

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 ( $0.85\text{--}2.13\text{ mg kg}^{-1}$  vs.  $0.17\text{ mg kg}^{-1}$ ), 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 ( $0.49 \pm 0.07\text{ mg kg}^{-1}$ ) 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

### P170

#### 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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### P171

#### 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