Packaging hot-boned meat properly

Achieving high meat quality with hot-boned meat

The Pi-Vac packaging system for hot-boned meat

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The production of hot-boned meat has long offered substantial advantages in terms of meat quality. For technical reasons, these advantages could previously be used mainly for processing meat, especially sausage production. With the Pi-Vac packaging process, hot-boned meat production can also be applied to roast meat and other high-value cuts. The system supports a significantly shorter maturation time and creates the basis for high meat quality.

The established advantages of hot-boned meat production include:

- the high water-binding capacity helps minimise drip loss
- the comparatively low initial microbial load supports a long shelf life
- immediate packaging helps retain flavour compounds and aroma in the meat
- cooling capacity can be saved because chilling of the half carcasses before boning is no longer required
- weight loss caused by moisture loss during cooling is significantly reduced

The logistical requirements of hot-boned meat production, particularly the technical implementation of boning immediately after slaughter, can be addressed by established methods. The real challenge, however, lies in the packaging of hot-boned meat cuts, especially when high-value cuts such as sirloin, roasting joints from the hindquarter, loin chops or pork neck are to be packaged while still warm. The following problems traditionally arose:

- Once the bones are removed as the natural supporting structure of the meat and the warm packaged cuts are then stored horizontally for cooling, the muscles have a far greater tendency to contract than cold-boned meat. This process, known as “cold shortening”, can make the meat extremely tough. In many cases, this loss of quality could only be compensated by a maturation period of at least three weeks for beef.
- When conventional vacuum bags are used for hot-boned meat, the atmosphere is removed from the package. This makes it much more difficult for external cooling to reach the core of the meat. As a result, so-called “suffocation” can occur, rendering the product unusable.
- When shrink bags are used, the bag must be heated for a defined period in order to shrink. Unchilled hot-boned meat reacts much more sensitively to this than chilled meat and can develop surface denaturation, leading to visible colour deviations.
- The surface of hot-boned meat is highly sticky, which makes insertion into a package considerably more difficult. During filling, the meat adheres to the inside of the package and can therefore only be introduced with difficulty. To compensate for this, significantly oversized bags often had to be used.

It is therefore understandable that these advantages and disadvantages allowed only limited production of hot-boned meat for high-value cuts over a long period.

With the Pi-Vac packaging system, the known advantages of the hot-boned meat process can be used in a targeted way, while the technical hurdles described above can be significantly reduced. At the same time, the maturation time of packaged hot-boned meat can be shortened considerably compared with conventional cold-meat production. For beef, the available documentation describes a maturation time of around 8 days.

The Pi-Vac packaging system for hot-boned meat

A permanently elastic film tube is fed from a supply roll on the packaging machine through a packaging tube from the rear. At the front opening of the packaging tube, the film tube is opened by gripping hooks up to the edge of the tube. A vacuum is then generated inside the film tube. The meat cut is held in front of the opening (Figs. 2 and 3).

