# Figs
# Postharvest Quality Maintenance Guidelines

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## Scientific Name and Introduction

Edible figs are the multiple or compound fruits of *Ficus carica* L. a member of the family Moraceae. The plant is a tree or shrub native to Asia Minor, from where it spread into the Mediterranean region. It was known to the ancient Egyptians in 4000 B.C. and later Herodotus (*ca*. 485-425 B.C.) wrote about its cultivation.

Figs were introduced from Europe to North America as early as 1600 but commercial cultivation did not start until about 1900. The largest center of cultivation in the USA is in California. Figs thrive only in the hotter parts of the moderate zones while in tropical countries they can be cultivated only at higher altitudes.

The best-known cultivated varieties are the common or Adriatic fig and the Smyrna fig. The common fig produces seedless fruit by parthenocarpy, while the Smyrna fig must be pollinated in spite of the fact that it does not develop any male flowers. The figs, are pear-shaped structures formed from the rolled up discs of the capitula so that the florets of the capitulum occur inside the aperture and are not visible from the outside. The capitulum is connected with the outside by a small aperture at the top of the fig. The female florets develop into the actual fruits, tiny achenes. The achenes inside the fig represent the infructescence and the edible part is the swollen, fleshy disc of the capitulum forming the fruit wall.

## Quality Characteristics and Criteria

Fresh figs' skin color and flesh firmness are related to their quality and postharvest-life. Flavor is influenced by stage of ripeness and overripe figs can become undesirable due to fermentative products. Other quality indices include absence of defects (such as bird-peck, sunburn, scab, skin break, and stem shrivel), insects, and decay.

## Horticultural Maturity Indices:

Fresh market figs must be harvested when almost fully ripe and firm to be of good eating quality. Skin color and flesh firmness are dependable maturity and ripeness indices: 'Black Mission' figs should be light to dark purple rather than black and should yield to slight pressure. 'Calimyrna' figs should be yellowish-white to light yellow and firm. Figs for drying should fully ripen and partially dry on the tree before harvesting and completion of drying to about 17% moisture using either solar drying or a dehydrator at 60ºC (140ºF).

## Grades, Sizes and Packaging

Fully mature fresh figs are soft, easily bruised, and highly perishable. Figs are hand picked and packed in a one-layer box. Pickers wear gloves as a protection against the fig juice. 'Mission' fig, a black fig with distinctive flavor, and 'Calimyrna' fig, a large yellowish fig, are the main cultivars sold fresh in the USA.

## Optimum Storage Conditions

-1ºC to 0ºC (30ºF to 32ºF) and a relative humidity of 90-95%. Expedited forced-air cooling to 0ºC (32ºF) is strongly recommended.

## Controlled Atmosphere (CA) Considerations

CA combinations of 5-10% oxygen and 15-20% carbon dioxide are effective in decay control, firmness retention, and reduction of respiration and ethylene production rates. Postharvest-life at optimum temperature and relative humidity depends upon cultivar and ripeness stage at harvest and ranges from 1 to 2 weeks in air and from 3 to 4 weeks in CA for California-grown ‘Black Mission’ and ‘Calimyrna' figs.

## Retail Outlet Display Considerations

Figs should be displayed cold 0-2ºC (32-36ºF) and dry with a high relative humidity (90-95% RH).

## Chilling Sensitivity

Figs are not chilling sensitive.

## Rates of Ethylene Production and Sensitivity

| Temperature | 0ºC (32ºF) | 5ºC (41ºF) | 10ºC (50ºF) | 20ºC (68ºF) |
|---|---|---|---|---|
| µl $C_2H_4$/kg•hr | 0.4-0.8 | 0.8-1.5 | 1.5-3.0 | 4.0-6.0 |

Figs are climacteric fruit and are slightly sensitive to ethylene action on stimulating softening and decay severity, especially if kept at 5ºC (41ºF) or higher temperatures.

## Respiration Rates

| Temperature | 0ºC (32ºF) | 5ºC (41ºF) | 10ºC (50ºF) | 20ºC (68ºF) |
|---|---|---|---|---|
| ml $CO_2$ / kg•hr | 2-4 | 5-8 | 9-12 | 20-30 |

To calculate heat production, multiply ml $CO_2$ / kg•hr by 440 to get BTU/ton/day or by 122 to get kcal/metric ton/day.

## Physiological Disorders

**CA-related disorders:** Extended storage in CA can result in loss of characteristic flavor. Figs exposed to less than 2% oxygen and/or more than 25% carbon dioxide develop off-flavors due to fermentative metabolism.

## Postharvest Pathology:

- **Alternaria rot.** (caused by *Alternaria tenuis*) appears as small, round, brown-to-black spots over the fruit surface. Any cracks on the skin make the fruit more susceptible to the rot.

- **Black mold rot.** (caused by *Aspergillus niger*) appears as dark or yellowish spots in the flesh with no external symptoms. At advanced stages the skin and flesh turn slightly pink color and white mycelia with black spore masses follow.

- **Endosepsis (soft rot).** (caused by *Fusarium moniliforms*) appears in the cavity of the fig making the pulp soft, watery and brown with sometimes an offensive odor.

- **Souring.** (caused by various yeasts and bacteria) is a preharvest problem resulting from yeasts and bacteria carried into the figs by insects, especially vinegar flies, resulting in odors of alcohol or acetic acid.

Recommendations to reduce Postharvest Diseases are the following: controlling orchard insects to reduce fruit damage and transmission of fungi; using effective control of pre-harvest diseases; enforcing strict

sanitation of picking and transporting containers; supervising careful handling to minimize abrasions, cracks, and other physical damage; avoiding picking figs for fresh market from the ground, enforcing prompt cooling to 0ºC (32ºF) and; maintaining the cold chain all the way to the consumer.

## Special Considerations

Handling figs to avoid infection with *Aspergillus* species is very important to minimize formation of mycotoxins. Solar heating reduces insect infestations in ripening and drying figs.

## References


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## Acknowledgments


Most of the information included is from the University of California - Davis website on “Fresh Produce Facts” at

http://postharvest.ucdavis.edu/produce/producefacts/