

Title Fruit maturation and ripening and their relationship to quality
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Abstract

Purpose of the review: This review is intended to provide a general understanding of how fruit maturation and ripening relate to quality. In addition, approaches to manipulating (either accelerating or inhibiting) ripening are discussed in relation to their relative level of success and their potential for use in the future. Finally, discussion of molecular technologies for monitoring fruit maturity and ripening are discussed, and their potential application to either manipulating or assessing ripening is highlighted.

Main findings: Existing approaches to measuring maturity and ripeness in fruit provide reasonable prediction tools that can be applied commercially. However, there are limitations that can lead to imperfect prediction with consequent variation in quality. Some of this variation can be managed by postharvest treatments such as heat, phytohormones, anaerobic metabolites and 1-methylcyclopropene. Nonetheless, application of knowledge of biological variation and uncertainty analysis can improve the outcome. Finally, it is suggested from recent research that use of molecular biology tools (eg, analysis of differential protein expression) can potentially provide a powerful alternative assessment of maturity, particularly in stone fruit, which are very difficult to evaluate using existing methods.

Directions for future research: Future research to identify the components of the complex changes in gene and protein expression during ripening is essential since these changes are responsible for the quality or metabolic changes in fruit. Strong correlations of metabolic component shifts provide the basis for relating to gene expression to actual and specific quality shifts during ripening and in response to postharvest treatments. The measures of molecular events may be more reliable than current measures of maturity and ripeness since they are less affected by short term fluctuations in the growing and handling environments.