HAL open science

Editorial: Quality of animal-source foods related to their production and processing conditions

G Richard, S de Smet, M Font-I-Furnols, F Leroy, V Lind

To cite this version:

G Richard, S de Smet, M Font-I-Furnols, F Leroy, V Lind. Editorial: Quality of animal-source foods related to their production and processing conditions. Animal, 2022, 16 (Supplement 1), pp.100440. 10.1016/j.animal.2021.100440 . hal-03714279

HAL Id: hal-03714279

https://hal.inrae.fr/hal-03714279

Submitted on 20 Jan 2023

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Distributed under a Creative Commons Attribution 4.0 International License

Animal 16 (2022) 100440

Contents lists available at ScienceDirect

Animal
The international journal of animal biosciences

Editorial: Quality of animal-source foods related to their production and processing conditions

G. Richard [a,*], S. De Smet [b], M. Font-i-Furnols [c], F. Leroy [d], V. Lind [e]

[a] Direction de l'Expertise scientifique collective, de la Prospective et des Etudes (DEPE), INRAE, 147, rue de l'Université, 75338 Paris Cedex 07, France
[b] Ghent University, Department of Animal Sciences and Aquatic Ecology, Ghent, Belgium
[c] IRTA-Food Quality and Technology, Finca Camps i Armet, 17121 Monells, Girona, Spain
[d] Research Group of Industrial Microbiology and Food Biotechnology (IMDO), Faculty of Sciences and Bioengineering Sciences, Vrije Universiteit Brussel, Pleinlaan 2, 1050 Brussels, Belgium
[e] Norwegian Institute of Bioeconomy Research (NIBIO), Pb 115, NO-1431 As, Norway

The quality of a food is generally reliant on the attributes that give it the ability to satisfy the stated or implicit needs of a user. The notion of quality has become increasingly complex, especially for animal-source foods. This evolution is paralleling and partially driven by concerns related to their impacts on human health and environment, to farming and food processing practices and to animal welfare. Such concerns, however, are set to play out in a sector marked by a mosaic of very different production and processing models. Consumption practices also change, which comes with a set of (sometimes conflicting) expectations. There is not only a clear demand for convenient ready-to-cook and ready-to-eat meals, which are often (but not always) highly processed, but also for quality labels (including organic), wholesome nutrition, etc. In addition, high levels of red meat and processed meat consumption have become a public health concern. Beyond their role in nutrition (macro- and micro-nutrients), recent public nutrition and health programmes (in UK and France, for instance) recommend limiting their consumption level.

The 10 papers within this supplement issue are the result of a collective effort by scientists with complementary scientific knowledge, situated in the domains of animal production, food science and technology, human health, economics, law and social sciences. They critically address the scientific literature, using input from around 3 500 publications, to address the special issue's central objective of characterising the quality of animal-source foods according to animal production and food processing conditions. This collective and multidisciplinary scientific assessment was carried out by the French National Research Institute for Agriculture, Food and Environment (INRAE) at the request of the Ministry of Agriculture and Food and the public French agency 'France AgriMer' (an agency dedicated to trends and challenges in agriculture). It considered the importance of consumer behaviour, the impact of consumption on health, the authentication of the animal production and food processing conditions, and the regulatory instruments that can bring transitions to improve the diet. Additionally, several factors or steps in the food chain that induce antagonisms or take advantages of synergies among quality attributes were singled out.

The authors of this supplement issue approach the quality of animal-source foods by jointly characterising their safety and health impact, commercial criteria, sensory, nutritional, technological, and convenience quality attributes, while also looking into their ethical, cultural and environmental dimensions, the latter shaping the food image quality attributes. Whereas standard products focus mostly on commercial attributes (the basis on which farmers get paid), certified labels aim at fulfilling other needs and wants such as typicality and specificity, higher sensory attributes and practices that respect environment and human health.

A series of six papers focus on the determinants of the different dimensions of food quality, specifically looking into bovine carcass and meat (Clinquart et al., 2022), ovine carcass and meat (Prache et al., 2022a), pig carcass and fresh pork (Lebret and Čandek-Potokar, 2022a), processed pork products (Lebret and Čandek-Potokar, 2022b), poultry carcass and meat (Baéza et al., 2022), and chicken table eggs and egg products (Gautron et al., 2022). They mainly deal with on-farm and slaughtering conditions, but also address the effects of some processing conditions.

The paper by Raulet et al. (2022) is dedicated to the quality of the certified label *Label Rouge*, analysing how its specifications help to shape superior sensory and image attributes through commitments along the production chain for beef, together with the selection of label-eligible animals, carcasses and meats.

Cabiddu et al. (2022) seek to go beyond the results obtained in experimental controlled trials, by pioneering a quantitative review on the effects of on-farm feeding practices (fresh *versus* conserved forages, grass or maize silage-free diets, permanent grasslands rich in species or plant secondary metabolites) on a wide array of quality traits in meat and dairy products from cattle, sheep and goat.

The demand for organic foods being expanding, a paper cross-cutting the various animal sectors reviews the literature on the quality and authentication of organic dairy, meat, fish and eggs (Prache et al., 2022b). The authors seek to decipher the farming practices underlying the differences observed.

* Corresponding author.
E-mail address: guy.richard@inrae.fr (G. Richard).

https://doi.org/10.1016/j.animal.2021.100440
1751-7311/© 2021 The Author(s). Published by Elsevier B.V. on behalf of The Animal Consortium.
This is an open access article under the CC BY license (http://creativecommons.org/licenses/by/4.0/).

