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## How does a superior quality sign guarantee the quality of lamb meat? The *Label Rouge* case



D. Drevon<sup>a,\*</sup>, S. Prache<sup>b</sup>, M-O. Nozières-Petit<sup>a</sup>

<sup>a</sup> Inrae, Cirad, Institut Agro Montpellier, UMR Selmet Campus de la Gaillarde, 2 Place Pierre Viala, 34060 Montpellier, France

<sup>b</sup> University of Clermont Auvergne, Inrae, Vetagro Sup, UMR1213 Herbivores, 63122 Saint-Genès-Champanelle, France

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### ABSTRACT

Owing to the social, environmental and health changes in Europe, meat quality is becoming a critical issue for the long-term future of livestock farming. *Label Rouge (LR)* is a quality label owned by the French government that identifies food products produced inside or outside the European Union. This label guarantees the superior quality of a product compared with a standard product. This superior quality is guaranteed throughout the production process by specifications negotiated between the Institut National de l'Origine et de la Qualité (INAO) and operators in the sector. These specifications comprise two documents: first, common production conditions that apply to all specifications in a sector, and second, a book of specifications (BoSs). These two documents, which form the qualification mechanism, are divided into several parts: product name, product description, traceability, production method, labelling and the main control points. This study aims to understand how the *LR* defines lamb meat quality in the 11 existing BoSs using the seven dimensions of quality of animal-source foods (nutritional, sensory, commercial, technological, safety, convenience and image). We performed a computerised qualitative transversal analysis of the commitments associated with the production method and description of the product. This analysis was enriched by five semi-structured interviews with INAO members. We show that although *LR* is committed to all aspects of lamb meat quality, the sensory, image and carcass commercial quality attributes are predominant. However, the image attribute of quality is so ubiquitous that it required refinement to provide a better understanding of the construction of quality in terms of its environmental, ethical and cultural components.

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### Implications

The *Label Rouge* lamb meat qualification mechanism focuses on the sensory and image quality attributes of the lamb meat. This case study illustrates the organisation of a sector committed to a quality approach, from animal characteristics, farming practices to slaughter. This analysis enables a better understanding of how the commitments guaranteeing the quality of lamb meat are influenced by the different demands of civil society, stakeholders and public authorities.

### Introduction

The gradual liberalisation of world markets over the past 30 years has led to greater price volatility and a general downward trend in Western domestic markets, undermining farm-gate prices.

This has been the case with the common market organisation for European sheepmeat, with falling prices and tonnages, particularly in France (Benoit et al., 1997; Nozières-Petit et al., 2018). Under these conditions, quality segmentation schemes are recognised by producers and operators in the agricultural sector to ensure a better distribution of value by defending a premium producer price and consolidating farm margins (Vandecastelaere et al., 2021). In Europe, various labels combined with third-party certification are supposed to help consumers to identify quality products.

The French lamb meat sector is heavily involved in Signes d'Identification de la Qualité et de l'Origine (SIQO), representing 19.1% of animals slaughtered in France in 2021, ahead of broilers (17%), beef cattle (5.6%), veal (5.5%) and pork (5.3%) (INAO, 2022; Chatellier, 2024). *Label Rouge (LR)*, with or without Protected Geographical Indication, predominates (12%), and organic represents 3%.

French sheep farmers are particularly committed to *LR* since half of all lambs marketed under SIQO are so under the *LR* (INAO, 2022; Chatellier, 2024), and *LR* exhibits a positive dynamic, with

\* Corresponding author.

E-mail address: [david.drevon@inrae.fr](mailto:david.drevon@inrae.fr) (D. Drevon).

a 2.8% increase in tonnages of lamb meat marketed between 2020 and 2021 (INAO, 2022). *Label Rouge* is the oldest SIQO used in the meat sector and enables consumers to identify products of 'superior quality' in comparison with 'similar', more standard products. This clear message is conveyed by a label that has been used for many years and is now well known (92% of French consumers know it, according to a survey carried out in 2020 by Quantitude for Libre Services Actualités (Belloir, 2020)), contributes significantly to market segmentation (Innes and Cranfield, 2009; Ferrer and Ames, 2012). Superior meat quality is considered to be the result of production factors and transformation processes and is assessed at least every 4 years via organoleptic tests. These tests validate the merits of this comparative advantage concerning a defined standard product. This procedure, known as the Evaluation and Monitoring of Superior Quality, is specific to *LR*.

*LR*'s reputation for organoleptic quality is consistent with the expectations of French consumers who place emphasis on taste and tenderness in lamb meat (Legrand et al., 2021). Despite regional variations, European consumers also demonstrate a particular interest in sensory dimensions of lamb meat quality, including its taste, tenderness and juiciness (e. g. Sañudo et al., 2007; Tsitos et al., 2020). Although specific to France, *LR* is nevertheless an object of analysis for other international situations due to the efficiency of its supply-chain organization (e.g. Westgren, 1999; Buhr, 2003; Ferrer and Ames, 2012).

Animal science studies have proven the effect of production and/or processing factors on meat quality. The effects of the genotype choice, associated breeding practices, feed resource types and more generally, the feeding system organisation have also been analysed (Prache et al., 2022a; Scollan et al., 2006; Conanec et al., 2021). While a few studies have developed methods to assess meat quality (e.g. Guillemin et al., 2009; Ellies-Oury et al., 2014; Rey-Cadilhac et al., 2021), others have focused on the content of the specifications themselves (Roche et al., 2000; Aubron et al., 2014; Raulet et al., 2022) and their links with meat quality (Raulet et al., 2022). As far as specific studies on *LR* are concerned, many of them are focused on poultry meat, especially chicken meat (e. g. Farmer et al., 1997; Lewis et al., 1997; Smith et al., 2012).

Through the example of the *LR* qualification mechanism, the analysis presented here seeks to show how the commitments of a superior quality sign shape the quality of lamb meat. We understand product quality as 'the set of properties and characteristics [...] that give it the ability to satisfy the expressed or implicit needs of a user' (ISO standard 8402). Prache et al. (2022b) proposed to distinguish seven dimensions of quality: nutritional, sensory, commercial, technological, safety, convenience and image, which we use as a framework for our analysis.

## Material and methods

The use of the *LR* sign is structured by common production conditions (CPCs), the requirements of which apply to the books of specifications (BoSs). These BoSs assimilate the production conditions specific to each situation. Each BoS is managed by a Defence and Management Organisation (DMO) and can be reopened and modified through a dialogue between the DMO and the INAO at the initiative of either. The CPCs are regularly revised, and an updated version for lamb meat was enforced in 2022 after 3 years of work and discussion. The commitments of the CPCs and BoS are superimposed on the legislation in force, which is not normally mentioned in either of them. Each of these texts is accompanied by a monitoring plan that outlines the control methods and the penalisation of breaches of the commitments. The CPCs, in conjunction with these BoS and monitoring plans, are the qualification mechanisms for *LR* lambs.

## Data used

Our documentary database comprises the text of the CPCs and those of the 11 currently active *LR* lamb meat BoSs. Two BoSs refer to lambs from dairy flocks, which are younger and lighter. These unweaned animals are known as 'type A' (light lambs). They are < 50 days old and weigh < 10 kg. Nine BoSs involve heavier, older animals from suckler flocks. These 'type C' lambs are heavy (heavy lambs), with a carcass weight of > 12 kg, suckled the dam for at least 60 days and have a maximum age of 210 days for uncastrated males and 240 days for other animals. The age at slaughter can be extended by a maximum of 30 days between October 1 and January 31. By retaining only these 11 BoSs instead of the existing 12, we excluded one of the three types of lamb defined by the CPCs (type B, intermediate in weight and age at slaughter), which has not been produced for several years.

These two categories of animals, light and heavy lambs, come from two distinct types of farming systems and produce two types of meat that cannot be compared. Light lambs are young suckling lambs from dairy-purpose herds that are slaughtered at 25–45 days (Prache et al., 2022a); their meat is pale with subtle flavour. Heavy lambs are slaughtered at between three and 12 months of age; these lambs are slaughtered at a much higher age and live-weight, so the quality of their meat and carcass is very different from that of light lambs (Prache et al., 2022a).

