How do consumers perceive sensorial quality of beef?

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Presentation outline

- Introduction.
  - Evolution of selections objectives.
  - Selection for meat quality.
  - The Avileña-Negra Ibérica (ANI) breed.
  - Study aims
- Methods.
  - Questionnaire and sampling procedure.
- Results.
  - Consumers perception on beef quality.
  - Consumers profile regarding knowledge on beef breeds and on influence of genetics on beef quality.
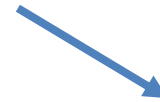- Conclusions.

Introduction. **Evolution of selection objectives**

Up to now genetic breeding have mainly focus on two groups of traits
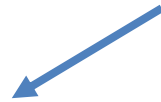
Beef performance

- Conformation
- Carcass traits: carcass weight, carcass yield, carcass conformation, carcass fat.
- Growth: birth, weaning, post-weaning

Maternal performance

- Maternal ability at weaning
- Fertility
- Calving easiness

Introduction. **Evolution of selection objectives**

Selection objectives are now aiming to include another two groups of traits

More efficiency

- Fertility

- Functional Longevity

- Health

- Feed efficiency

Quality of products

- Ultrasounds to predict IMF

- pH

- …

Reduction of production costs

Add values to products

Introduction. **Selection for meat quality**

- Two major key difficulties:

  1. Organizational aspects: How to establish a recording

     system?

  2. Meat quality definition: How to define it?

Introduction. **Avileña-Negra Ibérica breed**

Introduction. **Avileña-Negra Ibérica breed**

- Linked to extensive production systems: transhumance and transtermitance.

- Low input-low output systems.

- Beginning of the XX century a group of farmers began beef selection.

- Wealthy land owners, high educated, very linked to the breed and its land as a lifestyle and a status symbol.

- 1970 creation of the breeders Association.

Introduction. **ANI breed association**

- Enthusiastic and keen farmers strongly linked to the breed.

- Performance recording of animals and selection program since 90's.

- Breed markets, promotion activities of the breed and its products.

- Research. Collaboration with universities and research institutes.

- Product development.

    - 1990. Creation of the first Spanish fresh meat label ("Carne de Ávila").

    - 1995. Common fatten houses.

    - 2012. Common cutting and packing room, online sales and doorstep selling.

Introduction. **Avileña-Negra Ibérica breed**

Integrated Production System from Farm to consumers' homes

Introduction. **Meat quality**

Meat quality			
Organoleptic properties Tenderness, juiciness, color, o dor, flavour	**Technological properties** pH, water holding capacity, oxidativ e stability	**Food security** Sanitary risks, residuals from antibiotics, hormones	**Social aspects** Animal welfare, producti on systems enviroment friendly

- It embraces multiple components.

- Beef quality demand depends on the taste and point of view of consumers.

- **A second step to integrate beef quality in a selection program would be to establish criteria that allow prioritizing its different components.**

Introduction. **Aims**

- Specifically in this study we aimed to:

  1. Analyze the point of view of consumers of beef products of Avileña-Negra Ibérica breed to determine the components of beef quality for consumers and to analyze its relative importance.

  2. Profile consumers regarding knowledge on beef breeds and on the influence of genetics on beef quality.

Introduction. **Questionnaires**

- Consumers questionnaires are an easy and straightforward method to establish prioritization criteria.

- Key point of sampling of respondents: Who?, How many?, Where?.

- What do we want to analyze?

- How do we ask it?

  - Type of questions: Open and close ended.

  - Order of questions.

Methods. **Sample size**

- Sample size determination;

$$n = \frac{N \times Z_\alpha^2 \times p \times q}{d^2 \times (N-1) + Z_\alpha^2 \times p \times q}$$

$=383$

N = 227,393 families.

Zα = 1.96. Confidence level (α) of 0.05.

p = 1-q= 0.5. Since it is unknown we apply the most unfavourable option.

d = 0.05. Maximun expected sampling error.

