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New protective packaging for conservation of

Almonds



Conservation issues

Moisture content of almonds is a critical parameter that negatively impacts both the quality ánd shelf life and thus needs to be controlled during storage. Critical is to maintain the optimum equilibrium between the moisture content and the ambient Rh (and temp). When almonds pick up moisture, they may lose their crunch, mold my start to grow and lipid oxidation increases. On the other hand, at very low moisture, lipid oxidation also increases.

Almonds can pick up or lose moisture depending on their initial moisture content and the humidity of the surrounding environment—this is called moisture migration—and storage temperature can play a critical role. … Moisture migration occurs until equilibrium within the system is reached—almonds in high humidity environments will generally pick up moisture, especially at ambient and higher temperatures. Stopping migration requires either a moisture-barrier package and/or reducing the humidity of the environment.

Quote from study "almonds shelf life factors", G. Huang, M.S., Food Research and Technology

Once almonds are processed (cut, blanched or roasted), the oxidation of (lipid) fats and oils becomes more problematic. Lipid oxidation is a complex series of undesirable reactions that cause the breakdown of fats and oils. In oil-containing foods like almonds, the oxidation reactions lead to a loss of quality as the nuts develop "rancid" flavors and odors. During lipid oxidation, oxygen reacts spontaneously with the fatty acids in fats to form primary breakdown products (e.g., peroxides, conjugated dienes) and, as oxidation progresses, secondary products (e.g., volatile aldehydes, ketones) are formed that give rise to off-flavors and off odors.

… The most important aspect to preserving the incredible quality of California Almonds is maintaining controlled conditions. Elevated temperatures and moisture can significantly reduce quality and shelf life….

Processing can affect the shelf life of almonds. In general, cutting (dicing, slivering, slicing, grinding) and blanching increases the exposed surface area and begins the oxidative process, which can reduce shelf life. Because both oil and dry roasting subject almonds to higher temperatures, roasted products must be protected from oxygen. In addition, it is good practice to avoid exposure to direct sunlight, which can darken the surface of the nut.

Quote from the website of the Almond Board of California

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High-barrier, Oxygen-free, Bulk Packaging

Traditional bulk packaging does not provide the almonds with sufficient protection from the external environment, making lefty investments in humidity and temperature controlled storage a necessity.

With the introduction of fully hermetic, high barrier, protective packaging (e.g. aluminum or PA/EVOH barrier films), long-term storage in bulk-size packaging is now possible.
The patented two-way valve system allows you to create extreme low oxygen conditions and thus minimize the oxidation processes.
Once packed under these conditions, the almonds will keep an optimum moisture content while the detrimental oxygen is significantly reduced.

The advantages that are well known of high-barrier, modified atmosphere packaging for consumer-packed almonds, are now available for your bulk storage, during the full supply chain.

Lipid oxidation is effectively prevented by anoxic conditions and by excluding light, while the moisture content is kept at optimum level

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High storage temperatures, increased moisture, light, and some metals (e.g., iron) may promote lipid oxidation in almonds and reduce shelf life. Processing also makes almonds more susceptible to oxidation—blanching and cutting increase the surface area exposed to oxygen, and roasting changes the almond microstructure which allows more oil within the cells to be exposed to oxygen.
Water activity (aw) level affects lipid oxidation rates—lipid oxidation is typically lowest when almond aw is ~0.25 to 0.35 (~3–4% moisture content), and increases above or below that aw range.

Quote from study "almonds shelf life factors", G. Huang, M.S., Food Research and Technology

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