Optimal Fresh

The fruit, vegetable and fresh produce expert system



Detailed Report Printed on Wednesday, 19 December 2001

Crop carrot

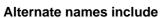
Maturity stageImmatureCategoryVegetablePlant PartRoot

Usage Cooked, Fresh/ Raw,

Juice/ Drink, Salad,

Stir fry

Botanical name Daucus carota subsp.sativus
Botanical family Apiaceae (Umbelliferae)



Picture source: Dept. Agriculture, NSW, 1980

Refrigerated Container/Coolroom Recommendations

Optimum product storage temperature

0.0 to 0.0°C

0.0°C

Temperature set point

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: $6 \text{ m} (20^\circ) = 10 \text{ m}^3/\text{h} = 5 \text{ cfm} @$

12 m (40') = **15 m³/h** :

Acceptable product temperature at loading into container

Values taken from carrot.

15 m³/h = 10 cfm@ -0.5 to 4.5°C

Key Properties

Storage time	Humidity	Humidity Freezing point		Ventilation
(days)†	(% RH)	(°C)	ambient (~20°C)	rate
28 - 42	98 - 100	-1.4	8 - 8@	Very Low@

t at optimum storage temperature

Wash before storage; ethylene causes bitterness

Other Properties

	Ref	Maturity stage	Air exchange *	Freezing Point (°C)	Ethylene production **	Ethylene sensitivity	Ice compat- ibility	Water loss ***	% Water content	Bruising suscept- ibility
Ī	1	Immature		-1.4	No	Yes	Yes			
1	1	General	Very Low	-1.4	Very Low	High	Yes	M (1.3)	87.8	

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

[@] Values taken from carrot.

^{**} 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		2 % CO2		Temp°C		Benefit of controlled	
ı			min	max	min	max	min	max	atmosphere	
ſ	1	General					0	0	None	
ı	1	Fresh Cut	2	5	15	20	0	5	Good	

Reference notes

1 CA not advantageous; use perforated plastic films

Respiration* and Heat Transfer

Ref	Maturity	0	°C	5'	°C	10)°C	15	S°C	20)°C	25	S°C	Specific heat
	stage	min	max	kJ/kg/EC **										
1	General	29	59	38	76	59	124	76	159	135	279			3.78
1	Mature	25	55	35	70			70	140	120	250			

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 umol CO2/kg/h = 0.308 mg CO2/kg/h

Compatibility in Mixed Storage

Temperature compatibility group

0 7	13	20
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Humidity compatibility group

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

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

Odours will be absorbed by: Celery

Absorbs odours from:

Ethylene-producing fruits and vegetables from Optimal Fresh database

(Medium ethylene production levels or greater.)

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

Seasonal Availability

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

^{**} 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

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References for carrot

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.