



TENDERNESS OF THE BOVINE MEAT: TOWARDS AN AUTONOMOUS MEASUREMENT SYSTEM FOR THE AGEING ASSESSMENT.

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One of the frequently criticisms advanced by the consumers is the lack of consistent bovine meat quality, particularly in tenderness, and thereby it has become one of the major problems to be resolved by the meat industry.

It is possible both to commercialise completely ageing meats and to lessen costs of storage if we have a system allowing a measure of the meat ageing at early time of the maturation, allowing to send products towards appropriate process. The ageing state can be estimated by the measure of the strain at 20 % of deformation which is a reference but invasive measure used in laboratory. The development of non destructive methods which can give the same information on-site is necessary. The structural modifications of the meat which occur during the ageing storage affect not only the mechanical properties but also the electrical and dielectrical properties of the product. We attempted to demonstrate the feasibility of a sensor of ageing, useful in the meat industry, based on the measure of the electric anisotropy of meat. Probes have been designed in order to be easily handled, realized with food-processing industries compatible materials allying electric properties (perfects conductive or insulating materials) and robustness. We have developed an original circular sensor (patented) which permits to measure the anisotropy of the impedance properties, by carrying out rapidly a multitude of measures in different directions relative to muscular fibers with a single application. This sensor itself declines in two circular probes with different diameters.

Trials to evaluate the ageing have been done on a population of 104 samples of 28 *Rectus Abdominus* (RA) bovines muscles, 48 *Semimembranosus* (SM) bovine muscles, 28 *Semitendinosus* (ST) bovine muscles, which have been put in relation with the 20 % deformation mechanical stress.

The circular probe with 20 electrodes allows to evaluate the state of ageing with a good correlation ($R^2 \approx 0,80$) with the mechanical reference method, and to classify the muscles maturation with a percentage of good classification near 90%.

The integration of electronics into the sensors allowing the measurement of the impedances, the commutations between electrodes, and on the other hand to carry out calculations in order to obtain a display of the measure, ought to allow in a near future the availability of an equipment able to access ageing for a better stocks management and consistency of the meat tenderness.

Keywords: sensor, meat ageing, tenderisation, quality

THE "TENDERCUT" PROCESS: A NON-NEGLIGIBLE IMPACT ON THE TENDERNESS OF BEEF MEAT

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The aim of this work was to appraise the potential utility of the 'Tendercut' process with regard to beef meat tenderness in the context of the French meat industry and to answer questions raised by operators concerning:

- the implementation of the process,
- the identification of the muscles that may be made

more tender by the process,
- the quantification of the gain in tenderness when demonstrable.

Keywords: tenderness, Tendercut, beef meat.

HARMONISATION OF AW MEASUREMENTS: TOWARDS A STANDARD METHOD FOR MEASURING WATER ACTIVITY IN DRIED/SMOKED DUCK BREAST

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Water activity allows characterization of microbiological stability of food product (critical threshold approximately 0,9 for good bacteriological stability). The research undertaken on duck steaklets (magrets) submitted to various drying duration and analysed with different Awmeters led to the following recommendations for a standard measurement of Aw:

- to take on the thickest part of the steaklet,
- to separate the one from the fat and to carry out Aw measurement on the part,
- to use Awmeter having a precision higher than 1% of Aw and allowing a rapid measurement (< 30 min).

Keywords: duck breast, water activity, drying, smoking, quality control, measurement

MICROBIAL QUALITY OF DRIED SAUSAGE: MODELLING OF LISTERIA MONOCYTOGENES IN DRIED SAUSAGE.

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The implantation of *Listeria monocytogenes* in meat curing plants is favoured by moisture, warmth and the presence of nutrients. In addition, owing to their strong potential resistance to the curing process, adapted strains of *Listeria monocytogenes* are a real problem because they may contaminate and persist in ready-to-eat finished products.

Faced with this health hazard, the main aim of this work was to enable meat processors to understand and evaluate the behaviour of *Listeria monocytogenes* according to the physical and chemical characteristics of the product, using predictive microbiology. A study of the behaviour of this pathogenic micro-organism was used to construct a simple mathematical model to help processors assess the hazard.

Keywords: *Listeria monocytogenes*, dried sausage, contamination, modelling

GAS ANAESTHESIA OF PIGS: QUALITY OF MEAT FROM PIGS STUNNED WITH VARIOUS GAS MIXTURES

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Gas (CO₂/air or CO₂/N₂O mixtures) caused a faster initial decline of the longissimus pH compared to electrical stunning. Ultimate Adductor femoris pH tended to be higher after electrical stunning than after CO₂/N₂O stunning. CO₂ stunning produced ultimate pH averages similar to CO₂/N₂O stunning, but more variable. Thus, in the experimental context where physical activity before stunning was much reduced, the use of gas appears to influence post-mortem metabolism.

Keywords: gas stunning, pigs, meat quality, CO₂, N₂O

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Summary