	Population [1]	Avileña-Negra Ibérica labelled products consumers
Madrid (Province)	6,271,638	639,707
Ávila (Province)	171,815	17,525
Burgos	177,879	18,144
Palencia	82,626	8,428
Valladolid	318,461	32,483
TOTAL	7,022,419	716,287
[2]Percentage of consumers of labelled products IGP, DO y MG		15%
[3]Percentage of consumers of Avileña-Negra Ibérica labelled products		68%

[1] Spanish National Institute of Statistics (January 2008).
[2] Porcentage over total population.
[3] Porcentage over consumers of labelled products.

Methods. **Samples distribution**

Sample distribution by province and cities

	Nº butcheries	Proportion	Sample distribution
Madrid (province)	23	64%	**245**
Ávila (province)	10	28%	**106**
Burgos	1	3%	**11**
Palencia	1	3%	**11**
Valladolid	1	3%	**11**
TOTAL	36	100%	**383**

Methods. **Samples distribution**

Distribution of samples by stores, location and province.

Province	Location	Stores	Nº Interviews	TOTAL
Madrid	Madrid	Carnicería Hnos.Palacios. Mercado los Mostenses	43	**246**
		Carnicería Peña. Mercado Chamartín	32	
		Carnicería Domingo Javier de Pedro	43	
		Carrefour Hortaleza	32	
	Alcobendas	Carrefour Alcobendas	32	
	Mahadahonda	Carrefour Majadahonda	32	
	Las Rozas	Carrefour El Pinar de las Rozas	32	
Ávila	Ávila	Carrefour Ávila	28	**112**
		Carnicería J.L.Sastre	28	
	Las Navas del Marqués	Carnicería La Comercial	28	
	La Torre	Industrias Cárnicas Roal	28	
Valladolid	Valladolid	Carrefour Parquesol	11	**11**
Palencia	Palencia	Carrefour Palencia	11	**11**
Burgos	Burgos	Carrefour Burgos	11	**11**
TOTAL		**14**	391	**391**

Methods. **Questions**

1. Open question: What do you understand by beef quality?

2. Close question: Can you value from 0 to 5 the influence of the following components in beef quality?

    *Color *Flavour *Tenderness *Texture *Juiciness *Others

3. Open question: Which are the factors that influence beef quality?

4. Close question: Can you value from 0 to 5 the influence of the following factors in beef quality?

    *Alimentation *Sanitary conditions *Climatic conditions

    *Farming system *Breeds *Animal welfare *Slaughter age

    *Meat maturation *Geographic origin *Others.

Methods. **Additional questions**

- Questions to analyze the consumers profile referring to its knowledge on cattle breeds,

  1. Can you name the Spanish indigenous breeds that you know?

  2. How important is the breed as a criterion when buying beef products?

  3. How important is the breed as a criterion when buying labeled beef products?

- Knowledge on "Carne de Ávila" label.

  4. What does "Carne de Ávila" label refer to?

  5. Does "Carne de Ávila" labeled products refers to any breed? Which one?

Methods. **Additional questions**

- Influence of genetics on the quality of beef products,

  1. Are there differences in beef quality of "pure" and F1 animals? How much difference?

  2. Do labeled products use only "pure" animals, only F1 animals or both?

  3. Does "Carne de Ávila" label use only "pure" animals, only F1 animals or both?

  4. Do you think that the inclusion of F1 animals will influence the quality of "Carne de Ávila" beef?

Results. **Components of quality**

Components of sensorial quality of beef

	[+]Proportion	Sample error
Flavour	**0.611**	0.035
Tenderness	**0.378**	0.028
Juiciness	**0.098**	0.014
Texture	**0.065**	0.012
Color	**0.051**	0.010
Freshness*	**0.085**	0.013
Aspect*	**0.024**	0.007
Water content*	**0.098**	0.014
Security*	**0.081**	0.013
Others*	**0.054**	0.011
n	294	

[+]Porportion refers to the consumers that point out each of the components
*Aspects pointed out by interviewers that do not refer to sensorial quality.

