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Effect of breed on milk fat quality: comparison between Altamura and Leccese

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The aim of this work was to investigate the effect of breed on morphometric characteristics of fat globules, fatty acid composition, and cholesterol content of milk from two autochthonous sheep breeds at risk of extinction: Altamura (A) and Leccese (L) breed. The sheep used in this study (20 subjects for each breed), belonging to the same mounting groups within the considered breed, were reared under an extensive system on the same farm in the province of Potenza (southern Italy). The milk fat globules (MFGs) size were measured on milk individual by using a fluorescence microscope; fatty acid profile was determined by GC and cholesterol content by HPLC-UV. After determination of diameter, MFGs were divided into three classes: small globules (diameter <2 µm), medium-sized globules (2 ÷ 5 µm), and large globules (>5 µm). The percentage incidence of each globule class on total measured milk fat globules was calculated: $\frac{\sum n_{\text{iglobules}}(\text{each class})}{\sum n_{\text{total globules}}} \times 100$. The statistical analysis was performed by means of ANOVA. No significant difference was detected for fat content: 7.18 and 7.15 g/100 g milk, for A and L milk, respectively. However, a higher incidence of smaller and medium MFGs was associated with the A milk (29.21% and 65.37%, respectively) compared to L milk (24.17% and 58.93%, respectively); whereas, L milk showed a higher incidence of large MFGs (16.90%) than A milk (5.42%). GC analysis revealed differences in the lipid profile of each breed. In particular, a higher content of saturated fatty acids was detected in A milk (71.89%) than L milk (68.74%; $p < .05$), which showed a higher content ($p < .05$) of monounsaturated (25.09 vs. 22.69% for L and A milk, respectively) and polyunsaturated fatty acids (4.33 vs. 3.35% for L and A milk, respectively). Moreover, L milk showed a higher PUFA_{n-3} content (1.72 vs. 0.93% for L and A milk, respectively); consequently, atherogenic and thrombogenic indices were significantly higher in A milk than L milk (3.14 and 2.92% vs. 2.38 and 2.22%, $p < .05$). However, no difference were detected for PUFA_{n-6} and CLA content (2.40 and 2.05% vs. 2.29 and 1.83% for L and A milk, respectively). The highest cholesterol content was detected in L milk (16.87 mg/100 g milk) compared to A milk (15.91 mg/100 g milk; $p < .05$). The differences highlighted in this study on fat characteristics could be ascribed to the genetic peculiarities of the genomes of the two considered breeds, which are the result of a selective process linked to adaptation.

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Fatty acid profile, liposoluble vitamins and antioxidant capacity in three historic cheeses of southern Italy: Piacentinu ennese DOP, Maiorchino e Canestrato di Moliterno IGP

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Piacentinu Ennese PDO (PE), Maiorchino (MR) and Canestrato di Moliterno IGP (CM) are historical cheeses belonging to the dairy tradition of southern Italy. PE, produced in Sicily, is a pressed pasta cheese with a unique yellow colour, due to the use of saffron in the milk; it is produced with raw, whole ewe's milk using traditional tools predominantly on wood. MR is a Sicilian hard cheese, still produced with traditional techniques, from raw, whole ewe's milk sometimes mixed with goat's milk (ewe's milk 30–50% and goat milk 70–50%). CM cheese is a PGI hard cheese produced in Basilicata with a combination of raw or heat-treated goat and sheep milk (70–90% sheep's milk and 30–10% goat's milk).

PE (5 samples), MR (3 samples) and CM (5 samples) cheeses were chosen at ripening phases mostly appreciated by consumers (4, 10 and 6 months, respectively). Cheeses were analysed for fatty acid composition (% of Fatty Acid Methyl Esters, %FAME), retinol, α -tocopherol (mg/kg of cheese), total phenol content (TPC) and antioxidant capacity with FRAP (ferric reducing ability) and TEAC (trolox equivalent antioxidant capacity) tests. MR cheese was characterised by a lowest content of SFA (Saturated Fatty Acids) 65% vs. 70% and a highest content of monounsaturated fatty acids 27% vs. 24% vs. 22% respect to CM and PE, respectively. As concern beneficial fatty acids, MR cheese showed a highest content of CLA c9 t11 (1.8% vs. 1.4% vs. 1.1%) and of Polyunsaturated Fatty Acids- ω 6 (PUFA- ω 6, 2.2% vs. 1.9% vs. 1.8%) compared to PE and CM, respectively. PE cheese was featured by a highest content of PUFA- ω 3 (2.1% vs. 1.6% vs. 1.4%) and consequently the lowest ω 6/ ω 3 ratio value compared to MR and CM cheeses. Retinol content (mg/kg of cheese) was significantly higher in PE (4.1) than MR (3.2) ($p < .05$) and it was intermediate

in CM (3.5) cheeses; α -tocopherol values were 9.7, 8.2 and 7.9 (mg/kg of cheese) for PE, MR and CM, respectively.

