

Freshline® MAP for Red Meat

Meat holds a prime position in the food supply chain and has long been at the forefront of modified atmosphere packaging (MAP). As long ago as the early 1930s, modified atmospheres have been used beneficially by the meat industry.

The color of red meat comes from a pigment called myoglobin, which on exposure to oxygen turns bright red (oxymyoglobin). To the consumer, the brightness of the color indicates freshness and quality. If the meat is starved of oxygen, the pigment turns brown (metamyoglobin), making it unattractive to the consumer and less likely to sell. The color can be protected by packing meat in high concentrations of oxygen with a balance of carbon dioxide to inhibit microbial spoilage. In this way, shelf life extensions of 6 to 8 days can be achieved. Packaging in a high-oxygen environment is particularly important for very red meats such as beef due to the color intensity.

Other meats that benefit from Freshline oxygen-rich modified atmospheres include pork, lamb, and veal.

For primal cuts

Primal cuts are large pieces of meat intended to be cut into smaller pieces for retail sale. At this stage in the distribution chain, a bright red color is not critical, so oxygen can be excluded from the packaging atmosphere. In its absence, the meat is purple in color. When the meat is removed from the pack, the myoglobin reacts with oxygen and turns bright red upon exposure to air; this color change is called “bloom” in the meat trade. Modified atmospheres of 50% CO₂/50% N₂ are often used with the exception of pork, where atmospheres of 80% CO₂/20% N₂ are used.

Bulk master packs

Bulk master packs contain a number of smaller packs ready for retail displays. The use of bulk master packs allows centralized packaging and ensures that products can be stored under optimum conditions during distribution. Since the red color is not required until display, a modified atmosphere of 20% CO₂/80% N₂ is typically used for beef and lamb and 80% CO₂/20% N₂ for pork.

Retail packs

For retail display packs, the red meat color is very important to maintain consumer appeal; therefore, a high oxygen content is required. A mixture of 70%–80% O₂/20%–30% CO₂ is usually used.

With some meats, 10% nitrogen is included (balance 70% O₂/20% CO₂) in the modified atmosphere in order to minimize the danger of pack collapse due to carbon dioxide absorption.

Retail packs are usually tray and lidding type packages, produced on thermoform-fill-seal (TFFS) or preformed tray and lidding (PTLF) machines.



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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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