



CALIFORNIA WALNUTS

Best Practices for Handling & Storage



CALIFORNIA Walnuts

Walnut quality and shelf life can be influenced by three general factors:

- 1 Product characteristics
- 2 The environment during distribution and storage
- 3 Packaging



The most important aspect to preserving the incredible quality of California walnuts is maintaining controlled conditions.

Elevated temperatures and moisture can significantly reduce quality and shelf life. For that reason, inshell walnuts are normally held in bins, silos or other bulk containers that are stored in cool, dry conditions.



Processing can also affect the shelf life of walnuts. In general, proper handling of walnuts can increase shelf life in bulk storage. However, cutting (dicing, slicing, grinding) increases the exposed surface area and begins the oxidative process, which can reduce shelf life.



It is good practice to avoid exposure to direct sunlight, which can darken the surface of the nut.

The three biggest quality concerns to the consumer at home enjoying California walnuts are:

moisture content that affects the crunch

rancidity in flavor

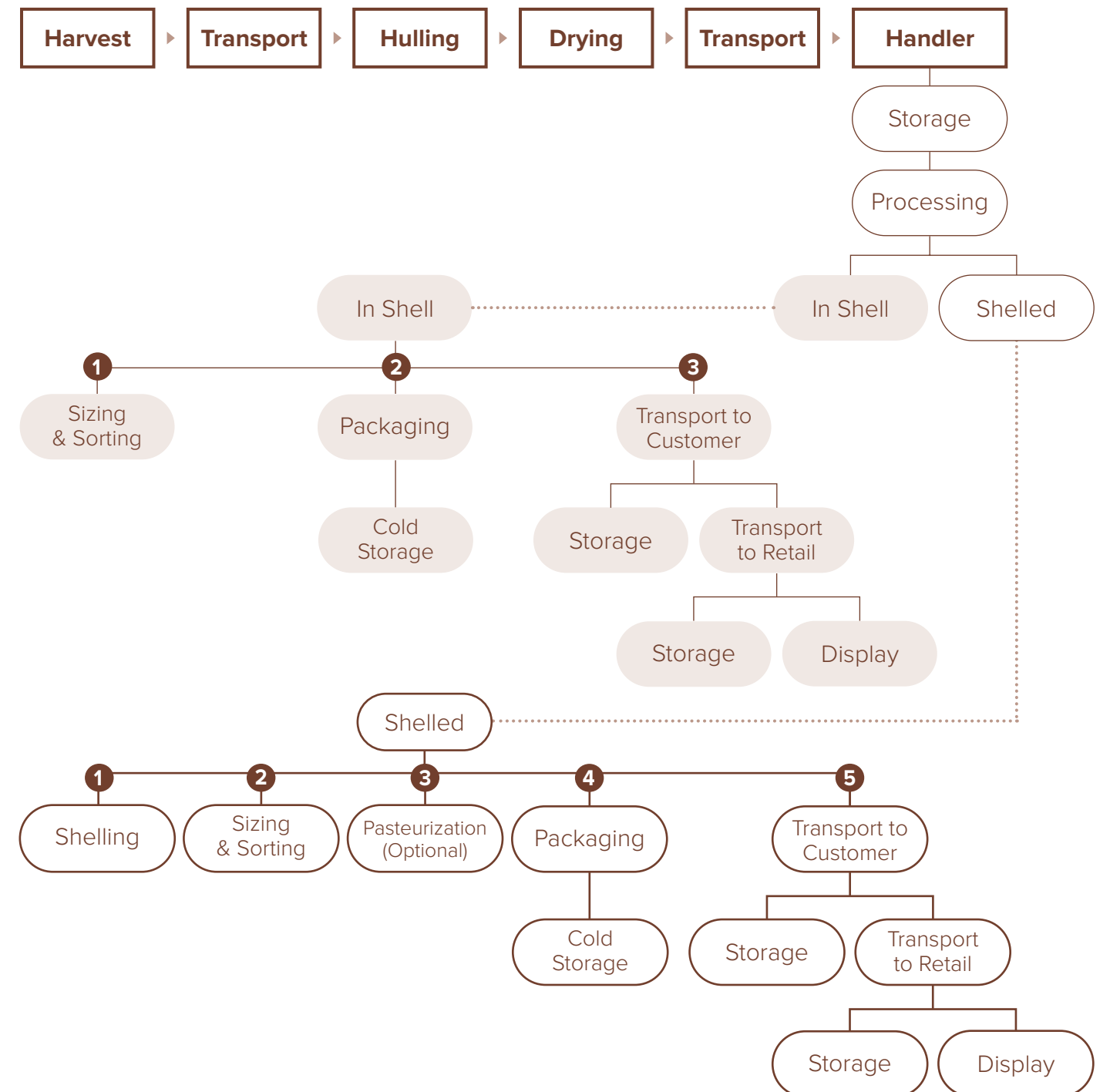
too much "meal" in the bag for cleanness

