

Title Quality challenges for fresh-cut products

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Abstract

Fresh-cut fruit and vegetable products are prepared and handled to maintain their fresh state while providing convenience to the user. Fresh-cut products for foodservice and retail outlets have an estimated value of 15 billion dollars in the U.S. In recent years, the rate of growth of fresh cut fruit has led, although the value of salads and other vegetable products has continued to increase as well.

The physical damage or wounding caused by preparation respiration and ethylene production rates, and may be associated with increases in rate of other biochemical reactions responsible for changes in color (including browning), flavor, texture, and nutritional quality (sugar, acid, vitamin content). Many factors affect the response to cutting including the degree of processing (piece size), the quality of the equipment (blade sharpness), processing treatment, temperature, and modified atmospheres. Salad cut romaine lettuce will be used to examine how these factors impact the respiration, wound-induced phenolic metabolism, shelf-life and compositional quality (sugars, ascorbic acid, carotenoids) of the salad product. Strict temperature control is required to minimize the wound-induced respiration and other biochemical reactions and examples from cabbage, onions, peppers, and melons will be presented. Fresh-cut fruits generally have a more complicated physiology than fresh-cut vegetables and the stage of ripeness at processing may alter the physiological responses to cutting. Examples from fresh-cut melon will be used.

Control of the wound response is the key to providing a fresh-cut product of good quality. Low temperatures minimize differences in respiration, ethylene production rates and other metabolic changes between the fresh-cut and the corresponding intact product. Low temperatures are also essential to retard microbial spoilage on cut surfaces. Packaging is essential for all fresh-cut products, and for some products (cut salads especially) modified atmosphere packaging are important to maintaining visual appearance. Atmospheres that are too extreme, however, may lead to less of texture, off-orders, and Vitamin content. In mixed product trays, atmospheres beneficial to one component may be damage to another.

There are several microbiological concerns specific to fresh-cut products: they are generally consumed raw with no critical kill step for pathogens, temperature abuse may occur during distribution and display, some microorganisms of concern may grow under low temperature and modified atmospheres. Because of these

potential hazards, the microbiological quality and safety of minimally processed fruits and vegetables is a high priority for the industry. Nevertheless recent outbreaks of E.coli 0157:H7 on salad products in the U.S. are reminders of the vulnerability of these products to human pathogen contamination. Many sanitizers are being tested for process lines, but strict implementation of GAPs, GMPs, and HACCP to prevent contamination is most important. The microbial food safety of fresh-cut products remains a constant challenge.

Improvements in processing equipment, packaging materials and preparation procedures have greatly advanced the fresh-cut fruit and vegetable industry. Products of high visual quality are being produced, but in the future more emphasis will be placed on the aroma, flavor and other sensory characteristics as well as nutritional qualities of fresh-cut products. This will be an even greater challenge for fresh-cut fruits which inherently have more rapid losses in quality than most fresh-cut vegetable products.

Raw material quality and consistent supplies of that quality remains a major challenge for the fresh-cut industry. The development of varieties for different growing areas with specific traits for fresh-cut quality will be increasingly important: varieties of lettuce, potato, apples, peaches, etc. with lower browning potential are needed; melon fruits with high sugar contents and firm texture are needed; and varieties that facilitate cleaning, trimming and cutting operations are needed. Besides varieties, pre-processing storage periods and handling conditions need to be considered for fresh-cut preparation.