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ASPA 24th Congress Book of Abstract

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Padova, September 21–24, 2021

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Padova, September 21-24, 2021

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content, that was lower (5.8 ± 0.8 g·kg^{-1}) in SC samples compared to literature grass values (25 g·kg^{-1}). Total Viable Count was scant and Salmonella was never present. Salad crops are a prospective feed ingredient for ruminants' diets, albeit a full assessment of their potential requires further investigation.

Acknowledgements
The present work was funded by Ministero degli Affari Esteri e della Cooperazione Internazionale, as part of Progetto di Grande Rilevanza IT-RS 'Sustainable animal nutrition' (SAN).

SENSORY AND INSTRUMENTAL ORGANOLEPTIC PROPERTIES

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Mechanical strength of myofibrillar and connective tissue of Italian Mediterranean Buffalo meat

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Meat tenderness, or toughness, is a complex property determined mainly by the connective tissues and the muscle fibres. The amount of collagen, as well as the density and type of cross-links between collagen fibrils are directly linked to meat toughness. The aim of this study was to investigate the effect of sex and ageing time on the mechanical strength of Italian Mediterranean Buffalo meat using the Warner-Bratzler shear force (WBsf) test and the Texture Profile Analysis (TPA), which are the classic mechanical methods for estimating meat tenderness. Samples of *Longissimus thoracis* muscle, from 6 young males and 6 spent females (17 ± 1 and 47 ± 18 months old, respectively), were aged at 4 °C for 7 and 14 days. At each ageing time, meat samples were analysed for WBsf on raw and cooked meat, and for TPA on raw meat. WBsf of raw meat gives an estimation of the connective tissue toughness, whereas WBsf of cooked meat largely reflects myofibrillar toughness. For WBsf of cooked meat, the meat was vacuum packed and cooked in a water bath at 75 °C until the internal temperature reached 70 °C. In WBsf test, tenderness was measured as the maximum force required to shear 1 cm^2 cross-section cores. In TPA test, samples were compressed twice at 20% and 80% of their original height. Hardness (H, maximum force required to compress the sample) at low and high strain values were used to measure the strength of the myofibrillar and connective tissue, respectively. Data were analysed by GLM procedure considering sex and ageing time as factors. As regarding connective tissue, no significant differences between sexes were observed in WBsf values of raw meat and H at 80%, probably also due to the confounding effect of age at slaughter. Similarly, no significant differences were detected for the two parameters during ageing. Young males' meat was found to have significantly higher cooking loss percentages than that of spent females (26% vs. 22%; $p = .004$). Concerning myofibrillar tissue, no significant differences between sexes were observed for WBsf values of cooked meat and H at 20%. Instead, ageing significantly reduced only the WBsf values of cooked meat (47.32 vs. 34.15 N; $p < .001$) that is an estimation of myofibrillar toughness. The results indicate that H at 80% showed a lower coefficient of variation than that of WBsf of raw meat, and WBsf on cooked meat are more suitable to estimate the connective and myofibrillar tissue strength of meat, respectively.

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Muscle pigmentation in rainbow trout fed novel protein sources from microalgae and crustaceans: the image analysis approach

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The pink-red pigmentation of rainbow trout (*Oncorhynchus mykiss*) fillet determines consumer choice and economic value of the products. The main responsible for salmonid muscle pigmentation is astaxanthin, that is provided with diet, primarily as synthetic astaxanthin. However, the high costs of synthetic pigments and the consumers' concerns about their use in animal feeds are leading the research for natural carotenoids.
The pattern of fillet pigmentation was assessed in rainbow trout (*Oncorhynchus mykiss*, $n = 63$, mean weight 260.5 g) fed for 15 weeks with six (in triplicate) iso-proteic (42%) and iso-lipidic (24%) pelleted diets deprived of fish meal where 10% of vegetable protein blend was replaced by microalgae dried biomass (*Arthrospira platensis,* AP, *Tetraselmis suecica,* TS, a mix of *Tisochrysis lutea* and *T. suecica,* MA) or red swamp crayfish (*Procambarus clarkia*, RC) meal. A commercial diet (CO, 3 replicates) was used in the trial. The feeding trial was carried out at the Edmund Mach Foundation (San Michele all'Adige, IT). All procedures involving fish

