

# GENETIC PARAMETERS FOR INTRAMUSCULAR OLEIC FATTY ACID CONTENT IN A DUROC LINE

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## 1 INTRODUCTION



Duroc boar

Intramuscular fat (IMF) and oleic fatty acid content (OL) are major quality characteristics of pig meat.

Oleic content is positively related to manufacturing, organoleptic and nutritional properties of dry-cured products as well as to human health.

**Objective:** To estimate the genetic parameters associated to oleic acid in a Duroc line used for high quality dry-cured ham production



High marbled Duroc meat

## 2 MATERIAL AND METHODS

**Line and animals:** Data from 91,343 Duroc pigs born from 1996 to 2009 were used. 82,190 pigs had at least one recorded trait.

Pigs were performance-tested at an average age of 180 days for body weight (BW) and backfat thickness (BT). BT was ultrasonically measured at 5 cm off the midline at the position of the last rib.

A subgroup of pigs (barrows) was slaughtered and a sample of the *gluteus medius* muscle was taken from their left side ham

Table 1: Description of the data set

Traits	n	Mean	SD
BW, kg	81,941	104.8	12.6
BT, mm	77,640	15.6	3.6
IMF, %	947	4.9	1.9
Oleic, % fatty acid	947	44.8	3.1
Age at test, days	82131	180.4	10.7
Age at slaughter, days	947	214.8	10.8

**Laboratory analyses:** IMF and OL were determined in duplicate by gas chromatography. IMF was calculated as the sum of the individual fatty acids (C14:0, C16:0, C16:1n-7, C18:0, C18:1n-9, C18:2n-6, C18:3n-3, C20:0, C20:1n-9, C20:2n-6 and C20:4n-6) expressed as triglyceride equivalents.

**Statistical analyses:** BW, BT, IMF and OL were described using a multiple four-trait model. IMF and OL were isometric log-ratio transformed.

$BW$  and  $BT = age\ at\ measure + sex + batch + litter + animal + e$   
 $IMF$  and  $OL = age\ at\ measure + batch + animal + e$

Genetic parameters were estimated in a Bayesian framework using Gibbs sampling with the TM software (Legarra et al., 2008; <http://cat.toulouse.inra.fr/~alegarra/>).

## 3 RESULTS

Table 2: Heritability estimates for body weight (BW), backfat thickness (BT), intramuscular fat (IMF) and oleic fatty acid

Traits	Heritability	
	Mean (SD)	HPD <sub>95</sub>
BW	0.31 (0.01)	0.29; 0.33
BT	0.44 (0.01)	0.42; 0.47
IMF	0.56 (0.08)	0.42; 0.71
Oleic	0.50 (0.08)	0.37; 0.68

HPD<sub>95</sub>: Highest probability density interval at 95%

Oleic acid showed a high heritability, and favorable and moderately high genetic correlation with IMF.

Parameter estimates associated to IMF and OL hardly differed when they were isometric logratio transformed.

Table 3: Genetic correlations of intramuscular fat (IMF) and oleic acid with body weight (BW) and backfat thickness (BT)

Traits	Genetic correlation with IMF		Genetic correlation with Oleic	
	Mean (SD)	HPD <sub>95</sub>	Mean (SD)	HPD <sub>95</sub>
BW	0.28 (0.11)	0.08; 0.50	0.13 (0.11)	-0.11; 0.34
BT	0.40 (0.11)	0.18; 0.60	0.24 (0.11)	0.04; 0.48
IMF	-	-	0.50 (0.10)	0.30; 0.68

HPD<sub>95</sub>: Highest probability density interval at 95%

Oleic acid was genetically less correlated to BT than IMF (the probability of the genetic correlation being higher than 0.4 was 52%, for IMF, but only 7%, for OL).

Selection for OL can be effective provided OL can be recorded cost-efficiently

## 4 CONCLUSION

There is scope for commercial pig lines to be successfully selected for oleic acid content and IMF without decreasing carcass lean growth.

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