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Bridging environmental sustainability and intrinsic quality traits of pork

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The perceptions by consumers of fresh pork quality determine their re-purchase behaviour, which is key to the success of the pork industry. Consumers rely on intrinsic (product-related) and extrinsic (production-related) cues to form their opinions about pork. The intrinsic cues (organoleptic, technological and nutritional properties) are usually used to assess pork quality. Extrinsic cues refer to the ethical, cultural and environmental dimensions of pork production, and are becoming increasingly important to consumers who are notably seeking pork produced in sustainable and environmentally friendly practices. Notwithstanding, studies integrating environmental impacts into pork quality assessment are constrained. This work intends to address this drawback through two approaches. First, we provide an overview of the current knowledge on the expectations of consumers towards environmental sustainability of pork production with an emphasis on the gap between attitudes (expectations) and behaviours (willingness-to-purchase). Second, a proof of concept integrating environmental footprints with intrinsic qualities of meat was provided. For that, we used an experiment from farm-to-fork designed to improve intrinsic and extrinsic dimensions of pork quality. The trial included two pig genotypes (Duroc and Pietrain NN crossbreeds) and two feeding regimens: an experimental diet with extruded faba bean (national origin) as protein and extruded linseed as omega-3 fatty acid sources, while the control diet was based on oilseed meal (imported soybean, rapeseed and shelled sunflower). Raising Duroc crossbred pigs with the diet containing extruded faba bean and linseed was found as a favourable strategy to jointly improve the sensory, technological and nutritional properties of pork, while meeting the challenge of relocating protein feed resources. We further calculated and compared the environmental impacts of the four combinations of pig genotype and feeding strategy using life cycle assessment, and addressed their relationships with intrinsic meat quality traits using multivariate and clustering analyses. Incorporating environmental impacts into pork quality assessment can help promoting sustainable pork production practices and guide consumers in their purchase decisions.

Improving milk intrinsic quality: considering synergies and antagonisms of farming practices

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While over the past 30 years many studies have focused on the effects of farming practices on a few milk compounds, few have considered combinations of farming practices on all compounds characterizing the intrinsic quality of milk. However, these practices could interact with each other and have antagonistic or synergistic effects on different compounds. Therefore, this study aimed to investigate the effect of combinations of farming practices on overall intrinsic quality of milk using data obtained from private farms. Ninety-nine dairy farms were visited to collect a sample of bulk tank milk and to conduct a survey on the farming practices applied to produce this milk (herd characteristics, feeding management, housing conditions, milking and milk storage conditions). The milk sample was analysed according to different compounds involved in intrinsic quality. A multi-criteria assessment was then conducted: it allows to implement about 30 indicators from the analyses carried out on milk, which, when aggregated, give scores (from 0 to 10) of the 4 dimensions (sensory, technological, nutritional and health) of the intrinsic quality and of the overall intrinsic quality. This assessment is implemented for 2 targeted products: raw milk cheese and semi-skimmed ultra-high-temperature milk. These indicator values, dimension and overall intrinsic quality scores were then predicted from combinations of farming practices using the regression tree method. Regression trees allowed to identify the combinations of practices that lead to the best indicator values, dimension and overall intrinsic quality scores, and to prioritize the importance of these practices. By comparing the trees, it was also possible to determine synergistic and antagonistic effects of farming practices among the different indicators, dimensions and targeted products. This method could be adapted to other topics such as the 'One quality' by considering both extrinsic aspects of quality in order to determine the trade-offs to be made among different quality aspects.