

Fresh-cut Products from Chilling Sensitive Commodities

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Studies on fresh-cut products produced from chilling sensitive commodities such as peppers, tomatoes, summer squash, winter squash, and cucumbers have shown that low temperatures are required to maintain quality of the fresh-cut product. This is principally due to control of microbial growth. The jicama root is another chilling sensitive commodity that provides a further example of this rule. Jicama is often prepared as sticks or strips in combination with celery and carrots to use with dips. The white crisp starchy pulp is a good complement to the colors and textures of celery and carrots. Here we report its behaviour as a fresh-cut product.

The intact root of jicama (*Pachyrhizus erosus*) is extremely chilling sensitive (1-2 weeks at 10°C (50°F) cause symptoms of internal discoloration and increased decay). Our objective was to evaluate a range of storage temperatures and controlled atmospheres potentially useful to preserve the quality of minimally processed jicama. Jicama root pulp was cut into 1.8 x 4 cm cylinders, washed in chlorinated water, drained, and stored at a range of temperatures from 0 to 15°C (32-59°F) in air, or at 5 and 10°C (41-50°F) in controlled atmospheres (0.3, 3 and 21% O₂ with 0, 5, 10 or 20% CO₂). Pieces were evaluated after 0, 4, 8, 12 or 16 days for visual quality, color, texture, and composition (soluble solids, ethanol, acetaldehyde). Total aerobic plate counts were determined on samples from some atmospheres. At temperatures >5°C (41°F), browning was the most significant cause of quality loss. High CO₂ atmospheres retarded the development of brown discoloration at 10°C (41°F). During storage at 0° or 5°C (32- 41°F) in air, quality loss was principally due to yeast and bacterial

growth. The 10% CO₂ atmospheres helped maintain the white color and crisp texture of the pieces and retarded microbial growth. Atmospheres with 20% CO₂ damaged jicama stored longer than 8 days. Atmospheres of 3% O₂ or air with 10% CO₂ resulted in acetaldehyde and ethanol concentrations 4 and >10 times those of air-stored pieces after 8 days at 5°C (41°F). Although the jicama root is chilling sensitive, our results demonstrate that the quality of the minimally processed product is best maintained with low temperatures in combination with high CO₂ atmospheres.

Processors may have difficulty with fresh-cut items from chilling sensitive commodities because they have been chilled before processing. Our general conclusions regarding the handling of fresh-cut products from chilling sensitive commodities are the following:

1. It is imperative that intact chilling sensitive commodities not be stored below their recommendation temperature before they are prepared as a fresh-cut product.
2. Once a chilling sensitive commodity is prepared as a fresh-cut product, storage at low temperature is needed to retard microbial growth and ensure quality.
3. Microbial changes are much faster than the appearance of any symptom of chilling injury.
4. For chilling sensitive commodities, the temperature and controlled atmosphere recommendations for the intact products are often inappropriate for fresh-cut pieces.