From Orchard to the Customer

The walnut harvest season in California typically runs from late August through early November. Once the outer green hull of the walnut begins to dry and split, the nuts are ready for harvest.



Thanks to their sturdy shells and leathery outer husk, walnuts are exceptionally well protected from pests and other quality issues. If stored and handled properly, they can even be consumed at least one year after harvest, although they're generally consumed much earlier.



Quality Assurance & Food Safety Programs

Ensuring the integrity of California walnuts begins in the orchard and is carried through to the manufacturer.

California walnuts are produced with consideration for quality control and food safety standards. Careful practices have been instituted by the California walnut industry's growers and processors.

Walnut industry quality assurance and food safety programs are central to maintaining the industry's reputation. Programs are proactively reassessed when new research or agricultural conditions suggest that practices could be further improved. The ultimate objective is to provide customers around the world with the highest level of confidence in California walnuts.



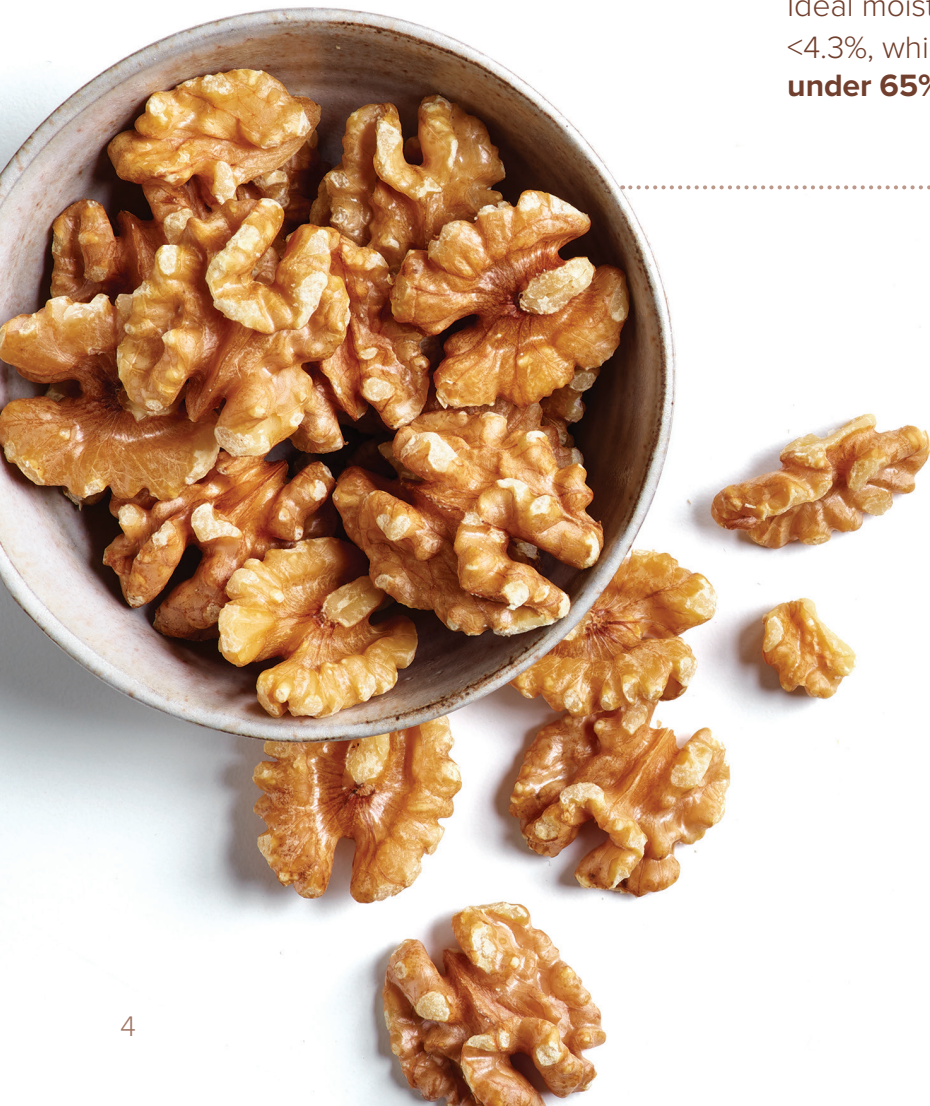
Moisture Management

Initial moisture and relative humidity (rH) of the surrounding environment can affect texture, microbial stability and the shelf life of various walnuts.

Two simple solutions to stop moisture migration are:

- 1 **Moisture-barrier packaging**
- 2 **Reducing the humidity of the environment in which the walnuts are stored**

Ideal moisture levels for walnut kernels exist at <4.3%, which can be achieved in an environment **under 65% rH**.



Pasteurization

- ▶ A **customer-specific process** that walnuts can undergo.
- ▶ Pasteurization processes are often used to **ensure the safety of walnuts** sold within North America.
- ▶ Pasteurization processes have the potential to **enhance the food safety** of the product.
- ▶ High standards have been set to ensure the **optimal attributes of each walnut's quality** as well as its nutritional value are maintained.

For further information, please contact your supplier.

