Postharvest Handling of Some Specialty Fruits (Date, Fig, Olive, Pomegranate)

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Genotypic variation in color of khalal stage dates. Some cultivars with lower phenolics content (such as Barhee, Samani, and Zaghlol) are consumed at this stage.

Ripening of Barhee Dates from Khalal to Rutab

Genotypic differences in color and size of tamar (tamr) stage dates.

Date Harvesting in California-1

Date Harvesting in California-2
Date Harvesting in California

Photos by David Karp

Sun Drying of Dates in Coachella Valley, California

From David Karp

Date fumigation for insect control

Sun drying of Medjool dates in a pallet wrapped with shrink wrap with ventilation at the top and bottom

Bin of Tamar (Tamr) Stage ‘Deglet Noor’ Dates (leading cultivar grown in Southern California)
Preparation of Dates for Market-1

- Initial sorting to remove defective dates and foreign materials.
- Cleaning to remove dust, dirt, and other foreign materials using air pressure and water followed by air drying to remove surface moisture. Damp towels may be used in cleaning the dates.
- Sorting by quality and size into grades.

Preparation of Dates for Market-2

- Surface coating with wax or other materials to reduce stickiness and improve appearance (gloss).
- In some cases, the dates are pitted and may be stuffed with nuts. Other products include date pieces that are used in cereals and other foods and macerated dates that are used in backed products.
- Packaging to protect the dates from physical damage and moisture absorption if moisture-proof packaging material is used. Use of insect-proof packaging is highly recommended to prevent reinfestation of the dates with insects during their subsequent storage and handling step.

Storage Potential of Dates

<table>
<thead>
<tr>
<th></th>
<th>Semi-Sweet Dates (Bibit Naser, Halawy and Zahidi)</th>
<th>Soft Dates (Medjool, Barkoo, Khadrawy, Maknoum, Sayer, and Dayer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>59°F (15°C)  60°F (15°C)  60°F (15°C)  62°F (15°C)</td>
<td>32°F (0°C)  32°F (0°C)  32°F (0°C)  62°F (15°C)</td>
</tr>
<tr>
<td>Storage Period</td>
<td>1 month  3 months  6 months  1 year  over 1 year</td>
<td>5 months  More than 6 months</td>
</tr>
<tr>
<td>Relative Humidity</td>
<td>75% or less</td>
<td>75% or less</td>
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</tbody>
</table>

Packages of Dates

Figs
Evaluating Quality Attributes of Four Fresh Fig (*Ficus carica* L.) Cultivars Harvested at Two Maturity Stages (Crisosto et al, 2010)

- Fig quality attributes such as weight, soluble solids concentration (SSC), titratable acidity (TA), SSC:TA, firmness, antioxidant capacity, and consumer acceptance varied by cultivar.
- Fig cultivars harvested at the advanced maturity stage ("tree-ripe") had lower TA and firmness but higher weight, SSC, and SSC:TA than figs harvested at "commercial maturity." Fig maturity did not affect antioxidant capacity, but tree-ripe figs had higher consumer acceptance than commercial maturity figs.
- SSC was more highly correlated with consumer acceptance than TA or SSC:TA, but other factors may also be important in controlling this relationship.

Effect of temperature and CO₂-enriched air on decay incidence on figs

- Effect of temperature on decay incidence on fresh figs
- Effect of carbon dioxide on decay incidence on fresh figs

Evaluation of the use of sulfur dioxide to reduce postharvest losses on dark and green figs (Cantin et al, 2011)

- SO₂ fumigation seems to be a promising technology to reduce decay and increase the shelf life of fresh figs. However, continuous application has significant impact and requires further research, at the same time that application conditions must be optimized to minimize secondary negative effects such as fruit bleaching and browning.
- SO₂ fumigation with 25 (uL/L).h was a less harmful method to reduce decay than SO₂ generating pads or the combination of an initial fumigation with the use of SO₂ pads.
- In addition, repeated fumigations during fig cold storage did not significantly improve control of decay compared to a single 25 (uL/L).h fumigation before cold storage.
- SO₂ fumigation was, to some extent, able to kill the pathogens present on the surface of fresh figs that cause decay under favorable conditions.
Olives

Mature-green olive harvesting operation in California-1

Mature-green olive harvesting operation in California-2

Mature-green olive harvesting operation in California-3

Mechanical Harvesting of Olives for oil extraction in High-density Plantings

Source: Jim Thompson, UC Davis

Maturity and Ripeness Stages of Manzanillo Olives

1 2 3

4 5 6
Olives are non-climacteric fruits

Effect of storage temperature on color development and softening of mature-green olives

Intercultivar Differences in Olive Sensitivity to Chilling Injury after one month at 0°C (32°F)

Optimum Storage Conditions For Fresh Olives

- Temperature: 5 to 7°C (41 to 45°F)
- Relative humidity: 90 to 95%
- Avoid exposure to ammonia and sulfur dioxide

Pomegranate Maturity Indices

Red color of juice equal to or darker than Munsell color chart 5R-5/12

Acidity of juice below 1.85%

Preharvest Defects include Cracking and Sunburn
Pomegranate Harvesting Operations

Harvesting and Postharvest Handling Defects

Alternaria and Aspergillus Rot as a Preharvest Defect
Infection begins in the orchard especially following rain during flowering and early fruit development. The fungus can grow within the fruit without external symptoms.

Pomegranate Packinghouse Operations-1

Pomegranate Packinghouse Operations-2
Pomegranate Packinghouse Operations-3

Pomegranate is a nonclimacteric fruit that produces less than 0.1 microliter ethylene per kilogram-hour.

Effect of temperature on Chilling Injury of Pomegranates

Postharvest Pathology Considerations

Botrytis cinerea is the major fungus that causes decay on pomegranates. Infection begins in the orchard and fungal spores may be present in the fruit calyx at harvesting time.

Use of Fludioxonil (Scholar) as a postharvest fungicidal dip or drench is effective in controlling Botrytis cinerea.

Carbon dioxide-enriched Atmospheres inhibit Botrytis growth.

Optimal Storage Conditions for Pomegranates

- 7°C (45°F) for longer than 2 months; 5°C (41°F) is acceptable for up to 2 months.
- 90-95% relative humidity.
- CA of 5% Oxygen + 15% Carbon dioxide, especially if storage for longer than 3 months is desired.