



**MECHANIZATION–AUTOMATIZATION  
–ROBOTIZATION IN THE MEAT  
INDUSTRY : POTENTIAL  
SOCIOECONOMIC BENEFITS OF THE  
MECHANIZATION–AUTOMATIZATION  
–ROBOTIZATION OF MEAT SLAUGHTER-  
CUTTING-PROCESSING UNIT  
OPERATIONS.**

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Strand (B) of the French SRDViand [robotization-enabled meat cutting system] project – funded by the INTERBEV together with the Auvergne and Rhône-Alpes regional councils and led by the ADIV [French technical centre for the meat sector] – has identified and prioritized new targeted focuses for mechanization–automatization–robotization across the meat industry.

The prioritization shortlist proposed is based on socioeconomic cost-benefit analysis integrating prospective trends in business activity over the coming years. It emerges five unit operation clusters.

Keywords: robotization, meat sector, unit operation targets

**VIRUSES AND MEAT PRODUCTS :SPOT-  
REVIEW ON VIRAL TRANSMISSION TO  
HUMANS THROUGH THE  
CONSUMPTION OF MEATS**

*FEURER C.*

Regardless of the country studied, the viruses most ubiquitously incriminated in foodborne disease outbreaks vectored via intake of contaminated food are hepatitis A, norovirus and rotavirus. The main risk remains eating raw or undercooked products that have been handled by a contaminated person who has not taken the requisite food hygiene measures.

The main high-risk virus affecting the pork industry is hepatitis E virus, which research has shown can be vectored via direct routes from pigs to humans. Few published studies have addressed the impact of pork processing steps on risk of virus transmission in the pork industry.

Regular concentrations of the disinfectants routinely used in the food and farming industry are too low to contain the risk of viral outbreak involved.

Further research is needed in order to better evaluate the risks presented by foodborne viral vectors, with particular focus on the type of virus incriminated as public health threat and its sector-by-sector prevalence, the development of reliable viral strain isolation and detection techniques, and process efficacy against viral damage. The best prevention measure currently available to the food and farming industry remains compliance on good hygiene practices.

Keywords: virus, pork, hygiene, disease outbreak

**THE HALOTHANE-SENSITIVITY GENE :  
EFFECT OF HALOTHANE GENOTYPE ON  
GROWTH PERFORMANCE AND CARCASS  
AND MEAT QUALITY**

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The halothane allele (n) is segregating in the French national Pietrain breed. Records from the three French central test stations were available for 1,557 Pietrain pigs of known halothane gene status (128 NN, 334 Nn and 1,095 nn). Production traits, carcass composition and meat quality measurements were studied to compare the three genotypes and assess the allele effects. Water holding capacity was the trait most affected by the halothane allele (-0.76 phenotypic

standard deviations, sd) followed by the length of the carcass (-0.62 sd) and by carcass traits related to leanness and fatness: dressing percentage, fat and muscle depth and weights of ham, loin, and fat and rind above loin. The magnitude of the effect of the halothane allele varied from 0.21 to 0.47 phenotypic standard deviations for these carcass traits. In addition, performance of the heterozygous genotype was more similar to the homozygous (NN) genotype. Significant differences between the three genotypes were found for ultimate pH but not for color. Color (L\*-value) was the only trait for which the heterozygous genotype was more similar to the superior homozygous genotype. In comparison to carcass and meat quality traits, the halothane allele effect was lower for production traits (from -0.12 to 0.02 sd).

Key words : halothane allele, Pietrain pigs, production traits, carcass composition, meat quality

**DIFFERENTIAL ENTHALPY ANALYSIS :  
UTILIZATION FOR CHARACTERIZING  
OVERALL DEGREE OF COOKING IN  
MEATS**

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Differential enthalpy analysis (DEA) is a fast and accurate technique for quantifying rate of protein denaturation in a raw or cooked meat sample. Tests were therefore run on the ability of DAE to quantify overall degree of cooking in meats subjected to different treatments (grilling, roasting), integrating both core and surface of the cooked meats. In order to pinpoint the limits of DEA technology, the experiment trialled different cooking conditions and parameters, including different product formats (steaks, roast cuts, slab), different cooking techniques (oven, grill, microwave), different meat muscles (topside, rump steak), and upstream muscle processes. DEA proved generally well adapted to predicting the degree of cooking (blue, rare, medium-rare) in a cooked and cooled-down meat sample. Excluding for products less than 4 cm thick, the all-round sample analysis integrating both core and surface is unable to predict the cooking parameters used (time, inside core temperature) due to difficulties involved in collecting a sample representative of the full thickness range of the product. Finally, DEA is unable to predict the juiciness of cooked meat products.

Keywords: meat, cooking, differential enthalpy analysis

**ENERGY EFFICIENCY IN BEEF  
INDUSTRY: ANALYSIS ON UNIT  
OPERATIONS**

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Since energy costs have risen, meat industries have interest in controlling energy and water consumptions. ADIV with technical and equipment input of TECALIMAN has led a study on 14 beef industries which characterizes main consumption items and identifies ways of improvement. Analysis showed high differences in energy performances between the companies. That is why there is a great potential for making savings on the majority of energy inputs used. In first, companies can set up energy and fluid metering equipments at site scale and on strategic items.

Keywords: energy efficiency, cattle sector, water, gas, electricity, cold chain

English

Summary