Assessment of TTI application to support cold chain management

*Sonja Rossaint, Judith Kreyenschmidt University of Bonn, Institute of Animal Science, Preventive Health Management Group, Katzenburgweg 7 - 9, D-53115 Bonn, *Correspondence: rossaint@uni-bonn.de, www.ccm.uni-bonn.de*

9% - 29% of meat products are wasted (Selzer, 2010; Muth et al., 2011; Gustavsson et al., 2011).Week points in the cold chain are one main reason for the amount of waste. Up to now the temperature measurement in the cold chains is conducted by several different ways and the control is mostly focuses on company level, but not over the entire supply chain. As a consequence typical week points may often stay undetected. One possibility to control the temperature history of a product from the packaging process to the consumption is the implementation of Time-Temperature Indicators (TTIs). Time–temperature indicators (TTI) provide the possibility to continuously monitor and record the temperature history along the whole chill chain in a simple and cost effective way. The temperature history is visualized by a cumulative color change. If the discoloration correlates with the food spoilage, the TTI give also information about food quality. The principle of most of the different indicators that have been developed is based on enzymatic, chemical, mechanical, electrochemical or microbiological reactions which result in a color change of the label in a rate that is temperature dependent. There are several different systems already available but up to now TTIs are not widely spread in the market due to different reasons. The food industry is afraid of high losses due to sorting the products by consumers within the shelves of the food retailers and concerned about what happens after the point of sale. Furthermore the industry is skeptical about the beneficial effect of TTI on a sustainable food production and they are also afraid about the implementation costs.

Up to now, there are no data available describing the effect on the implementation of intelligent labels on a sustainable food production and on the cost and benefits for the different chain participants. Therefore in the frame of the EU IQ-Freshlabel project (FP7-243423) a concept was developed to define the economical impact on intelligent label application in different supply chains with special regard to a sustainable food production. Further on a flexible online tool was developed to calculate the cost and benefits for the implementation of intelligent labels in different parts of the supply chain. The costs and the benefits are depending on several factors, like the step of the chain, the structure and the size of the enterprises and the label technology, etc. To consider all these factors in a more meaningful way an tool which can be used and adapted in a more flexible way to different

chains, enterprises and different intelligent labels was developed. In the presentation the developed tool will be presented and the application of the tool resp, the costs and benefit for the TTI implementation will be demonstrated exemplified for national poultry processing company in Germany.

ACKNOWLEDGEMENTS

This work was financed by the EU project IQ-Freshlabel (FP7- 243423).

References:

Gustavsson J., Cederberg C., Sonesson U., Otterdijk van R., Meybeck A. (2011). Global Food Losses and Food Waste. Study for the international Congress Save Food, 16-17.05.2011 Düsseldorf, DE

Muth M.K., Karns S.A., Nielsen S.J., Buzby J.C., Wells H.F. (2011). Consumer-level food loss estimates and their use in the ERS loss-adjusted food availability data. Technical Bulletin no. 1927. Washington, DC: USDA.

Selzer, M. (2010): Die Entsorgung von Lebensmitteln in Haushalten: Ursachen – Flüsse – Zusammenhänge. Wien: Universität für Bodenkultur