Ultima recensione del 11 Febbraio 2011

Headlines > Processing & Packaging

Oxygen absorbers rated above irradiation for almond shelf life

Greek researchers investigating the effect of irradiation, active and modified atmosphere packaging, and storage conditions on quality retention of raw, whole, unpeeled almonds find a method using only an oxygen absorber the most effective.

The authors, writing in the Journal of Food Science and Agriculture, concluded that non-irradiated almonds retained acceptable quality for around a year when stored at 20°C with an oxygen absorber irrespective of lighting conditions and packaging material oxygen barrier.

They also concluded that lower doses of irradiation gave better sensory results than higher doses.

Irradiation and active packaging can be effective alternative technologies for pest control and inhibition of growth of aflatoxigenic Aspergillus species in almonds.

But, according to the literature insects are killed at a dose of 1 kGy, while doses between 3 and 5 kGy are needed to inhibit mycelium growth and toxin production of Aspergillus.

The researchers report that they had previously evaluated the short-term effect of irradiation dose on the quality of raw unpeeled almonds and found that they become organoleptically unacceptable at doses higher than 3.0 kGy.

Meanwhile, oxygen absorbers are also efficient for control of growth of aerobic microorganisms such as Aspergillus species and may still prevent damage caused by larvae and insects, note the authors

Method

Almond kernels were packaged in barrier and high-barrier pouches, under nitrogen gas (N2) or with an oxygen (O2) absorber and stored either under fluorescent lighting or in the dark at 20°C for 12 months.

Treatments included the following: raw, non-irradiated almonds under nitrogen or with an ZPT type O2 absorber; irradiated almonds at 1.0 kGy under nitrogen or with a ZPT type O2 absorber, and finally irradiated almonds at 3.0 kGy under nitrogen or with a ZPT type O2 absorber.

The authors also tested an experimental silicon oxide coated polyethylene terephthalate low-densitypolyethylene (PETSiOx// LDPE) laminate as an effective barrier for the protection of almonds.

In the case of modified atmosphere packaging, pouches were first evacuated and then immediately injected with N2 gas. The pouches were heat sealed using a vacuum sealer. In terms of active packaging, a ZPT type O2 absorber was introduced into each pouch and then the packs were heat sealed.

Control samples, said the authors, were prepared by packaging raw unpeeled almonds in glass jars flushed with N2 and stored at -18°C for up to 12 months.

They explained that at storage intervals of zero to 2, 4, 6, 8, 10 and 12 months of storage, three separate identical samples were withdrawn from each treatment for chemical and sensory analysis.

Quality parameters monitored were peroxide value, hexanal content, colour, fatty acid composition and volatile compounds. Of the sensory attributes colour, texture, odour and taste were evaluated, added the team.

Ultima recensione del 11 Febbraio 2011

Oxygen absorbers rated above irradiation for almond shelf life

Results

The authors found that non-irradiated raw unpeeled almonds with the oxygen absorber could be classified as fresh even after 12 months of storage.

But they concluded that the peroxide value and hexanal increased with dose of irradiation and storage time.

Irradiation resulted in a decrease of polyunsaturated and monounsaturated fatty acids during storage with a parallel increase of saturated fatty acids.

Volatile compounds were not affected by irradiation but increased with storage time indicating enhanced lipid oxidation, they reported.

For samples packaged under a N2 atmosphere, colour values decreased during storage with a parallel increase of redness resulting to gradual product darkening especially in irradiated samples, said the team.

" Irradiation substantially increased lipid oxidation during long-term storage even in the case of almonds stored under extreme protection, i.e. use of a high-barrier film combined with the oxygen absorber and storage in the dark," added the authors.

Source: *Journal of Food Science and Agriculture*

Published online ahead of print: DOI 10.1002/jsfa.4225

Title: *Effect of irradiation, active and modified atmosphere packaging, container oxygen barrier and storage conditions on the physicochemical and sensory properties of raw unpeeled almond kernels (Prunus dulcis)*

Authors: S.F. Mexis, K. A. Riganakos, M. G. Kontominas