

The importance of packaging

You can supply meat onwards to your customers packed in a variety of ways. Understanding these packaging options and the effects on the meat (beneficial and detrimental) is very important. Shelf life is a key factor in meat storage and usage.

1. Vacuum Packing

What is it?

- Seals cuts of meat in plastic bags from which air has been excluded
- Extremely hygienic – packs are leak proof and 'clean'

How does it work?

- The bags minimise both gas and moisture permeability, thereby acting as a barrier preventing the meat surface coming into contact with external oxygen and the meat's moisture from reaching the outside world
- The lack of oxygen is enough to inhibit any Pseudomonads (bacteria which would cause the meat to deteriorate)

Tips to manage your suppliers

- Ask how quickly meat is vacuum packed post slaughter. Ensure this is as soon as possible to maximise shelf life or as long as possible after slaughter if you prefer the meat to be dry aged
- Understand the quality of the vacuum packs themselves. Inferior quality materials can cause surface discolouration of the meat
- Ensure a bone guard is used to prevent puncturing the membrane

Be aware of...

- Sour or cheesy odours – when objectionable spoilage takes over
- Colour change of the meat to 'bright red' on opening the pack through oxidation
- Meat sitting in an excessive pool of its blood

Storage Recommendations

Duration	Packaging Type	Rationale
Short term (<2 weeks)	Lower barrier vacuum packaging is sufficient	Cheaper; organism activity not a significant threat
Medium term (<4 weeks)	High barrier film may be required and/or CO2 flushed outer packaging	Requirement to reduce longer term storage consequences
Long term (2-4 months)	Top of the range non-permeable packaging and/or CO2 flushing	Greater need to reduce longer term storage consequences

Source: Meat and Livestock Commission, Shelf Life of Fresh Meat



The film used in vacuum packaging ensures hygiene and a barrier to bacteria



Vacuum packaging is still a popular choice, despite some claims of a sour taste to the meat



Check with your supplier what type of film they use



Vacuum packaging is extremely hygienic and 'clean'

2. Overwrapping and Modified Atmosphere Packing

a. Overwrapping

What is it?

- Before modified atmosphere packaging and centralised pre-packing, overwrapping was extensively used for the retail display of meat
- The film used for overwrapping is purposely permeable to external air

How does it work?

- The film facilitates oxygenation of the meat, causing the production of oxymyoglobin and the red 'fresh meat' that consumers tend to look for
- However, the meat soon oxidises further, changing colour to dull brown

Tips to manage your suppliers

- Ensure packing only occurs when the meat is less than 2°C as low temperatures favour deeper oxygen penetration

Be aware of...

- Meat that is >2 days old should not be overwrapped
- Meat that has been stored for long periods as it discolours more rapidly than fresh meat



Overwrapping – a process inherited from retail

b. Modified Atmosphere Packing

What is it?

- Meat is packed under modified atmospheres (MA) that contain higher levels of oxygen and carbon dioxide
- Microbial deterioration is retarded

How does it work?

- The uPVC or expanded polystyrene packs are formed to produce trays from a web of plastic
- The pack has its air evacuated, flushed with the higher gassed atmosphere and then the meat is sealed therein under a top web of laminated, low permeable barrier film
- At these higher oxygen concentrations (60-80%), oxygen is able to penetrate almost twice as far into the meat giving a deeper layer of the bright redness
- The carbon dioxide presence (at 20–40%) prevents pseudomonads from spoiling the meat

Tips to manage your suppliers

- Ensure pads are used in each tray as these absorb any released drip
- 'The colder, the better' (less than 2°C) – once packed, further cooling is difficult
- Good production standards should provide a colour shelf life of about one week at 1°C
- Ensure your supplier checks for seal integrity and gas compositions using a gas analyser

Be aware of...

- Shallow trays – the meat should not come into contact with the lid
- Meat that has been stored for long periods as it discolours more rapidly than fresh meat



Modified atmosphere packaging offers a shelf life of up to one week



'Peach' paper is a material to absorb released drip

**Overwrapping or Modified Atmosphere Packing – the decision is yours
The summary below should assist in deciding:**

Overwrapping	MA Packaging
Uses inexpensive equipment and packaging materials	Needs expensive equipment and packaging materials
Requires in-store butchery	Allows centralised packing
Short shelf life (1-2 days)	Longer shelf life (up to 7 days)
Any released drip can leak out	No leakage due to hermetical seal

Source: Meat and Livestock Commission, Shelf Life of Fresh Meat

Note: Meat aged or stored for long periods before packaging significantly affects shelf life.

Mince packaging – a process within a process

The raw material for mince can be frozen meat or fresh meat which is then refined to meet particular specifications. It is derived from the forequarter cuts, hindquarter trim, or both.

What is the process and how does it work?

The manufacture of mince uses a combination of vacuum packing and MA. Prior to mincing, the temperature of the meat needs to be as low as possible (when mince is made from frozen meat, residual ice in the mince keeps temperatures relatively low). Using textbook practice and with MA packaging and transportation in trays allowing free circulation of cold air, mince can be expected to enjoy a shelf life of 7 days.

Tips to manage your suppliers

- Speak to your supplier if your product appears dull brown
- **Mince is a good base for offsetting the cost of expensive cuts** – always try and balance a menu with top price meat items and cost effective ones

3. Alternative packaging techniques

Technology is always innovating. Look out for:

- Captech process
- Secondary packaging (masterpacks)
- Hyperbaric Oxygen

Warning signs

The table below gives a quick reference for packaging problems, their symptoms and manifestations:

Effect	Possible Cause
Retail Packs	
<ul style="list-style-type: none"> • Reduction in colour shelf life 	<ul style="list-style-type: none"> • Meat has been aged too long • Temperature abuse during supply chain • Poor quality packaging materials • Faulty seals • Incorrect use of gases (CO₂, O₂, N₂)
<ul style="list-style-type: none"> • Localised browning in MA packs 	<ul style="list-style-type: none"> • Meat in contact with the film
<ul style="list-style-type: none"> • Meat appears overly dark 	<ul style="list-style-type: none"> • DFD (dark, firm and dry)
<ul style="list-style-type: none"> • Bulging MA packs (using Captech) 	<ul style="list-style-type: none"> • Release of carbon dioxide
<ul style="list-style-type: none"> • High drip loss 	<ul style="list-style-type: none"> • Use of frozen meat • Temperature abuse
<ul style="list-style-type: none"> • High microbial numbers, spoilage 	<ul style="list-style-type: none"> • Poor hygienic practice • Temperature abuse • Atypical spoilage bacteria
Vacuum Packs	
<ul style="list-style-type: none"> • Reduction in colour shelf life 	<ul style="list-style-type: none"> • Using meat aged on bone prior to packing • Temperature abuse • Poor quality packaging materials
<ul style="list-style-type: none"> • 'Greening' (putrefaction in 2-3 weeks) 	<ul style="list-style-type: none"> • High pH meat (pH > 6.0) allows hydrogen sulphite producing bacteria to grow • Packaging materials with relatively high oxygen permeability
<ul style="list-style-type: none"> • Gas production through pack expansion 	<ul style="list-style-type: none"> • Spore-forming bacterium, clostridium estertheticum