The main lessons of this scientific collective assessment are synthesised by Prache et al. (2022c). The authors highlight critical factors determining quality attributes; to cite a few: animal feeding, preslaughter and slaughter conditions, thermal processing conditions and additives. They also review recent nutritional epidemiology meta-analyses, which investigate the associations between the consumption of animal-source foods and increased or decreased risk for chronic non-communicable diseases, and inform public health recommendations. The authors also point out that synergies and antagonisms may arise between the different dimensions of quality, as well as between the different stages of food elaboration for various products.

A major lesson from this collective scientific assessment is that, beyond the essential requirement of safety, commercial attributes held primacy, particularly for standard commodity food products. This primacy is, for instance, manifest in the beef, sheep and pork carcass value criteria dictating payment to farmers. These 'quantitative-first' commercial attributes have driven genetic selection, output—focused livestock specialisation and farming practices in all livestock commodity chains. Although they have enabled substantial quantitative gains, the authors emphasise that these gains are frequently obtained at the expense of other quality traits. They cite the emblematic example of standard broilers, where selection to increase breast meat yield has induced muscle myopathies and negative consequences on the nutritional, sensory and technological attributes of most fillets, and on animal welfare. Another example of an ethical issue collateral to this primacy is the fate of males in the heavily specialised egg sector. The authors conclude on the need to change course by considering other quality traits in a more global and multidimensional approach and they review a number of studies investigating these transitions.

Monitoring quality helps in managing its variability by orienting the raw materials towards the most suitable processing techniques and the various foods towards their various and appropriate market segments. It also helps in food authentication purposes. The authors highlight recent advances on rapid, precise and non-destructive tools to characterise and predict quality traits.

Taken together, this supplement issue produces a state of the art of animal-source food quality and pinpoints the need for further concerted and collaborative interdisciplinary efforts to address the various remaining research gaps. By doing so, it also identifies avenues for research and options for policy action across the entire production and processing chain. Such efforts are primordial in view of the challenges that are ahead.

Ethics approval

Not applicable.

Data and model availability statement

Not applicable.

Authors ORCIDs

G. Richard: https://orcid.org/0000-0003-1513-8574
S. De Smet: https://orcid.org/0000-0003-1422-805X
M. Font-i-Furnols: https://orcid.org/0000-0002-2979-5113
F. Leroy: https://orcid.org/0000-0001-8682-9626
V. Lind: https://orcid.org/0000-0002-1857-3304

Author contributions

G. Richard, S. De Smet, M. Font-i-Furnols, F. Leroy, V. Lind: writing, reviewing and editing.

Declaration of interest

None.

Acknowledgements

The work presented in this special issue is part of the collective scientific expertise on the 'Quality of animal-derived foods according to animal production and food processing conditions' that was carried out by INRAE at the request of the French ministry responsible for Agriculture and Food, in cooperation with the agency FranceAgriMer.

Financial support statement

The work presented in this special issue was supported with funds from the French Ministry of Agriculture and Food (agreement No 2017-424-2102316438) and the FranceAgriMer agency (agreement No 181911). The salaries of the scientific experts were covered by their respective institutions.

Transparency Declaration

This article is part of a supplement entitled '*Quality of animal-source foods*' supported by the French National Research Institute for Agriculture, Food, and Environment – INRAE.

References

Baéza, E., Guillier, L., Petracci, M., 2022. Review: Production factors affecting poultry carcass and meat quality. Animal 16, 100331.
Cabiddu, A., Peratoner, G., Valenti, B., Monteils, V., Martin B., Coppa, M., 2022. A quantitative review of on-farm feeding practices to enhance the quality of grassland-based ruminant dairy and meat products. Animal 16, 100375.
Clinquart, A., Ellies-Oury, M.P., Hocquette, J.F., Guillier, L., Santé-Lhoutellier, V., Prache, S., 2022. Review: On-farm and processing factors affecting bovine carcass and meat quality. Animal 16, 100426.
Gautron, J., Dombre, C., Nau, F., Feidt, C., Guillier, L., 2022. Review: Production factors affecting the quality of chicken table eggs and egg products in Europe. Animal 16, 100425.
Lebret, B., Čandek-Potokar, M., 2022a. Review: Pork quality attributes from farm to fork. Part I. Carcass and fresh meat. Animal 16, 100402.
Lebret, B., Čandek-Potokar, M., 2022b. Review: Pork quality attributes from farm to fork. Part II. Processed pork products. Animal 16, 100383.
Prache, S., Schreurs, N., Guillier, L., 2022a. Review: Factors affecting sheep carcass and meat quality attributes. Animal 16, 100330.
Prache, S., Lebret, B., Baéza, E., Martin, B., Gautron, J., Feidt, C., Médale, F., Corraze, G., Raulet, M., Lefèvre, F., Verrez-Bagnis, V., Sans, P., 2022b. Review: Quality and authentication of organic animal products in Europe, Animal 16, 100405.
Prache, S., Adamiec, C., Astruc, T., Baéza-Campone, E., Bouillot, P.E., Clinquart, A., Feidt, C., Fourat, E., Gautron, J., Girard, A., Guillier, L., Kesse-Guyot, E. Lebret, B., Lefèvre, F., Le Perchec, S., Martin, B., Mirade, P.S., Pierre, F., Raulet, M., Rémond, D, Sans, P., Souchon, I., Donnars, C., Santé-Lhoutellier, V., 2022c. Review: Quality of animal-source foods, Animal 16, 100376.
Raulet, M., Clinquart, A., Prache, S., 2022. Construction of beef quality through official quality signs, the example of *Label Rouge*, Animal 16, 100357.