## Structure of the *Label Rouge* books of specifications

On the front page of each BoS, in addition to the number of the *LR* and its full name, the communicative certified characteristics (CCCs) are listed. Each DMO selects its CCCs as the basis for public communication. The first part of the BoS concerns the name of the applicant and the scope of application (type of lamb, see above) for the CPCs. In the rest of the document body, the CPCs and BoS have the same formal structure. The full name of the *LR* forms the second part. The third part, i.e. the product description, includes a detailed presentation of the product, including the weight of the lamb and its age at slaughter, a comparison with the current product and a justification for the superior quality. The elements of product traceability, with a traceability diagram and the identification of the operators, correspond to the fourth part. The fifth part, the production method, is at the heart of each document. These are the *LR* commitments. It unifies all the measures required to obtain the *LR*, from the production to the packaging of the meat, and specifies the items to be checked and their target values. While the general structure of the production method is the same for all BoSs, the wording, particularly the items to be checked and the target values, varies from one BoS to another. The sixth part brings together the labelling instructions and information specific to the *LR*, followed by the seventh part, which lists the main points to be checked in each BoS.

Our analysis focuses on part two, the 'Product name' to which the CCCs are added, as well as parts three 'Product description' and five 'Production method'. We have excluded traceability elements because aside from the characteristics of the animals, the carcasses and the meat from which they come, they correspond to the information that must be presented to certify compliance with the production method. This information is essential for *LR* production because it protects producers and processors from fraud. We have also excluded from the analysis the sixth and seventh parts of the BoSs, which summarise, for operational purposes, the information contained in the previous parts.

## Qualitative data analysis

The cross-sectional analysis of the material was conducted in two steps with a qualitative perspective (e.g. Sandelowski, 1995;

Onwuegbuzie et al., 2012). First is the characterisation of the CCCs and second is the description of the product, which includes justifications for the superior quality and the choice of the standard comparison product. These are, in fact, the key elements of product

quality that have been established by the INAO and are the main means of their public communication.

The second part of the analysis is based on constructing a thematic grid (Table 1) including 61 criteria, grouped into 22 sub-

**Table 1**

Themes and criteria for the transversal analysis of the *Label Rouge* lamb meat books of specifications.

N°	Themes and sub-themes	Criteria
	Animal	
1	Genetics	Ram breed
2		Ewe breed
3	Castration	Authorisation/prohibition
4		Age at castration
5		Method of castration
6	Identification	
7	Age at slaughter	
	Farming practices	
8	Main farm characteristics	Coexistence of different types of lamb
9		Lambs stall-fed or grass-fed
10		The farm and its surroundings
11	Farming practices and buildings	Veterinary treatments
12		Layout of the premises
13		Animal density/Stocking rate
14		Soil and litter
	Animal Feeding	
15	General animal feed	Ewe's feeding
16		Composition of feed and supplements
17		Forages
18		Troughs (number of animals/troughs, cleanliness)
19		Water
20	Local feed resources	Farm feed self-sufficiency
21		Transhumance
22		Ewes' grazing
24	Lamb feeding	Weaning age
25		Prohibited foods
26		Diet composition
	From farm to slaughterhouse	
27	On farm	Preparation and selection of animals
28		Animal loading and handling conditions
29	Transport	Vehicles and driving
30		Traceability
31	Place of transit	Accommodation conditions
32	Collection, transport and waiting times	Maximum time for removal of animals
33		Maximum transport time
34		Maximum waiting time in the transit centre
35	Before slaughter	Waiting conditions
36		Maximum waiting time at the slaughterhouse
37		Animal handling
38		Animal traceability
39	Slaughter	Layout of premises, handling of animals, slaughter methods
40	Chilling	Chilling
41		Cooling kinetics
	Carcass	
42		Carcass weight
43		Conformation
44		Degree of fatness
45		Quality of fat cover (firmness, colour)
46		Meat colour
47		Carcass sorting
48	Presentation, packaging and storage	Carcass packaging and preservation
49		Carcass presentation
50		Identification of selected carcasses
	Meat	
51	Preservation and freezing	Preservation
52		Freezing
54	Packaging and traceability	Meat presentation
55		Packaging
56		Traceability and labelling
	Offal	
57	Selecting and cutting offal	Labelable offal
58		Offal selection criteria
59		Traceability (time of separation of offal from the carcass)
60	Packaging and storage	Preservation
61		Packaging methods

themes and eight themes, to examine the material as a whole. It brings together all available information in terms of zootechnical components (animal characteristics, feed, carcass characteristics, etc.) and the production and transformation process (starting from the farm to the slaughterhouse and packaging). Based on the existing scientific literature (see the review by Prache et al., 2022b), each criterion is subsequently mapped to one or more of the seven quality dimensions. Using the qualitative analysis software QSR NVivo, each document was coded, i.e. parts of the text were identified as relating to one or more of the criteria and themes (Walsh, 2003). This coding was applied to the 'Product description' and 'Production method' sections. The software was thus able to structure the data according to criteria, sub-themes and themes.

### Semi-structured interviews

Five semi-structured interviews were conducted with resource persons: two professionals working at the INAO within the framework of the National 'Label Rouge-Protected Geographical Indication-Traditional Speciality Guaranteed' Committee and three people from the INAO departments or the Fédération Interprofessionnelle des viandes *Label Rouge*, IGP et AOP. These five people were selected to represent public-operators, notably INAO and the Ministry of Agriculture, as well as private-operators, such as farmers, involved in the *LR* lamb meat sector. The questionnaire was structured around three main themes: the operational structure of *LR*; the construction of quality within CPCs and BoSs; and current issues in the lamb meat sector. The questionnaire used is given in [Supplementary Material S1](#).

The views of these key stakeholders helped us gain a better understanding of the rationale behind the various quality criteria, the choices made and the possible absence of certain quality criteria within CPCs and BoSs, we gathered the views of key stakeholders in these processes. These interviews also enabled us to identify quality criteria that have been or are currently the subject of debate. Finally, the results of our analysis were discussed with some of the technicians and of the professionals who use and manage these BoSs.

Our results present the commitments of the *LR* lamb quality specifications in two sections. First, we analyse the main criteria used to justify the quality, as presented by the stakeholders themselves in the CCCs and the description of the product. Second, we present the salient commitments of the BoSs, which have been selected either because (i) they are the most common among the 11 BoSs, (ii) they have a real impact on the quality of lamb meat throughout the production chain as defined by Prache et al. (2022a), (iii) they turn out to be very restrictive and distinctive or (iv) they reflect current questions about the livestock sector (Delanoue and Roguet, 2015).

## Results

### Key features of *Label Rouge* lamb meat as a basis for communication and justification of superior quality

Formally, the name of each *LR* must be per the instructions of the CPCs. The name includes the type of product (meat or offal), the type of conservation (fresh or frozen) and the type of animal (types A, B or C, as presented above) (Table 2). This requirement is an institutional choice aimed at describing the product; however, it results in a long name such as 'Fresh lamb meat weighing more than X kg carcass, fed through suckling by the dam for at least Y days'. This proves impractical for the operators concerned, particularly in terms of marketing.

### Communicative certified characteristics

The CCCs are mandatory for all *LR* products. For the *LR* lamb meat, there are three or four CCCs, depending on the case (Table 2). Two aspects of animal husbandry, present in the production methods, are common to all *LR* as CCCs. For example, all the BoSs emphasise their commitment to lambs fed through suckling the dam, either throughout the animal's life and 'with ewe's milk' (light lambs) or for a minimum period, which is generally 60 days (seven BoSs), and 70 and 90 days for two BoSs, respectively. In addition, all BoSs have a CCC referring to the maximum age at slaughter, except the LA17/93. As a result, apart from the two BoSs corresponding to light lambs (slaughtered at an age of <35 or 45 days), two BoSs require a slaughter age of < 150 days, a third requires a slaughter age between 70 and 140 days and three require a slaughter age of < 170, 180 and 200 days, respectively. Finally, two BoSs allow slaughter at an age of up to 240 days.

The third and fourth CCCs are more variable. Four BoSs refer to feed, three of which mention complementary lamb feed, 'cereal-based' or '100% vegetable, mineral and vitamin based' and one BoS highlights the grazing of the ewes. Breeds are only mentioned in three BoSs. One emphasises the use of hardy and local breeds, while the other two mention the use of meat breeds and their crossbreeding. Four BoSs state that the lamb is 'born and reared on the same farm', which is a characteristic common to all *LR* and is mentioned as such in the CPCs. Two BoSs list traceability as a CCC.