TCP values were 4.66, 3.75 and 3.93 (g GAE/kg cheese) in CM, PE and MR, respectively. FRAP assay detected a wide range of values: 1.77, 3.10 and 2.56 (mmol FeSO₄/kg cheese) in CM, PE and MR, respectively. TEAC values (mmol Trolox/kg cheese) were significantly higher ($p < .001$) in CM (63.1) and MR (44.6) respect to PE (16.2) cheeses. In conclusion, values of fatty acids, vitamins, TCP, FRAP and TEAC characterize the single cheese because they are linked to the breed, feeding system, production season and ripening phase. This gives them the characteristic of uniqueness.

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Poultry meal in feed for Gilthead seabream (*Sparus aurata*): results from an ‘on farm’ feeding trial

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An ‘on farm’ feeding trial was conducted on Seabream (*Sparus aurata*), with inclusion of poultry meals (PM) in the diet to replace fishmeal (FM) as protein source. The aim of the study was to evaluate the possibility of a complete substitution of FM; therefore, the inclusion of other alternative protein sources, such as plant-derived proteins and an addition of AA, including taurine, was adopted. Three floating cages of 5600 m³ each, moored in the North Adriatic Sea, were loaded with 173,589–185,213 fish/cage of 267–285 g mean initial weight, total biomasses ranging from 46,348 to 52,786 kg. Fish were fed for 83 days with either a Ctrl (a commercial diet) or two experimental diets: A (20% PM +10% FM), and B (20% PM +10% corn gluten meal). At the end of on-growing, total biomass and fish average size were measured. Gut samples were collected for histological and microbiota analysis.

The fish cage that received Ctrl feed (49,700 kg in total), reached a production of 24,742 kg, SGR 0.514, FCR 2.001, with a mortality of 620 fish. The cage that received diet A (52,900 kg feed), reached a production of 27,032 kg, SGR 0.495, FCR 1.957, with mortality of 143 fish. The third cage, receiving diet B (41,975 kg feed), reached a biomass of 20.816 kg, SGR 0.474, FCR 2.016, with a mortality of 595 fish.

Histological examination revealed alterations attributable to enteritis in all fish, in particular in those receiving zero FM and

unexpectedly, in those fed the Ctrl diet, whereas fish receiving 10% FM the enteritis was significantly less severe. Gut microbiota analysis is still in progress and results will be shortly available. The apparently higher biomass reached with diet A may be explained by an higher feed consumption and a lower FCR. The Ctrl diet led to a better SGR, nevertheless FCR was the same as FCR of diet B (FM free). The results showed that the performance of fish fed with diet B with a complete substitution of FM, did not differ markedly from fish fed with the Ctrl diet, nevertheless the intestinal morphology indicated a nutritional imbalance in diet B. Therefore, in spite of similar performances observed among the cages, before the marketing of FM-free commercial diets, further studies need to be conducted at a laboratory scale, to identify how to further balance the feed formulations.

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Quails meat quality as affected by *Tenebrio molitor* larva meals in feeds

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Insects have been rapidly emerging as an alternative high quality, efficient and sustainable protein source to the conventional livestock feed protein. *Tenebrio molitor* (TM) is considered one of the most promising species in this sense. This study evaluated the effect of a partial replacement of soybean and corn meal with TM larval meal in the diet of common quails (*Coturnix coturnix*) on physical and chemical characteristics of raw and cooked meat. To this purpose, 96 quails, divided into four groups (24 quails per group), were fed with four different diets for a period of 42 days. A group with soybean and maize meal (C), the other three groups with a partial replacement of soybean meal at 5, 10, 20% with TM meal (T5, T10, T20, respectively). All the diets were isonitrogenous, isolipidic, and isoenergetic. At 42 days of age, quails were slaughtered, and the peeled carcasses were used for meat quality evaluations. Specifically, each carcass was divided into two symmetrical halves to analyze the left side as raw, allotting the right half to the cooking trial (baking in oven at 200 °C for 35 min). Data related to the raw and cooked samples were analyzed separately by means of one-way ANOVA using PROC GLM of SAS statistical software. Marketable and physical parameters showed that the inclusion of TM meal did not compromise the carcass traits and cooking losses of the product. The T20 raw breasts were