Results. **Components of quality**

Quality components valuation by consumers
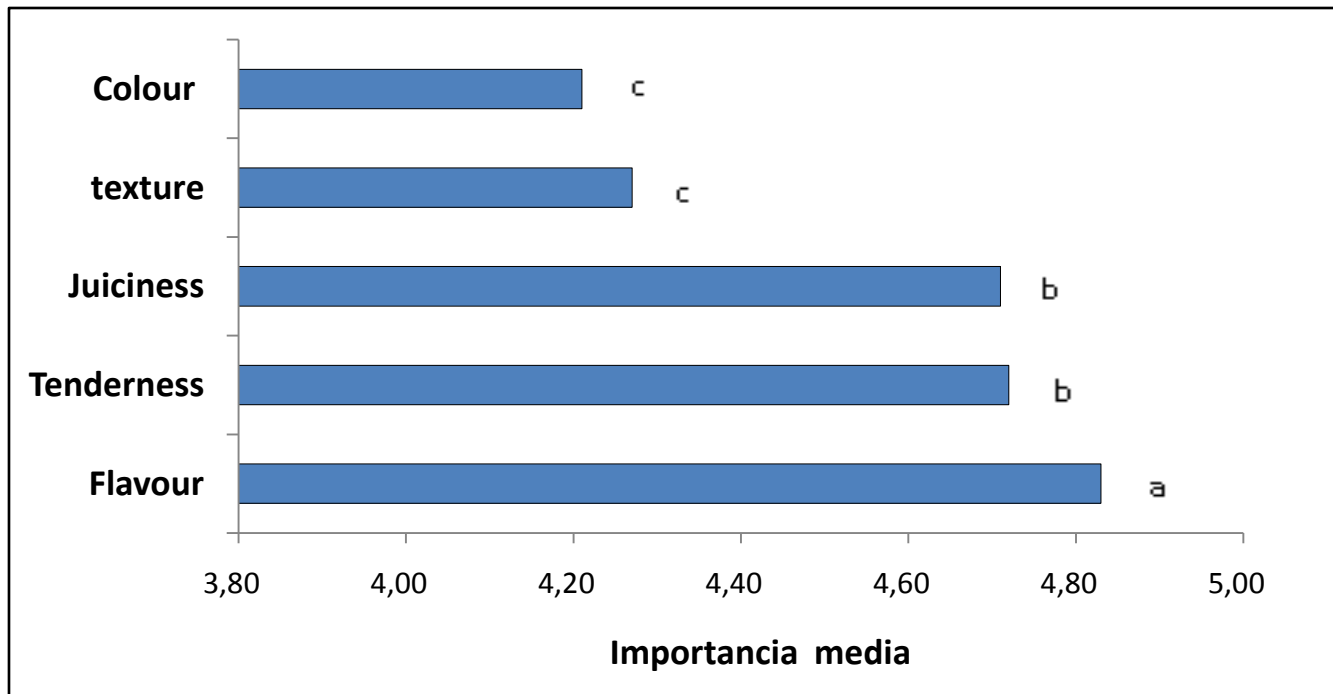
Same letters are not statistically different (Kruskal-Wallis Test p<0.001)

