



Development of shelf life models for organ meats using a sensory panel

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INTRODUCTION

A correctly estimated shelf life is the key to reduce food waste and ensure a high degree of eating quality. Predictive models are a valued tool for estimating shelf life.

Deterioration of food is generally a combination of microbial growth and lipid oxidation, both processes can be captured simultaneously by a sensory assessment (off-odour). Spoilage of organ meats stored under aerobic conditions develops primarily on the surface due to oxygen availability. The deterioration process is not always uniformly distributed on the whole surface of the organ meats. Therefore, the sample presentation for a sensory shelf life test is critical as it may influence the intensity ratings of the attributes.

AIM

To develop a sensory method for shelf life testing of organ meats (hearts) and to use the data (sensory and microbial) for development of a predictive model.

METHOD

The hearts (pig) for the shelf life study were collected right after slaughter at a local slaughterhouse and brought to the Danish Technological Institute for storage at 2.8°C.

Throughout the shelf life, 5 hearts were randomly selected and assessed by a trained panel using a 15 cm unstructured line scale. The panel evaluated the hearts against a fresh reference sample using the following attributes; sour flavour, rotten flavour, oxidized flavour and the degree of discoloration.

The shelf life test of the hearts was conducted using two different protocols for sample presentation:

- **Method 1:** Each heart was sliced into 2 cm slices and distributed into Petri dishes, which were served individually for each panellist (Figure 1, left)
- **Method 2:** Each (whole) heart was served in glass containers with lids and randomly rotating between the panellists during assessment (Figure 1, right)



Figure 1. Sample presentation for the sensory assessment. Left: heart served sliced in Petri dish. Right: heart served whole in glass container with lid.

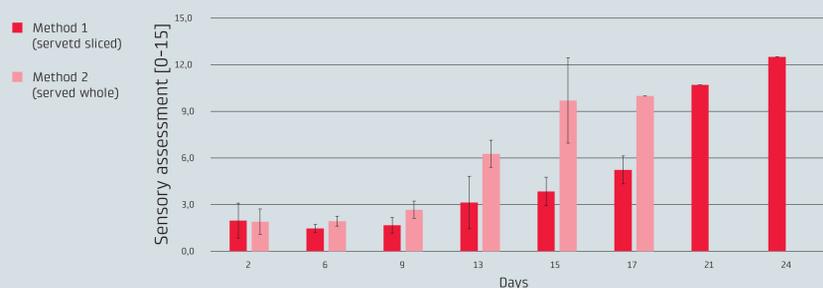


Figure 2. Sensory assessment of the attribute sour odour (AVG ± SD, n=15).

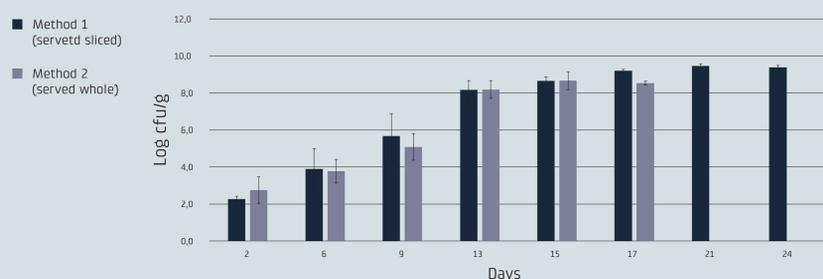


Figure 3. Aerobic plate count (6.5°C) (AVG ± SD, n=15).

RESULTS

- The intensity of the attribute sour odour increased during storage, as expected, because of bacterial growth and the related production of bacterial metabolites (Figure 3).
- The sample presentation highly influenced the results of the sensory assessments. The panellists evaluated the sliced hearts less sour during the storage period, than when the products were served whole (Figure 2).
- According to the shelf life model on pork (DMRIPredict.dk), the hearts should be spoiled around day 13-15, which is in accordance with the assessment of the whole hearts. However, when the hearts were sliced, the sensory panel scored the hearts significantly lower in sour odour intensity at the same time during shelf life (Figure 2).

CONCLUSION

When conducting shelf life investigations using a sensory panel, the presentation of the samples to the panel is critical. When slicing the product, there is a risk that the off-odours are perceived less intense compared with the whole product. This can lead to false shelf life estimations.

CONTACT INFORMATION



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