

# Optimal Fresh

The fruit, vegetable and fresh produce expert system



Detailed Report Printed on Wednesday, 19 December 2001

**Crop** avocado, Booth 1

**Maturity stage** General

**Category** Fruit

**Plant Part** Fruit

**Usage** Fresh/ Raw, Salad

**Botanical name** *Persea americana* var. *americana*

**Botanical family** Lauraceae



Picture source: Glowinski, 1991. Picture taken from avocado

## Alternate names include

(E) Booth 1 avocado

(E) avocado, Booth 1

## Refrigerated Container/Coolroom Recommendations

**Optimum product storage temperature**

4.0 to 4.5°C

**Temperature set point**

4.0°C

Add a margin for uncertainty in equipment performance if necessary.  
For return air control set point add 1°C to delivery set point.

**Ventilation (air exchange) settings for containers:** 6 m (20') =

60 m<sup>3</sup>/h = 35 cfm\*

12 m (40') =

120 m<sup>3</sup>/h = 70 cfm\*

**Acceptable product temperature at loading into container**

4.0 to 9.0°C

\* Values taken from avocado.

## Key Properties

| Storage time (days)† | Humidity (% RH) | Freezing point (°C) | Storage time at ambient (~20°C) | Ventilation rate |
|----------------------|-----------------|---------------------|---------------------------------|------------------|
| 28 - 56              | 85 - 90         | -0.9                | 2 - 7*                          | High*            |

† at optimum storage temperature

\* Values taken from avocado.

Storage life depends on maturity, Temperature depends on variety

## Other Properties

| Ref | Maturity stage | Air exchange * | Freezing Point (°C) | Ethylene production ** | Ethylene sensitivity | Ice compatibility | Water loss *** | % Water content | Bruising susceptibility |
|-----|----------------|----------------|---------------------|------------------------|----------------------|-------------------|----------------|-----------------|-------------------------|
| 1   | General        |                | -0.9                | High                   | High                 |                   |                |                 |                         |
| 1#  | General        | High           | -0.3                | High                   | High                 | No                | M (2.5)        | 76              | Medium                  |
| 1#  | Green          |                | -0.5                | No                     |                      | No                |                |                 |                         |
| 1#  | Ripe           |                | -0.5                | Yes                    | Yes                  | No                |                |                 |                         |

# Values taken from avocado

\* Air exchange rates: Nil = 0%; Very low = 25%; Low = 50%; Medium = 100%; High = 200%; Very high = 400% fresh air/hour.

\*\* Ethylene production rates at 20°C: Nil = 0 nM; Very low = <4 nM; Low = 4 - 40 nM; Medium = 40 - 400 nM; High = 400 - 4000 nM; Very high =>4000 nM ethylene/kg/hour.

\*\*\* Where % weight loss/week is given this is converted as: Low <= 1%; Medium = 1.1 - 3.4%; High = >3.5%

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## Controlled Atmosphere

| Ref | Maturity stage | % O2 |     | % CO2 |     | Temp°C |     | Benefit of controlled atmosphere |
|-----|----------------|------|-----|-------|-----|--------|-----|----------------------------------|
|     |                | min  | max | min   | max | min    | max |                                  |
| 1#  | General        | 2    | 5   | 3     | 10  | 5      | 12  | Good, (+42 days)                 |

# Values taken from avocado

### Reference notes

1 Large varietal differences in chilling sensitivity

## Respiration\* and Heat Transfer

| Ref | Maturity stage | 0°C |     | 5°C |     | 10°C |     | 15°C |     | 20°C |      | 25°C |      | Specific heat kJ/kg/EC ** |
|-----|----------------|-----|-----|-----|-----|------|-----|------|-----|------|------|------|------|---------------------------|
|     |                | min | max | min | max | min  | max | min  | max | min  | max  | min  | max  |                           |
| 1#  | General        |     |     | 59  | 88  | 100  | 200 | 182  | 462 | 218  | 1020 | 347  | 1258 | 3.38                      |
| 1#  | Ripe           |     |     | 53  | 80  |      |     | 160  | 415 | 195  | 915  | 310  | 1130 |                           |