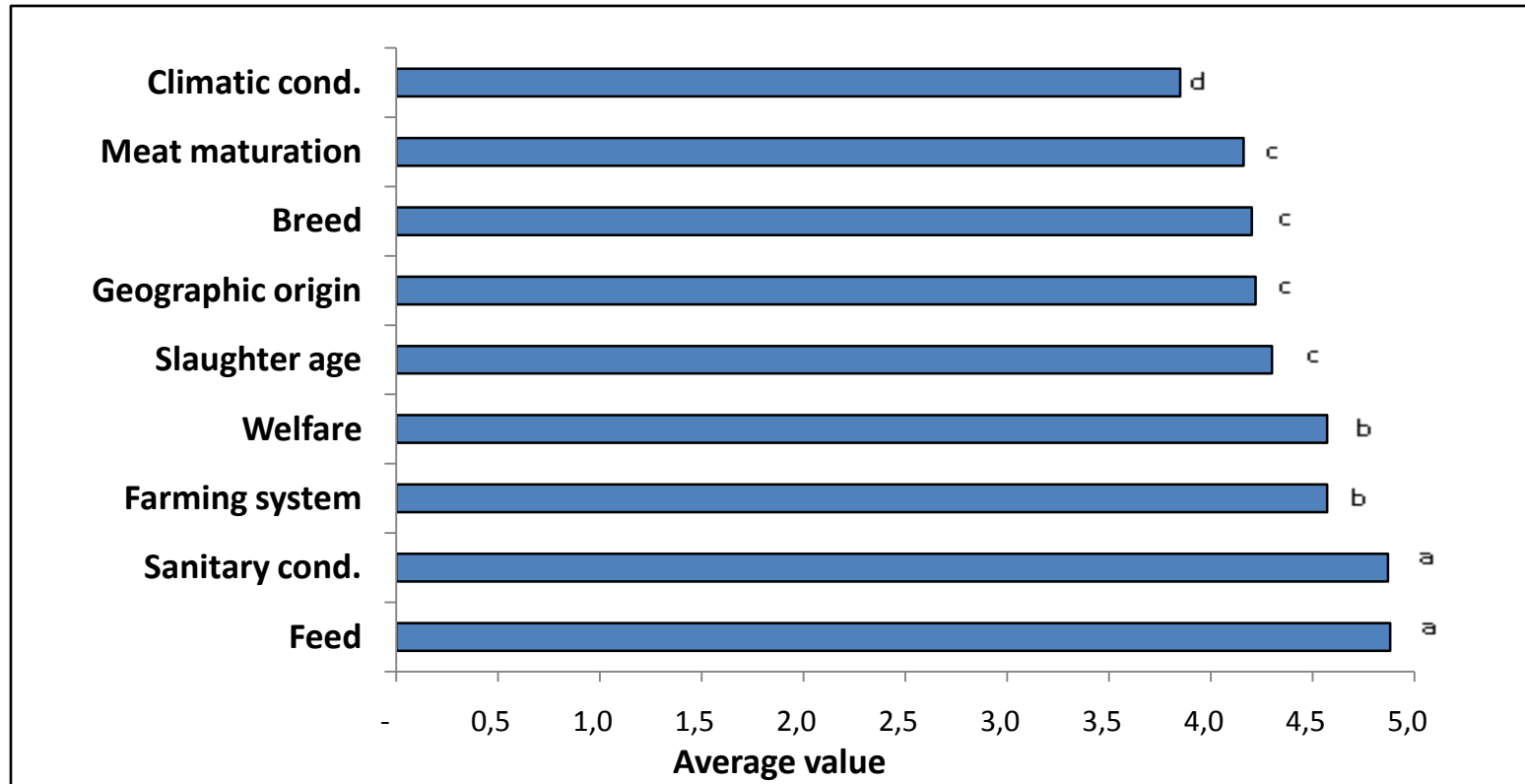# Results. **Factors of quality**

Factors influencing beef quality according to consumers

	Proportion	Sampling error
Feed	**0.651**	0.049
Farming system	**0.071**	0.016
Geographic origin	**0.059**	0.015
Sanitary conditions	**0.053**	0.014
Welfare	**0.047**	0.013
Conservation	**0.047**	0.013
Breed	**0.024**	0.009
Slaugter age	**0.024**	0.009
Meat maduration	**0.024**	0.009
Climatic conditions	**0.006**	0.005
n		169

