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Author Josef Streif
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Abstract

The primary task of postharvest technologists is to devise methods by which the deterioration of fruit is restricted during the period between harvest and consumption. As fruit remain alive after harvest it is necessary to restrain their respiratory and metabolic activity in order to maintain postharvest quality. Ethylene plays a crucial role in the initiation and continuation of ripening in climacteric fruit. Inhibitors for the key steps in ethylene biosynthesis and action are known and developed as commercial applications: Preharvest application of Retain™ (AVG=aminoethoxyvinylglycine) temporarily delays the ripening of climacteric fruit such as apples and pears; and Harvista™ a preharvest sprayable formulation of 1-MCP (1-methylcyclo-propene) is currently being developed which can block ethylene binding with receptors. In commercial apple production both, Retain™ and Harvista™, are mainly used to prolong the harvest period by 1-2 weeks for better harvest management, but some positive effects on storage behaviour can also be observed. Storage factors like low temperature, reduced O₂ and elevated CO₂ partial pressures in the storage atmosphere generally have the potential to influence ethylene biosynthesis and action and are widely used in many different commercial CA (controlled atmosphere) applications. Technical progress in combination with better gas tightness of storage rooms has led to the development of ultra low oxygen (ULO) storage and improved additionally fruit quality maintenance. A further step in CA storage technology is dynamic CA storage (DCA) which involves reducing the oxygen level in the storage atmosphere near to the lowest level tolerated by the fruit. Real-time measurements of ethanol production or chlorophyll fluorescence can be used for a fast and reliable detection of low O₂ and high CO₂ stress conditions of the fruit. The postharvest application of the ethylene inhibitor 1-MCP has the special advantage of a long lasting ripening inhibition which can also limit major quality losses during marketing and shelf-life. It is well documented that ripening regulation as practically applied in ULO storage and more recently by DCA and 1-MCP application shows great benefits to maintain fruit texture, colour, soluble solids and acidity but fruit can suffer from inadequate aroma formation.