wyma™ Fresh Thinking

How to get the best out of your carrots

Ideas for growers on improving carrot quality from harvest to processing

Nine tips for improving carrot quality:

1.	Harvest in cooler parts of the day.	
2.	For delays between harvesting and washing, place carrots in the shade or in a temperature-controlled area.	
3.	Use liners during storage and transportation to increase moisture retention.	
4.	Polish carrots so the outer skin is fully removed.	
5.	Cool produce using a Hydro-Cooler, forced-air cooling or hydro-vacuum cooling.	
6.	For long-term storage, use a controlled atmosphere with high humidity to avoid dehydration.	
7.	Store and transport carrots in a controlled atmosphere.	
8.	For best results, ensure you have a ‘cool chain’ all the way to the supermarket shelf. Chill carrots in a cool store → Transport in a refrigerated truck → Utilise supermarket cool store → Ensure your produce is arranged on a cooled shelf or spray with cold water periodically.	
9.	If you experience dehydration with your carrots at home, place them in a bowl of icy water for 15 minutes. Alternatively, store carrots in the fridge in cold water so there is no further chance of dehydration.	

Overview:

For many families, carrots are a household staple and have been for thousands of years. Carrots are so versatile that they remain at the forefront of many dishes from dips and salads through to boiling and roasting.

Consumers expect their carrots to be in the best possible condition. They buy carrots that look good on the shelf, and expect carrots to retain their quality until they are ready to eat them. Unfortunately, dehydration, decay and rotting are all potential threats to carrot quality. The condition of the carrots can be traced right back to the harvesting and pack-house processes.

The best practice for carrot harvesting and processing varies from region to region around the globe depending on their unique conditions and carrot varieties. This guide has been put together to provide some insights and tips to answer some of the questions Wyma often receives from our carrot customers around the world.

What is carrot silvering?

Carrot silvering is the white film that sometimes appears on carrots. The white film (also known as scaling or blushing) occurs as the carrot's outer skin (periderm) becomes dehydrated. This is the carrot's natural response and acts as a protective measure to stop the carrot becoming more dehydrated.

Carrots are a root vegetable so while they are growing they hold a lot of water. This water nourishes the carrot as it grows. After the carrot is picked from the ground, the moisture evaporates into the atmosphere causing the carrot to start to dehydrate. Dehydration causes carrot cells to die. When the cells die, they detach from the carrot - like dandruff - causing the 'white blush'. This leads to rapid deterioration of the carrot's visual appearance.

Dehydrated carrots with 'silvering'.

Carrots in optimum condition.

Why is it a problem and how does it affect carrot growers?

Even though the white film (or blush) is safe to eat, the whiteish appearance lowers the perceived quality of the carrot, making them harder to sell. This can be devastating to growers. When produce quality is low, the sell-price is low.

Growers want to make sure their produce is the highest possible quality.

What can growers do to reduce carrot silvering?

Harvesting:

Take care during harvesting to make sure your carrots are in the best possible condition.

1. Optimum maturity: Harvest your carrots when they are at optimum maturity. If the carrots over-mature, they are more susceptible to dehydration, decay and rotting.

2. Harvest in the coolest part of the day: Warmer temperatures speed up dehydration. If you are harvesting in hot weather, try to harvest during the coolest part of the day to decrease the chance of dehydration.

3. Cool your carrots: After harvesting, cool carrots as quickly as possible (ideally within 24 hours) to below 5°C (41°F). If there is a delay between harvesting and the washing process, place carrots in the shade and if possible spray them with water to help limit dehydration.

Storage before processing:

1. For long-term storage, keep unwashed carrots at a low temperature. Depending on the region this is usually between 0°C - 4°C (32°F-39°F). Be mindful of the increased risk of frosting the carrots if the temperature is too low.

2. Liners can be used during storage and transportation to increase moisture retention. However it is worthwhile noting that in some conditions, increased moisture can result in a slightly elevated risk of sweating or rotting so it is wise to monitor moisture levels and produce quality at appropriate intervals when storing for longer periods.

3. Your storage location must have permanent ventilation with a relative humidity as close to 100% as possible. In these conditions, carrots can keep for up to six months.

Processing:

1. Wash carrots as soon as possible after harvesting. Once washed, keep them moist.
2. Carrot washing: A gentle washing process can leave the carrot's outer skin intact.
3. Carrot polishing: Processing carrots in polishing equipment can reduce the chance of carrot silvering occurring. Make sure carrots are polished until the outer layer (periderm) is completely removed. If part of the outer skin remains on the carrot, it can dehydrate and turn white. Conversely, if the carrot it polished too much this can also reduce carrot quality. Only use high quality polishing equipment that can be programmed to best suit your particular produce and conditions.
4. Ideal methods of cooling carrots include hydro-cooling, forced air cooling, or hydro-vacuum cooling.

Storage after processing:

1. As per the before processing storage, keep the temperature low when storing carrots. Depending on the region this is usually between 0°C - 4°C (32°F-39°F). Be mindful of the increased risk of frosting the carrots if the temperature is too low.
2. Your storage location must have permanent ventilation with a relative humidity as close to 100% as possible.

About the Author:
Peter Knotts is the Group Project Delivery Manager at Wyma Solutions. He has held various positions in the Engineering sector including Senior Design Manager and Engineering Project Manager. Having joined Wyma in 2009 he has a thorough understanding of the industry, machinery and best practice processes. Peter is passionate about innovation and thoroughly enjoys helping customers to reach their full potential in their business.

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