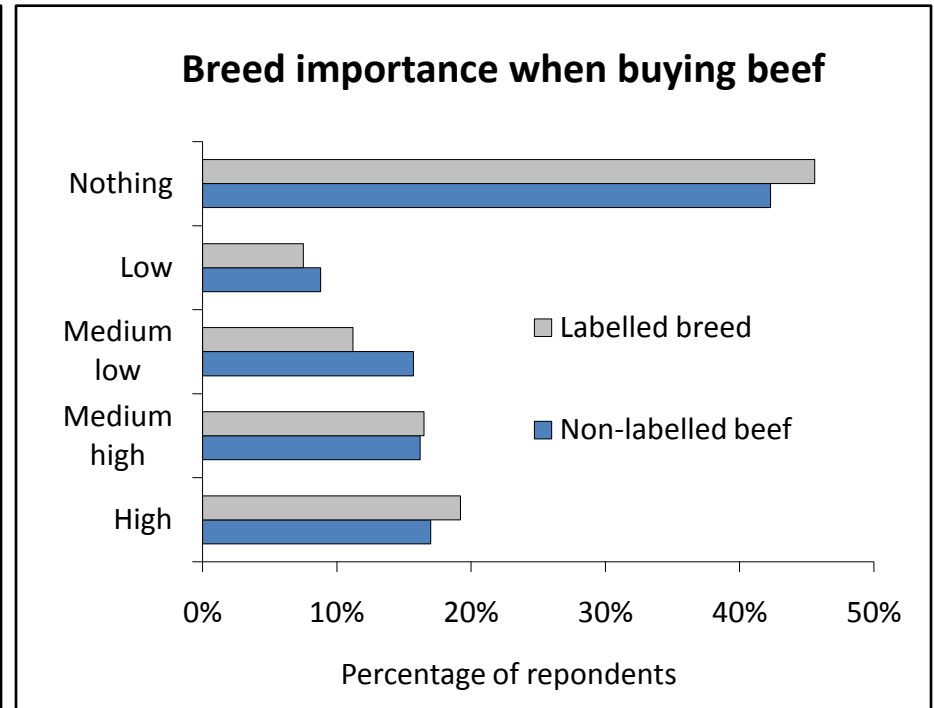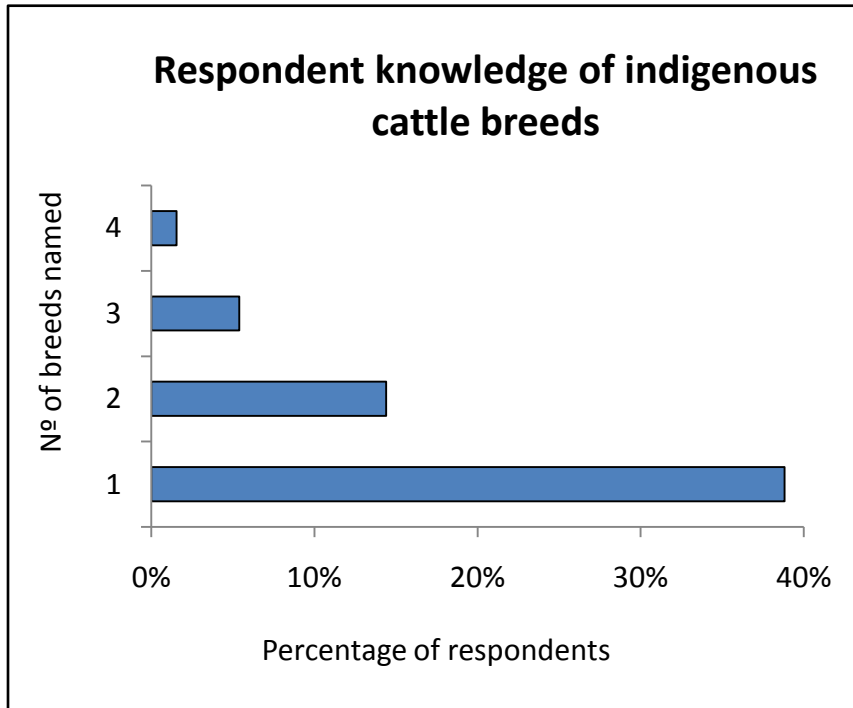Porportion refers to the consumers that point out each of the factors

