

Title Managing maturity and ripening in the fruit production chain for improved flavour
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Abstract

The main biochemical and physiological changes occurring in fruit maturation and ripening, like pigment breakdown and formation, hydrolysis of starch, sugar and acid metabolism, biosynthesis of volatiles, cell wall breakdown, respiration and ethylene production, all have an effect on flavour. For human consumption, optimal harvest of fruit should maximize quality and yield, while minimizing fruit loss and allowing the time for handling, storing and marketing the product. During growth, all kinds of small local differences in growing condition (position of fruit on the tree relative to leaves and other fruit, microclimate, hormonal and nutritional effects) integrate into a considerable variation in quality at the moment of harvest. Fruit heterogeneity regards size, colour, chemical composition as well as their physiological state, i.e., their maturity level, since maturation does not occur simultaneously in all fruit of a tree. This variability is a challenge for those who want to deliver fruit with consistent eating quality. The choice of the optimal harvest thus regards both the right time for picking each fruit during its maturation, and the choice of which fruit to pick at each time. Maturity indices have been traditionally developed to define minimum maturity for harvest in different fruit species. Recently new non-destructive methods are emerging as an innovation for quality assessment and control. The use of stochastic kinetic models, combined with non-destructive measurements, allows description of physiological processes while dealing with biological variation which is the main challenge in the supply chain management to provide fruit and vegetables of consistent maturity and quality. It is envisaged that this approach will be further extended and thoroughly studied, in order to develop applications for the supply chain management of fruits and vegetables, to improve their quality and uniformity and to provide end consumers with reliable, good quality produce.