For the past 8,000 years, cheeses have formed a staple part of mankind’s diet. The application of modified atmosphere packaging (MAP) has led to a dramatic increase in the shelf life of many cheeses, from soft gouda to grated cheddar, and the benefits are real and cost-effective.

**Hard and semihard cheeses**
**(moisture content 20%–55%)**

Hard cheeses have traditionally been packed using vacuum technology. This allows for good preservation and shape retention, excludes oxygen, and minimizes moisture loss. Vacuum packing suffers, however, from a down-market image, and packs that are difficult to open.

Hard cheeses are now commonly packed in Freshline carbon dioxide/nitrogen gas mixtures on horizontal form-fill-seal (HFFS) machines using barrier packaging films. Carbon dioxide within the mixture has a powerful antibacterial effect. Lowering the residual oxygen levels within HFFS pillow packs to values in the range 1%–2% reduces bacterial and mold growth.

Gas ratios vary in the range of 10%–40% CO₂/60%–90% N₂, although 100% CO₂ is used by many manufacturers. Since cheese absorbs carbon dioxide, packs with high carbon dioxide content can suffer from collapse. In some very hard cheeses like cheddar, this is a benefit; in other more crumbly cheeses, this can lead to product compression. A good working compromise is 30%–60% CO₂ with a balance of nitrogen.

**Soft cheeses**
**(moisture content 55% or more)**

Soft cheeses are not suitable for vacuum packaging but show significantly extended shelf life when packed in a 30% CO₂/70% N₂ atmosphere (shelf lives of approximately 21 days have been shown to be possible). Retail soft cheeses are usually supported in a semi-rigid tray and then gas flushed into pillow packs using HFFS machines.

Some soft cheeses contain live respiring mold that produces carbon dioxide during storage. In these products, mold growth must be allowed to continue, but at a controlled rate. By using a packaging material of appropriate permeability and gas flushing with low levels of carbon dioxide, it is possible to achieve an acceptable compromise. Typically, a 10% CO₂/90% N₂ mixture using a film of intermediate permeability has been found effective.

**Value-added cheeses**
**(processed, sliced, grated, etc.)**

Vacuum packaging cannot be used for packaging sliced and grated cheese since the packaging tends to solidify the product. Typical modified atmosphere packaging gas mixtures are 30% CO₂/70% N₂. A carbon dioxide level of greater than 50% can lead to pack collapse due to absorption of carbon dioxide by the cheese. Some producers use 100% nitrogen.

Grated cheese is modified atmosphere packed on vertical form-fill-seal (VFFS) machines using barrier flexible films similar to those used for hard cheeses. Resealable gas flushed packs are becoming highly popular with consumers.
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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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