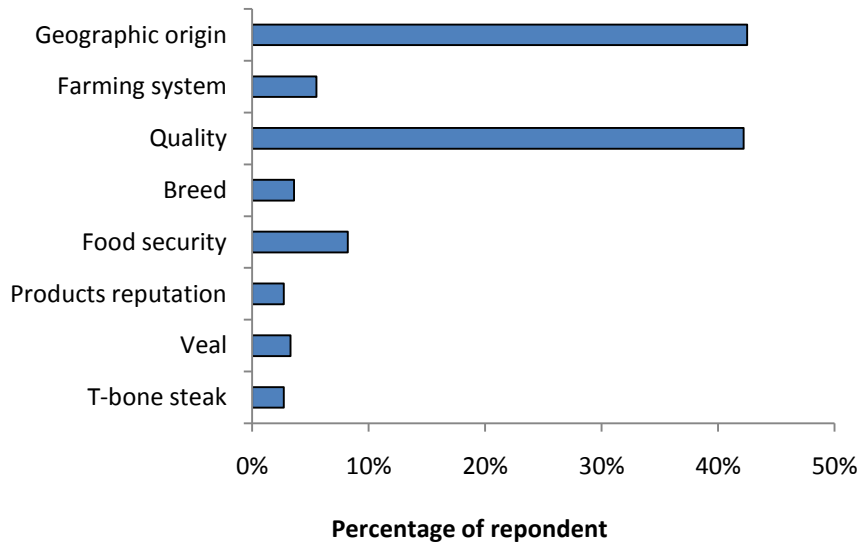# Results. **Factors of quality**

Quality factors valuation by consumers

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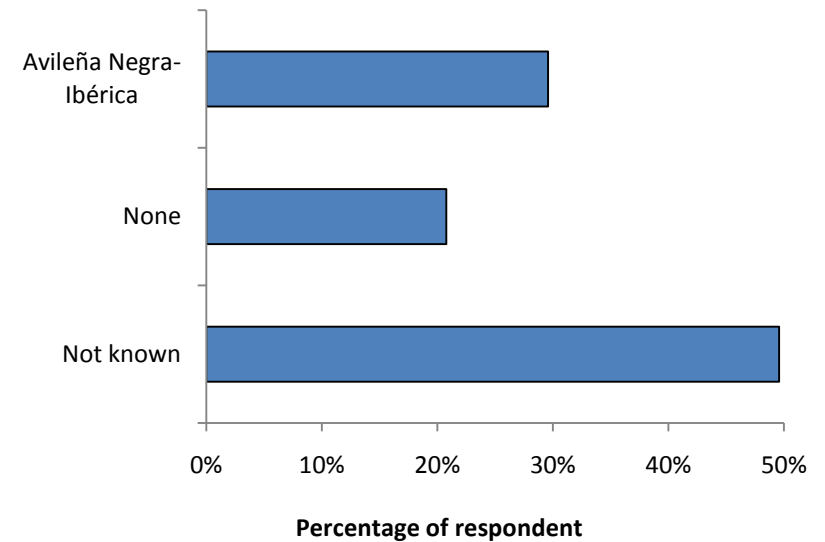
Results. **Breed knowledge**

Respondent knowledge of indigenous cattle breeds

Breed importance when buying beef

Results. **"Carne de Avila" label meaning**

Results. **Genetic influence of quality**

Differences in meat quality between beef from "pure" and F1

Percetage of repondents

Results. **Genetic influence of quality**

Genetic of animals included in labeled products (PGIs, ODs y GBs)