### A product of superior quality: the importance and difficulty in comparing with a standard product

*Label Rouge* is defined by its superior quality, particularly higher sensory quality attributes, compared with a standard product. It is within each BoS that the standard product with which the *LR* lamb meat is compared is defined. We note that the choice of this standard product is not clearly defined and varies from one BoS to another. Therefore, there is diversity in how the standard product for comparison is described, and diversity in the standard product itself. Seven BoSs state that the conformation of the standard product falls within the EUROP grid, which does not specify anything as all lambs on the market are classified in this grid. Six BoSs refer to the legislation by stating that the lamb from which the standard product is derived is < 1 year old. The LA07/07 BoS specifies that the standard product to be compared is meat 'from farms located outside France and not eligible for a SIQO'. The LA17/93 BoS compares its *LR* product with New Zealand lamb meat.

The definition of the standard product for comparison raises three problems. The first is specific to light lambs. Our discussions with the stakeholders highlight the fact that it can be difficult to demonstrate the superior taste of this specific product, described as a niche product, especially when compared with the meat of heavier lambs. The second problem is that the standard comparison product may come from an animal that has not been awarded a label but has been reared per the SIQO BoS (including *LR*). There is always a proportion of animals reared following a qualification mechanism but not sold under a SIQO. In some cases, this proportion can be negligible (Nozières-Petit and Stark, 2021); however, in others, it can be up to one-third of a farm's production (according to our interviewees). In such cases, the choice of an imported lamb is a suitable alternative. The third problem stems from the difficulty in establishing the superiority of *LR* lamb meat in the context of organoleptic tests due to the variability of farming practices or the uneven selection of animal carcasses (Bord et al., 2019).

The CPCs define a minimum base including 10 points on which the *LR* product must differ from the standard product. For example, for an *LR* product, at least 55% of the flock feed has to be produced on farm (this does not apply to transhumant farming systems), whereas there are no specific requirements in the case of a stan-

**Table 2**Summary of *Label Rouge* lamb meat names and their communicative certified characteristics.

LA NO.	Name of the LR	Type of products	CCC—lactating lambs	CCC—age at slaughter	CCC—feed	CCC—traceability	CCC—breed
01/12	Meat and offal, fresh or frozen, of lambs weighing >14 kg carcass, fed by udder-feeding for at least 60 days	Meat and offal, fresh or frozen	Udder-fed for at least 60 days	Up to 200 days old		Born and raised on the same farm	
02/95	Fresh meat from lambs weighing >15 kg carcass, suckled for at least 60 days	Fresh meat	Udder-fed for at least 60 days	Up to 170 days old	100% vegetable, mineral and vitamin supplements		
03/94	Fresh meat and offal from lambs weighing >15 kg carcass, fed by udder-feeding for at least 60 days	Fresh meat and offal	Up to 180 days old	Receiving a cereal-based supplementary feed		Born and raised on the same farm	
05/07	Fresh and frozen meat and offal of lambs weighing 14–22 kg carcass, fed by udder-feeding for at least 90 days or until slaughter if slaughtered between 70 and 89 days of age	Meat and offal, fresh or frozen	Udder-fed for at least 90 days or until slaughter if slaughtered between 70 and 89 days of age	Slaughtered between 70 and 140 days	Supplementary power supply		
05/85	Fresh and frozen meat from lambs weighing >13 kg carcass, suckled for at least 60 days	Fresh and frozen meat	Udder-fed for at least 60 days	Up to 240 days old		Born and raised on the same farm	Meat breeds or crosses between meat breeds
07/07	Fresh and frozen meat and offal of lambs weighing 13–22 kg carcass, suckled at the udder for at least 70 days or until slaughter, if slaughtered between 60 and 69 days	Meat and offal, fresh or frozen	Fed by suckling from the udder for at least 70 days or until slaughter if slaughtered between 60 and 69 days	Maximum of 150 days		Identified from farm to point of sale	
09/95	Fresh meat from lambs weighing >13 kg carcass, fed by udder-feeding for at least 60 days	Fresh meat	Udder-fed for at least 60 days	Less than 150 days old	Ewes reared under extensive pastoral management		Made from hardy Mediterranean ewes (Mérinos d'Arles, Préalpes du Sud and Mourérours),
11/08	Fresh and frozen meat and offal of lamb fed exclusively on ewe's milk	Meat and offal, fresh or frozen	Exclusively breastfed by suckling at the udder	35 days old maximum	Exclusively breastfed by suckling at the udder		
17/93	Fresh and frozen meat and offal from lambs weighing >14 kg carcass and fed by udder for at least 60 days	Fresh or frozen meat and offal	Udder-fed for at least 60 days			Identified and tracked from farm to point of sale	Produced by crossing meat breeds
19/92	Meat and offal, fresh and frozen, of lamb fed exclusively on ewe's milk	Meat and offal, fresh or frozen	Exclusively breastfed by suckling at the udder	Up to 45 days old	Exclusively breastfed by suckling at the udder		
31/90	Fresh and frozen meat and offal of lambs >14 kg carcass weight, suckled for at least 60 days	Meat and offal, fresh or frozen	Udder-fed for at least 60 days	Up to 240 days old		Born and raised on the same farm	

Abbreviations: LA=Label (official abbreviation from the INAO); CCCs = Certified Communicative Characteristics.



standard product. The nine other criteria involve birth and rearing, lamb identification, surface area per animal, medicinal treatments, lamb feed, litter type, no tranquilliser use, maximum stay in transit centres and carcass fatness. Each BoS follows those 10 criteria but is free to add other ones about, for instance, the choice of breed, length of suckling period or weight of the carcass, as long as they are included in the production method.

#### *Choice of elements to justify superior quality*

The product description section contains the key features of the production method. The stakeholders are free to define the criteria of the superior quality of their product, write the production method in a non-standardised framework and translate it into CCCs. This freedom leads to a variability of production and a diversity of highlights justifying the type of superior quality. For instance, LA17/93 BoS requires 'the traditional use of annual, temporary and natural pastures', while the production of lambs in the LA09/95 BoS has to be embedded in a 'pastoral tradition of farming'. LA05/85 BoS specifies that the rearing of lambs destined for slaughter has to be based on the slow growth of the animals and must comply with the 'grassland cycle, with the aim of making the most of their grassland production'. Descriptors for meat are also presented: six BoSs require a 'light' coloured meat for heavy lambs, while others refer to a slightly coloured meat or 'a more intense colour' of meat. A greater tenderness of the *LR* meat is mentioned in four BoSs and greater juiciness in five. Three BoSs are looking for a more intense lamb flavour, while two others highlighted meat with a 'less' pronounced flavour.

#### *Commitments at various steps of production to ensure the quality of Label Rouge lamb meat*

##### *Key commitments related to animals*

Commitments refer to suckling and the age of the lamb at weaning. Lambs must be fed through suckling by the dam and artificial milk as feed is prohibited by the CPCs. All BoSs for heavy lambs require lambs to be suckled for a minimum of 60 days. Two BoSs extend this period, requiring a minimum of 70 or 90 days of suckling. This practice plays a role in the sensory and commercial meat quality attributes, resulting in firmer fat (Prache et al., 2022a). It also relates to the image of the product.

The CPCs specify a maximum age for heavy lambs at slaughter: 240 or 270 days if the animal is slaughtered at the end of the year. Some BoSs go further. Three BoSs specify an age at slaughter of < 170, 180 and 200 days, two impose an age at slaughter of < 50 days and a third indicates a slaughter age between 70 and 140 days. Two BoSs accept an age of slaughter at < 210 days. The two BoSs for light lambs specify a maximum slaughter age of 45 or 65 days. This diversity is related to the inter-individual variability in lamb growth, which depends on the breed and feed resources. However, the inclusion of such a criterion in a BoS designed to guarantee a superior quality of a product is essential as it has an impact on numerous quality attributes, particularly sensory and nutritional attributes (Prache et al., 2022a).

Other production method commitments refer to the quality of *LR* lamb meat. For example, all 11 BoSs have breed considerations but never specify that the lamb must be purebred. It can come from various breeds and crossbreeds: of the 59 sheep breeds recognised in France, 37 are mentioned at least once as permitted for the ram or dam breed. For heavy lambs, heavy breeds are preferred for the ram, with a recurrence of Suffolk, Berrichon du Cher, Texel or Charollais breeds, thus contributing to the commercial dimension of quality through conformation. References to approved breeds for dams emphasise local breeds alongside heavy breeds, reflecting the image attributes of quality.

