

**P-02-34**

**A shelf-life model to predict the actual spoilage level in German pork supply chains (#538)**

**Stephanie Krieger-Güss<sup>1</sup>**, **Martin Hebel<sup>1</sup>**, **Antonia Albrecht<sup>1</sup>**, **Matthias Brunner<sup>2</sup>**, **Achim Baier<sup>3</sup>**, **Judith Kreyenschmidt<sup>1, 4</sup>**

<sup>1</sup> University of Bonn, Insitut for Animal Sciences, Bonn, Germany; <sup>2</sup> Tsenso GmbH, Stuttgart, Germany; <sup>3</sup> Arconsis IT Solutions GmbH, Karlsruhe, Germany; <sup>4</sup> University Geisenheim, Department of Fresh Produce Logistics, Geisenheim, Germany

**Introduction**

Appropriate shelf life assessment and monitoring the actual spoilage status of fresh meat in food supply chains is still challenging. The aim of the FreshIndex project is the development and implementation of a dynamic quality FreshIndex for fresh pork based on predictive modeling. In combination with temperature monitoring data, the FreshIndex displays real-time information about the shelf life of the product.

**Methods**

The spoilage of more than 650 samples of MA-packed pork loin and steaks was characterized with focus on initial contamination, microbial and sensory spoilage, pH, texture and color. Storage tests under constant and dynamic conditions were conducted to characterize the spoilage kinetics of the food. Based on sensory and microbial models, a FreshIndex was established as real-time shelf life indicator. Finally, the implementation of the FreshIndex was investigated in pilot trials in a German pork supply chain.

As main predictors for the freshness, initial contamination, total viable count (TVC) during storage and sensory attributes were identified. Based on the growth of the TVC, a shelf life model was developed by combining the mod-

ified Gompertz and the Arrhenius model. It was matched to a sensory model to scale the information on a FreshIndex. Combining sensory and microbiological models was challenging due to the variability of the data. The definition of a combined acceptance level enabled the calculation of the FreshIndex.

**Results**

A freshness data cloud was established to provide the required data architecture and enable an online data exchange to calculate the remaining shelf life and the FreshIndex, respectively. A mobile APP was developed to provide the actual product information in every step of the chain. In order to model the up scaling of the data, a Virtual Supply Chain was developed covering the Freshindex, logistic processes, flow of goods and sensor data.

**Conclusion**

The FreshIndex, in combination with adequate temperature monitoring solutions, is considered as an effective tool to reflect the actual status of the product. An upscaling for different supply chains and for further perishable food products is planned as future prospect. This contributes to an improved cold-chain management and long-term prevention of food waste.

**Notes**