Pomegranates Have Been Cultivated for Thousands of Years

Intercultivar Variation in Aril Color

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

Acidity of juice below 1.85%

Pomegranate cultivars vary in chemical composition and color

Intercultivar Variation in Juice Color
Pomegranate Quality Indices

- Freedom from growth cracks, sunburn, cuts, bruises, and decay.
- Skin color and smoothness.
- Aril color intensity and uniformity.
- Flavor depends on sugar/acid ratio, which varies among cultivars. A soluble solids content above 17% and total phenolics content below 0.25% are desirable for optimal levels of sweetness and astringency, respectively.

Gray mold caused by Botrytis cinerea

- Most important decay of pomegranates.
- Flower parts are infected at bloom time.
- Infections remain quiescent until fruit ripening.
- Extended blossom period: bloom treatments not economical.
- The fruit crown that is covering the blossom parts prevents the use of preharvest treatments and postharvest sprays.
- Postharvest treatments with Scholar or Judge are very effective.

Black heart rot caused by Aspergillus niger

- Infection begins in the orchard especially following rain during flowering and early fruit development.
- The fungus may grow within the fruit without external symptoms. Infected fruit generally is of lighter weight and off-color. Insect damage associated with problem by some growers.
- Estimated losses usually less than 1% but can be up to 6%.

Alternaria rot caused by Alternaria sp.

- Infection begins in the orchard especially following rain during flowering and early fruit development. The fungus can grow within the fruit without external symptoms. Infected fruit generally is of lighter weight and off-color. Insect damage associated with problem by some growers.

Preharvest Defects include Cracking and Sunburn

- Crown
- Stamens and pistils
- Pomegranate blossom tissues colonized by B. cinerea
- Mature flower
- Harvested fruit
Pomegranate is a nonclimacteric fruit that produces less than 0.1 microliter ethylene per kilogram-hour. The higher the temperature and the lower the relative humidity, the greater the water loss. The respiration rate of pomegranates increases with temperature except those kept at 0°C exhibit a higher rate than at 2°C as a result of chilling injury. These pomegranates were kept in containers ventilated with humidified air.
Chilling Injury - induced External Browning

Effect of Storage at 0°C (32F) for 3, 4, or 5 weeks followed by 5 days at 20°C (68F)

Chilling Injury Induced External Discoloration

Effect of temperature on Chilling Injury of Pomegranates

External Symptoms of Chilling Injury

Internal Symptoms of Chilling Injury

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 fungicide is effective in controlling Botrytis cinerea. Carbon dioxide-enriched controlled atmospheres are fungistatic and inhibit growth of Botrytis during storage.
Responses to Controlled Atmosphere

Arpaia - Pomegranates/Persimmon

Responses to Controlled Atmosphere

Range of Sulfur Dioxide Injury Symptoms on Pomegranates

Do not mix with grapes during storage or transport

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.

Fruit sanitation

After bin dumping fruit are being washed with chlorine solution.

No phytotoxicity on fruit at rates up to 200 ppm chlorine for 1 min exposure.

Fruit sorting

Remove fruit with
- Discolorations
- Light weight
- Cracks
- Splits
- Bruises
- Sunburn

Fruit with internal Alternaria or Aspergillus decay – are often discolored (off-colored) and are of lighter weight.

Commercial treatment of pomegranates

Scholar 50WP /Scholar SC
Rate: 16 oz or 32 fl oz/200,000 lb
For control of Botrytis
### Persimmons Cultivars

**General Considerations**

- In Japan there are more than 1000 cultivars. They are classified based on 2 features: **flesh coloration as influenced by pollination**, and **astringency**.

- **Astringent** cultivars: high in soluble tannins that remain in the fruit until the mature stage.

- **Non-astringent** cultivars: low in soluble tannins that decrease (and finally disappear) before fruit maturation.

#### Pollination-constant

- No difference in flesh color as a result of pollination or presence of seeds.

#### Pollination variant

- The flesh of the fruit is darkened as a result of pollination (presence of seeds).

#### Seeds

- Dark flesh

### Cultivar: “Fuyu”

- Non-astringent: can be eaten off the tree like an apple. Excellent in fruit salads.
- Pollination-constant, no dark streaking in the fruit flesh.
- Most popular cultivar in the world.
- Late ripening season.

### Cultivar: “Hachiya”

- Most popular astringent cultivar.
- Large fruit (average of 220 grams).
- Oblong cone-shaped fruit.
- Older cultivar used in drying in the Orient.
- Pollination constant
**Harvesting**

- Harvest season is mid to late fall
- Minimum maturity based on ground color
- Normally single harvest

**Persimmon Color Chart**

Minimum for long distance shipping

Minimum for local market

**Fruit Harvest**

- Clip each fruit individually leaving a short piece of stem.
- Can also pull the fruit off.
- Handle carefully to avoid bruising.

Nearly ripe “Jiro” persimmons
Fruit ripening: non-astringent

- “Fuyus” are ripe and ready to pick in October, November and December.
- They are ripe when the fruit changes from green to orange stage.
- “Fuyu” is best eaten when orange and firm.

Fruit ripening: astringent

- Astringency comes from water-soluble tannins.
- Decrease as the fruit softens, either before or after the fruit is picked.

Fruit ripening: Astringent

- Commercially treated “Hachiya” fruit with 10 ppm ethylene ripens in 2 days; but, fruit softens too much.
- Better: Treat “Hachiya” with 80% CO₂ for 24 hours.

A closer look at astringency

- Astringency in persimmons is caused by water-soluble tannins.
- Loss of astringency is caused by the polymerization of these water-soluble tannins, resulting in their insolubilization.
- Temperature during fruit growth influences tannin disappearance even in non-astringent cultivars.
- Treatment with ethanol results in the formation of acetaldehyde in the fruit.
- Insolubilization of tannins is caused by condensation with acetaldehyde.

Carbon dioxide treatment removes astringency of persimmons
Vibration Damage of Persimmons

Effect of storage temperature and duration on 'Fuyu' persimmons

Browning Due to Impact Bruising

Effect of storage temperature and duration on 'Fuyu' persimmons
Modified Atmospheres reduce chilling injury of ‘Fuyu’ persimmons

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