

## Fatty acid composition of minced pig carcasses according to sex and weight (#82)

Maria Font-i-Furnols<sup>1</sup>, Isabel Diaz<sup>1</sup>, Marjetta Čandek-Potokar<sup>2</sup>, Daniel Mörlein<sup>3</sup>, Marina Gispert<sup>1</sup>

<sup>1</sup> IRTA, Monells, Spain; <sup>2</sup> Agricultural Institute of Slovenia, Ljubljana, Slovenia; <sup>3</sup> University of Göttingen, Department of Animal Science, Göttingen, Germany

### Introduction

Fatty acids composition may affect the firmness of the fat and the characteristics of the meat for processing, mainly in terms of oxidative stability. It is affected by pigs' diet, however also by the level of carcass fatness. Therefore, differences between four sex categories known to differ in body composition (surgically castrated-CM, entire male-EM, immunocastrated-IM and females-FE) can be expected. A meta-analysis carried out by Pauly *et al.* (2012) showed that saturated fatty acids were lower and polyunsaturated fatty acids were higher in EM than in CM and IM. These differences are expected to be greater at higher weights (Mörlein and Tholen, 2015). If the use of surgical castration is diminished or stopped and EM production increases, the fatty acids composition may considerably affect pork technological quality. The aim of the present work was to determine the fatty acids composition of minced carcasses from EM, CM, IM and FE at three target body weights (TBW), namely 70, 100 and 120 kg TBW.

### Methods

A total of 68 Pietrain x (Duroc x Landrace) pigs were used, 18 CM, 18 FE, 16 IM and 16 EM. Immunocastration was performed with two doses of the vaccine Improvac®. The vaccination were applied at 12 weeks of age and 6 weeks later at approximately 70 kg TBW.

All pigs were fed the same commercial diet *ad libitum* (10.24 and 10.08 MJ net energy/kg for the 1<sup>st</sup> and 2<sup>nd</sup> feeding phase, respectively). Between 3 and 4 pigs per sex were slaughtered at 70 and 100 kg TBW and the rest were slaughtered at 120 kg TBW (approximately 8 weeks after 2<sup>nd</sup> vaccination).

When pigs reached the desired TBW they were slaughtered. The right half carcasses without teeth were frozen, cut into small pieces with a cutting guillotine and minced with an industrial mincer. Minced carcasses were homogenized and a sample was vacuum packed and kept frozen.

Fatty acids were determined using gas chromatography (with FID detector) following the extraction of lipids (Folch *et al.*, 1957). Individual fatty acids were summed into saturated, monounsaturated and polyunsaturated (SFA, MUFA, PUFA, respectively).

Statistical analysis was performed with SAS v. 9.4 software (SAS Institute Inc., Cary, NC, USA). Mixed procedure was used including sex, TBW and its interaction as fixed effects. Tukey test was applied to evaluate differences between least square means.

### Results

The concentration of SFA, MUFA and PUFA (in g/100 g of fat) according

to sex and TBW is presented in Figure 1. For SFA an interaction between sex and TBW can be seen ( $P=0.053$ ). The evolution of SFA with increasing weight was similar for FE, CM and EM carcasses, with a significant ( $P<0.05$ ) decrease of SFA at 100 kg. However, for IM SFA increased with higher weight. Except at 70 kg, FE had the lowest amount of SFA, followed by EM. For MUFA, interaction between sex and TBW was not significant ( $P=0.557$ ). In all sexes, MUFA were higher at 120 kg TBW than at lower weights. EM and IM had lower MUFA than FE and CM. Regarding PUFA, interaction was also not significant ( $P=0.115$ ). PUFA were higher at 100 kg than 70 and 120 kg TBW. In general, PUFA were lower in CM than in the other sexes and it might be related with the higher amount of fat of these pigs.

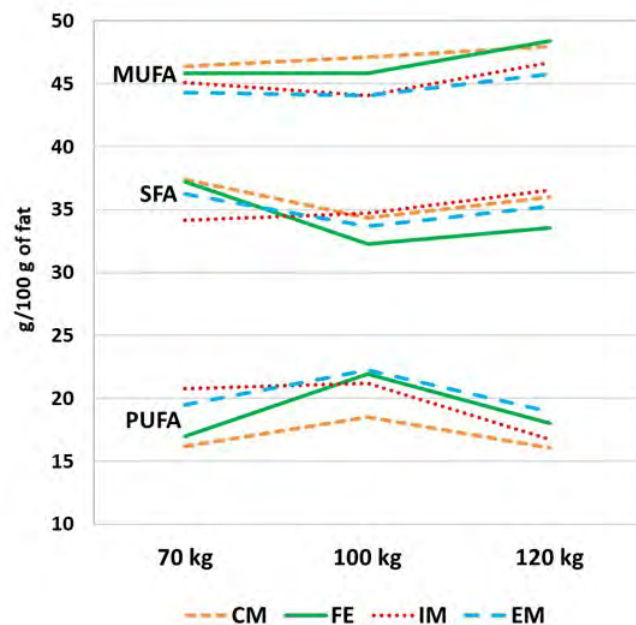
When only animals of 120 kg TBW were considered ( $n=42$ ), differences between sexes were significant ( $P<0.001$ ) for all the fatty acid groups considered (Table 1). In this case, SFA were significantly lower in FE than in CM and IM, EM being in between whereas MUFA were significantly higher in FE than in EM and IM and significantly higher in CM than EM; no significant differences were found between CM and FE and between CM and IM. Finally, the highest PUFA were observed for EM and lowest in CM, with IM and FE taking intermediate position. IM were closer to CM and FE closer to EM. These results can be related with the different levels of carcass fatness, which is significantly higher in CM than IM and EM and being intermediate in FE. In fact, the total fat of the minced carcasses is negatively correlated with the PUFA content and positively correlated to the SFA and MUFA content.

### Conclusion

According to the present results, the pigs' sex, and their weight affect the fatty acid composition which is correlated with total carcass fat content. Also an interaction of sex and weight needs to be considered. If surgical castration is stopped, differences in the fatty acid composition may affect the quality of meat and meat products.

### Literature

- Folch J, Lee M, Sloane-Stanley GH. 1957. J Biol. Chem. 226, 497-509.  
Mörlein D, Tholen E. 2015. Meat Sci. 99, 1-7.  
Pauly C, Luginbühl W, Ampuero S, Bee G. 2012. Meat Sci. 92, 858-862.



**Figure 1** Saturated (SFA), monounsaturated (MUFA) and polyunsaturated (PUFA) fatty acids by sex and live weight.

	Surgically castrated	Immunocastrated males	Entire male	Female	RMSE	P-value
<b>SFA</b>	36.0a	36.6a	35.3ab	33.6b	1.59	0.0007
<b>MUFA</b>	48.0a	46.7bc	45.8c	48.4a	1.15	<.0001
<b>PUFA</b>	16.1c	16.8bc	19.0a	18.0ab	1.21	<.0001
<b>Fatness</b>	25.7a	21.4b	16.9c	20.2bc	3.52	<.0001

RMSE= root mean square error

<sup>1</sup>Different superscripts within row indicate significant differences between sexes.

**Table 1** Fatty acid composition (Saturated: SFA, Monounsaturated: MUFA, Polyunsaturated: PUFA) (in g/100 g of fat) and carcass fatness by sex in pigs of 120 kg target body weight<sup>1</sup>.

## Notes