

# Protected shelf life

## Hygiene technology in fresh meat and sausage processing

In the last years, food producers have constantly been facing an increasing load of product stability and safety requirements from the trade. One key approach towards an effective and product-supporting plant hygiene is the application of decontamination methods in the presence of personnel and open products. This will ensure the necessary hygienic protection over the entire production time.

When thinking about appropriate hygiene technologies and their applications (e.g. decontamination of air or surfaces), physical principles should be considered which in turn exclude a number of less suitable methods right from the beginning. The use of chemical substances, for example, is subject to strict legal controls. One important aspect for the selection of the substances to be applied is their composition. For air degermination applications, alcohol or hydrogen peroxide (in amounts above 5%) have to be avoided because they may have an irreversible corrosion effect on installed equipment or result in additional fire protection requirements. In a long-term study on fresh meat and heat-cured meat products (Mortadella, cooked ham etc), the active air decontamination process with aerosols as offered by Air Solution, Bremen, Germany, was investigated for its effectiveness and compliance with the food law. This process

has been employed successfully in food processing environment for more than ten years.

It is important to review the process under food legislation aspects when assessing the use of the biological agent L.O.G in fresh meat production with workers being present. According to the relevant version of the European food legislation, this product, intended for distribution in the air, is classified as processing aid as defined in Regulation (EC) No 1333/2008 on food additives. This has been backed by expert opinions.

### Fresh meat in cold storage

In this case, the challenge included the reduction of the total count as well as of yeasts and moulds. The low microbial load achieved should then be maintained for the subsequent production of minced meat. The number of fogging units needed depended on the size of the cold storage area. It was proven that an active agent concentration of only 0.04–0.1 ml/m<sup>3</sup> was sufficient for achieving a significant count reduction. For the hygiene analysis, air samples were collected at three spots within the cooling chamber (P1, P2, P3) and the total count as well as the

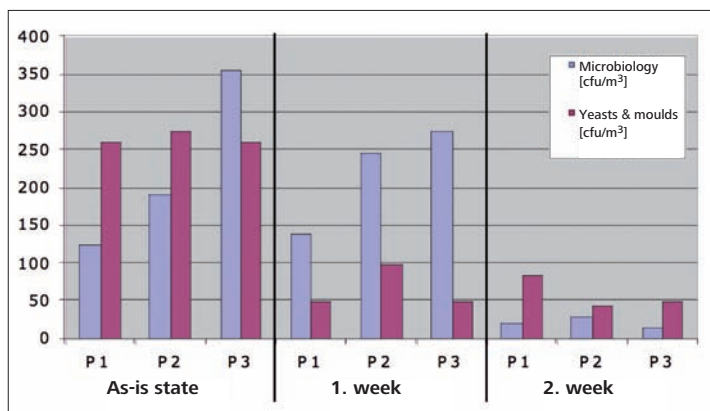


Fig. 1: Determination of germ count during active decontamination in a cold storage

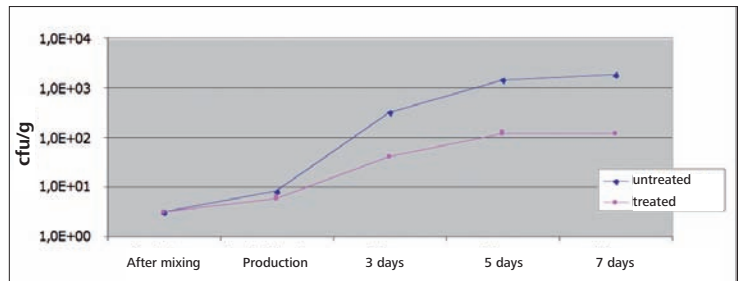


Fig. 2: Comparison of minced meat samples produced with and without active decontamination

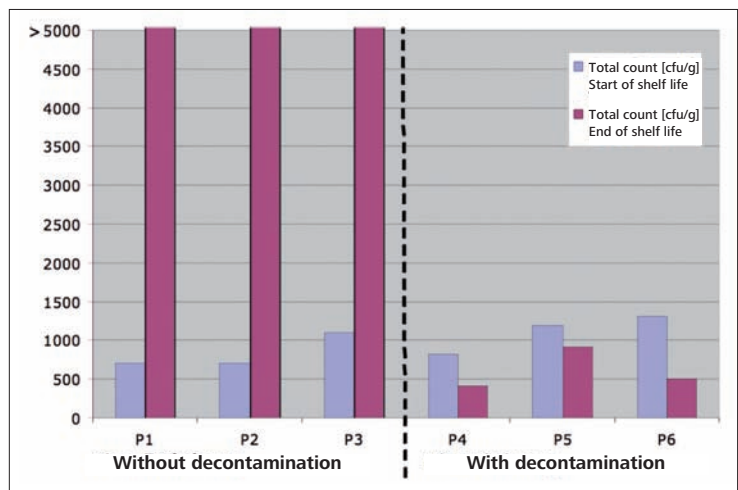


Fig. 3: Result of stability test with and without decontamination measures

number of yeasts and moulds determined (actual condition without decontamination as well as the status one and two weeks after the start of the decontamination measures.) After the hygiene technology had been applied for a short time, the microbial status in terms of total count and number of moulds and yeasts remained at a constantly low level (figure 1). This highly hygienic condition could be reliably maintained during the entire production run in the presence of open product and personnel working in this area. Apart from the clearly improved air hygiene, the surface count of the product could also be reduced so that the products could be moved to the next processing steps with a much lower initial count.

The decontamination technology was also used in downstream processing steps (production of minced meat in this case). The results (figure 2) showed that the germ count of untreated samples increased by two log levels over the test period. The curve for the treated samples showed a flatter slope until, after seven days, no increase in total count was detectable any more.

#### Slicing of fresh sausage

The challenge in this case was the reduction of the surface count as well as a reduction of cleaning and disinfection efforts with the aim of achieving a prolonged shelf life. The application of the decontamination agent L.O.G. at an entire slicer line also included the treatment of all moving surfaces (as well as parts of the surrounding air). Apart from a significant improvement of the hygienic condition, the number of intermediate disinfection steps could also be reduced. The products jagdwurst, mortadella and bologna sausage produced with and

without active decontamination were subjected to storage tests and their total count determined right after production (beginning of shelf life) and at the end of the shelf life period. The results showed that the total count for products treated with the process was within the same log level at the beginning and the end of the storage period, thus indicating that the total count had not increased (figure 3). Some samples even displayed a lower log level at the end of the shelf life than at the beginning because of the lasting effect of the active agent.

#### Summary and outlook

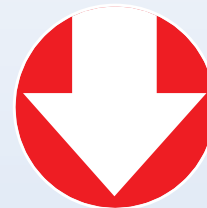
It was shown - even in long-term tests - that the decontamination technology described here effected a clear reduction in total count but also in the number of moulds and yeasts in fresh meat processing. The positive effect of a lower initial count could be transferred also to the following processing steps (e.g. production of minced meat) while providing the final product with a very high hygienic stability.

For the field of heat-cured meat products it could be stated that with the active decontamination process the total count at the end of the storage period can be kept at a significantly lower level than observed in products produced on lines not equipped with an active decontamination unit. These results show that, with a reasonable technical effort, a stable and prolonged shelf life could be achieved this way. With the hygiene technology described, any company will be able to comply with the hygiene requirements under the existing food legislation and reduce operating costs in relation to the production quantities. RO/St. ■

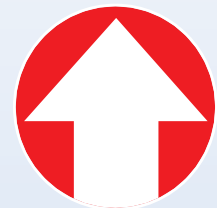
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