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Muscle biomarkers to differentiate pork quality categories based on industry and consumer demands

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Pork quality is a complex phenotype assessed by a combination of physical, biochemical, and occasionally sensory indicators measured one or even few days after slaughter using generally costly and/or invasive analyses. Early post-mortem (p.m.) biomarkers of pork quality have been identified by functional genomics however they usually refer to a single indicator and not to the overall quality level of a pork sample. This study aimed at determining pork quality categories combining both sensory and technological dimensions, and at identifying biomarkers discriminating these categories to further develop tools to monitor and predict pork quality in slaughterhouses. Sensory, technological and gene expression data were collected on the longissimus muscle of 100 pigs of two different breeds reared in various production systems and thereby exhibiting a wide and gradual variability in meat quality. Scientific expertise and statistical (multiple correspondence analysis) approaches were combined to select indicators and their thresholds specifying quality categories: low (impaired) quality (L; pH30<6.10 or pH 24 h<5.50, n=37); and among non-defective pork, acceptable (A; drip $\geq$ 1% or intramuscular fat (IMF)<2.5%, n=26) and extra (E; drip<1% and IMF $\geq$ 2.5%; n=35). The L category had the highest drip loss and lightness ( $P<0.001$ ) and the lowest tenderness ( $P<0.001$ ) and juiciness ( $P<0.05$ ) scores, whereas E had the highest values of pH30, pH24, red colour and tenderness score ( $P<0.001$ ). Levels of previously identified biomarkers of single quality traits, determined in longissimus sampled 30 min p.m., highly differed according to quality categories. Two genes were up-regulated ( $P=0.003$ ) specifically in L, 5 genes were up-regulated ( $P\leq 0.007$ ) and 4 down-regulated ( $P\leq 0.009$ ) specifically in E, and 2 genes had gradual expression level between L, A, and E categories ( $P<0.0001$ ). Biomarkers differentiating pork quality categories will be validated on a commercial pig population.

## Session 55

## Theatre 4

Forage preferences of free-ranging UK pigs in deciduous woodland and pasture

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Iberian pigs, which exist in a regimented and planted ecosystem, are reported to consume acorns and grass, almost exclusively. However as pannage pigs in the UK are often turned out into mixed woodland, where there are more diverse feedstuffs available, the present study aimed to quantify the forage preferences of a group of pannage UK woodland pigs. Three adult sows (with piglets at foot) and two juvenile males were penned in mixed woodland and pasture, without access to concentrate feeds. Pigs were observed for 25 days between September and December 2011; piglets at foot were not observed. Focal observation of individual pigs recorded total number of bites taken per hour and bite composition, using the method set out by Rodriguez-Estevéz et al. Means separation was conducted using the GLM procedure of Minitab 16, with age/gender as a fixed effect. There were clear differences in feed preference between the two age groups, with older animals taking significantly more bites of grass ( $P<0.01$ ) and less of mast ( $P<0.05$ ) than the juvenile males. Acorns and grass contributed significantly to the total number of bites recorded: grass comprised 63.2 and 35.0% of total bites for sows and juveniles respectively, with acorns comprising 17.9 and 32.5%. As expected, however, acorns were not the sole mast species consumed by pigs in UK woodland, with beech mast contributing 14% of the bite intake of sows and 25% of juvenile bites. This may affect the meat quality of pork produced in mixed woodland systems, reducing the 'acorn aroma' assigned to Iberian pigs.