Note

Mathematical model for prediction of shelf life of fresh chicken packed in high oxygen modified atmosphere

- Studies behind the model

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Introduction	Based on results from several years of work on the development of a mathematical model for prediction of shelf life of fresh pork cuts under varied storage conditions, the Danish poultry industry supported the initiative to develop a similar model concerning fresh chicken meat. The Danish industry prioritized the model to concern high oxygen modified atmosphere packaging (MAP), which contains 70-80 % oxygen and the rest is carbon dioxide. This note is a brief summary of the storage experiments that have generated data for development of the model.
The model	The model can be used from the site: http://dmripredict.dk, free of charge. It concerns MA-packed chicken, both fresh and enhanced in the temperature interval from 0 °C till + 7 °C. The outputs are a growth curve for psychrotrophic bacteria and a curve for the development of shelf life based on odour assessment of the raw meat.
Factors of importance	It has been an area of focus to include as much natural variation in the model as possible, in order for the model to be robust and applicable. Therefore different chicken cuts have been used in the different studies, the meat was collected at commercial slaughterhouses, and the meat (preferred packed at the slaughterhouse) was randomly selected from the normal production. In a typical storage experiment approx. 80 individual packages of meat were used.
The experimental set-up	The storage experiments have been performed after the following set-up:

- Meat was collected at a commercial slaughterhouse (DK)
- Transportation under cooled conditions to DMRI (Roskilde)
- Base line analyses on 15 individual packs of meat (gas composition in the package before opening, psychrotrophic bacterial count and odour assessment)
- Storage under controlled conditions
- 10-15 times of analyses (gas composition in the package before opening, psychrotrophic bacterial count and odour assessment) during the storage experiment, this lasts until the meat is rotten.

Data for the model

The following studies were performed in order to generate data for the model:

- Fresh chicken filets from company A, stored at 4 °C
- Enhanced chicken filets from company A, stored at 4 °C
- Enhanced chicken filets from company B, stored at 7 °C
- Chicken drumsticks with skin from company B, stored at 7 °C
- Fresh chicken filets from company B, stored at 0 °C
- Enhanced chicken filets from company B, stored at 0 °C
- Whole birds from company C, stored at 5 °C

These seven individual storage experiments performed during two years generated a solid data foundation for development of the shelf life model.

Validation of the model

The developed model was validated with data from two storage experiments performed with meat from company D in Sweden. In this way, the validation experiments truly generated new data.

The validation experiments were performed with the following meat:

- Fresh small filet cuts for wok from company A, stored at 7 °C
- Enhanced small filet cuts for wok from company A, stored at 7 °C
- Fresh chicken filets from company D, stored at 5 °C
- Enhanced chicken filets from company D, stored at 5 °C

Conclusion

The data from the validation experiments did not alter the pre-developed model. The model was then final.