

» Cooked Ham: With a 39 day shelf life

Bioprotection is the application of lactic acid bacteria to a product in order to control the spoilage and pathogenic microflora without significantly altering the sensory properties. The freeze-dried meat culture used in this study was *Lactobacillus sakei* BJ-33.

Studies (Lee & Salminen, 1996; Dave & Shah, 1997) have shown that dairy products containing lactic acid bacteria (LAB) cultures of 10^8 cfu/ml are acceptable to consumers. Similar levels of LAB cultures have been used in fermented meat products (Tyopponen et al, 2003) and were assumed to be acceptable in this study. The majority of cooked ham products are currently sold in modified atmosphere packaging and have a shelf life of 21-28 days.

The aim of this study was to investigate the shelf life extension of cooked ham using a LAB culture by assessing their microbial, chemical and organoleptic properties.

Ham processing & bioprotective culture application

15kg of cooked ham was manufactured using a commercial cure. The LAB bioprotective culture was prepared at a concentration of 10^6 cfu/ml following manufacturers instructions. An untreated cooked ham was also prepared as a control.

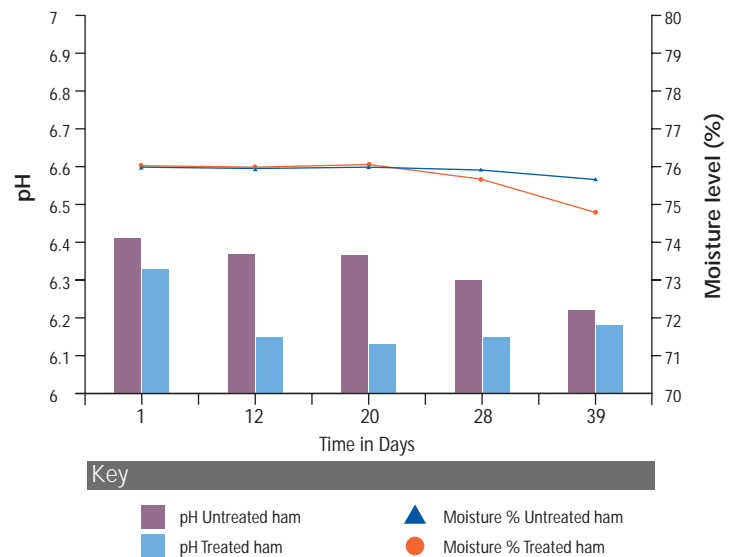
100g of treated and untreated cooked ham samples were sliced & packed in modified atmosphere (30%CO₂/70%N₂) packaging and

stored at 4°C. Sliced ham samples were analysed on predetermined days for chemical (pH, moisture), microbiological (TVC, LAB) and organoleptic properties.

Project findings

The treated ham was found to have a slightly lower pH value than that of the untreated ham slices. This was most likely due to the accumulation of lactic acid from the presence of the LAB bioprotective culture (Figure 1). The treated ham had a slightly lower moisture content compared with the untreated ham.

Figure 1. Comparison of pH and % moisture content between treated and untreated ham samples.



In the treated ham samples, the level of TVC were 10^6 cfu/ml on day 1, as this was the initial level of bioculture applied. During the shelf life the level of bioculture increased to 10^8 cfu/ml by

day 28 and remained at this level until day 39. Biochemical tests performed on day 28 and 39 confirmed the presence of *Lactobacillus sakei* on the treated ham. On day 1, the untreated ham samples had 10^2 cfu/ml TVC and increased steadily to reach 10^8 cfu/ml by day 32 and remained at this level. A range of *Lactobacillus* spp. was detected on the untreated ham.

During taste panel analysis, off-odours or flavours were not detected from the treated ham samples. Taste panel studies conducted during shelf life rated the texture, flavour and overall acceptability of the treated ham samples higher than the untreated ham samples.

Terminology Explained

Bioprotective cultures contain lactic acid bacteria which improve food quality through controlling growth of bacteria

Lactic acid bacteria are a group of Gram positive bacteria used in the production of fermented food products

Total viable count is a term used to quantify the amount of microbial organisms present in a foodstuff

Conclusion

The development of a cooked ham product containing bioprotective cultures with a maximum shelf life of 39 days can be achieved. Initial taste panel studies found this product to be acceptable in terms of appearance, flavour and texture.

Further assistance in application of bioprotective cultures in meat products can be obtained by contacting Dr Roisin Lagan at CAFRE, Loughry Campus on 028 867 68153 or by emailing roisin.lagan@dardni.gov.uk

CAFRE is an integral part of the Northern Ireland Department of Agriculture and Rural Development. Loughry is the College's centre of excellence for food technology and has lead responsibility for people development and technology transfer programmes in the food processing and supply industry. It provides key expertise in food manufacture, safety, packaging, innovation and waste minimisation.

References

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