# Values taken from avocado

\* Respiration values given are in Watts per tonne. 1 W/t = 20.4 kCal/t/d = 82.1 Btu/tn./d = 73.3 Btu/2000 lbs/d = 0.167 mL CO<sub>2</sub>/kg/h = 7.0 umol CO<sub>2</sub>/kg/h = 0.308 mg CO<sub>2</sub>/kg/h

\*\* Specific heat (kJ/kg/°C) = 0.0335 x % water content + 0.8374; Specific heat in Btu/lb/°F = 0.08 x % water content + 0.2

### Reference notes

1 0°C chilling temperature; 5°C borderline

## Compatibility in Mixed Storage

### Temperature compatibility group

|   |   |    |    |
|---|---|----|----|
| 0 | 7 | 13 | 20 |
|---|---|----|----|

### Humidity compatibility group

|               |                    |                |                      |
|---------------|--------------------|----------------|----------------------|
| Dry<br>60-80% | Moderate<br>80-90% | High<br>90-95% | Very high<br>95-100% |
|---------------|--------------------|----------------|----------------------|

Not compatible with crops that: Produce ethylene (especially when they are ripe or ripening)  
Are sensitive to ethylene

Odours will be absorbed by: Pineapples

Absorbs odours from:

### Ethylene-producing fruits and vegetables from *Optimal Fresh* database

(Medium ethylene production levels or greater.)

|              |            |                   |                 |
|--------------|------------|-------------------|-----------------|
| apple        | apricot    | atemoya           | avocado         |
| banana       | breadfruit | cherimoya         | custard apple   |
| durian       | feijoa     | fig               | jackfruit       |
| jujube fruit | kiwifruit  | litchi            | mamey sapote    |
| mango        | mangosteen | melon, cantaloupe | melon, honeydew |
| nashi        | nectarine  | papaya            | passionfruit    |
| peach        | pear       | plum              | rambutan        |
| sapodilla    | tomato     |                   |                 |

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## Ethylene-sensitive fruits and vegetables from *Optimal Fresh* database

(High sensitivity.)

|                   |                 |                 |                   |
|-------------------|-----------------|-----------------|-------------------|
| Chinese broccoli  | Chinese cabbage | apple           | apricot           |
| asparagus         | atemoya         | avocado         | banana            |
| bean, French      | bitter melon    | bok choy        | broccoli          |
| brussels sprouts  | cabbage         | carrot          | cauliflower       |
| celery            | cherimoya       | chicory         | collards          |
| corn, sweet       | cucumber        | custard apple   | eggplant          |
| endive            | fuzzy melon     | globe artichoke | guava             |
| kale              | kiwifruit       | kohlrabi        | leafy greens      |
| lemon             | lettuce         | litchi          | long bean         |
| mamey sapote      | mandarin        | mango           | mangosteen        |
| melon, cantaloupe | melon, honeydew | nashi           | nectarine         |
| okra              | olive, fresh    | onion, green    | papaya            |
| parsnip           | passionfruit    | pea, green      | peach             |
| pear              | persimmon       | plum            | potato            |
| pumpkin           | quince          | rambutan        | rhubarb           |
| sapodilla         | silver beet     | spinach         | squash, soft rind |
| squash, zucchini  | sweet potato    | tamarillo       | tomato            |
| turnip greens     | watermelon      | yam             |                   |

## Seasonal Availability

| Ref | Country   | Region<br>(where given) | Start Season | End Season | Start Peak | End Peak |
|-----|-----------|-------------------------|--------------|------------|------------|----------|
| 1   | USA       | Florida                 | August       | December   | October    | October  |
| 1#  | Australia |                         | January      | December   | March      | August   |
| 1#  | Thailand  |                         | May          | July       | -          | -        |
| 1#  | Jamaica   |                         | July         | November   | -          | -        |
| 1#  | Chile     |                         | September    | December   | -          | -        |

# Values taken from avocado

## References for avocado, Booth 1

Values quoted in Detailed Report are taken from a compilation of the best set of figures from all references. This best set of figures is always referred to as Reference 1.

See Reference Report for full listing of all values, original references and alternate names.