharvest fruit development, ripening, and postharvest shelf-life. Gas chromatography–mass spectrometry was used to identify both polar and volatile metabolites that were involved in fruit development and ripening. Characteristic metabolites for the various fruit developmental stages were identified. Mannose, citramalic, gluconic and keto-l-gulonic acids were shown to be strongly correlated to final postharvest stages. During on-vine ripening, an increase was observed for the major hexoses, glucose and fructose, cell wall components such as galacturonic acid, and for amino acids such as aspartic, glutamic acid and methionine. Major changes were also observed at the level of the TCA cycle, showing a decrease in malic and fumaric acids, and accumulation of citric acid.