

Abstract

It is not possible to discuss the future of modified atmosphere (MA) research without considering the broader aspects of research aimed at maintaining quality of fresh horticultural perishables between harvest and consumption. Providing better flavored fruits and vegetables is likely to increase their consumption, which would be good for the producers and marketers (making more money or at least staying in business) as well as for the consumers (increased consumption of healthy foods). To achieve this goal, we and all those involved in producing and marketing fruits and vegetables need to: (1) replace poor flavor cultivars with good flavor cultivars from among those that already exist and/or by selecting new cultivars with superior flavor and good texture; (2) identify optimal cultural practices that maximize flavor quality, such as optimizing crop load and avoiding excess nitrogen and water; (3) encourage producers to harvest fruits at partially-ripe to fully-ripe stages and vegetables at their optimal maturity stages by developing handling methods that protect these commodities from physical damage; (4) identify optimal postharvest handling conditions (time, temperature, relative humidity, atmospheric composition) that maintain flavor quality of fruits and vegetables and their value-added products. Postharvest-life should be determined on the basis of flavor rather than appearance. The end of flavor-life results from losses in sugars, acids, and aroma volatiles (especially esters) and/or development of off-flavors (due to fermentative metabolism or odor transfer from fungi or other sources); (5) develop ready-to-eat, value-added products with good flavor; and (6) optimize maturity/ripeness stage at the time of processing and select processing methods to retain good flavor of the processed products. Future modified atmosphere research can be part to research on strategies number 4, 5, and 6 listed above. Continued improvements in polymeric films and other packaging materials will facilitate expanded use of MA packaging to extend postharvest-life of fresh-cut fruits and vegetables and permit their distribution via vending machines. More cost-effective methods for establishing and maintaining MAs will facilitate their use during storage at shipping points, transportation, and storage at destination points. Maintaining the MA chain is the second most important factor after the cold chain in keeping quality and safety of fresh produce between harvest and consumption. Further evaluations are needed of; (1) the synergistic effects of MA and the ethylene-action-inhibitor, 1-methylcyclopropene, on delaying ripening of partially-ripe climacteric fruits and senescence of vegetables; (2) MA as a component of postharvest integrated pest

management (decay and insect control); (3) MA in relation to food safety considerations; and (4) the biological bases of MA effects on fresh horticultural perishables.