Fig. 1: Packaging machine for packaging hot-boned meat

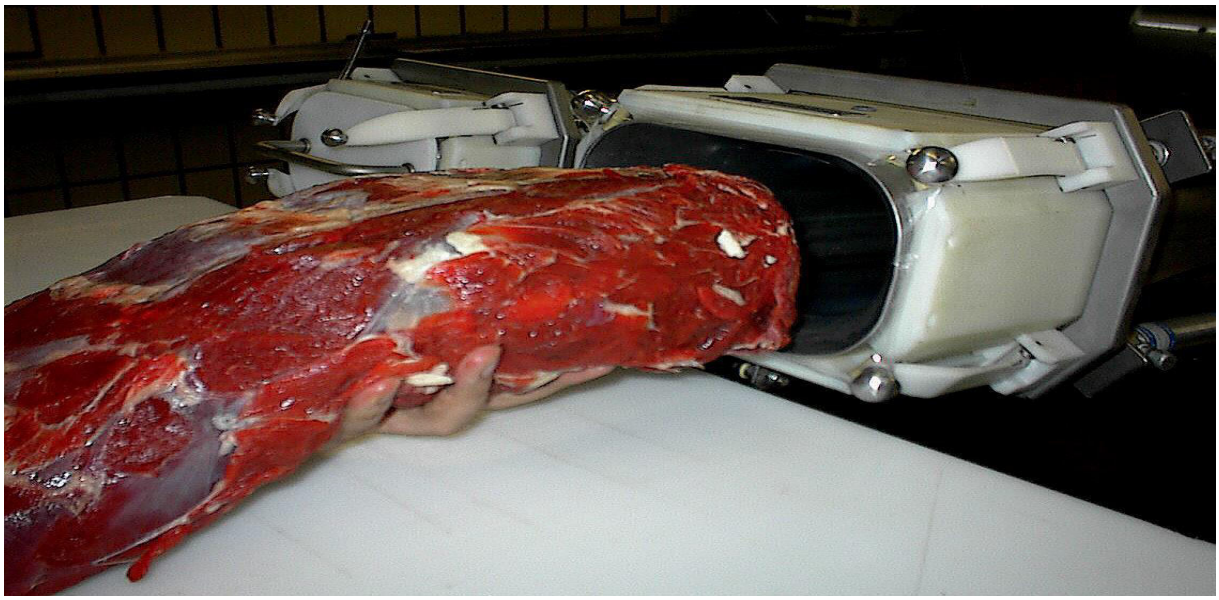

Fig. 2: Machine during the packaging process

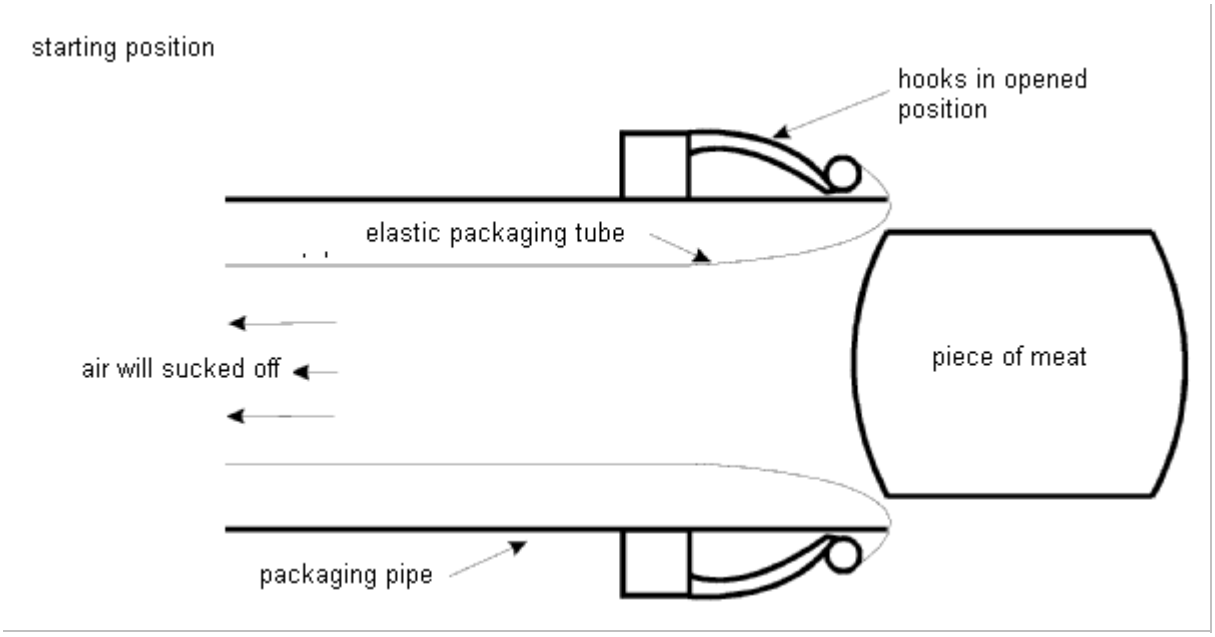

Fig. 3: Schematic diagram of the machine in the initial position

The vacuum draws the meat cut into the film tube despite its sticky surface and stretches the tube around it. Once the meat has reached the intended position, the packaging machine automatically switches off the vacuum. The elastic packaging material then returns by itself and encloses the meat firmly (Fig. 4). The packaged cut is removed from the packaging tube, which simultaneously pulls the next section of film into place. The still-open ends of the package are then sealed on a separate closing unit.

