Hen eggs represent a traditional food with an excellent nutritive value due to the presence of highly digestible proteins, vitamins, minerals and lipids, such as polyunsaturated fatty acids (PUFAs). Lipid composition of hen eggs is a subject of primary consumer concern, due to the relationship between specific dietary lipids and the development of coronary heart diseases (CHD). Nowadays, it is well known that ω-3 PUFAs provide important health benefits to humans as prevention and treatment of many chronic diseases. The most significant ω-3 PUFAs appear to be α-linolenic acid (ALA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and for the mentioned reasons over the course of time a growing interest has been developed in the production of eggs rich in ω-3 fatty acids, by feeding laying hens with experimental feedstuffs containing these nutrients. For example, ALA is predominantly in seed oils such as flax (*Linum usitatissimum*). Linseed is unique among oilseeds because of their exceptionally high content of ALA (≅50% of the total oilseed).

The aim of this work was to determine the effect of the hens diet integration with extruded flaxseed (7%) on productive parameters and on the quality of resultant Bio-ω-3 eggs.

At the end of the treatment, no significant difference was observed for eggs production while it was observed for the average egg weight (58.05 ± 1.94% for control eggs vs. 63.37 ± 2.14% for flax eggs). Regarding, instead, the chemical-nutritional parameters, significant differences were not observed for total lipids and in the TBARs-test while significant differences were observed in the acidic profile. Specifically, ω-3 PUFAs were higher in flax eggs ($p< .01$) while SFA were higher in control eggs ($p<.01$). Also, β-carotene was found higher in flax eggs (478.20 ± 15.19 µg/g vs. 324.80 ± 13.84 µg/g, $p<.001$). The aromatic profile was, also, analysed and significant differences were observed both for the alcohols and aldehydes compounds ($p< .05$). Finally, a significant difference in the colour was observed between the two types of eggs ($\Delta E_{ab}=1.77 \pm 0.23$, $p<.05$).

In conclusion, it is possible to assert that the integration of the laying hens diet gave positive results as it has not negatively affected the production parameters, has improved the ω-6/ω–3 ratio (5.9:1 for flax eggs vs. 62:1 for control eggs) and the β-carotene content, and has decreased the percentage of SFA guilty of cardiovascular pathologies.

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Effect of dried liquorice root supplementation on chemical-nutritional quality of dairy products obtained from goats

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Enriching the goat's diet with plant extracts, rich in bioactive compounds, allow to improve the chemical-nutritional properties of dairy products. Liquorice has anti-inflammatory, antimicrobial, antioxidative effects associated with the presence of compounds, as triterpene saponins, flavonoids and coumarins.

The aim of the present work was to evaluate the effect of dietary integration with 8% of dried liquorice root on chemical-nutritional quality of goat milk and cheeses. The study was conducted for 60 days on Saanen goats divided into two groups: a control group (CG) and an experimental group (LG+) whose diet was supplemented with liquorice. Milk samples were collected to determinate chemical-nutritional composition and fatty acids profile (FA) at 30 and 60 days from the beginning of the study. At the end of the experiment, cheeses produced with CG and LG + bulk milk were analysed for chemical–physical parameters at 3 (T3) and 60 (T60) days of ripening.

A different FA profile and a significant increase in proteins ($p<.01$) and casein ($p<.01$) percentage but no variation in lipids, lactose, urea and in FA were observed in LG + milk samples respect to CG milk. Regarding cheeses, no variation in lipid and protein but a lower water content ($p<.05$) were found in LG + T3 and T60 cheeses, this reflected in a different texture. Indeed, the LG + cheeses were harder, more elastic and more gummy than the CG cheeses and these differences were observed both in fresh and aged cheeses. Moreover, the LG + cheeses showed a yellowish colour probably correlated to the presence in LG + milk of specific compounds of liquorice roots, such as tannins, carotenoids and ascorbic acid which have antioxidant activity and are also responsible for the yellow colour. A greater presence of antioxidant compounds deriving from liquorice roots can be also correlated with greater oxidative stability found in both LG + T3 ($p<.05$) and T30 ($p<.05$) cheeses. Different families of volatile compounds were detected in T30 cheeses obtained from the two groups. A significant reduction of octanoic acid ($p<.05$) and a significant increase in nonanal ($p<.01$) were found in LG + T3 cheeses, instead in LG + T60 cheeses, significant increases of 3-methyl, 1-butanol ($p<.01$) and acetoin ($p<.05$) have been found.

In conclusion, it is possible to assert that the integration with liquorice has modified chemical and technological properties of goat cheeses, improving the oxidative stability and inducing changes in texture and colour.

