References

1. Badea A, Johnson A, Magnetic Resonance Microscopy, Biophotonics in Pathology. 2013;185: 153.
2. Mariette F et al., Quantitative MRI in Food Science & Food Engineering, Encyclopedia of Magnetic Resonance, Online 2007-2012, John Wiley & Sons, Ltd.
3. Sequi P et al., Journal of the Science of Food and Agriculture. 2007;87:127.
4. Gaggl W et al., Magn Reson in Medicine. 2014;72: 1668.
5. Kenouche S, et al., Magn Reson Imaging. 2014;32: 1418

MEAT COMPOSITION, FROM MICROSCOPY TO CHEMISTRY BY WAY OF DIAGNOSTIC IMAGING

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The increasing demand of a real-time monitoring of food products has encouraged the application of non-invasive techniques. Computed Tomography (CT) and Magnetic Resonance Imaging (MRI) proved to be very accurate and valuable tools in estimating body and carcass composition in farm animals.[1] CT has been successfully used for the characterization of food Italian products such as salami, providing a precise evaluation of fat percentage, also assessing its spatial distribution.[2] Manzocco and colleagues demonstrated that MRI has great potential in monitoring the evolution of dry curing in S. Daniele hams.[3]

In our experience, helical CT proved to be a fast tool in the classification of different meat cuts, deriving from adult cow and destined for the preparation of aircured products as "lean meat" or "fat meat", both in fresh and frozen samples.

Histological studies confirmed that CT clearly distinguishes adipose and connective tissue infiltration within muscles and that semi-quantitative analysis of infiltration degree can be achieved. These data were further supported by the chemical analysis of meat samples corresponding to the same region of interest observed in both CT and histologic investigations; dry matter, crude proteins, crude fat and ash contents, calculated following standard international methods,[4] varied in fact depending on the fat infiltrated extent, according with CT images. We finally observed that CT could be used in the evaluation of the same products at the end of ripening, without removing the outer envelope.

These results are important for beef and meat industrial processing sector, suggesting that CT could be employed as an on-line instrument in abattoir and dry-cured meat industry in classifying the products at the beginning of the manufacturing even they are frozen. Moreover, it might represent a rapid and non-invasive technique for quality check at the end of the production line and for the assignment of the most appropriate nutritional and commercial value to different products.

References

1. Scholz AM et al. Animal. 2015; 9: 1250
2. Frisullo P et al. Journal of Food Engineering. 2009; 94: 283
3. Manzocco L et al. Food Chem. 2013;141(3):2246
4. AOAC International 2012. Official Methods of Analysis. 19th ed. AOAC International Gaithersburg, MD

MRI (AND NOT ONLY) IN FOOD SCIENCE

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Food is any substance consumed to provide nutritional support for the body. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins, or minerals. The whole food industry covers several areas from farming and food production, packaging and distribution, to retail and catering including subareas like regulation, educa-