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# Postharvest Technology and Shelf-Life Extension in Gauva

*P Akshaya, V Abishek and Deepika V
Department of Fruit Science, SRM College of Agricultural Sciences,
Chengalpattu- 603201, Tamil Nadu, India
*Corresponding Author's email: ap6287@srmist.edu.in

Guava, scientifically known as *Psidium guajava*, is a tropical fruit cherished for its unique flavor, vibrant aroma, and impressive nutritional profile. Native to Central America and now widely cultivated across Asia, Africa, and the Caribbean, guava has become a staple in both home gardens and commercial orchards. Belongs to the Myrtaceae family. Grows as a small tree or shrub, often reaching 3–10 meters in height. Produces round or pear-shaped fruits with green, yellow, or pink skin and white to deep pink flesh. Contains numerous small, edible seeds.

## The Challenge of Preserving Guava

Guava (*Psidium guajava*) is a tropical fruit beloved for its sweet aroma, juicy pulp, and rich nutritional profile. But despite its appeal, guava is notoriously perishable. Once harvested, it begins to soften, discolor, and decay within just a few days especially in warm climates like India's. This rapid deterioration poses a major challenge for farmers, retailers, and consumers alike.

- It's a climacteric fruit, meaning it continues to ripen after harvest.
- It has a thin skin and soft flesh, making it vulnerable to bruising and microbial attack.
- High respiration and ethylene production accelerate ripening and spoilage.

Without proper postharvest care, guavas can lose their market value within 3–5 days. But thanks to advances in postharvest technology, researchers and growers are finding ways to extend shelf life sometimes up to 3 weeks.

## Innovative Techniques for Shelf-Life Extension

To combat guava's perishability, scientists have developed a range of strategies. These include natural coatings, temperature control, chemical treatments, and smart packaging.

**Edible Coating**

Recent studies have shown that herbal coatings made from Allium cepa (onion) leaves can significantly delay spoilage. These coatings:

- Form a protective barrier against oxygen and moisture.
- Reduce microbial growth.
- Maintain firmness and color for up to 10 days longer than untreated fruit.

**Other coatings include:**

- Chitosan: A natural antimicrobial polymer.
- Aloe vera gel: Helps retain moisture and reduce oxidation.
- Starch and guar gum blends: Biodegradable and eco-friendly.

**Cold Storage and Atmosphere Control**

- Cold storage at 5–10°C with high humidity (85–90%) can extend shelf life to 2–3 weeks.

- Modified Atmosphere Packaging (MAP) uses low oxygen and high carbon dioxide to slow ripening.
- Controlled Atmosphere (CA) storage is ideal for large-scale operations, maintaining freshness for export markets.

**Chemical Treatments**

- Calcium chloride dips strengthen cell walls and delay softening.
- Potassium permanganate sachets absorb ethylene gas.
- Salicylic acid and gibberellic acid treatments reduce decay and maintain antioxidant levels

**Smart Packaging and Handling**

- Use ventilated crates and cushioned trays to minimize bruising.
- Sort guavas by ripeness and size to ensure uniform quality.
- Emerging technologies include UV-C irradiation to kill surface microbes and smart sensors that monitor freshness.

## Research and Innovation

- Nano-coatings with antimicrobial nanoparticles are being tested for longer protection.
- Genetic breeding aims to develop guava varieties with thicker skins and slower ripening.
- Blockchain and IoT tools are being integrated to track freshness from farm to shelf.
- Harvest guavas at the mature green stage, not overripe.
- Avoid washing fruits unless necessary—moisture can promote decay.
- Store in cool, shaded areas and avoid stacking too high.

## Conclusion

Guava may be delicate, but with the right postharvest technologies, its shelf life can be dramatically extended. These innovations not only reduce waste but also open up new markets for growers and ensure consumers enjoy fresher, tastier fruit.

## References

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