# A basic look at some of meat's packaging options

Packaging can influence the product in many ways, so in this article we are going to take a relatively simplistic, not too technical look at packaging and the benefits it can bestow. This information is applicable in larger operations but can also be of value to smaller operations and retail butchers as it considers the options available.

If we consider packaging in very basic terms we want it to keep goodness in the product and to prevent the product being harmed or contaminated.

We normally look upon oxygen in a very positive light, which is fine for living animals and man. However, when it comes to meat this is not the case as oxygen is required by many bacteria, such as the spoilage organism pseudomonas, and is implicated in some chemical changes that can occur.

● **Vacuum packing.**

The first method of packing to consider is vacuum packing, which works by excluding all the air and then sealing the product in an impermeable bag. The impermeable bag prevents moisture loss and prevents oxygen coming into contact with the surface of the meat.

In vacuum packing we create an oxygen deficit and this is usually enough to prevent the growth of various bacteria, including pseudomonas.

The quicker the meat is vacuum packed the better because minimal moisture loss will have occurred and there will have been less opportunity for bacterial contamination.

Obviously this can not be the case if we first want to air dry the product but for most situations the rule of thumb is 'the quicker you vacuum pack the meat, the longer its shelf-life will be'.

Using poor quality or inferior bags is often a false economy and we need to ensure that we do not pierce the bag, for example by a bone fragment or a kebab skewer, as this will cause the loss of the vacuum and its associated benefits. Remember, when we ultimately open the vacuum pack meat usually reddens through oxidation on exposure to oxygen in the air.

Some people are not great fans of vacuum packing because they claim it can adversely affect taste and flavour of the meat.

The length of time the fresh meat is going to stay in the bag will dictate the type of bag used and whether flushing with carbon dioxide is needed. As a general rule, the longer we want to store meat in a vacuum pack the greater the importance of bag type and the possibility of carbon dioxide flushing.

● **Overwrapping.**

Overwrapping is an approach in which the meat is wrapped in a film which is permeable to air and this allows the meat to get oxygen and appear red. The process which gives this redness is the production of oxymyoglobin by the interaction of myoglobin and oxygen.

A drawback of this approach is that this process does not stop and progresses on to produce a brown discolouration of the meat. For this reason overwrapping is done for a couple of days at the most. Overwrapping has declined in popularity.

● **Modified atmosphere packing.**

In modified atmosphere packing the meat is packed under a modified atmosphere that contains excess oxygen (60-80%) and carbon dioxide. In the packing process the air is removed and replaced by the modified atmosphere before the plastic tray is sealed by fixing a layer of laminated low permeable barrier film across its top.

The higher levels of oxygen enable the oxygen to permeate deeper into the meat thereby giving it a more intense redness and at 20-40% levels carbon dioxide inhibits bacterial growth, including that of pseudomonas, so that shelf-life is extended.

It is preferable to place the meat in the tray on an absorbent pad so that excess release fluids ('drip') is absorbed.

Seal integrity and gas mix should be routinely checked and if this process is done correctly the red colouration of the meat should be retained for about a week.

Finally, Table 1 is a simple troubleshooting guide to packaging problems. ■

***Table 1. Meat packaging troubleshooting guide (QM Scotland).***

| Problem | Possible cause(s) |
|---|---|
| **Retail packs** | |
| Reduction in colour shelf-life | Meat has been aged too long<br>Supply chain temperature abuse<br>Poor quality packing materials<br>Faulty seals<br>Incorrect use of gases |
| Localised browning in modified atmosphere packs | Meat in contact with the film |
| Meat excessively dark in colour | DFD (dark, firm and dry) meat |
| Bulging modified atmosphere packs | Released carbon dioxide |
| High drip loss | Use of frozen meat<br>Temperature abuse |
| High numbers of bacteria/spoilage | Poor hygienic practices<br>Temperature abuse<br>Atypical spoilage bacterium present |
| **Vacuum packs** | |
| Reduction in colour shelf-life | Use of meat aged on bone before packing<br>Temperature abuse<br>Poor quality packing materials |
| Greening/putrefaction after 2-3 weeks | High pH meat (>6) favours growth of hydrogen sulphite bacteria<br>Packaging materials with relatively high oxygen permeability |
| Gas production/pack expansion | Presence of Clostridium estertheticum |