

metabolome can help describe the lipidome, providing new insights into the genetic and physiological mechanisms underlying fat related traits. Fat deposition and composition traits are particularly important in the Italian heavy pig production sector, due to their impact on carcass, meat quality and production traits. In this study, we combined genomic and lipidomic information from approximately 700 Italian Large White (ILW) and 300 Italian Duroc (IDU) pigs to analyse genetic factors affecting the pig plasma lipidome. These pigs were genotyped with a 60,000 single nucleotide polymorphism (SNP) panel and their lipid profiles, consisting of ~300 lipids and derived metabolites were analysed. Lipidomic profiles were initially compared between the two breeds using multivariate approaches. A total of 30 sphingolipids were found to be differentially abundant in the plasma of pigs from these two breeds. Additionally, genome wide association studies identified significant SNPs for 78 and 54 molecules in ILW and IDU pigs, respectively. The same QTL identified in both breeds had opposite allele frequencies, suggesting that lipid related metabolism is controlled by different genetic mechanisms in these breeds.

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O303

Exercise as a modifier of the molecular clock in the athletic horse: a genome-wide study

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The methylome and its fluctuations are emerging as fine-tuning mechanisms for many biological phenomena. The analyses of these variations so-called 'molecular clocks' may indicate the true biological age of an organism; molecular clocks are largely influenced by the environment.

The aim of this 'proof of concept' is to investigate the genome-wide methylation status in elite athletic horses to verify if physical exercise can improve or worsen biological age. To do so, we used an innovative tool: Illumina Horvath mammalian methylation chip (HorvathMammalMethylChip40) which allows monitoring the CpG methylation of over 37,000 conserved mammalian loci to

assess whether exercise can accelerate or decelerate the molecular clock. The success of the technology with the equine species is already demonstrated by the previous use by the group of Finno and collaborators. The subjects recruited in the study were elite athlete horses participating into two equestrian disciplines: 20 gallop-race Thoroughbred (from 3 to 5 years old) and 20 show jumping Italian saddle (from 8 to 12 years old). The horses were subjected to the same training program according to the specific discipline. DNA was extracted from blood samples (buffy coat) collected via venipuncture into EDTA tubes and processed by the service connected to the Clock Foundation (<https://clockfoundation.org/>). We compared data from our samples to the molecular clock baseline identified by retrieving the data produced in the study by Horvath et al. (2022), based on key methylation loci from 42 blood samples (buffy coat) of 24 different breeds. The analyses are ongoing and are confirming that exercise and the molecular clock are interconnected revealing a shift of methylated positions correlating with age. This approach will also open the possibility of comparative analyses with humans and other species where athletic performance is a desired and pursued trait.

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O234

Evaluation of the triple attitude of the alpine Ciuta sheep breed: quality assessment of milk, meat and wool

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Local breeds and traditional farming systems play a key role in preserving rural biodiversity, especially in mountain areas. The survival of a breed depends on its ability to meet market demands for derived products and to exploit their inner quality. The Val3Ciuta project aims to characterise and promote the products derived from the Ciuta sheep—meat, milk, and wool—recovering the potential triple purpose of this native breed from the alpine area of Lombardy, Italy. Through chemical analyses, the nutritional properties and specific chemical markers of meat and milk were identified and linked to a traditional farming system based on grazing practices, use of local forages and natural reproductive cycles. Fresh ($N=60$) and cured ($N=26$) meat samples were collected during spring and winter seasons of 2023–2024. Ciuta sheep chops were identified as lean meat (<5% fat), regardless of

commercial category (light or heavy lambs, ewes, ram). Traditional dry-cured products, *violino* and *bresaola*, comprised 45% protein and 4–5% fat, of which 45–50% was unsaturated. Milk qualitative parameters were measured in an 11-week trial ($N = 110$). On average, 336g of milk were collected per ewe during a single daily milking, with top producers yielding up to 698g, with part of milk still suckled by lambs. Ewes were also assessed for their milking attitude. Discomfort behaviors at milking decreased over the trial (from 1.9 to 1.3 movements/min), with individual differences, indicating promising potential for selection in milk production among ewes. Milk comprised 4.8% lactose, 5.8% protein, and 4.6% fat, with an excellent n-6/n-3 ratio (1.4) and beneficial fatty acids content (2.9% BCFAs, 1.3% CLAs). Somatic cell counts were below the threshold suggested for healthy sheep mammary glands and high milk quality ($<250,000$ cells/mL). Wool quality was assessed; contributing to its valorisation and to the development of a local supply chain for the future, considering that wool is still considered a by-product to discard. Each sheep yielded about 1.5kg of wool per shearing, with a yield on greasy wool of 75% in line with non-Merino small breeds. The average fiber diameter of 30.0 μ m (61.8% comfort factor) highlighted a rather coarse wool but usable for textile purposes. These outcomes promote an added value for the Ciuta sheep, providing farmers with original knowledge, stimulating interest from agricultural entrepreneurs, and supporting biodiversity conservation in the alpine area.

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O343

Effects of including destoned olive cake in sheep feed on meat quality and salami production

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The residual cake produced during olive oil extraction is rich in oil and can be used in animal feed due to its high content of fatty acids and bioactive compounds, which may influence meat quality. This study examined the effect of incorporating destoned olive cake (OC) into sheep feed on meat and salami production. A total of 124 ewes (homogeneous for parity and milk yield) were randomly assigned to control (CTR) and experimental (EXP) groups. All ewes

grazed pasture, with CTR ewes receiving 0.5 kg/d/ewe of commercial concentrate, while EXP ewes were given the same concentrate supplemented with 17% OC on a fresh matter basis. After a 16-week trial, 10 ewes (5 from each group) were slaughtered (BW 46.9 \pm 6.9 kg and 59.4 \pm 5.2 kg, respectively), and the meat from their carcasses was used to produce salami. The meat from each group was minced and divided into three portions to prepare the following mixtures: 100% sheep meat (SM), 90% SM +10% heifer meat (HM), and 90% SM +10% pork lard (PL). All mixtures were seasoned, stuffed into natural casings, and aged for 32 days in a controlled chamber (11–20 °C temperature, 62–88% humidity). The chemical composition, fatty acid profile, microbiological aspects, and sensory properties of the salami were evaluated. Salami made from SM had lower L* values and higher a*, b*, and Chroma values compared to HM and PL. EXP salami showed lower weight loss than CTR (40.9% vs. 45.5%), with SM and HM mixtures having higher weight loss than PL. EXP salami had lower water (38.7% vs. 44.3%) and protein content (25.8% vs. 28.6%), but higher fat content (29.6% vs. 20.6%). Within each group, water content increased from SM to HM to PL. The inclusion of OC in the diet increased polyphenol content and monounsaturated fatty acids, primarily oleic acid, while reducing saturated fatty acids in SM. No significant effect on lipid oxidation was observed in the salami. Lactic acid bacteria and coagulase-negative staphylococci reached ~8.0 log CFU/g in both groups' salami, with no pathogenic bacteria found. In sensory analysis, EXP salami had a more pronounced olfactory impact, with vegetal and herbal notes, and hints of undergrowth and oxidative characteristics from the OC in the diet. In conclusion, OC is a valuable feed supplement for ewes, including those at the end of their productive life. Although OC influenced product quality at varying levels, further studies are needed to investigate different inclusion levels to optimise its health benefits.

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O366

Effects of feeding bergamot by-products on performance and meat quality in lambs

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