The California walnut industry has been fully engaged in, with the help of university and industry experts, the following quality assurance programs:

GAPs

Good Agricultural Practices (GAPs), which provide guidelines to growers on how to minimize potential hazards, such as pathogens, contaminants and pest management materials during production and harvest.

GMPs

Good Manufacturing Practices (GMPs), which define procedures to be used by handlers to process, pack, store and distribute walnuts under sanitary conditions.

HARPC

Hazard Analysis and Risk-Based Preventive Controls (HARPC), which is another food safety system that helps identify and control potential hazards in the production process. It involves analyzing and preventing risks before they happen, ensuring the safety of the nut being processed.

Environmental Monitoring

Environmental monitoring/post-process contamination control, which targets control of microorganisms in the processing environment with an emphasis on the prevention of post-process recontamination.

HACCP

Hazard Analysis Critical Control Point (HACCP), which provides a systematic approach to identify, assess and control the risk of biological, chemical and physical hazards.

SSOPs

Sanitation Standard Operating Procedures (SSOPs), which ensure a clean and sanitary environment in the processing facility.

Together, these programs provide a complete food quality and safety program.

Preventing Oxidation/Rancidity

- ▶ **Cold storage** can minimize primary walnut quality issues such as rancidity.
- ▶ **To prevent rancidity** and extend finished product shelf life, the product should be packaged in materials that do not allow light or air to come into contact with the product.
- ▶ **Resealable packaging** is ideal for snack mixes and other retail packs, which may be opened and closed several times by the consumer.
- ▶ **Nitrogen flushing** (replacing the oxygen with food-grade nitrogen) can also extend the shelf life of unopened sealed product.
- ▶ **Walnuts formulated with coatings** like chocolate, starches, gums, egg whites and sugar will have a longer shelf life than plain or roasted walnuts because they are protected by the coated exterior.