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Effects of polyphenols and algae supplement on rabbit meat quality

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Recently, natural extract has been studied as dietary supplement in animal feed for its antioxidant, anti-inflammatory, antiviral and antimicrobial properties. There is a growing interest on the use of natural supplements in rabbit nutrition in order to enhance meat quality, improving oxidative stability and nutritional parameters. Moreover, these nutritional strategies are able to support growth performances in rabbit antibiotic-free production, which is gaining increasing interest by producers and consumers. The aim of the study was to evaluate the effect of a dietary supplementation with natural extract mixture in growing male rabbit on *Semimembranosus* muscle quality parameters. One hundred and forty-four New Zealand White rabbits were housed in an antibiotic-free production system for 42 days and divided into 3 experimental groups (4 rabbits/cage) from weaning (35 days old) to slaughter. The first group fed a basal diet (C), the second (T1) and the third one (T2) received 0.3% and 0.6% of natural extract mixture containing polyphenols and brown seaweeds. At slaughter (average live weight 2.89 ± 0.33 kg) 10 carcases per groups were randomly selected, frozen and sent to lab for determination of meat quality and sensory parameters. Right thighs were selected and chemical parameters, pH, colour parameters, Vitamin E content, oxidative stability and sensory analyses were performed. Data on meat quality were analysed by one-way ANOVA and sensory parameters were analysed using three-way ANOVA. Physical and chemical parameters of *Semimembranosus* muscle did not differ ($p>.05$) among experimental groups. Vitamin E content was improved by dietary treatment (0.130 ± 0.001 mg/100 g C; 0.174 ± 0.001 mg/100 g T1; 0.164 ± 0.001 mg/100 g in T2; $p<.001$). However, oxidative stability was not affected by dietary treatments (0.136 ± 0.002 mg/kg C; 0.133 ± 0.001 mg/kg T1; 0.131 ± 0.002 mg/kg MDA in T2; $p>.05$). Sensory evaluation revealed that dietary supplementation with polyphenols and brown seaweed improved ($p<.05$) meat texture parameters and aroma. Overall, these results highlight that in rabbit antibiotic-free production, dietary supplementation with plant polyphenols and brown seaweeds, positively affects *Semimembranosus* muscle sensory parameters, enhancing Vitamin E content.

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The production of typical cured meats from cattle of Cinisara breed

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The meat of Cinisara cattle could be used to obtain also processed products as commercial alternatives to fresh meat. The aim of this research was to produce bresaola and salami from adult cows (AC) and grazing (GB) or housed (HB) young bulls of Cinisara breed, evaluating their physico-chemical and sensory traits. In the last 3 months, all animals were fed with hay and concentrate; moreover, AC and GB were continuously grazing pasture until slaughtering. The carcases were dissected to separate *semimembranosus*, *semitendinosus* (ST) and *biceps brachii* muscles for bresaola and using the rest of meat for salami. The muscles, after removing fat and tendons, were salted for 14 days at 4 °C, dripped for 8 days at 4 °C, stuffed into natural casing and transferred to drying cells. For the salami, the meat was minced with 20% of lard from pigs of 'Nero dei Nebrodi' breed cut into cubes, and a mixture of salt and spices; each mixture was stuffed into natural casings of straight type (35 cm in length and 7 cm in diameter). During the phases of production, the salami and bresaola were stored in rooms with controlled temperature and relative humidity for 45 and 35 days, respectively. The fat content (% DM) was higher in AC for both bresaola (as muscles mean values: 9.68 vs. 4.78 in HB and 3.52 in GB; $p\leq.001$) and salami (41.46 vs. 36.96 in HB and 32.62 in GB; $p\leq.01$), due to the higher fat content of meat. The contents of SFA, MUFA and PUFA (% FA) in bresaola, as muscles mean values, showed differences among animals (45.24, 42.51 and 10.79 in AC; 41.73, 23.33 and 34.80 in GB; 45.20, 32.32 and 21.72 in HB; $p\leq.001$), as consequence of their different diet, age and especially, intramuscular fat; indeed, the increase of this latter, increasing the level of intracellular lipids, reduce the relative incidence of PUFA incorporated in phospholipid cell membranes. In salami, the differences were minor probably due to the lower lipid contribution of meat compared to the lard added. Sensory analysis of salami showed a better overall acceptability for AC. The bresaola from ST of grazing animals (AC, GB) showed higher shear force. In both products, the volatile organic compounds were higher in AC than in GB and HB. The multivariate statistical approach discriminated animal categories for both bresaola and salami. The results evidenced the possibility to obtain bresaola and salami from different animals and muscles, thus to improve the economic performance of autochthonous cattle.