Castration of male lambs is authorised by the CPCs with obligations on pain relief. Four BoS prohibit castration, two of which refer to the production of light lambs, which are not affected by quality problems induced by sexually mature males. Five BoSs specify a maximum age for castration, whereas the CPCs require castration to occur 60 days' maximum before the date of slaughter. Three BoSs, which predate the current version of the CPCs, are at odds with the latter, allowing the application of an elastic band up to 30 days of age, whereas the CPCs only allow it up to 8 days of age. There has been considerable debate regarding this issue, as castration may be frowned upon for animal welfare reasons, although it is beneficial for improving the sensory and commercial aspects of meat quality (Prache et al., 2022a). Indeed, in addition to improving precocity, castration helps limit defects in the firmness and colour of the fat cover (Prache et al., 1990; Normand et al., 1997; Thériez et al., 1997) and reduces the risk of flavour defects, particularly in pasture-fed lambs (Prache et al., 2022a). However, two items that impact meat quality are not included. The sex of the animal influences the sensory and commercial quality attributes (Prache et al., 2022a). Male lamb carcasses are more at risk for firmness and fat cover colour defects (Normand et al., 1997). Birth weight influences carcass weight and degree of fatness (Villette and Thériez, 1981) and therefore, the commercial quality attributes. However, it is rarely measured on farms.

##### *Key commitments related to farming practices*

The pastoral or grassland orientation of the farming system is a quality criterion for certain BoS. For example, the LA19/92 requires pastoral management that makes the best use of grazing land, which is emphasised in its justification for superior quality. Another BoS, the LA05/85, mentions 'respect for the grassland cycle on farms whose aim is to make the most of their grassland production'. The LA17/93 states that 'the dominant farming system is a semi-open-air system based on the traditional use of grazed annual, temporary, and natural grassland'. Three BoSs, including the two for light lambs, also commit to a maximum annual stocking density. LA09/95 requires a stocking density of < 1.4 LU per hectare. Such commitments refer to the image quality attributes.

The CPCs state that the lamb must be born and reared on the same farm. Animals that have passed through a fattening centre are therefore not eligible for *LR* status. This commitment relates to the image quality attributes. However, if lambs can stay with their mother at pasture, there is no requirement to do so. The LA11/08 BoS for light lambs specifies that the lamb lives in contact with its mother and therefore indirectly indoors, 'particularly during the lambing season when the animals still live in the sheepfold'. Two BoSs for heavy lambs are even more explicit. For the LA03/94, the lamb is reared either exclusively indoors or outside for an initial period on pasture with its mother before returning indoors for the finishing period. At the same time, the LA05/07 specifies that 'the lambs are reared indoors'. The *LR* lamb is therefore primarily a stall-fed lamb, as no BoS requires lambs to be finished on grass. In fact, the members of the INAO who we met stated that there had never been a request for a commitment to finish lambs on grass. This farming practice has a major impact not only on the nutritional and sensory quality attributes of meat (Prache et al., 2022a) but also on its extrinsic dimensions of quality (image; Stampa et al., 2020; Prache et al., 2022a).

Commitments relating to the design and maintenance of buildings provide minimum requirements for the sanitary conditions of livestock farming and respect for animal welfare. Animal density is the main concern. The CPCs impose a minimum animal density (0.5 m<sup>2</sup> for heavy lambs and 1.5 m<sup>2</sup> per ewe and her lamb for light lambs). Density is an essential factor in ensuring good hygiene in the sheepfold and limiting certain health risks for the animals. Two BoSs go further by requiring 1.5 m<sup>2</sup> for ewes at the end of ges-

tation. Some BoSs also make commitments on feeding and drinking troughs, which are criteria not covered by the CPCs. Four BoSs impose a maximum of three ewes or four lambs per linear metre of the trough. All but one BoS require lambs to have permanent access to drinking points, and three BoSs require water to meet drinking standards.

Nine BoSs mention that ventilation must be 'sufficient'. The LA01/12 states that where ventilation is adequate, the premises must be 'free from ammonia odours and traces of persistent humidity', and the LA07/07 states that the farmer must 'protect the herd from heat, draughts, moisture and ammonia odours'. Some BoSs also include commitments on light levels. In addition, the CPCs require buildings to be emptied and cleaned regularly, and four BoSs repeat the importance of cleaning the buildings. In addition, two BoSs require the provision of natural or artificial shelter for grazing animals.

Finally, six BoSs contain commitments that link the farm to its territory, thus organising a quality image for the 'Label Rouge lamb meat' product. The LA01/12 limits the spread of plots of land within a 50-km radius of the farm, except in the case of transhumance. The LA02/95 refers to 'landscape integration', where sheepfolds are integrated into the landscape and the surroundings of buildings are kept clean and tidy. Finally, the two BoSs for light lambs limit the size of the farm, although this limitation is not very restrictive.

#### Key commitments related to animal feeding

Some of the key commitments presented above, such as suckling by the dam and pasture-feeding, already relate to animal feeding. The farm feed self-sufficiency must be at least 55%, as mentioned in the CPCs. It is assessed 'by comparing the quantity of DM purchased and distributed to the sheep with the quantity of DM consumed by the sheep in theory'. The people we consulted stressed that this threshold had been widely debated, but since sheep farming is conducted in disadvantaged areas with regular and severe droughts, too high a threshold would have led to the exclusion of many farms. The LA03/94 is the only BoS to raise this threshold to 70%. Transhumant farms benefit from an exemption and can opt out of this commitment.

The CPCs regulate other feed regulations. The use of genetically modified feed and urea and palm kernel by-products are banned. These bans are key to building the image quality attribute of the meat. Rapeseed is also banned, probably because its consumption can impart an unpleasant taste to the meat (Schreurs and Kenyon, 2017) and have an unfavourable effect on the colour of fat (Thérier et al., 1997).

In addition, haylage and silage are forbidden by the CPCs when feeding lambs, the main reason for this ban being the image quality attributes. The impact of these forages on the intrinsic quality attributes of meat has been little studied but does not appear to affect sensory quality attributes (Stanley, 2003). Other authors suggest that feeding lambs on grass silage could be beneficial for the nutritional properties of the meat (elevated levels of omega-3 fatty acids), but this would be detrimental to the nutritional requirements of the lamb (Bernes et al., 2012).

The BoSs add a few specifications regarding feed. Seven BoSs complete the list of prohibited feeds. The LA02/95 prohibits all additives except ammonium chloride. Emulsifiers, stabilisers, thickeners and gelling agents are also banned by the LA03/94, LA05/07, LA05/85, LA07/07 and LA31/90. In addition, the LA02/95 commits to limiting the level of concentrate fed to lambs. This commitment refers to the commercial and sensory quality attributes. Limiting concentrate intake during the finishing period reduces defects in the firmness and colour of the fat cover (Prache et al., 1990; Normand et al., 1997; Thérier et al., 1997). Three BoSs take commitments regarding the level of cereals in

the lamb diet. For the LA05/07 and LA07/07, cereals and cereal derivatives must make up at least 30% of the diet. In addition, the LA03/94 requires that cereals be fed only as whole or flattened grains to prevent defects in the firmness and colour of the fat cover (Normand et al., 1997; Thérier et al., 1997).

Although the LR lamb is primarily a stall-fed lamb, some BoSs encourage feeding ewes at pasture. Five BoSs specify a minimum annual grazing period for the ewes (180–244 days/year), which can be a strong marketing element for which consumers are willing to pay more (Denos et al., 2020). An interviewee said there had been plans to generalise the commitment to a minimum grazing period for ewes in the CPCs, as 'it is an interesting communication criterion'. However, such a project would require considerable work on the part of the DMOs.

#### Key commitments related to animal health

Current health legislation (e.g. European Commission, 2019) is already strict, and only a few additional measures are indicated in the CPCs. For example, the CPCs specify a minimum period of 7 days between a course of medication and the slaughter of the lamb. The use of medical drugs for transport is also prohibited. For light lambs, the rules on medication are more restrictive: LA19/92 tolerates no preventive or curative treatment and LA11/08 prohibits the use of antibiotics and sulphonamides for ewes.

#### Key commitments related to transport and handling before slaughter and at slaughter

The CPCs set a maximum time between the departure of lambs from the farm and slaughter (24 h for light lambs and 120 h for heavy lambs). Some BoSs re-enforce this commitment. Ten BoSs reduce this maximum time, and four BoSs require a maximum of 96 h for heavy lambs. In addition, three BoSs (including the two for light lambs) regulate the layout of vehicles. Five BoSs prohibit the use of sticks or tools that could injure the animal. All these commitments, which aim to reduce animal stress, contribute to the sensory (Miranda et al., 2012) and image quality attributes.