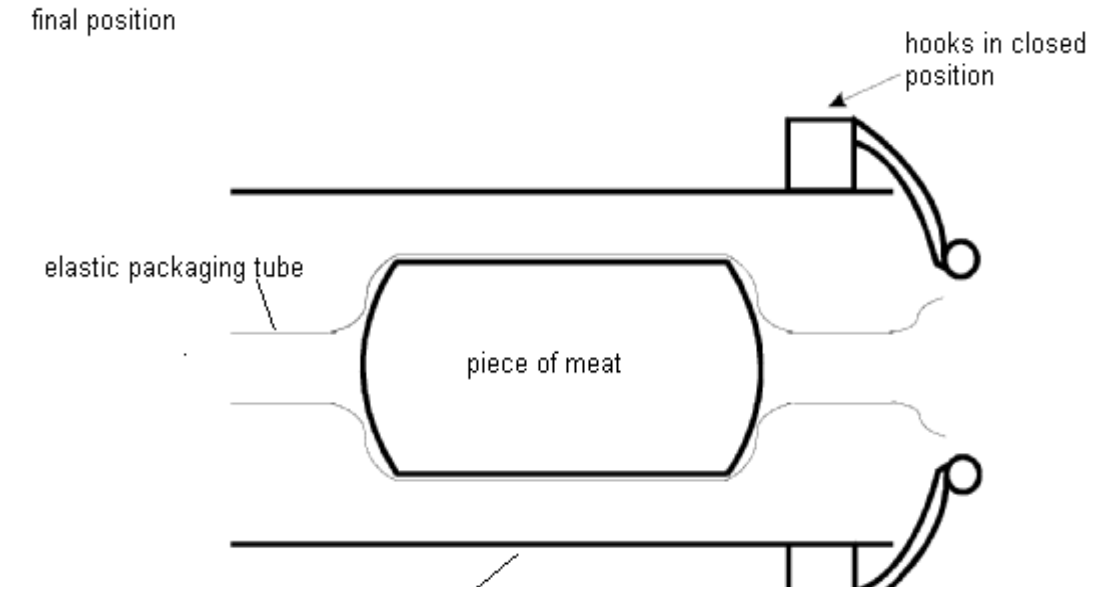

Fig. 4: Schematic diagram of the machine in the final position

With this process, hot-boned meat can be packaged without difficulty, resulting in a visually appealing product (Fig. 5).

Fig. 5: Packaged product

One of the most important effects of the system is that the permanently elastic packaging film helps to avoid cold shortening to a large extent. Because the film exerts continuous pressure on the meat cut, excessive contraction of the muscle fibres is reduced. The tender texture present in the warm state of the meat can therefore be better preserved. Beef, for example, can reach a high degree of tenderness after only 7 to 8 days of maturation.

Shelf life is supported by the fact that the permanently elastic packaging remains firmly in contact with the product throughout the entire storage period and applies even pressure. Under this pressure, the myoglobin in the meat can absorb residual oxygen remaining in the package more effectively, which may also contribute to a more intense red colour. Verified shelf-life periods are at least comparable to those achieved with a good vacuum package.

The use of the system for packaging hot-boned meat also helps to avoid surface denaturation from the outset, because the packaging material adapts to the product through its permanent elasticity and no heat treatment is required for this purpose.

The overall system was developed with significant involvement from Matforsk – Norwegian Food Research Institute, Norway. The test series carried out there scientifically documented the results achieved.

Among the early practical applications of the system was its use by Gilde Norge Ans in Norway.

Summary

The Pi-Vac packaging system enables users to produce hot-boned meat with its known advantages, including roast meat and other high-value cuts, and to achieve a high-quality product with a significantly shortened maturation period. Through economical use of packaging material, reduced drip loss and weight loss, and shorter storage times for meat maturation, the overall system can also offer economic advantages. Taste, aroma and product quality allow clear differentiation from conventionally produced meat products.

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