

To Obtain an Adequate Fatty Acid Composition of Adipose and Lean Tissues in Immunocastrated Male Pigs the Dietary Fatty Acid Supply Needs to be Adjusted

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At a given supply of unsaturated dietary fatty acids (FA) the degree of unsaturation of adipose tissue (AT) lipids increases with decreasing carcass fat deposition. Because carcasses of immunocastrated male pigs (IC) fed standard grower-finisher diets are leaner than those of barrows one can expect higher levels of unsaturated FA in the AT, which then might negatively affect its oxidative stability and firmness. Therefore, the goal of this study was to determine the effects of castration method and dietary FA supply on lipid composition of the AT and intramuscular fat (IMF).

Forty-eight Swiss Large White male pigs were blocked by litter and assigned by BW to 4 experimental groups: barrows were fed a grower-finisher diet with a PUFA-MUFA-Index [$\text{PMI} = 1.3 \times \text{MUFA (g/MJ DE)} + \text{PUFA (g/MJ DE)}$] of 1.7 (C17), IC pigs were fed a grower-finisher diet with a PMI of 1.7 (IC17), 1.5 (IC15) or 1.3 (IC13). All pigs had *ad libitum* access to the diets from weaning to 107 kg BW. One day after slaughter the carcass characteristics were assessed and the AT and longissimus muscle were collected for the determination of the FA composition. The data were analyzed using PROC MIXED with treatment as fixed and litter as random effect. Means (C17 vs. IC17 and IC17 vs. IC15 vs. IC13) were compared by orthogonal polynomial contrasts.

Compared to barrows (C17), IC17 pigs tended ($P < 0.10$) to grow slower, consumed less ($P < 0.04$) feed, were more ($P < 0.01$) feed efficient and their carcasses were leaner ($P < 0.01$). In the AT of IC17, the n-6 (18:2; 20:2; 20:4) and n-3 (18:3; 20:3) FA concentration was greater ($P \leq 0.06$), whereas the saturated and monounsaturated FA level was only numerically lower ($P \geq 0.12$) than in barrows. In the IMF, the 16:0 and 20:0 concentrations were lower ($P \leq 0.08$) and the levels of n-6 (18:2; 20:4; 22:4) and n-3 (18:3; 22:5) were greater in IC17 than C17. Except for the linear decrease ($P_l = 0.04$) in total feed intake with decreasing dietary PMI level, diet had no effect on growth rate, feed efficiency nor carcass leanness. With decreasing dietary PMI level the 16:0, 18:0 and 16:1n-7 concentration in the AT linearly increased ($P_l \leq 0.05$) and the n-6 (18:2, 20:2) and n-3 (18:3, 20:3, 22:5) concentration as well as the total FA tissue content linearly decreased ($P_l = 0.03$). The FA profile of the IMF was not ($P_l \geq 0.15$) affected by the dietary FA composition except for a linear decline ($P_l = 0.03$) in the 20:1n-9 and a linear rise ($P_l \leq 0.06$) in the 20:4n-6 and 22:4n-6 level with decreasing dietary PMI. These results confirmed that the lower lipid deposition in carcasses of IC pigs markedly elevated the degree of unsaturation of the AT as well as IMF lipids, which might negatively affect processability, especially, of the AT. However, by applying a specific feeding strategy the FA composition of the AT can be adjusted: the lowest dietary PMI (1.3) level compensated for the 14% lower carcass fat deposition as the FA profile was comparable in the AT of IC13 and C17. With respect to human consumption of pork it is worthwhile to mention that the greater degree of unsaturation of the IMF lipids in IC compared to C pigs remained unaffected by the dietary PMI level.