

Pork cuts composition measured by scanner as influenced by sex and halothane genotype



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Knowledge of the main factors influencing the cuts composition can help both sorting cuts and designing composition experiments. Sex and halothane gene, well known for their effects on carcass composition, also deserve to be studied on cuts. The aim of this work is to study the sex and halothane gene effects on the proportions of tissues in the four main pork cuts: ham, shoulder, loin and belly. Composition was determined by scanner, a modern technique, which has recently been intensively studied in the COST action FAIM (Farm Animal Imaging).

Material & Methods

Material

- Sample of 250 carcasses
- Selected in 3 slaughterhouses
- Stratified by sex in the same proportions as in the French population in 2012: 50 % castrated males & 50 % females

Methods

- Standardized EU cutting (Walstra & Merkus, 1996)
- Scan of the 4 main EU cuts (ham, loin, shoulder & belly) according to Daumas & Monziols (2011)
- Calculation of Tissue weight in each cut:
 - tissue segmentation on the Hounsfield scale: [-500, -1] for fat, [0, 120] for muscle and >120 for bone
 - application of an average tissue density: 1.04 for muscle and 0.95 for fat
 - bone Weight = Cut weight – Muscle weight – Fat weight
- Conversion into Tissue %
- Variance analysis of Tissue % for each cut:
 - sex & Hal: main effects
 - interaction: tested

Results

- Complete results on 211 carcasses, including 2 Hal nn, removed before statistical analyses.
- Sexual types and Hal genotypes well balanced
- No significant interaction between sex and Hal
- Sex effect on all the tissue proportions, except Bone % in ham and loin. Major effect on Muscle % in loin and Fat % in shoulder.
- Hal effect on all the tissue proportions, except Fat % in shoulder and Bone % in belly. Highest effect on the Bone % in shoulder

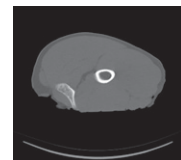
Methods



The 4 main EU cuts



CT acquisition (3 mm slices)



Raw image (ham example)



Thresholded image (muscle in orange)

$$LM\%cut = 100 \frac{1.04 * \text{Muscle volume of the cut}}{\text{Weight of the cut}}$$

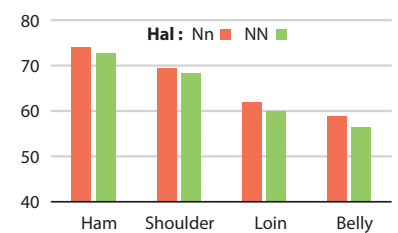
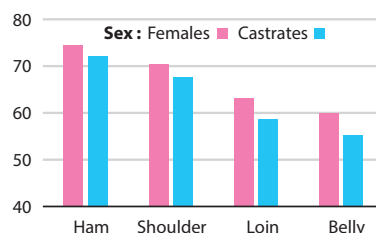
Sample description

Number of carcasses per subpopulation

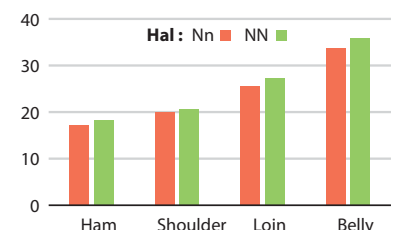
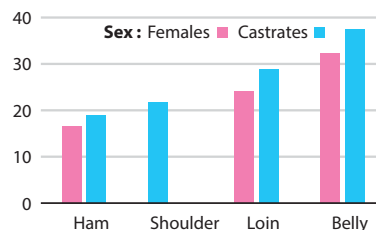
		HALOTHANE GENE		
		Nn	NN	All Hal
SEX	Females	53	53	106
	Castrates	55	48	103
	All Sexes	108	101	209

Results

Least Squares Means of Muscle % per :



Least Squares Means of Fat % per :



Conclusion

- There was no significant interaction between sex (females and castrates) and Hal genotype (Nn and NN) on the composition of pork cuts. Sex effect was the most important and affected the muscle % and fat % of all the four main cuts (ham, shoulder, loin and belly). Hal effect was significant for all muscle % and most fat % of the four main cuts.
- Sex and Hal factors should be considered in composition experiments.

