

Shelf life Enhancement of Minimally Processed Fruits and Vegetables

Dong-Man Kim

Korea Food Research Institute

According to changes in population, economic conditions, life-style and eating habits, the fruits and vegetables market will be shifted from processed (i.e., canned) to fresh. Undressed fresh produce, consisting of washed, disinfected and peeled fruits and vegetables that either sliced or grated, are currently increased in demand by retail and institutional market which use them as salad components or in ready-to use foods. Main attributes of minimally processed fruits and vegetables are convenience and fresh-like quality. Minimally processed products readily deteriorate in quality, especially color and texture, as a result of endogenous enzyme enhanced respiration and microorganisms which lead to reduced shelf life. Thus, to prevent these undesirable changes, various techniques such as controlled atmosphere (CA) storage, modified atmosphere (MA) storage, including vacuum packaging have been receiving considerable attention. Although much research has been done to find optimal conditions for whole intact fruits and vegetables, only limited information is available on fresh cut and other minimally processed products. Sliced fruits exhibit increased ethylene production and respiration compared to whole fruits during distribution in response to tissue damage.

As a result, accelerated senescence and enzymatic browning occur. Recent research on minimally processed fruits and vegetables has mainly focused on methods to inhibit browning, due to ban on use of sulfur dioxide. In order to retard or prevent these physiological changes, various alternatives, reducing agents, acidulants, chelating agents and inorganic salts have been evaluated for use on fresh cut fruits. Although some agents were effective replacement for sulfur dioxide, consumers demand

less use of chemical on such products. Shelf life of minimally processed products has been extended by inhibition of metabolic reactions associated with loss of quality and by inhibition of aerobic spoilage caused by wide variety of microorganisms. Application of MA packaging, including vacuum packaging, retards the rate of respiration, prevents growth of aerobic spoilage organisms, inhibits oxidation and color deterioration. Tissue softening is another major problem in minimally processed products because enzymes related to cell wall degradation are not inactivated. Various treatments have been investigated for retardation of the softening of sliced products. Some studies have concentrated on the application of an active packaging system with MA packaging and calcium infiltration as possible measures to retain firmness of processed products. In my opinion, one important step for production of minimally processed fruits with favorable color of cut surface and firm texture is the selection of better cultivar. As the view, changing tendency of fresh color by apple cultivars and relationship between the tendency and PPC activity will be discussed in the seminar. In addition to the topic, research result on quality enhancement of fresh apple slices by heat shock treatment will be introduced.