Freshline® MAP for Fruits and Vegetables

Fruits and vegetables begin to show signs of deterioration long before most other foods and are therefore prime candidates for the use of modified atmosphere packaging (MAP) gases. Principle spoilage mechanisms result from microbial growth, enzymatic browning and moisture loss. When properly cleaned, chilled and placed in suitable packaging, the shelf life of some fresh produce can be significantly extended.

**Preparation**

Only high-quality fruits and vegetables should be used for MAP. It is recommended that produce be washed in chilled, chlorinated water, rinsed and then dewatered.

**Packaging**

If fruits or vegetables are packed in impermeable film, then, as they continue to spoil, they use available oxygen within the packing. This causes an increase in the proportion of carbon dioxide and leads to anaerobic deterioration, which causes unpleasant odors, appearance and flavor.

An over-permeable film will result in rapid moisture loss and wilting and shriveling of the product. A film displaying intermediate permeability is required so that a minimum level of 2%–3% oxygen is maintained as the deteriorating product and the permeable film establish a balance between oxygen consumed during deterioration and oxygen permeating into the pack.

Packaging for retail is typically in pillow-pack or tray-and-film-lidding. Bulk generally uses a large bag of appropriate permeability.

A natural product of deterioration in fresh fruit (especially bananas) is ethylene. Some packaging makes use of ethylene scavengers as this reduces the aging of produce.

**Freshline MAP gases**

For most fruits and vegetables, a mixture of 5% CO₂/5% O₂/90% N₂ provides a good equilibrium modified atmosphere (EMA). For some produce, the carbon dioxide and oxygen concentrations can be reduced to 3%. By gas flushing, it is possible to establish a beneficial EMA more quickly than a passively generated EMA.

Recent research has shown that MAP in very high concentrations of oxygen (up to 80%) can lead to significant benefits with some produce.

**Storage temperatures**

Most fruits and vegetables should be stored at temperatures ranging from 32°F to 37°F. Care should be taken not to let temperatures fall below freezing or irreversible damage can occur. On the other hand, certain fruits and vegetables, such as whole tropical fruits, bananas, tomatoes and cucumbers, should be stored between 50°F and 59°F to prevent chill damage from occurring.
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and expect more.

Whether your packaging, cooling, chilling or freezing applications include bakery goods, fruit and vegetables, poultry, meats, ready meals or anything in-between, Air Products’ Freshline® solutions offer you the high-purity gases and equipment, the international supply capability, and - most important - the unmatched industry experience and technical support to help you succeed, just about anywhere in the world. We can help you improve your productivity, lower your costs, maximize your returns, and, as a result, help make you more competitive in a very competitive market.

For more information on Freshline modified atmosphere packaging, or any of our Freshline offerings, call Air Products today to speak with a food industry expert, or visit us at the website below.

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