manipulation were carried out in accordance with the EU legal framework relating to the protection of animals used for scientific purposes (Directive 2010/63/EU). They were approved by the Animal Welfare Committee of the Istituto Zooprofilattico Sperimentale delle Venezie and authorized by the Italian Ministry of Health (permission n. 530/2018-PR). An automatic, repeatable, free, and objective image analysis tool for the integrated determination and direct visualization of fillet colour was applied to digital images. Colour of fillets was also measured with a chromameter (L*, a*, b* indexes) and used to validate image analysis results. Fillet carotenoid content was determined, and the pattern of variation was compared to that obtained by image analysis.

Image analysis results and colorimetric data consistently indicated that, even if characterized by a significantly higher fillet carotenoid content respect to vegetable control (0.85–2.13 mg kg^{-1} vs. 0.17 mg kg^{-1}), fillets of trout fed microalgae-based diets displayed a yellowish colour instead of the desired pink-red one. *P. clarkii* meal was instead confirmed as a promising and sustainable integration in vegetable aquafeed for carnivorous fish, in view of its carotenoid content (0.49 ± 0.07 mg kg^{-1}) and coloring capacity. Further studies are required to evaluate the potential of this ingredient as a natural source of carotenoids, both testing the effects on flesh pigmentation of higher percentages of inclusion and longer administration times, or at different developmental stages.

FOOD LABELLING AND VALORIZATION

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Using Blockchain for animal welfare labelling: a case-study on dairy products

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This study aimed to explore the applicability of blockchain as an instrument to convey clear and unalterable information on the welfare of food-producing animals, in order to improve consumers' trust in farmers and in the livestock sector.

Dairy products were taken as a case-study, and parameters listed in the ClassyFarm welfare assessment protocol were used. An exploratory questionnaire was submitted to a small sample of Italian consumers ($N = 112$) asking them to rate, on a 0-to-5 scale, the perceived importance of each of the parameters of the ClassyFarm checklist in determining dairy cows' welfare. Based on the ratings attributed by consumers, a prototype webpage was built, in which animal welfare parameters could be shown to consumers based on their perceived importance.

The Blockchain-based prototype was built so that consumers, through a QR-code and/or a batch number printed on the dairy product packaging, could access a specifically-created 'landing page'. The landing page allowed consumers to freely navigate among different animal welfare parameters and showed first those parameters which were rated as more important in the questionnaire. For each parameter, the page would provide specific information on the farm (or farms) from which the milk came from. Each parameter, classified as insufficient, improvable, or optimal according to the ClassyFarm protocol, would be visualized in the landing page using an intuitive traffic-light system (red, yellow, or green, respectively), and providing additional information upon request.

Our method allowed the creation of a prototype that would allow consumers to retrieve information concerning the product of animal origin they are going to buy. The prototype was meant to be intuitive and easy to understand also for those having no previous knowledge about animal production or animal welfare. This case-study could represent a first step towards using blockchain technology for animal welfare certification, fostering a direct information exchange between producers and consumers, thus enhancing the growth of new, diversified markets based on trust and transparency. A foreseeable weakness would be the need to feed the system with very heterogeneous data, originating from different data acquisition systems that are not always fit with automation. This issue could be overcome over the next years thanks to the progressive implementation of the integrated ClassyFarm system.

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A labelling scheme to communicate the health values and environmental sustainability of meat and milk from extensive farming

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Food from extensive agricultural systems may have positive peculiarities which can hardly be valued because not adequately perceived by consumers. Food labels let manufacturers to promote the value-adding qualities of their products and help consumers make informed choices about the food they buy. In the EU, the Regulation No 1169/2011 provides the principles governing mandatory food information on nutritional characteristics, allowing additional forms of expression and presentation only if based on sound and