Preserving Pecans Freshness

Maximizing Shelf-Life, Flavor, & Consumer Acceptability

American PECANS™

Pecans are a delicious and nutritious nut that, when stored properly, can stay fresh much longer than many people realize. While they naturally have a long shelf-life, proper care is key to preserving their flavor and texture. Consider the information below to ensure you're getting the best taste from every bite of pecans.

Key Factors Influencing Pecan Shelf-Life:

TEMPERATURE & HUMIDITY

- Cooler temperatures (8°C) slow oxidation and rancidity which preserves quality
- Warmer temperatures (above 23°C) enhance oxidation and rancidity which leads to darkening of color, degradation of flavor, and overall reduced quality
- High humidity can enhance mold growth, so pecans should be stored in dry environment with limited moisture to stay fresh and safe from spoilage

EXPOSURE TO OXYGEN & LIGHT

- Oxygen enhances the oxidation process which leads to off flavoring over time, so limiting oxygen in packaging environment is important
- Light also accelerates oxidation process leading to off color and flavor, so storing and using specific packaging to prevent light penetration can help maintain higher quality

PACKAGING TYPE

- Modified Atmosphere Packaging (MAP) is the most ideal due to its high barriers against oxygen and light which extend shelf-life
- Vacuum packaging is another good source of packaging because it poses a barrier for oxygen to slow degradation and preserve quality
- Cardboard is a low-barrier packaging by allowing moisture and air in which reduces quality and shortens shelf-life significantly compared to vacuum and MAP packaging which is not ideal and further reduces quality in higher temperatures rapidly

NATURAL CHARACTERISTICS OF OIL

- Pecans naturally have a high oil content which can increase rancidity if nuts are exposed to oxygen, light, and warmer temperatures in storage and transport making proper packaging and environmental conditions crucial to extend shelf-life

MOISTURE CONTENT

- Pecans with lower moisture content last longer, so proper drying after harvest and prior to packaging and transport is essential for stable shelf-life

The most important factor in preserving quality, extending shelf life, and ensuring consumer acceptability of American pecans is ensuring ideal environmental conditions.

Increased temperatures and moisture can significantly reduce quality and shelf-life over time. Due to this, shelled pecans need to be stored and transported in cool, dry environments accompanied with vacuum or MAP packaging to enhance shelf-life and preserve quality of pecans.

Naturally high oil content of pecans can lead to enhanced rancidity, so shelled pecans should be packaged to prevent oxidation process and reduce sunlight penetration to extend shelf-life.

THREE LARGEST QUALITY CONCERNS FROM CONSUMERS:

1. **Moisture content affects firmness of pecans reducing crunch**
2. **Color (lightness) appearance impacted consumer acceptability**
3. **Oxidative flavor compounds over time impacted acceptability**

In general, a good practice is to avoid exposure to direct sunlight which can cause pecans' color to darken and enhance oxidation resulting in lower quality and poor shelf-life.

Packaging Comparison Chart

CRITERIA	CARDBOARD PACKAGING	VACUUM PACKAGING	MODIFIED ATMOSPHERE PACKAGING
Freshness Estimate	6-8 months	8-12 months	12-24 months
Barrier to Oxygen	None – fully permeable	Partial – oxygen reduced	Excellent – oxygen replaced with inert gases
Moisture Protection	Low – susceptible to ambient humidity	Moderate – sealed environment	High – sealed and humidity-controlled
Color Stability (Lightness)	Poor – rapid darkening, especially at elevated temps	Moderate – slows darkening under controlled conditions	Excellent – significantly delays discoloration
Flavor Retention	Low – prone to oxidative flavor development	Moderate – improves with temperature control	Excellent – minimizes off-flavor formation
Shelf Life	Shortest – frequent early failure	Moderate – acceptable for short- to mid-term storage	Longest – maintains consumer acceptability up to 24 months
Performance Elevated Temps (23–32°C)	Fails rapidly – not suitable for warm environments	At risk – moderate degradation	Best performing – maintains sensory and physical quality
Recommended Use	Short-term, domestic markets	Short-to mid-term storage, if refrigerated	Long-term, export-focused supply chains
Cost & Accessibility	Low cost, widely available	Moderate cost, broadly accessible	Higher cost, specialized equipment required

Freshness timeline is heavily dependent on temperature and other environmental conditions, but vacuum and MAP packaging are the best options to prolong shelf-life. Estimate is based on conditions below 8°C.

Tree to the Table: Shelf-Life Estimate

The pecan harvest season in the United States typically runs from September through February. Once the green shuck splits and the hard brown shell is visible, the nuts are matured and will begin to naturally fall indicating crop is ready for harvest.

