

## Assessment of different packaging strategies on the quality and shelf life of poultry meat

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The spoilage of meat is a complex process, which is mainly caused by microbiological growth and their metabolism during storage. The growth of the typical spoilage organisms is influenced by the intrinsic product factors (pH,  $a_w$ ,...) and extrinsic factors (temperature, gas atmosphere,...). Especially the overall packaging conditions have a significant impact on the spoilage process. Important packaging parameters are the gas atmosphere, packaging material and the headspace, the packaging equipment and the additives inside the material (Han, 2005; Zhou et al., 2010). The general effect of different packaging parameter on poultry spoilage is discussed intensively.

Therefore the overall objective of the study was to make an assessment of different packaging strategies on the quality and shelf life of poultry meat.

Therefore, 3 different influence factors on MAP poultry meat were analysed:

- Reduction of the headspace gas volume
- Testing Argon as an alternative to nitrogen (15% Ar / 25 % CO<sub>2</sub> / 60 % O<sub>2</sub> vs. 15% N<sub>2</sub> / 25 % CO<sub>2</sub> / 60 % O<sub>2</sub>)
- Testind different O<sub>2</sub>-concentrations (aerob, 45% O<sub>2</sub>, 60% O<sub>2</sub>, 70% O<sub>2</sub>) and comparison of the recommended (70% N<sub>2</sub> / 30% O<sub>2</sub>) with the commonly used atmosphere in Germany (70% O<sub>2</sub> / 30% CO<sub>2</sub>) regarding quality and safety aspects

During storage the growth of typical spoilage organisms (*Brochothrix thermosphacta*, *Pseudomonas* spp., *Enterobacteriaceae* and *Lactobacillus* spp.) and Total Viable Count (TVC) were analysed and modelled using the Gompertz function. Additionally, parts of the samples (70% O<sub>2</sub> / 30% CO<sub>2</sub> vs. 70% N<sub>2</sub> / 30% CO<sub>2</sub>) were inoculated with pathogenic bacteria (*Listeria monocytogenes*, *Staphylococcus aureus*). Sensory analysis of the poultry samples were carried out by trained sensory panellists to analyse colour, odour, texture, drip loss and general appearance.

The reduction of the headspace volume leads to a significant reduction in sensory shelf life. No difference on microbiological growth could be observed between the storage of poultry meat in argon and nitrogen enriched atmospheres, but a significant effect on meat colour could be observed in parts of the samples (Herbert et al., 2013). The variation of the oxygen concentration between 60% and 70% has no significant influence on shelf life, but lower concentration of 45% increase the spoilage process. Comparison between oxygen and

nitrogen shows no differences in shelf life, but 70% O<sub>2</sub> slows down the growth of *Listeria monocytogenes*. Therefore the effect of an MA-package containing 70% O<sub>2</sub> leads to a remarkable improvement of poultry meat shelf life and results in a reduced waste production.

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#### **References**

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