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Consequences of the future EU regulation on pig carcass classification

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A new EU regulation on classification of beef, pig and sheep carcasses was published in July 2017 and shall apply from 11 July 2018. For pig carcasses the reference of lean meat percentage, based on partial dissection (LMP_{PD}) since 2006, will be replaced by a lean meat percentage based on total dissection (LMP_{TD}). Manual total dissection can be replaced by CT virtual dissection of half carcasses if adjusted. Sample should be stratified, but the minimal size would be 10 carcasses. The aim of this paper is to assess the main consequences of this future EU regulation on pig carcass classification.

Material & Methods

Material

- Sample of 29 carcasses
- Stratified by sex: 50 % castrated males & 50 % females

Methods

- Measurements by reflectance (CGM) and ZP method
- Scan of the half-carcasses
- Standardized EU cutting (Walstra & Merkus, 1996) and calculation of LMP_{PD}
- Scan of the 4 main EU cuts (ham, loin, shoulder & belly)
- Total dissection and calculation of LMP_{TD}

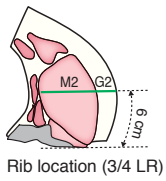
- Calculation of the CT Lean Meat Percentage in half-carcass ($LMP_{TD}ct$) and in each cut ($LMP_{PD}ct$) :
  - muscle segmentation: 0-120 HU (Hounsfield Units)
  - application of an average muscle density of 1.04
- Regression of LMP_{TD} on LMP_{PD} for impact assessment
- Regression of LMP_{TD} on $LMP_{TD}ct$ for adjustment
  - fatness in 2 or 3 classes (CGM and ZP)
  - residues by factor (sex, Hal, fatness)
  - T-test to the mean deviations by factor to O

Results

- Intercept not significant in the regressions
- **Decrease of 1.7% LMP with the new reference**
- CT scaling coefficient = 0.965 (s.e. = 0.001) for total dissection
- Error larger than for partial dissection
- No significant effect of sex, Halothane genotype and fatness, whatever the location/device (ZP or CGM method)

Methods

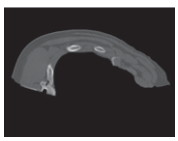
The 2 CGM depths



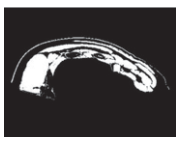
Rib location (3/4 LR)

The ZP depths with caliper

CT acquisition (3 mm slices)



Raw image (middle example)

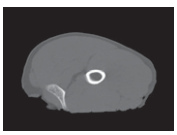


Thresholded image (muscle in white)

$$LMP_{TD}ct = 100 \frac{1.04 * \text{Muscle volume of the half carcass}}{\text{Weight of the half carcass including head and jowl}}$$

The 4 main EU cuts

CT acquisition (3 mm slices)

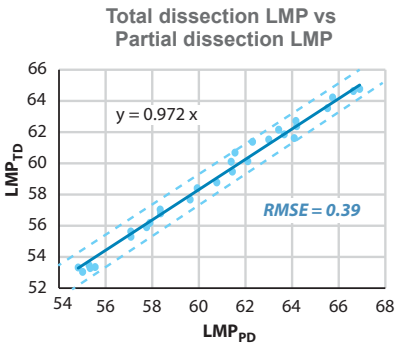


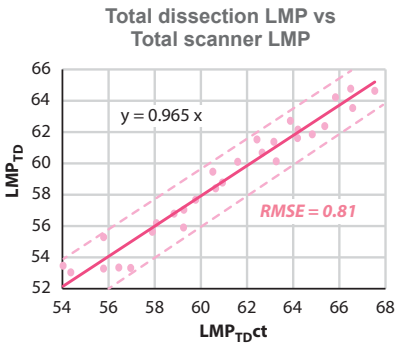
Raw image (ham example)

Thresholded image (muscle in orange)

$$LMP\ ct = 0.89 * 100 \frac{\text{tenderloin} + 1.04 * \Sigma\ \text{muscle\_volume (shoulder, loin, ham, belly)}}{\Sigma\ \text{weight (shoulder, loin, ham, belly, tenderloin)}}$$

Results





Conclusion

In the future pig classification results will be much lower than now. During the transitional period, which can last 10 years or more, systematic deviations between member States should increase dramatically. The LMP from the French CT procedure can be easily scaled, via a multiplicative coefficient, against the future LMP. This coefficient remains unchanged to any main factor. It would allow the robust scaling coefficient to be used without new dissections for the future trials.

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