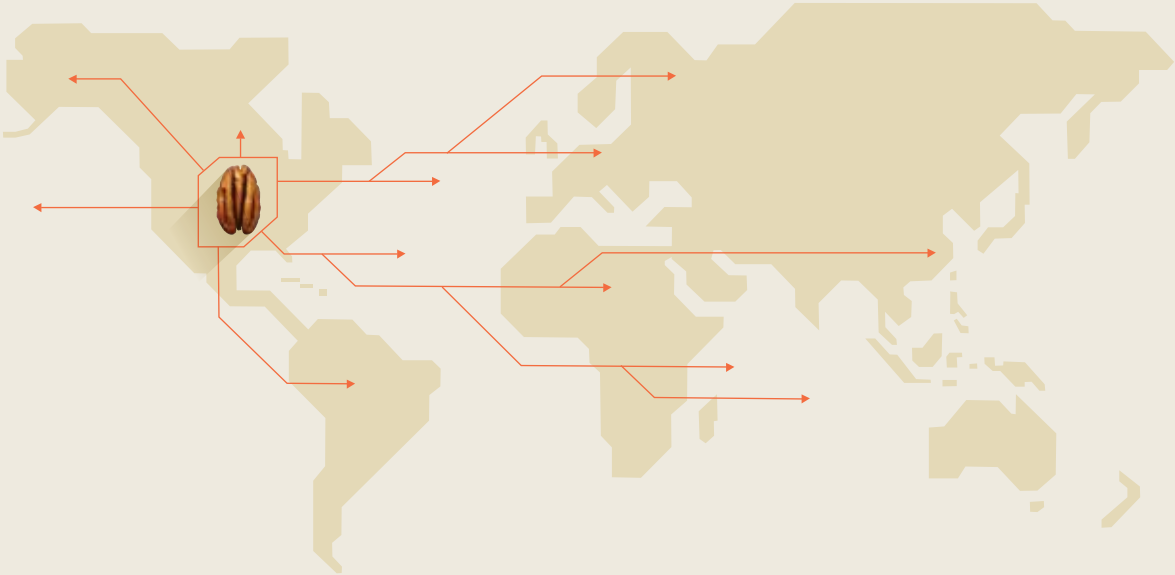
If stored properly, shelled pecans can maintain good quality and a stable shelf-life. Although shelled pecans do not have as long of a shelf-life as in-shell pecans, shelled pecans hold freshness in refrigerated and freezer conditions best. The recommended long-term storage conditions for pecans is close to -18°C at a relative humidity of 70%. The shelf-life can range between 18-40 months when stored at -3.8°C or below. In 2-10°C environments shelled pecans can last 6-12 months, and in 21°C environments, shelled pecans can maintain shelf-life for up to 3 months. In addition to environmental conditions such as temperature and moisture, the type packaging used for shelled pecans can enhance shelf-life.

SHELLED PECANS STORAGE TEMPERATURE

-18˚C	Recommended
-3.8˚C	18 - 40 Months
2˚-10˚C	6 - 12 Months
21˚C	3 Months

Big Picture...Why does it matter?

Consistent quality over long periods ensures greater customer satisfaction, reduced product loss, and stronger market reputation. Applying these insights helps maintain peak freshness in international supply chains and allows consumers across the world to enjoy pecans.



Shelled Pecan Quick Tips

HOW TO PREVENT RANCIDITY/OXIDATION?

Cold storage Prevents rancidity and preserve pecan quality better than room temperature storage.

Resealable packaging This is ideal for snack sized pecan products that may be opened and closed numerous times for consumption.

Vacuum or MAP packaging The type of packaging matters because vacuum and MAP both provide a barrier to oxygen to prevent oxidation and rancidity from occurring.

Store out of direct light Pecans last longer if they are stored in darker environment to prevent degradation of color and quality from natural oils breaking down.

HOW TO STORE?

Airtight Storing pecans in an airtight, resealable packaging allows for a barrier against oxygen to prevent oxidation process enhancing the shelf-life.

Cool Storing pecans in a cool environment allows for more fresh taste, color, and texture ensuring a positive experience for consumers.

Dry Storing pecans in a dry environment and drying them down to 4% moisture content after harvest helps to prevent mold, pathogen, and rancidity from occurring and diminishing quality.

Limit Exposure Pecans should avoid being exposed to other products during storage for long periods of time because they can absorb odors of other products which diminishes quality.

BEST TRANSPORTATION TECHNIQUES

- Pecans should be transported in proper environmental conditions to ensure quality and extend shelf-life, it is recommended to refrigerate transportation
- Transportation and handling are crucial so pecans maintain high quality

8°C

OPTIMIZING PECAN QUALITY

To optimize and preserve pecans throughout the supply chain, it is recommended that pecans be kept at 8°C to maintain optimal flavor and color. This cold chain is critical if shelled pecans are in long-term storage or being shipped internationally because temperature between 23-32°C accelerate degradation of pecans and reduce shelf-life.

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