Some BoSs include commitments for lamb-waiting conditions. Two BoSs require the sheepfold to be kept as quiet as possible to limit stress before departure. The CPCs set a waiting time of 48 h at the slaughterhouse for heavy lambs, and seven BoSs reduced this time further to 24 h. Slaughter itself is the subject of few commitments, as the legislation is already quite comprehensive. The additional BoS commitments relate to measures to limit animal stress. Three BoSs detail mandatory facilities for slaughterhouses, such as the requirement of a non-slip floor. The LA11/08 is the only one to mention that stunning is done by electrocution 'quietly' and quickly.

#### Key commitments related to carcass and meat quality

The quality of a heavy lamb carcass and its price are based on three criteria: weight, conformation and degree of fatness (Prache and Bauchart, 2015). All BoSs for heavy lambs have carcass weight commitments (Table 3). The CPCs indicate that a heavy lamb must have a carcass weight of > 12 kg, and the BoSs specify specific ranges between 13 and 23 kg. This wide range reflects the diversity of sheep production systems in France, as well as the diversity of breeds and the variability of lamb age at slaughter. For example, the two BoSs with a higher minimum carcass weight threshold (15 kg) are located in grassland areas. For light lambs, these criteria are less important, and the BoSs require a carcass weight between 5 and 10 kg.

The CPCs require either E-U-R or U-R-O conformation, depending on the breed type (EUROP grid), and a degree of fatness of 2 or 3, demonstrating the importance of the commercial quality attributes for the LR (Prache et al., 2022a). All BoSs specify these classes

**Table 3**  
Commitments regarding carcass weight and conformation in the different *Label Rouge* lamb meat books of specifications.

LA NO.	Eligible carcass weight	Eligible conformation class
01/12	14 kg minimum–21 kg maximum	U, R
02/95	15 kg minimum–23 kg maximum	E, U, R
03/94	15 kg minimum–21 kg maximum	E, U, R
05/07	14 kg minimum–22 kg maximum; no pluck	U, R, O
05/85	13 kg minimum–23 kg maximum	E, U, R
07/07	13 kg minimum–22 kg maximum; no pluck	U, R, O
09/95	13 kg minimum–19 kg maximum; cold weight	U, R, O
11/08	5 kg–10 kg; carcass weight without head and with pluck 4.5 kg–8.5 kg; carcass weight without head and pluck 5.5 kg–11 kg; carcass weight with head and with pluck 5 kg–10 kg; carcass weight with head and without pluck	
17/93	14 kg minimum–22 kg maximum	E, U, R
19/92	5 kg–10 kg; carcass weight without head and with pluck 4.5 kg–8.5 kg; carcass weight without head and pluck 5.5 kg–11 kg; carcass weight with head and with pluck 5 kg–10 kg; carcass weight with head and without pluck	
31/90	14 kg minimum–23 kg maximum	E, U, R

Abbreviations: LA=Label; E=exceptional muscle development; U=great muscle development; R=good muscle development; O=average muscle development (EUROP grid).

more precisely: five require E-U-R conformation, three require U-R-O conformation, one requires E-U-R-O conformation and only one BoS limits the conformation eligible to U-R. The colour and firmness of the fat cover are also important quality attributes in heavy lambs. Eight BoSs require white–light pink fat and three require only white fat. All BoSs also require firm fat cover (and exclude carcasses with soft or oily fat). Four BoSs justify their superior quality by providing lamb meat with a less intense fat flavour than the standard product. Other commitments mention fat characteristics, but in terms that are more difficult to assess: ‘good fat distribution’, ‘carcass with little fat’ and ‘aromatic fat’. All BoSs specify the target colour of the meat (assessed on the carcass): the target colour is light, with different formulations (‘light pink’, ‘light red’ and ‘exclusion of marked red’). This is consistent with the ban on pasture finishing. Finally, for three BoSs, the meat must also be free of haematomas or marks.

*Key commitments related to meat transformation, conservation and marketing*

The CPCs do not make any commitments regarding the cooling kinetics or the meat’s ultimate pH (**pHu**), although reportedly, a high pHu results in darker and less tender meat with a shorter shelf life (Sheath et al., 2001). Only three BoSs include commitments regarding carcass temperature lowering. They aim for a maximum core temperature of 7 °C. The two BoSs for light lambs specify that this temperature reduction should be achieved within 20 h. The LA09/95 points out the risk of cold shortening, but it does not commit in this regard.

Deep freezing meat is authorised by the CPCs, which specify the need for premises equipped with temperature recorders to maintain a core temperature of –18 °C. In addition, the time between slaughter and freezing of meat cuts does not exceed 7 days. Finally, the minimum durability for frozen meat must be <18 months. Five BoSs reduce this duration: four set it at 12 months and one at 6 months. The CPCs require that packaging operations be performed in cutting plants quickly after cutting. Each BoS then details the packaging methods it authorises: carcass, half-carcass, ready-to-cut, retail sales unit, industrial consumer sales unit, vacuum-packed or not, shrink-wrapped or not, etc. LA02/95 guarantees a use-by date depending on how meat is packaged: a maximum of 5 days if the product is wrapped in film, a maximum of 9 days in a modified atmosphere and a maximum of 30 days for vacuum-

packed. The CPC section dealing with meat processing proposes a list of authorised products (water, salt, spices, fruit, vegetables, mushrooms, wines, spirits, egg whites, breadcrumbs, cereals, non-hydrogenated vegetable oils and fats, natural casings, pork bard and pork caul) and requires a maximum of 24 h between meat processing and deep freezing. The BoSs do not include any additional requirements. Interviewees stated that there are no operators yet ready to process *LR* lamb meat in France; the traditional channel for *LR* lamb meat remains as slicing and traditional butchery.

*Key commitments related to offal*

Eight BoSs label offal in addition to lamb meat, although the list varies from one BoS to another. The CPCs guarantee that ‘all labelled offal comes from carcasses that meet the criteria of the *LR* specifications at the time of separation’. In practice, it appears that in most BoSs, separation occurs before the carcass is finally labelled. For example, the LA03/94 requires separation before final weighing, whereas LA31/90 requires separation of offal at the time of evisceration. The only exception is the LA19/92, which guarantees offal separation after carcass selection. The offal selection criteria are specific to each BoS but are based on visual and olfactory assessment.

*Sensory and image dimensions predominate the quality of Label Rouge lamb meat*

Except for the technological dimension, all other dimensions of quality are covered by at least one commitment (Table 4). The analysis highlights the pre-eminence of commitments focusing on sensory and image quality attributes. Several commitments address these two dimensions. This is the case for the age of lamb at weaning. Other commitments do not specifically contribute to image quality, such as the lamb age at slaughter, but have a major impact on the sensory and quality attributes. Certain key commitments, which strongly structure the farming system, specifically contribute to the image quality attributes, such as the ban on silage and haylage and fermented forages being associated with the intensification of the farming system. Finally, the relation between commitments and quality attributes may be different between light and heavy lambs. This is the case for ewe feeding and grazing, which have an impact on the nutritional quality attributes of light lamb meat (Ponnampalam et al., 2024).



**Table 4**Impact on lamb meat quality attributes of different commitments included in the *Label Rouge* books of specifications.

N°	Criteria	Sensory	Safety	Nutritional	Convenience	Technological	Commercial	Image
	Animal							
	Genetics							
1	Ram Breed						x	x
2	Ewe Breed						x	x
	Castration							
3	Authorisation/prohibition	X					x	x
4	Age at castration	X						x
5	Method of castration							x
6	Identification							x
7	Age at slaughter	X		x			x	
	Farming practices							
	Main farm characteristics							
8	Coexistence of different types of lamb							x
9	Lambs stall-fed or grass-fed	X		x			x	x
10	The farm and its surroundings							x
	Farming practices and buildings							
11	Veterinary treatments		x					x
12	Layout of the premises							x
13	Animal density/Stocking rate		x					x
14	Soil and litter		x					≈
	Animal feeding							
	General animal feed							
15	Ewes' feeding			x (light lambs)				x
16	Composition of feed and supplements	X		x			x	x
17	Forages	X		x				x
18	Troughs (number of animals/troughs, cleanliness)							x
19	Water							x
	Local Feed resources							
20	Farm feed self-sufficiency							x
21	Transhumance							x
22	Ewes' grazing			x (light lambs)				x
	Lamb Feedin							
24	Weaning age	X		x (light lambs)			x	x
25	Prohibited feed			x				x
26	Diet composition	X		x			x	x
	From farm to slaughterhouse							
	On farm							
27	Preparation and selection of animals	X					x	x
28	Animal loading and handling conditions	X						x
	Transport							
29	Vehicles and driving	X						x
30	Traceability		x					x
	Place of transit							
31	Accommodation conditions	X						x
	Collection, transport and waiting time							
32	Maximum time for removal of animals	X						x
33	Maximum transport time	X						x
34	Maximum waiting time in transit centre	X						x
	Slaughter							
	Before slaughter							
35	Waiting conditions	X						x
36	Maximum waiting time at the slaughterhouse	X						x
37	Animal handling	X						x
38	Animal traceability		x					x
	Slaughter							
39	Layout of premises, handling of animals, slaughter method	X	x					x
	Chilling							
40	Chilling	X						
41	Cooling kinetics	X						
	Carcass							
42	Carcass weight						x	
43	Conformation						x	
44	Degree of fatness	X		x			x	
45	Quality of fat cover (firmness, colour)	X					x	
46	Meat colour	X					x	
47	Carcass sorting	X					x	x
	Presentation, packaging and storage							
48	Carcass packaging and preservation	X	x					
49	Carcass presentation				x		x	
50	Identification of selected carcasses							x
	Meat							
	Preservation and freezing							
51	Conservation	X	x		x			

