Presentation overview

- Why dynamic CA (DCA) storage?
- What is DCA and how is it operated?
- How does New Zealand ‘Hass’ respond to DCA?
- DCA as a technology for managing exports?
Why dynamic CA storage?

- Export based industry
- Storage life to reach markets
- Quality after prolonged storage
Why dynamic CA storage?

Alternative technologies:

- Refrigeration, Air
  Insufficient storage life
  High rot incidence

- CA with low $O_2$ and high $CO_2$

- SmartFresh$^{(SM)}$
  Both: Increased storage life
  Prolonged ripening period
  High rot incidence
Effect of SmartFresh on ripe fruit quality

<table>
<thead>
<tr>
<th></th>
<th>Air</th>
<th>SmartFresh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days to ripen</td>
<td>4.1d</td>
<td>10.5d</td>
</tr>
<tr>
<td>Stem End Rot</td>
<td>29%</td>
<td>74%</td>
</tr>
<tr>
<td>Body Rot</td>
<td>38%</td>
<td>78%</td>
</tr>
<tr>
<td>External Rot</td>
<td>5%</td>
<td>52%</td>
</tr>
<tr>
<td>Diffuse Flesh Discoloration</td>
<td>14%</td>
<td>1%</td>
</tr>
</tbody>
</table>
What is dynamic CA?

Static CA (SCA)
   a pre-determined $O_2$ level is maintained

Dynamic CA (DCA)
   $O_2$ level is set dependent on the fruit response to low $O_2$

Allows greater optimisation and matching of storage conditions to the fruit tolerance to low $O_2$

Improved CA effect at low $CO_2$ level
Dynamic CA: Monitoring the fruit
Monitoring fruit stress under low oxygen

Stress monitored as skin fluorescence by HarvestWatch™
Oxygen levels in SCA and DCA

- Low O₂ stress point
- Back-off
- Lowest safe O₂ level
- Frequency
- Spike

**Graph Details:****

- **Y-axis:** Oxygen (%)
- **X-axis:** Dates from 3 Dec to 23 Dec

**Lines:**
- **Static**
- **Dynamic**
How does NZ ‘Hass’ respond to DCA?

Comparison of fruit stored in air, SCA and DCA

Key aspects

• fruit condition at the end of storage

• time to ripen

• disorders when ripe
At the end of storage

**Skin Colour**

- **Air**: High incidence
- **SCA**: Moderate incidence
- **DCA**: Low incidence

**Fuzzy Patch**

- **Air**: Low incidence
- **SCA**: Moderate incidence
- **DCA**: High incidence
Time to ripen

- Air
- SCA
- DCA

The bar chart shows the time to ripen for different conditions, with SCA having the longest time to ripen compared to Air and DCA.
When ripe

- **Stem End Rot**

  - Air: 80%
  - SCA: 60%
  - DCA: 40%

- **Body Rot**

  - Air: 90%
  - SCA: 80%
  - DCA: 60%

- **External Rot**

  - Air: 20%
  - SCA: 30%
  - DCA: 10%
When ripe

Diffuse flesh discoloration

Incidence (%)

Air  SCA  DCA

0   0   0
How does NZ ‘Hass’ respond to DCA?

DCA is suitable for NZ ‘Hass’

- prolonged storage life
- short ripening time
- reduced rots
DCA as a technology for managing exports?

**Onshore**
- Harvest better fruit / when favourable weather and store
- Supply out of inventory
- Dependent on suitable facilities

**Export**
- More distant markets
- Improved quality
- Dependent on capability of shipping containers
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