

# Abstracts: 54th International Congress of Meat Science and Technology

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## The animal fat paradox and meat quality - E.C. Webb and H.A. O'neilla

Paradoxical issues and perceptions regarding animal fats and the related effects on meat quality and consumer perceptions exist. Meat scientists have been studying carcass characteristics for many years and although the factors that influence the accumulation, distribution and composition of carcass fat in livestock have been extensively researched, the role, value and perceptions of animal fats in meat quality differ significantly in importance between producers, abattoirs, butchers, retailers and consumers. Fat and long-chain fatty acids, contribute to important aspects of meat quality and the nutritional and sensory values of meat. The 'quality' of meat depends greatly on the socio-demographic backgrounds of the consumer. There is currently no clear cut definition for fat quality because the acceptability and perceived quality of fat varies significantly in terms of quantity, colour, consistency and chemical composition in different species of livestock around the world. The association between animal fats and human health is critical and recommendations by health professionals range from excluding fats altogether to a moderate consumption of fats due to their essential role in the body. Recently the emphasis has shifted away from fat quantity to fat quality. Despite these recommendations and years of bad publicity in terms of the adverse affects of animal fats in human health, the livestock industry seems reluctant to shift its focus to fat quality rather than quantity. Consumers are becoming increasingly critical about the food they eat.

## A review and future potential of modified atmosphere packaging for meat - Kenneth W. McMillin

Modified atmosphere packaging (MAP) is the removal and/or replacement of the atmosphere surrounding the product before sealing in vapor-barrier materials. While technically different, many forms of MAP are also case-ready packaging, where meat is cut and packaged at a centralized location for transport to and display at a retail store. Most of the shelf life properties of meat are extended by use of MAP, but anoxic forms of MAP without carbon monoxide (CO) do not provide bloomed red meat color and MAP with oxygen (O<sub>2</sub>) may promote oxidation

of lipids and pigments. Advances in plastic materials and equipment have propelled advances in MAP, but other technological and logistical considerations are needed for successful MAP systems for raw chilled fresh meat. Current MAP options of air-permeable overwrapped trays in master packs, low O<sub>2</sub> formats of shrunk film vacuum packaging (VP) or MAP with carbon dioxide (CO<sub>2</sub>) and nitrogen (N<sub>2</sub>) and their peelable barrier film derivatives, and high O<sub>2</sub> MAP each have advantages and disadvantages. Packaging technology innovations and ingenuity will continue to provide MAP that is consumer oriented, product enhancing, environmentally responsive, and cost effective, but continued research and development by the scientific and industry sectors will be needed.

## Reassessing the principles of electrical stimulation - N.J. Simmons, C.C. Dalya, T.L. Cumming, S.K. Morgana, N.V. Johnson and A. Lombard

The mechanisms by which electrical stimulation (ES) of carcasses can be used to modulate meat quality are reviewed. Evidence to support an effect of ES on tenderness (and other meat quality attributes) based solely on changes in the pH/temperature profile within carcass muscles are presented. The interactions between electrical parameters and the contraction responses of carcass muscles are described to provide generalised principles to guide the design of electrical stimulation technology. The commercial risks to meat quality of inappropriate use of electrical stimulation, particularly excessive stimulation to produce PSE-like conditions, are considered.

## Meat quality assessment using biophysical methods related to meat structure - Jean-Louis Damez and Sylvie Clerjon

This paper overviews the biophysical methods developed to gain access to meat structure information. The meat industry needs reliable meat quality information throughout the production process in order to guarantee high-quality meat products for consumers. Fast and non-invasive sensors will shortly be deployed, based on the development of biophysical methods for assessing meat structure. Reliable meat quality information (tenderness, flavour, juiciness, colour) can be provided by a number

of different meat structure assessment either by means of mechanical optical, electrical probing or using ultrasonic measurements, electromagnetic waves, NMR, NIR, and so on. These measurements are often used to construct meat structure images that are fused and then processed via multi-image analysis, which needs appropriate processing methods. Quality traits related to mechanical properties are often better assessed by methods that take into account the natural anisotropy of meat due to its relatively linear myofibrillar structure. Biophysical methods of assessment can either measure meat component properties directly, or calculate them indirectly by using obvious correlations between one or several biophysical measurements and meat component properties. Taking these calculations and modelling the main relevant biophysical properties involved can help to improve our understanding of meat properties and thus of eating quality.

## Post-slaughter traceability - G.C. Smith, D.L. Pendell, J.D. Tatum, K.E. Belk and J.N. Sofos

Traceability programs can cover the whole of life, or parts of it, for individual animals or groups/lots of animals. Of 6 country or community traceability programs for sheep/sheep-meat, 3 are mandatory (1 encompasses birth to retail; 2 encompass birth to slaughter) while 3 are voluntary. Mandatory birth to retail programs that include "post-slaughter individual animal identification (IAID) traceability" have been implemented for cattle/beef, swine/pork and sheep/sheep-meat by the European Union and for cattle/beef by Japan. Many of the voluntary as well as mandatory, birth to slaughter traceability programs for all three species are presumed to include "post-slaughter group/lot identification (GLID) traceability" - e.g., those qualifying products for shipment to the EU. "Post-slaughter IAID traceability" can be accomplished in very-small, small, medium, large and very-large packing plants using single-carcass processing units, tagging and separation/segregation, and/or deoxyribonucleic acid (DNA) fingerprinting technology, but all of these approaches are time-consuming and costly; and, to-date, in most countries, there has been no reason compelling enough to cause industry to adopt such protocols or technology. ■