(continued on next page)

Table 4 (continued)

N°	Criteria	Sensory	Safety	Nutritional	Convenience	Technological	Commercial	Image
52	Freezing	X	x		x			
	Packaging and traceability							
54	Meat presentation				x			≈
55	Packaging	X			x			
56	Traceability and labelling		x					x
	Offal							
	Selecting and cutting offal							
57	Labelable offal						x	
58	Offal selection criteria	X					x	
59	Traceability (time of separation from the carcass)							x
	Packaging and storage							
60	Conservation		x		x			
61	Packaging method		x		x			

Abbreviations: x = has a definite impact; ≈ = has an uncertain impact.

Discussion

Tensions between different meat quality attributes

There are several points of tension between the various *LR* meat quality attributes, and we highlight two of them. The *LR* heavy lamb always comes from an animal that has been finished indoors or even reared entirely indoors. Pasture finishing is beneficial for the nutritional meat quality attributes (fatty acid profile and antioxidant content) (Gruffat et al., 2020; Prache et al., 2022a; Ponnampalam et al., 2024) and European consumers consider that meat from grass-fed lambs is better for their health (nutritional quality attributes) and the environment and more respectful of animal welfare (Font-i-Furnols et al., 2009). On the reverse, pasture finishing is unfavourable for the colour and flavour of lamb meat (Prache et al., 2022a), and from an organoleptic point of view, French consumers prefer meat from stall-finished lambs (Font-i-Furnols et al., 2011). Moreover, grass-fed lamb meat is more susceptible to quality variations owing to variability in lamb performance and slaughter age (Prache et al., 2022a). As *LR* historically focused on the promise of superior sensory quality, it therefore requires stall-finishing and for some BoS, even the entire rearing and finishing indoors.

The second area of tension identified regarding the quality of *LR* lamb relates to castration. Castration is authorised by the CPCs. Castration improves the commercial quality attributes and limits the risk of flavour defects. With this commitment, *LR* prioritises commercial and sensory attributes to the detriment of image quality. Castration raises profound questions regarding animal welfare (Temple and Manteca, 2020) and is becoming increasingly important for consumers, justifying the decline in meat consumption (Bertrandias et al., 2021). Moreover, castration is not justified for stall-fed lambs or for stall-finished lambs after weaning, which make up the majority of *LR* heavy lambs, as the lambs are young at the time of slaughter. However, if *LR* was to move towards pasture finishing of lambs, this would lead to an increase in their age at slaughter, with increased risks of flavour defects, insufficient carcass fatness and behavioural problems linked to sexual maturity, if the male lambs were not castrated.

Some commitments need further refinements

Commitments relating to production conditions are greater in number than those that relate to processing conditions. This is because of already existing regulations concerning the latter, which constitute an essential basis for quality, particularly in terms of safety and technological attributes. However, commitments regarding meat pHu and cooling kinetics of the carcass are missing.

Our analysis shows that the image quality attributes are omnipresent in the *LR* commitments. In this sense, *LR* makes it possible to consider quality dimensions that are important to consumers but are not related to the intrinsic qualities of the meat. This is even more important as the supply of a product with advanced extrinsic qualities is becoming a major challenge, particularly for the meat sector, as consumers are paying increasing attention to the aspects of meat production and processing that were previously relegated to second place. This trend offers a partial explanation for the growth of organic livestock production (Chatellier, 2024). However, organic farming guarantees a production process but offers no guarantee of product quality. The variability of farming practices and the lower level of inputs result in a significant variability in the quality of lamb meat (Prache et al., 2022c).

The position of livestock farming in society is now openly questioned in public debate. Delanoue and Roguet (2015) reported that the controversies surrounding livestock farming are structured around four main themes: environment, animal welfare, human health and the organisation of livestock farming. Recent studies (De Bauw et al., 2021; Weber, 2021) have analysed the impact of eco-scoring labels, whether combined with other labels or not. Others have shown that consumers are now willing to pay the same price for lamb meat produced using agroecological practices as for lamb produced under an official quality label (Legrand et al., 2021). While quality labels such as *LR* focused on the product itself, market and societal changes mean that stakeholders are now more likely to focus on the external attributes of meat quality, especially the image quality attribute. Image quality covers ethical, cultural and environmental dimensions related to farming and product processing (Prache et al., 2022b). Environmental and animal welfare aspects are complex to assess, as there are various dimensions to consider, with potential antagonisms and multicriteria evaluation methods just emerging (Prache et al., 2022b). However, the growing importance of environmental issues, climate change mitigation and adaptation and the controversies surrounding livestock farming reinforce the need for a clear, well-constructed image of the product, making it an object of study in its own right.

Label Rouge lamb meat and Label Rouge beef: similarities and particularities

This sign of quality is historically based on a promise of superior sensory quality, with commitments throughout the production chain, but also on an obligation to achieve results superior to those obtained with a standard product. This is common to all the *LR* systems. Although the poultry industry was a pioneer with the creation of the *LR* ‘Poulet fermier des Landes’ in 1965, we have chosen to compare the *LR* lamb meat to the *LR* beef (Raulet et al., 2022). Indeed, in these two cases, the production systems are

based on annual production cycles and on the importance of fodder resources. The sectors associated with these productions are also similar, with downstream operators organised by coordination rather than integration.

Our study highlights the importance attached to the sensory and image quality attributes of the *LR* lamb meat, as has already been observed for *LR* beef (Raulet et al., 2022). The commercial quality attributes are also especially important for lamb and beef *LR*, with eligible carcasses based on minimum weight and conformation criteria and a defined degree of fatness. Commitments to limiting animal stress are very present in *LR*, given the effects of stress, particularly at slaughter and preslaughter, on the sensory and image quality attributes of the meat.

The first difference between the two products concerns origin: *LR* lamb can come from dairy herds, linked to the definition of different types of lambs, unlike *LR* beef. Another difference is that some important sensory quality attributes are product-specific (Prache and Bauchart, 2015; Gruffat et al., 2015), with corresponding product-specific commitments. This is the case with firmness and the colour of fat cover, which are more important quality attributes for sheep than for beef cattle carcasses, as commercial transactions involve whole, untrimmed carcasses. This has led to specific commitments for sheep farming systems. The same applies to flavour defects, which are specific to lamb meat as their frequency and intensity increase when lambs are pasture-finished and get older; hence, the *LR* prohibits pasture finishing and sets a maximum lamb age at slaughter. These commitments do not apply to *LR* beef. Conversely, as tenderness is a major beef sensory quality attribute, uncastrated males are not eligible for *LR* certification, which is not the case for *LR* lamb meat. Castration of males is compulsory for *LR* beef, whereas it is authorised for *LR* lamb meat. The *LR* commitments are also the result of a different history for beef cattle and sheep farming systems. French beef cattle farming systems have historically focused on purebred animals, hence the high breed requirements in the *LR* beef BoSs. This is not the case for French sheep farming systems.

