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A sulphur amino acid deficiency changes the amino acid composition of tissue protein in growing pigs

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Methionine and Cys are considered the second or third-limiting amino acid (AA) for most cereal-soybean based diets in growing pigs. The AA content of body protein is usually assumed constant. However, there are indications that this AA composition can be affected by the AA supply. The objective of this study is to evaluate the effect of feeding pigs diets with a deficient or sufficient total sulfur AA supply (TSAA; Met+Cys) on tissue composition and meat quality. Two groups of 6 piglets were selected 14 d after weaning and received a diet either deficient (TSAA–) or sufficient (TSAA+) in TSAA for 17 wk and were slaughtered thereafter. Samples of the longissimus dorsi (LM) and rhomboideus (RM) muscles, liver, intestines and skin section were taken for analysis. Diets were formulated to meet nutrient requirements except for diet TSAA– in which the supplies of Met and TSAA were 19 and 16% below requirements, respectively. The TSAA– pigs had a lower ADG, and weights of the LM, RM, and skin section ($P<0.05$). The protein content of LM and RM decreased ($P<0.05$) in TSAA– pigs, while this was not changed in other tissues. The TSAA supply affected the AA composition of protein in all tissues but the Met content was changed only in the liver ($P<0.05$), and the Cys content in RM, distal jejunum and ileum ($P<0.01$). We conclude that pigs use different mechanisms to cope with a prolonged AA deficiency as tissues respond differently in terms of weight, tissue protein and AA contents with a slight impact on meat quality. Muscles responded more to a TSAA deficiency than did other tissues. The observed changes in the tissue AA composition question the use of a constant AA profile of retained protein in swine nutrition.

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Use of phase feeding in combination with split gender grouping for pigs

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In a 2×3 factorial design, the performance of gilts and boars penned in single or mixed gender groups and offered either a single diet (single phase) or a two phase dietary regime during finish was compared. A total of 480 pigs (PIC337 × (Landrace/Large White)) were grouped in pens of 10. Eight replicates per treatment were completed (8 time periods). Diets were barley, wheat, soya based and formulated to contain 13.5 MJ/kg DE and an ideal protein ratio. Diet 1 (formulated to contain 180 g/kg crude protein (CP), 9.5 g/kg lysine) and was offered to pigs weighing between 45 and 120 kg in the single phase regime and between 45 and 80 kg in the two phase regime. Diet 2 (formulated to contain 167 g/kg CP, 8.0 g/kg lysine) was offered between 80 and 120 kg in the two phase dietary regime. Pigs were individually weighed and pen feed intake was taken to correspond with the change in diet (target 80 kg) and at slaughter. Data was analysed according to the experimental design using Analysis of Variance in Genstat V 10. Start weight was used as a covariate in the analysis of live pig performance and slaughter weight as a covariate for the analysis of carcass performance There was no interaction ($P<0.05$) between group gender and dietary regime. Dietary regime had no effect on pig performance (average daily gain (ADG) 905 g/day, feed conversion ratio (FCR) 2.56 between 44 and 120 kg, both $P>0.05$, SEM 12.9 and 0.029 respectively) or back fat depth at P_2 (average 12.2 mm, $P>0.05$, SEM 0.27). However, between 45 and 120 kg the performance of gilts was poorer (ADG 865 g/day, FCR 2.70; ($P<0.01$, SEM 13.7 and <0.001, SEM 0.025 respectively) than that of boars (ADG 942 g/day, FCR 2.46). Although the kill out percentage of gilts was better than boars (77.7 vs. 76.1%; $P<0.01$, SEM 0.31), their back fat depth (P_2) was greater (12.1 vs. 11.5 mm ($P<0.01$, SEM 0.31). The performance of the mixed gender pens was intermediate to that of pens of gilts and boars housed separately but their back fat depth at P_2 was greater (13.0 mm).