

Modified Atmosphere Packaging (MAP)

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- ✔ Extends product shelf life by 2-5 times
 - ✔ Improves production process optimisation and distribution
 - ✔ Facilitates product diversification and new markets reach
 - ✔ Lowers product returns and waste
 - ✔ Improves perception of consumers towards quality and sustainability

What is MAP and how does it work?

MAP, also known as protective or controlled atmosphere packaging, consists of replacing air in the packaging with a single gas or gas mixture, adapted to each food product.

Common gases include Carbon Dioxide (CO₂), Nitrogen (N₂), and Oxygen (O₂). They are chosen for their preservation properties and form a protective bubble inside the packaging, preventing food products from crushing.

Replacing air with gas helps limit fat oxidation, and minimise the growth of microorganisms, to eventually extend the shelf life and quality of your product over a longer period.

We hear you!

Air Liquide's food specialists have a long track record of guiding food processors through the adoption of MAP, addressing their initial concerns and questions along the way.

Air Liquide customer #1: "Can MAP really improve the quality of my product?"

Absolutely. With MAP, you are not just packaging a product; you are creating a tailored environment that actively preserves the freshness, colour, taste and texture of your food product for a longer period. And that means better product quality, and ultimately, higher customer satisfaction.

Air Liquide customer #2: "MAP sounds complex and costly to implement."

Fair. MAP might seem more complex than conventional methods, but the benefits far outweigh the initial effort. The long-term gains in efficiency and product value make it a smart investment. Plus, reduced spoilage and waste, help maximise both quality and profitability.

The 3 essentials of MAP

1) The protective atmosphere

Precise gas mixtures are essential for controlling microbial growth, preventing oxidation, managing respiration in fresh produce, and maintaining overall food quality.

Key gases must be balanced according to each food product to ensure effective preservation, extended shelf life, and maximise the effect of MAP.

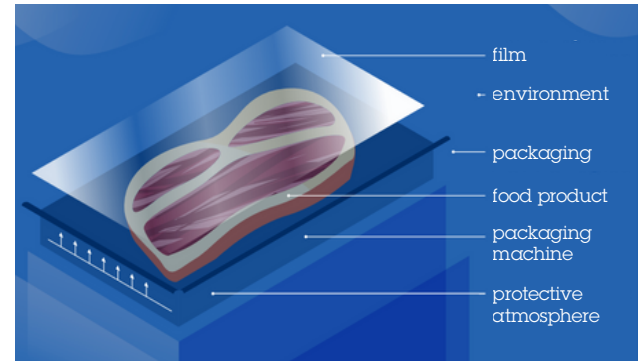
Gases	Function
Carbon Dioxide (CO ₂)	Inhibits microbial growth
Nitrogen (N ₂)	Prevents oxidation & package collapse
Oxygen (O ₂)	Maintains colour, slows anaerobic bacteria

Different foods have varying respiration rates, moisture content, and spoilage risk. Let's look at some common MAP combinations, and compare shelf life with air packaging vs. modified atmosphere packaging.

Comparison of product shelf life in air against protective atmosphere		
Product	Recommended gas composition	Shelf life gains with MAP vs. Air
Snacks & coffee	100% N ₂	3-10x longer (e.g. potato chips: from ~3 months to 9-12 months)
Fresh meat	70-80% O ₂ 30-20% CO ₂	2-4x longer (e.g. refrigerated chicken: from 12 days to 21 days)
Cooked meat & dairy	60-80% N ₂ 40-20% CO ₂	3-5x longer (e.g. sliced ham: from ~3-5 days to 15-30 days)
Bread & cakes	50-70% CO ₂ 50-30% N ₂	2-5x longer (e.g. bread: from ~5-7 days to 14-30 days)
Fruits & vegetables	2-10% O ₂ 3-10% CO ₂ N ₂ balance	1.5-3x longer (e.g. leafy greens: from ~4 days to 10-14 days)

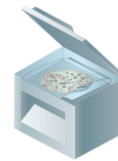
2) The packaging material

The packaging film uses premium quality materials and ensures minimal gas permeability, maintaining the desired atmosphere within the package, from production to consumption.

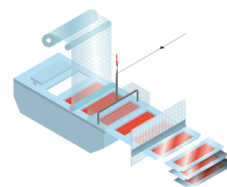


3) The packaging machine

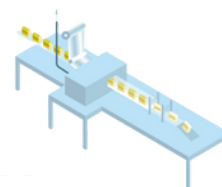
There are 5 main types of MAP machines, where the product is placed into a formed package before Air within the package is replaced by a specific gas mixture. The package is then airtight sealed.



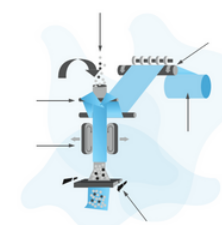
Vacuum chambers: Packages are manually placed inside the chamber where air is replaced with the modified atmosphere.



Tray sealers & thermoformers: The modified atmosphere is injected in pre-formed or heat-formed trays filled with the food product, before they are sealed.



Horizontal flow pack machine: The machine forms a bag around the product from a roll of film, fills it with the protective atmosphere, and then seals the bag. Used for products that can't withstand vacuum packaging.



Vertical flow pack machine: The machine forms a bag from a roll of film, fills it with the product, flushes the bag with the modified atmosphere, and then seals it. Used for products in small pieces or powder.

Why choose Air Liquide for your MAP needs?

Air Liquide's expertise at the service of your development



Air Liquide has been a world leader in industrial gas solutions since 1902.

Having tested over 1,500 food products worldwide and accumulated thousands of global references, we have extensive experience in the food industry. Our dedicated local team and food application experts will work with you to understand your needs and create the ideal solution for your operations.

For all types of food product, Air Liquide teams can support you with:

- ✔ Gas composition tests and MAP trials
- ✔ Design & commissioning of gas installation
- ✔ Choice of gas supply mode
- ✔ Training in the use and handling of gases
- ✔ Packaging line startup with machine vendors
- ✔ After-sales technical support

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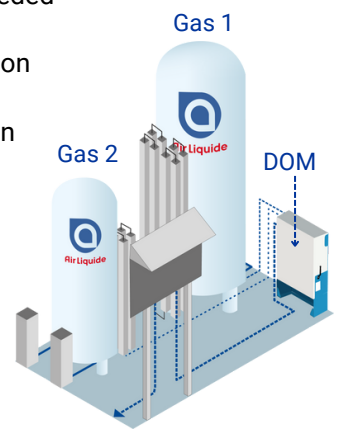
Food grade gas equipment

Air Liquide also has a complete range of food-grade gas equipment such as gas regulators, semi-automatic gas manifolds, flowmeters, and flexible hoses, to ensure a safe, seamless and accurate supply of gases to the point of use.

Dynamic On-site Mixer (DOM)

Get accurate, consistent and reliable gas mixtures for your packaging applications, compliant with the most stringent food safety standards.

- No power supply needed
- No solenoid valve
- Fixed gas composition and purity
- No on-site calibration or analyser needed
- Installation and maintenance done by Air Liquide



Air Liquide's gases are available with the best choice of supply modes according to your gas consumption needs to ensure quality, consistency, reliability and cost competitiveness.