A significant difference also concerns grazing commitments. *Label Rouge* beef comes from grassland-based and extensive farming systems, with all BoSs limiting stocking rate and requiring a minimum duration of grazing (Raulet et al., 2022). For *LR* lamb meat, grazing requirements only apply to ewes, and the heavy lambs from which *LR* meat is produced are always fattened indoors after weaning. Consequently, only one *LR* BoS for heavy lambs limits the stocking rate, whereas the others only commit to animal density indoors. Note that *LR* commitments for both products make little reference to the nutritional quality attributes of the meat. The only practices that optimise the fatty acid profile of meat are pasture-finishing or incorporating linseed in finishing (Ponnampalam et al., 2024). No BoS in *LR* beef or lamb meat guarantees pasture finishing, and only one *LR* beef BoS requires the incorporation of linseed in the finishing period (Raulet et al., 2022). Finally, there are fewer commitments in *LR* lamb meat after slaughter. Unlike *LR* beef, there is no selection of eligible carcasses based on the meat's ultimate pH, nor any commitment regarding meat ageing.

## Conclusion

This study analyses the *LR* qualification mechanism for lamb meat. It shows that the sensory and image quality attributes are paramount, which are consistent with the promises made by this official quality label. It also highlights the importance attached by this quality label to the commercial characteristics of the carcass. This quality label places considerably less emphasis on the nutritional quality attributes of the meat probably because these

are in tension with sensory quality attributes, with the latter being favoured. Our study helps decipher how a superior quality sign qualifies for lamb meat. The certified 'superior quality' must be established concerning a standard reference product, the definition of which remains elusive. Finally, our study highlights the need to renew a transdisciplinary field of research on image quality attributes to better deal with the multiplicity of issues that the live-stock sector is currently faced with and to which labels and signs of quality contribute.

## Supplementary material

Supplementary material to this article can be found online at <https://doi.org/10.1016/j.animal.2024.101312>.

## Ethics approval

Not applicable.

## Data and model availability statement

None of the data were deposited in an official repository. The data that support the study are public, except for the confidential interviews.

## Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the author(s) did not use any AI and AI-assisted technologies.

## Authors ORCIDs

David Drevon: <https://orcid.org/0009-0002-3105-9307>.

Sophie Prache: <https://orcid.org/0000-0003-1660-5058>.

Marie-Odile Nozières-Petit: <https://orcid.org/0000-0001-8081-9662>.

## CRediT authorship contribution statement

**D. Drevon:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **S. Prache:** Writing – review & editing, Supervision, Methodology, Conceptualization. **M.-O. Nozières-Petit:** Writing – review & editing, Supervision, Methodology, Conceptualization.

## Declaration of interest

None.

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## References

- Aubron, C., Peglion, M., Nozières-Petit, M.-O., Boutonnet, J.-P., 2014. Quality schemes and pastoralism in France. *Journal of Alpine Research* 102, <https://doi.org/10.4000/rga.2450>. Published online by Université Grenoble Alpes Editions 11 February 2015.