Preventing Meal

- ▶ Proper handling allows for the best-looking walnuts and clean touch in the bag for consumers.
- ▶ Procuring walnuts direct from the handler is recommended over repackers and distributors.
- ▶ The less walnuts are handled in processing and transportation, the less meal you will experience in the end-consumer package.



Storage Recommendations

Keep walnuts in refrigeration after May 1



Cold storage

can minimize primary walnut quality deterioration problems such as food safety risks, lipid oxidation (rancidification) and kernel phenolic oxidation (darkening).



Protect

from insects and pests. Store apart from other at-risk food items.



Rotate stock

to optimize shelf life.



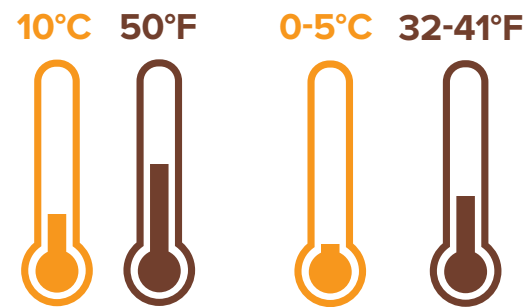
Walnut kernel moisture

should be maintained at 4.3% or less.



Avoid exposure

to strong odors as walnuts can absorb odors of other materials if exposed for prolonged periods.



SHORT TERM

LONG TERM

Store under cool and dry conditions

(<10°C/50°F and <65% relative humidity). For longer-term storage, up to six months: refrigerate at 0°C (32°F) to 5°C (41°F) and <65% relative humidity.

Transportation Logistics

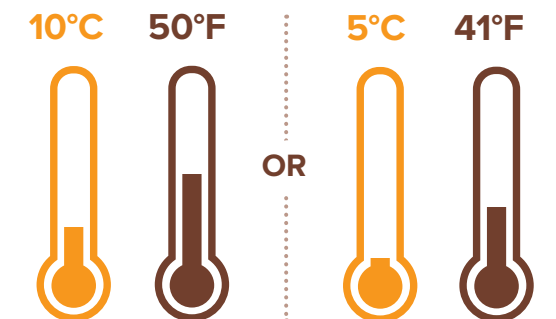
Walnuts should be transported on refrigerated trucks from the handler to retail warehouse. Best-practice retailers will store the walnuts refrigerated in their warehouses to enhance shelf life for the stores and consumers.

- ▶ **Maintain walnut inventories** for just-in-time or velocity-timed sales to minimize warehouse time.
- ▶ **At the point of sale**, walnuts are shelf stable and should be merchandised on-shelf in a cool, dry area.
- ▶ **Monitoring temperature and oxygen levels** in bags and pouches should be part of receiving quality control. Knowing these values, a lot rotation strategy can be developed to maximize walnut quality for consumers.
- ▶ **Proper handling and transportation** may affect the quality and shelf life of walnuts. Equally important are storage conditions upon arrival at the destination. It is important to maintain proper storage conditions throughout the supply chain to ensure optimal quality.
- ▶ **Recommend shipping in refrigerated trucks/containers** June to September. When receiving product in refrigerated containers, it needs to be received in a moderate or cooler temperature environment. Do not put directly into a high-temperature warehouse.



Optimizing Walnut Quality

To optimize walnut quality during transportation, distribution and retail store handling, it is recommended that walnuts be kept under 10°C (50°F) or ideally at or under 5°C (41°F), thus maintaining the cold chain. This cold chain concept is critical, especially when walnuts are under long-term storage.



Chemical & Microbiological Parameters

The California Walnut Board recommends maximum peroxide value of 2.5 meq/kg and maximum free fatty acid of 1.25%. There are currently no recommendations for microbiological standards for raw walnuts. This standard is normally defined between the supplier and the buyer.



Contact Information

For more information and questions related to walnut storage and handling, contact the California Walnut Board & Commission's Director of Technical & Regulatory Affairs




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