STONE FRUIT RIPENING

Mealiness
Lack of Flavor
F. Browning
Uneven Ripening

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Yellow Flesh Peach
Consumer Acceptance - 1995

Effect of Temperature on ‘Carnival’ Peach Chilling Injury After Storage Plus 2 Days at 68°F

Stone Fruit Ripening

Production
- Tree Ripe
- Well Mature
  (10-14 lbf.)

Warehouse
(12 lbf.)

Store

Consumption
(10-8 lbf.)

Production

Tree Ripe
Well Mature
(10-14 lbf.)

Warehouse

Store

Consumption
(2-4 lbf.)

“Ready to Eat”

Mature

Ripening
(12 lbf.)

Ripening (°F)

Flesh Softening
(6 lbf. P/N)
(5 lbf. plums)

“Ready to Buy”
Stone Fruit Ripening Terminology

- “Mature” (14-10 pounds)
- “Ready to Eat” (2-4 pounds)
- “Ready to Transfer” (6-8 pounds)
- “Ready to Buy” (6-8 pounds)
- Preconditioned (4-8 pounds)

Weak position on the fruit

Firmness Measurements

Collecting data and using it
Stone Fruit Transport

- Stone fruit temperature measured upon arrival at the retail warehouse after 3 days truck shipment, 1996

<table>
<thead>
<tr>
<th>Temperature (°F)</th>
<th>Nectarine (n=103)</th>
<th>Peach (n=102)</th>
<th>Plum (n=97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;35</td>
<td>14.7</td>
<td>5.9</td>
<td>4.6</td>
</tr>
<tr>
<td>35-50</td>
<td>89.9</td>
<td>72.4</td>
<td>71.4</td>
</tr>
<tr>
<td>&gt;50</td>
<td>15.7</td>
<td>14.7</td>
<td>24.0</td>
</tr>
</tbody>
</table>

Peach Delayed Cooling

- 0°C 20 Days
- 20°C 48 Hours + 0°C 20 Days
- 5°C 20 Days
- 20°C 48 Hours + 5°C 20 Days

Product Flow Through the Preconditioning Process

- Arrival
- Precooling (Hydrocooling, Forced Air, Room Cooling)
- Cold Storage
- Warm Packing
- Forced Air Cooling
- Preconditioning
- Packaging (Wax & Fungicide, Segregation)
- Holding/Partial Preconditioning
Do we need to apply Ethylene?

NO

Peach Market Life

Increase in market life of preconditioned peaches during 48h at 68°F compared to untreated (no cooling delay) based on development of chilling injury during storage at 32°F or 41°F.

<table>
<thead>
<tr>
<th>Change in delayed cooling treatment</th>
<th>Change in maximum market life at 32°F (weeks)</th>
<th>Change in minimum market life at 41°F (weeks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elegant Lady</td>
<td>0</td>
<td>1 *</td>
</tr>
<tr>
<td>Summer Lady</td>
<td>1 *</td>
<td>2 1,2</td>
</tr>
<tr>
<td>O’Henry</td>
<td>1 *</td>
<td>1 *</td>
</tr>
<tr>
<td>Zee Lady</td>
<td>0</td>
<td>1 *</td>
</tr>
<tr>
<td>Ryan Sun</td>
<td>2 *</td>
<td>2 2</td>
</tr>
</tbody>
</table>

Basic Requirements of the Preconditioning Program

• Infrastructure such as a ripening room and forced air capacity should be available for a reliable preconditioning/pre-ripening program.

• Trained and experienced quality assurance personnel and a "ripener" are key components of this program.

• Make quality data accessible.
Critical Points for a Successful Preconditioning Program

- Optimize your fungicide application operation. Slow down fruit softening after preconditioning-pre-ripening process.
- Control fruit and chamber temperature conditions and fruit firmness evolution during the preconditioning-pre-ripening process.
- Monitor and determine the end of the preconditioning-pre-ripening process.
- Retail handling instruction for preconditioned fruit.

Communicate with Your Growers, Merchandisers or Supervisors

Ripening ending point