Direct Facts 1 | Maturation for improved beef and lamb

This Factsheet is aimed at providing practical information on the different techniques and the recommended times for ageing beef and lamb.

It covers the following topics:

- **Recommended maturation times**
- **Methods of maturation**
- **Packaging types**
- **A summary table showing the pros and cons of different packaging and methods of maturation**

Ageing (or maturation) of meat after slaughter is widely used to enhance meat eating quality, particularly tenderness but also flavour. Provided meat is stored in the right conditions, tenderisation can occur under chill temperatures throughout the time from slaughter to consumption. It is important to get the ageing time right, however, as ageing for too long can result in off flavours developing.

Recommended maturation times (whether vacuum packed or dry-aged)

The table below gives recommended minimum maturation times for grilling, roasting and frying cuts to improve tenderness and maximum maturation times to reduce the risk of spoilage occurring. (Refer to www.eblextrade.org.uk for more information on cuts and tenderness and the Quality Standard Mark specifications).

	Minimum for acceptable tenderness	Optimum to maximise tenderness	Maximum to avoid excessive spoilage[1]
Beef: steers and heifers			
Hindquarter cuts	7d[2]	21d	120d
Forequarter cuts	14d	21d	120d
Beef: young bulls			
Hindquarter cuts	14d	21d	120d
Forequarter cuts	14d	21d	120d
Lamb	7d	10d	120d

[1]Achieving the maximum shelf without spoilage depends on rigorous control of hygiene, temperature

[2]If less tender cuts are to be used for steaks (eg beef topside) then this should be extended to 14 days

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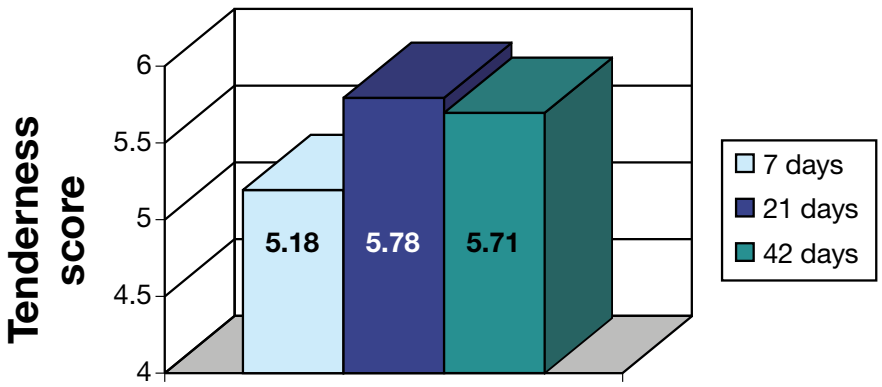
Methods of maturation

There are two key questions to consider when deciding which method of maturation to use:

1. Should maturation be on the bone or boneless?
2. Should it be vacuum packed or "dry-aged"?

Chart 1. **Tenderness of Beef Sirloin with Extended Ageing**



On-the-bone

Maturation is traditionally undertaken by keeping the whole carcase, side of beef or quarter under chilled storage – the term "hanging" can be used to refer to this type of maturation.

There is still a market for meat that has been matured in this form but, in the main, those cuts that are to be minced or diced are separated within a week and only those cuts that will be used as frying, grilling or roasting meats benefit from maturation beyond seven days. This can still be bone-in, as a hindquarter or as cuts. Maturing on the bone is considered to improve the flavour of the meat. Although there is little evidence of a large effect, some customers seek meat matured on the bone.

Boneless

Boning meat before maturation has several advantages over bone-in maturation:

- Trimmings from the bones are removed fresh and can be used in mince (be careful to stay within legal limits for time from slaughter)
- The weight of meat to be matured is reduced thus creating more space in the chiller and maximising available capacity
- Vacuum packing is made easier by avoiding the need to use puncture-resistant material.

Vacuum Packing

What is it?

Vacuum packing involves sealing cuts of meat in plastic bags from which air has been excluded. It has the following advantages for meat maturation:

- The bags minimise both gas and moisture permeability, thereby acting as a barrier reducing oxidation (improving flavour) and moisture loss (ie reduced weight loss)
- The lack of oxygen inhibits growth of some spoilage organisms, helping to maintain the shelf life of the meat.

