

Optimal Fresh

The fruit, vegetable and fresh produce expert system



Detailed Report Printed on Wednesday, 19 December 2001

Crop bean, French

Maturity stage General

Category Vegetable

Plant Part Pod

Usage Cooked, Fresh/ Raw,
Processed/ Canned



Picture source: Corel, 1998

Botanical name *Phaseolus vulgaris* var. *vulgaris* L.

Botanical family Fabaceae (Leguminosae)

Alternate names include

(E) bean, French

(G) Gartenbohne

(J-R) sayaingen

(E) bean, green

(J-K) 2] 9^] OR

(S) Judía

(F) haricot

(J-K; T) 2] 9^]

(S) frijol

(F) haricot commun

(J-R) ingenmame

Refrigerated Container/Coolroom Recommendations

Optimum product storage temperature

4.0 to 7.0°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') =

30 m³/h = 20 cfm

12 m (40') =

60 m³/h = 35 cfm

Acceptable product temperature at loading into container

4.0 to 9.0°C

Key Properties

| Storage time (days)† | Humidity (% RH) | Freezing point (°C) | Storage time at ambient (~20°C) | Ventilation rate |
|----------------------|-----------------|---------------------|---------------------------------|------------------|
| 7 - 14 | 90 - 95 | -0.7 | 2 - 2 | Medium |

† at optimum storage temperature
Sensitive to cold; rapid cooling

Other Properties

| Ref | Maturity stage | Air exchange * | Freezing Point (°C) | Ethylene production ** | Ethylene sensitivity | Ice compatibility | Water loss *** | % Water content | Bruising susceptibility |
|-----|----------------|----------------|---------------------|------------------------|----------------------|-------------------|----------------|-----------------|-------------------------|
| 1 | General | Medium | -0.7 | Low | Medium | No | H (6.0) | 88.9 | Very High |

* 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%

Optimal Fresh

The fruit, vegetable and fresh produce expert system



Controlled Atmosphere

| Ref | Maturity stage | % O ₂ | | % CO ₂ | | Temp°C | | Benefit of controlled atmosphere |
|-----|----------------|------------------|-----|-------------------|-----|--------|-----|----------------------------------|
| | | min | max | min | max | min | max | |
| 1 | General | 2 | 3 | 3 | 7 | 4 | 8 | (+7 days) |

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 | 51 | 71 | 105 | 122 | 163 | 207 | 265 | 414 | 397 | 580 | 568 | 568 | 3.82 |

* 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 CO₂/kg/h = 7.0 μmol CO₂/kg/h = 0.308 mg CO₂/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° chilling temperature

Compatibility in Mixed Storage

Temperature compatibility group

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

Humidity compatibility group

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

Not compatible with crops that:

Odours will be absorbed by:

Absorbs odours from:

Seasonal Availability

| Ref | Country | Region (where given) | Start Season | End Season | Start Peak | End Peak |
|-----|-------------|----------------------|--------------|------------|------------|-----------|
| 1 | USA | Florida | October | June | - | - |
| 1 | Netherlands | | June | October | July | September |
| 1 | Australia | | January | December | December | February |
| 1 | Canada | | June | October | - | - |

References for bean, French

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.