Effect of Reduced Protein Diets on Fatty Acid Composition in the Subcutaneous Adipose Tissue of Two Pig Genotypes

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The use of reduced protein diets (RPDs) or low lysine levels in the pig industry has been demonstrated to be the most desirable nutritional strategy to improve intramuscular fat accumulation without influence on subcutaneous adipose tissue (SAT). The objective of this study was to investigate the effect of pig genotype and dietary protein and lysine levels (normal and reduced) on SAT deposition. The experiment was conducted with sixty intact male pigs (30 Alentejana purebred, a fatty rustic genotype and 30 Large White × Landrace × Pietrain crossbred, a lean commercial genotype) from 60 to 90±3 kg of live weight. Animals within each genotype were divided into three groups and fed the following diets: normal protein diet equilibrated for lysine (17.5% plus 0.7% Lys, as control), RPD equilibrated for lysine (13.2% plus 0.6% Lys) and RPD not equilibrated for lysine (13.1% plus 0.4% Lys). A significant effect of breed (P<0.001) was observed for backfat thickness and total fatty acids (expressed as % of SAT weight) with the highest values for Alentejano pigs than those obtained for crossbred animals. In contrast to the backfat thickness, RPDs increased the total fatty acids content in both genotypes. The percentage of total fatty acids in the SAT was higher (P=0.049) in pigs fed the RPD by 2-4% when compared to the control diet. As consequence of the genotype effect on individual fatty acids, the partial sums SFA and MUFA were higher in Alentejano pigs, whereas total PUFA, *n-6*, *n-3* and both fatty acid ratios (PUFA/SFA and *n-6*/*n-3*) were higher in crossbred pigs. The RPD decreased PUFA (P=0.004), *n-6* PUFA (P=0.005), *n-3* PUFA (P<0.001) and PUFA/SFA ratio (P=0.007) when compared to the control diet. The results indicate that the fatty acid composition of SAT was more affected by the genotype than by the diet, under these experimental conditions. The genotype differences herein reported regarding the fatty acid content and composition of SAT might be due to differential expression of key genes controlling lipid metabolism.

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