

Optimizing postharvest life of horticultural products by means of dynamic CA: fruit physiology controls atmosphere composition during storage

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Acta Horticulturae 1071: 59-68. 2015.

Abstract

The postharvest life of some horticultural products stored with the most appropriate cooling procedures can be prolonged further by modifying the storage atmosphere to the optimal composition based on values determined empirically and set statically for the entire storage period. This is known as controlled atmosphere (CA) storage. In the last decade developments took place on the field of CA storage of horticulture products, which announce a paradigm shift away from CA controlling postharvest life, and towards physiology controlling atmosphere composition. This means that CA can be dynamically adjusted to the horticultural product requirements specific for genotype, phenotype and time (dynamic CA, DCA), to provide postharvest quality benefits. Earlier applications of the DCA concept were based on empirical or invasive data while the recent developments rely on non-invasive, real-time bio-sensing, such as DCA by the means of ethanol sensing in the atmosphere or of fruit chlorophyll fluorescence response (DCA-CF). Taking this technological evolution into account, we will focus on the development, validation, and influence of DCA-CF technique on the improvement of apple fruit quality preservation, not only from the point of view of research, but also on the commercial scaling up in South Tyrol, Italy, a significant apple-growing region that produces more than 1/10 of EU apple fruits. As of 2013 in this region, this technology penetrates approximately 15% of the market, which is similar to the market penetration of SmartFresh (1-MCP) and is the highest DCA-CF concentration worldwide.