To maximise retail shelf life (after the vacuum pack is opened), it is important that vacuum packing takes place as soon as possible after primary carcase chilling (ie within a few days of slaughter).

Chart 2. **Recommended storage times for meat held in vacuum packs (assuming best practice along the chill chain)**

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

Note: all vacuum-packed storage for maturation should be undertaken at less than 3°C.

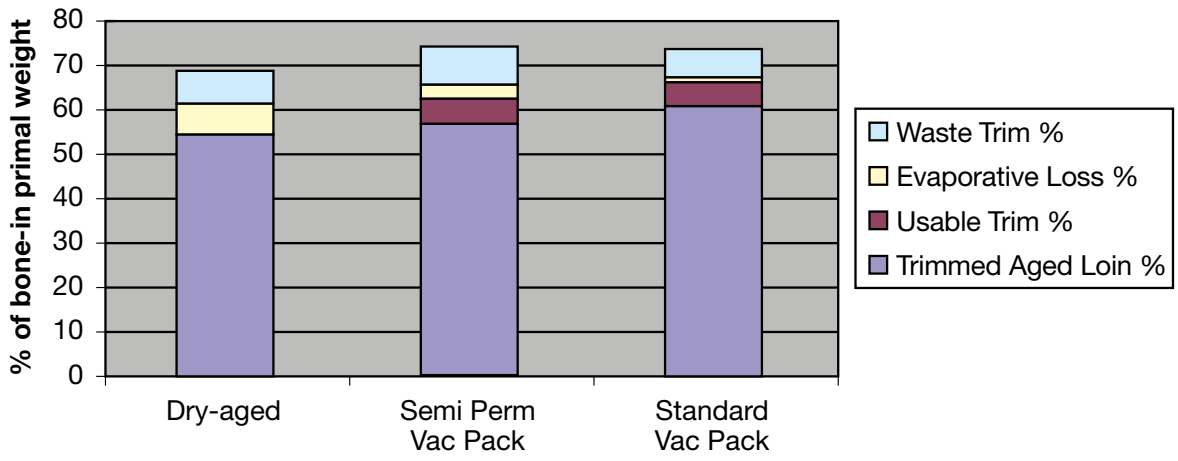
Dry ageing

Dry-ageing is maturing meat as carcases, quarters or cuts, exposed to the air. This results in a certain amount of drying out of the meat and some oxidation, as well as a different microbial profile developing. The effect is to create a specific flavour which is preferred by some customers. Tenderness improves at the same rate as in vacuum-packed meat.

More recently, vacuum packs that are permeable to oxygen and water have become available. These allow for the same flavour development as traditional dry-aging but with reduced weight loss and trimming.

(See chart 2).

Chart 3. **Yield and weight losses from different packaging treatments after 21-day maturation.**



Trimmed aged loin % (yield) = Final yield of trimmed loin compared with bone-in primal loin at start.

Usable yield % = Trimmed loin yield and usable trim combined. Waste trim includes trim both before and after 21-day maturation but not tissue attached to the bone for the dry-aged product.

Key Points

Semi-Permeable vacuum packing has the benefit of increased usable yield and reduced evaporative loss over dry-aged meat whilst maintaining a more characteristic dry-aged beef flavour by allowing some meat oxidation to occur.

Maturation in retail packs

Maturation can continue in retail packs where oxygen is excluded – eg vacuum-packed joints or vacuum skin packed steaks. Where oxygen is available, however, oxidation occurs and meat begins to toughen.

Be Aware: Retail packing should only be counted as part of the aging time if it is a vacuum pack.

Summary of key advantages and disadvantages of aging methods

Tenderness improves in all these packaging types.

	Dry	Vacuum
On the bone	Specific Flavour development. A certain flavour develops with dry-ageing that does not occur with vacuum packed meat as a result of oxidation during dry-ageing Desired by some customers Enables presentation of traditional product *but* Comparatively high weight loss (evaporation and trimming) Comparatively high demand for chiller space and hence increased energy costs.	Enables traditional presentation of product Lower weight loss than dry-aging loss *but* May need to use bone-guard to prevent puncturing, particularly with lamb.
Boneless	Specific Flavour development Desired by some customers Lean can be trimmed from fresh bones *but* High evaporative weight loss High demand for chiller space (meat needs to be on racks)	Lean can be trimmed from fresh bones Minimised weight loss Less space requirements

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EBLEX is a division of the Agriculture and Horticulture Development Board.