

# Metabolomics and postharvest sciences: challenges and perspectives

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## Abstract

With more than 400,000 plant and 1,000,000 estimated metabolites, metabolomics is an emerging technology that profiles the complete set of small naturally or induced metabolites. The recent progress of metabolomics led to a comprehensive and global analysis of metabolites and metabolic pathways. Metabolomics approach could be used to study the development and ripening stages of fruits and identifying novel information on the metabolic transition from immature to ripe fruit. Metabolomics profiling could also be used to reveal changes induced by cooling, irradiation and other postharvest treatments. Changes in primary and secondary, pathways associated with sugars, organic acids, and, phenolic compounds metabolisms, ethylene synthesis, and fruit texture could also be tracked by their metabolites. Broader use of metabolomics will speed the discovery of novel gene functions in primary and secondary metabolism and will provide comprehensive data sets necessary to model metabolic networks related to postharvest physiology and biochemistry of fruits and vegetables, and human health-promoting metabolites as well. The broad data collected will help to determine the appropriate conditions of storage and/or the physical treatments, such as modified atmosphere/controlled atmosphere, to divert the metabolism towards the desired pathway, or at least slow down the production of the undesirable metabolites by reducing the speed of the respective reactions. The issues of these results would also lead to make commodities acquire a self-defence, and extending the shelf-life of these commodities with less stress effects and better quality attributes preservation.