- Belloir, M., *Libre Actualité Services*, 2020. Les labels peinent à convaincre les Français. Retrieved on 30 July 2024 from: <https://www.lsa-conso.fr/les-labels-peinent-a-convaincre-les-francais>, 350974.
- Benoit, M., Laignel, G., Liénard, G., Dedieu, B., Chabousseau, J.M., 1997. Eléments de réussite économique des élevages ovins extensifs du Montmorillonnais. *INRA Productions Animales* 10, 349–362.
- Bernes, G., Turner, T., Pickova, J., 2012. Sheep fed only silage or silage supplemented with concentrates: 2. effects on lamb performance and fatty acid profile of ewe milk and lamb meat. *Small Ruminant Research* 102, 114–124.
- Bertrandias, L., Cazes-Valette, G., Gerviez, P., 2021. La préoccupation du bien-être animal, quels effets sur la consommation de viande ? *Décisions Marketing* 103, 83–105.
- Bord, C., Marty, M., Bois, N., Lebecque, A., 2019. Typologie sensorielle de la viande “Tendre Agneau”. Intérêt d’une typologie sensorielle pour la mise en place d’une grille de référence du suivi de la qualité supérieure de la viande “Tendre Agneau” Label Rouge. *Vandes & Produits Carnés, VPC-2019-35-2-5*, Published online by Adiv 21 July 2019.
- Buhr, B.L., 2003. Traceability and information technology in the meat supply chain: implications for firm organization and market structure. *Journal of Food Distribution Research* 34, 13–26.
- Chatellier, V., 2024. L’agriculture biologique et les produits animaux bio en France : après l’essor, le choc de l’inflation. *INRAE Productions Animales* 37, 7937.
- Conanec, A., Campo, M., Richardson, I., Ertbjerg, P., Failla, S., Panea, B., Chavent, M., Saracco, J., Williams, J.L., Ellies-Oury, M.-P., Hocquette, J.-F., 2021. Has breed any effect on beef sensory quality? *Livestock Science* 250, 104548.
- De Bauw, M., Matthys, C., Poppe, V., Franssens, S., Vranken, L., 2021. A combined Nutri-Score and ‘Eco-Score’ approach for more nutritious and more environmentally friendly food choices? Evidence from a consumer experiment in Belgium. *Food Quality and Preference* 93, 104276.
- Delanoue, E., Roguet, C., 2015. Acceptabilité sociale de l’élevage en France : recensement et analyse des principales controverses à partir des regards croisés de différents acteurs. *INRA Productions Animales* 28, 39–50.
- Denos, G., Ferrandi, J.-M., Pantin-Sohier, G., 2020. Valorisation des produits carnés : une étude du signal “élevé au pâturage” sur le packaging. *Economie Rurale* 373, 23–41.
- Ellies-Oury, M. P., Rousseau, G., Papillon, S., Dauvergne, A., Arranz, J. M., Recondo, X., Jacob, H., Micol, D., 2014. Construire de Nouvelles méthodes d’analyse sensorielle pour apprécier les produits carnés ovins et bovins aquitains sous label rouge. Paper presented at the 15th Journées Sciences du Muscle et Technologies des Viandes, 4–5 November 2014, Clermont-Ferrand, France.
- European Commission, 2019. Regulation (EU) No 2019/6 of the European Parliament and of the Council of December 2018 on veterinary medicinal products and repealing Directive 2001/82/EC. *Official Journal of the European Union* L4 of 7.1.2019, 43–167.
- Farmer, L.J., Perry, G.C., Lewis, P.D., Nute, G.R., Piggott, J.R., Patterson, R.L.S., 1997. Responses of two genotypes of chicken to the diets and stocking densities of conventional UK and Label Rouge production systems-II. Sensory Attributes. *Meat Science* 47, 77–93.
- Ferrer, M.C., Ames, G.C., 2012. Food Quality Certification: Is the Label Rouge Program Applicable to the US? *Journal of Food Distribution Research* 43, 114–115.
- Font-i-Furnols, M., Realini, C.E., Guerrero, L., Oliver, M.A., Sañudo, C., Campo, M.M., Nute, G.R., Cañeque, V., Alvarez, I., San Julian, R., Luzardo, S., Brito, G., Montossi, F., 2009. Acceptability of lamb fed on pasture, concentrate or combinations of both systems by European consumers. *Meat Science* 81, 196–202.
- Font-i-Furnols, M., Realini, C.E., Montossi, F., Sañudo, C., Campo, M.M., Oliver, M.A., Nute, G.R., Guerrero, L., 2011. Consumer’s purchasing intention for lamb meat affected by country of origin, feeding system and meat price: a conjoint study in Spain, France and United Kingdom. *Food Quality and Preference* 22, 443–451.
- Gruffat, D., Picard, B., Bauchart, D., Micol, D., 2015. La viande bovine : les principales qualités recherchées. *INRA Productions Animales* 28, 99–104.
- Gruffat, D., Durand, D., Rivaroli, D., Prado, I.N., Prache, S., 2020. Comparison of muscle fatty acid composition and lipid stability in lambs stall-fed or pasture-fed alfalfa with or without sainfoin pellet supplementation. *Animal* 14, 1093–1101.
- Guillemin, N., Cassar-Malek, I., Hocquette, J.F., Jurie, C., Micol, D., Listrat, A., Leveziel, H., Renand, G., Picard, B., 2009. La maîtrise de la tendreté de la viande bovine : identification de marqueurs biologiques. *INRA Productions Animales* 22, 331–344.
- INAO, 2022. Découvrez les chiffres-clés 2021 des viandes, charcuteries et volailles sous SIQO. Retrieved on 30 July 2024 from: <https://www.inao.gouv.fr/Nos-actualites/chiffres-clés-2021-viandes-charcuteries-volailles>.
- Innes, B., Cranfield, J., 2009. Consumer preference for production-derived quality: analyzing perceptions of premium chicken production methods. *Agribusiness* 25, 395–411.
- Legrand, I., Sagot, L., Prache, S., Gautier, D., Tessereau, A., Lagarde, E., Demarquet, F., Siciliano, L., Briantais, D., Grisot, P.-G., et al., 2021. ECOLAGNO - Production de viande d’agneau selon des pratiques agroécologiques : performances technico-économiques et perception par les consommateurs. *Innovations Agronomiques* 28, 95–109.
- Lewis, P.D., Perry, G.C., Farmer, L.J., Patterson, R.L.S., 1997. Responses of two genotypes of chicken to the diets and stocking densities typical of UK and ‘Label Rouge’ production systems: I. performance, behaviour and carcass composition. *Meat Science* 45, 501–516.
- Miranda-de la Lama, G.C., Salazar-Sotelo, M.I., Perez-Linares, C., Figueroa-Saavedra, F., Villarroel, M., Sañudo, C., Maria, G.A., 2012. Effects of two transport systems on lamb welfare and meat quality. *Meat Science* 92, 554–561.
- Normand, J., Bas, P., Gouedard, A., Pottier, E., Auroousseau, B., Matray, M., Thériez, M., Sauvart, D., 1997. Fermeté et composition des tissus adipeux sous-cutanés chez l’agneau de bergerie: effets du sexe, de l’alimentation et de l’origine paternelle. *Rencontres Recherches Ruminants* 4, 303–306.
- Nozières-Petit, M.O., Baritoux, V., Couzy, C., Dervillé, M., Perrot, C., Sans, P., You, G., 2018. Transformations des filières françaises de produits carnés et laitiers : la place des éleveurs en question Transformations of the French meat and dairy product sectors: the role of breeders. *INRA Productions Animales* 31, 69–82.
- Nozières-Petit M. O., Stark, F., 2021. Ancre territorial de la filière ovine en Occitanie – Agreste études n°4 – mars 2021. Retrieved on 30 July 2024 from: <https://draaf.occitanie.agriculture.gouv.fr/ancre-territorial-de-la-filiere-viande-ovine-en-occitanie-agreste-etudes-no4-a5879.html>.
- Onwuegbuzie, A.J., Leech, N.L., Collins, K.M., 2012. Qualitative analysis techniques for the review of the literature. *Qualitative Report* 17, 56.
- Ponnampalam, E.N., Kearns, M., Kiani, A., Sathiravel, S., Vahmani, P., Prache, S., Monahan, F., Mapiye, C., 2024. Enrichment of ruminant meats with health enhancing fatty acids and antioxidants: feed-based effects on nutritional value and human health aspects-Invited review. In: *Animal-derived foods in our diets: nutrition, health and social implications*. *Frontiers in Animal Science* 5, 1329346.
- Prache, S., Auroousseau, B., Thériez, M., Renner, M., 1990. Les défauts de couleur du tissu adipeux sous-cutané des carcasses d’ovins. *INRA Productions Animales* 3, 275–285.
- Prache, S., Bauchart, D., 2015. La viande et la carcasse des agneaux : les principales qualités recherchées. *INRA Productions Animales* 28, 105–110.
- Prache, S., Schreurs, N., Guillier, L., 2022a. Review: Factors affecting sheep carcass and meat quality attributes. *Animal* 16, 100330.
- Prache, S., Adamiec, C., Astruc, T., Baeza-Campone, E., Bouillot, P.E., Clinquart, A., Feidt, C., Fourat, E., Gautron, J., Girard, A., Guillier, L., Kesse-Guyot, E., Lebre, B., Lefevre, F., Le Perche, S., Martin, B., Mirade, P.S., Pierre, F., Raulet, M., Remond, D., Sans, P., Souchon, I., Donnars, C., Santé-Lhoutellier, V., 2022b. Review: Quality of animal-sourced foods. *Animal* 16, 100376.
- Prache, S., Lebre, B., Baeza, E., Martin, B., Gautron, J., Feidt, C., Médale, F., Corraze, G., Raulet, M., Lefèvre, F., Verrez-Bagnis, V., Sans, P., 2022c. Review : Quality and authentication of organic animal products in Europe. *Animal* 16, 100405.
- Raulet, M., Clinquart, A., Prache, S., 2022. Construction of beef quality through official quality signs, the example of Label Rouge. *Animal* 16, 100357.
- Rey-Cadilhac, L., Botreau, R., Ferlay, A., Hulin, S., Hurtaud, C., Lardy, R., Martin, B., Laurent, C., 2021. Co-construction of a method for evaluating the intrinsic quality of bovine milk in relation to its fate. *Animal* 15, 100264.
- Roche, B., Dedieu, B., Ingrand, S., 2000. Analyse comparative des cahiers des charges Label Rouge gros bovins de boucherie. *Rencontres Recherches Ruminants* 7, 259–262.
- Sandelowski, M., 1995. Qualitative analysis: what it is and how to begin. *Research in Nursing & Health* 18, 371–375.
- Sañudo, C., Alfonso, M., San Julián, R., Thorkelsson, G., Valdimarsdóttir, T., Zygoyiannis, D., Stamataris, C., Piasentier, E., Mills, C., Berge, P., Dransfield, E., Nute, G.R., Enser, M., Fisher, A.V., 2007. Regional variation in the hedonic evaluation of lamb meat from diverse production systems by consumers in six European countries. *Meat Science* 75, 610–621.
- Schreurs, N.M., Kenyon, P.R., 2017. Animal and on-farm factors affecting sheep and lamb meat quality. In: Greyling, J. (Ed.), *Achieving Sustainable Production of Sheep*. Burleigh Dodds Science Publishing Limited, Cambridge, UK, pp. 29–52.
- Scollan, N., Hocquette, J.F., Nuernberger, K., Dannenberger, D., Richardson, I., Moloney, A., 2006. Innovations in beef production systems that enhance the nutritional and health value of beef lipids and their relationship with meat quality. *Meat Science* 74, 17–33.
- Sheath, G., Coulon, J.B., Young, O., 2001. Grassland management and animal product quality. In: *Proceedings of the XIX International Grassland Congress*, 11–21 February 2001, Sao Pedro, Sao Paulo, Brazil, 1019–1026.
- Smith, D.P., Northcutt, J.K., Steinberg, E.L., 2012. Meat quality and sensory attributes of a conventional and a Label Rouge-type broiler strain obtained at retail. *Poultry Science* 91, 1489–1495.
- Stampa, E., Schipmann-Schwarze, C., Hamm, U., 2020. Consumer perceptions, preferences, and behavior regarding pasture-raised livestock products: a review. *Food Quality and Preference* 82, 103872.
- Stanley, D., 2003. The role of silage in lamb-finishing systems. In *Proceedings of the Joint Conference of GSV and GSNW* 2003, 57–61.
- Temple, D., Manteca, X., 2020. Animal welfare in extensive production systems is still an area of concern. *Frontiers in Sustainable Food Systems* 4, 545902.
- Thériez, M., Auroousseau, B., Prache, S., Mendizabal, J., 1997. Les défauts de couleur des gras d’agneau. *Rencontres Recherches Ruminants* 4, 295–301.
- Tsitos, A., Economou, V., Arsenos, G., Kalitsis, T., Theodoridis, A., 2020. A review of Consumer Preferences for Lamb and Beef Products. In: *Proceedings of the 9th International Conference on Information and Communication Technologies in Agriculture, Food & Environment*, 24–27 September 2020, Thessaloniki, Greece, 28–36.
- Vandecastelaere, E., Samper, L.F., Rey, A., Daza, A., Mejía, P., Tartanac, F., Vittori, M., 2021. The geographical indication pathway to sustainability: a framework to assess and monitor the contributions of geographical indications to sustainability through a participatory process. *Sustainability* 13, 7535.

- Villette, Y., Thériez, M., 1981. Influence du poids à la naissance sur les performances d'agneaux de boucherie II – Composition corporelle et chimique d'agneaux abattus au même poids. *Annales De Zootechnie* 30, 169–182.
- Walsh, M., 2003. Teaching qualitative analysis using QSR NVivo. *The Qualitative Report* 8, 251–256.
- Weber, A., 2021. Mobile apps as a sustainable shopping guide: The effect of eco-score rankings on sustainable food choice. *Appetite* 167, 105516.
- Westgren, R.E., 1999. Delivering food safety, food quality, and sustainable production practices: the Label Rouge poultry system in France. *American Journal of Agricultural Economics* 81, 1107–1111.