

Modifying the Atmosphere for Quality

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Consumers naturally want the highest quality possible for their purchasing dollar. This is definitely the case when it comes to food products. In response to this, food processors are constantly incorporating new methods to maintain freshness and maximize the shelf-life of their products. Shelf-life is the length of time during which perishable products are considered suitable for consumption.

One of the prime culprits in reducing shelf-life is oxygen. Oxygen makes up about 21% of the volume of the air we breathe. Not only is it necessary for the growth of certain microorganisms, but it can participate in a number of reactions with various components of foods. These oxidative reactions may cause undesirable colours to develop, such as the browning of orange juice if it lingers around in your refrigerator too long. Flavour oils that give many citrus-based juices their pleasing taste and aroma can become oxidized, and be anything but pleasant to the palate or the nose.

By removing as much oxygen as possible from food packages, the rate of oxidation can be reduced significantly, or virtually eliminated. An excellent example of this is potato chips, or “crisps”, as my British friends are prone to call them. If exposed to oxygen, cooking oil left on the surface of the chips may undergo a process of oxidative rancidity. As its name implies, the oils simply become unappealingly rancid.

One way in which to avoid oxidation of the cooking oils is to package the chips with no oxygen present. This is done by flushing the package with nitrogen. Nitrogen is the gas that makes up about 78% of the air we breathe, and does not react with sensitive food components. The metallized polyester film bags in which the chips are sealed form a protective barrier around the product keeping the nitrogen inside the bag and preventing oxygen in the surrounding air from penetrating inwards.

An added advantage of the modified nitrogen atmosphere inside the bag is that it helps create a “pillow” effect protecting the chips from breakage during shipping and handling.

Producers of juice-based beverages also use a modified atmosphere approach when packaging their products in flexible cartons. If no action is taken, any headspace between the surface of the liquid and the top of the container will be air. As such, it will contain about 21% oxygen by volume. Once sealed, the headspace oxygen is able to start reacting with the juice components, which ultimately leads to undesirable results.

Flushing the container headspace with sterile nitrogen at the time it is sealed is an effective way of removing the unwanted oxygen. This creates an unreactive or inert atmosphere in the headspace region. Glass containers allow products to be filled while hot, thereby avoiding many of the problems associated with “cold fill” processes.

Modified atmosphere packaging provides high quality products with improved shelf-life. These products are then delivered to customers who may be totally unaware of the technology involved in the packaging process.



The freshness of many snack foods is protected by modified atmosphere packaging