

ADIPOSE TISSUE TRANSCRIPTOME OF KRŠKOPOLJE PIGS REARED IN DIFFERENT PRODUCTION SYSTEMS

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Krškopolje pig is the only autochthonous Slovenian pig breed, well adapted to local feed sources and environmental conditions. They are reared under various conditions, from intensive indoor to extensive outdoor system. Studies have shown that the production system affects their performance, including the dynamics of fat deposition. To better characterize the metabolic processes underlying the changes, we aimed to compare the transcriptome of the backfat of Krškopolje pigs reared in two different production systems using RNA-sequencing. Krškopolje pigs were reared indoors (K-IND; N=24) and outdoors (K-OUT; N=24) and were fed equivalent diets. At 330 days of age, the animals were slaughtered and samples of backfat were collected. After RNA extraction, samples were sequenced using Illumina NovaSeq generating 150 bp paired-end reads. Quality control, mapping to the *Ssrofa*11.1 reference genome and extraction of gene hit counts were performed followed by detection of differentially expressed genes (DESeq2) and determination of functional enrichment (KOBAS-i). In total, the sequencing yielded approximately 66.8M paired-end reads, with more than 92.2% of reads uniquely mapped to *Ssrofa*11.1 genome. Differential expression analysis revealed 798 genes ($\log_2FC > 1$; $P\text{-adj} < 0.05$), of which 494 were overexpressed in group K-IND and 304 in group K-OUT. In group K-IND group, the most interesting upregulated genes were involved in collagen synthesis (COL1A; $\log_2FC = 4.6$), energy homeostasis (LEPR; $\log_2FC = 1.9$) or triglyceride metabolism (MOGAT; $\log_2FC = 2.5$). In K-OUT, several upregulated genes were involved in lipid metabolism (FASN, ME1 and SCD genes with $\log_2FC = 1.4$, 1.2 and 1.1, respectively). Functional enrichment analysis of the upregulated genes in the K-IND group revealed biological processes, such as negative regulation of angiogenesis (GO:0016525), collagen fibril organization (GO:0030199) and endothelial cell morphogenesis (GO:0001886). Upregulated genes in K-OUT were, enriched in immune response (GO:0006955), among others. The results of the present study provide the first insights into the genetic regulation of Krškopolje pigs kept in different production systems.

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