- Only "pure"
- Only F1
- Both
- Not know

■ "Carne de Ávila" label

■ Labelled products

Percentage of respondents

Influence on the inclusion of F1 animals in the "Carne de Ávila" label

- NO
- YES

Percentage of respondents
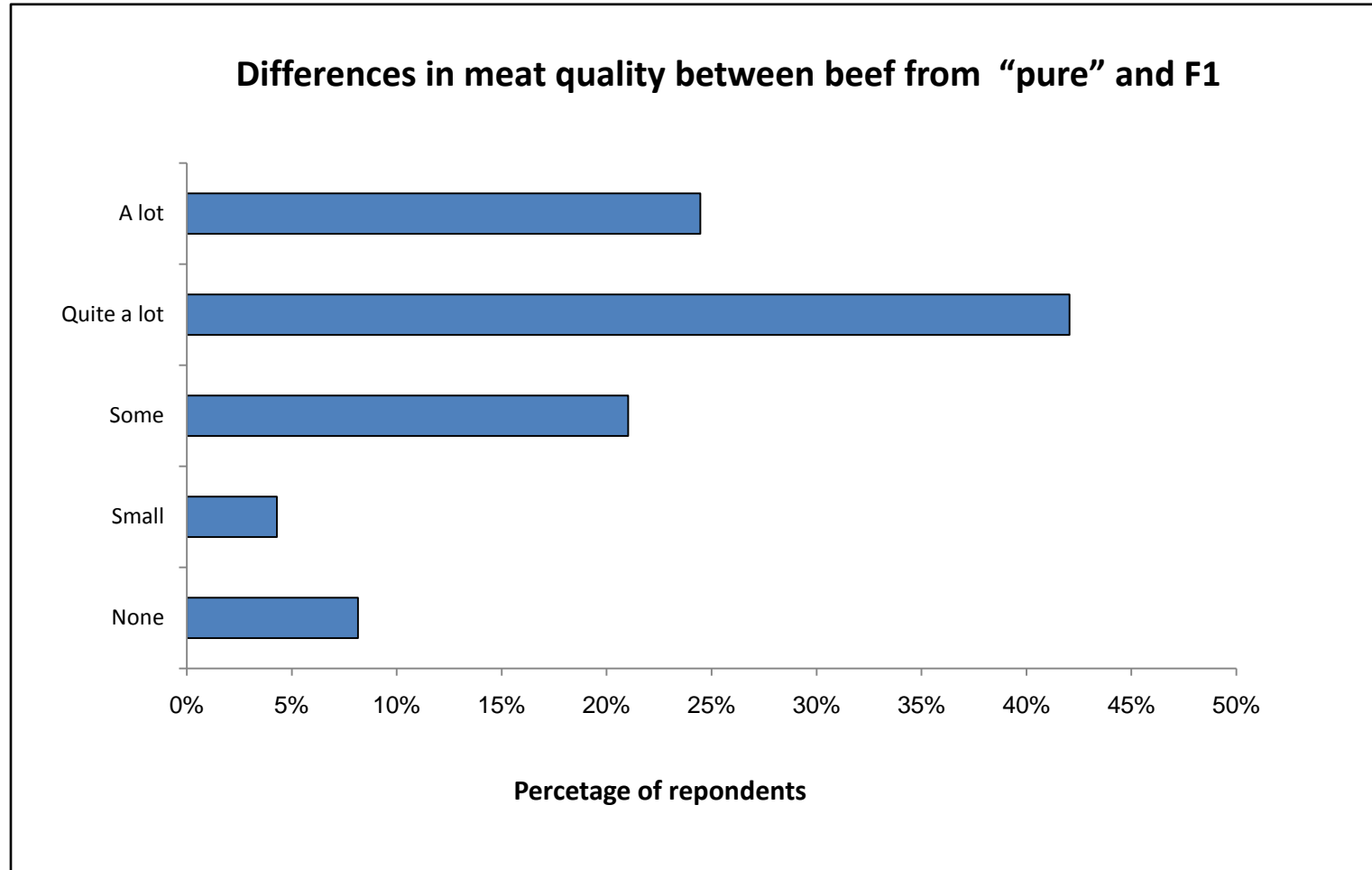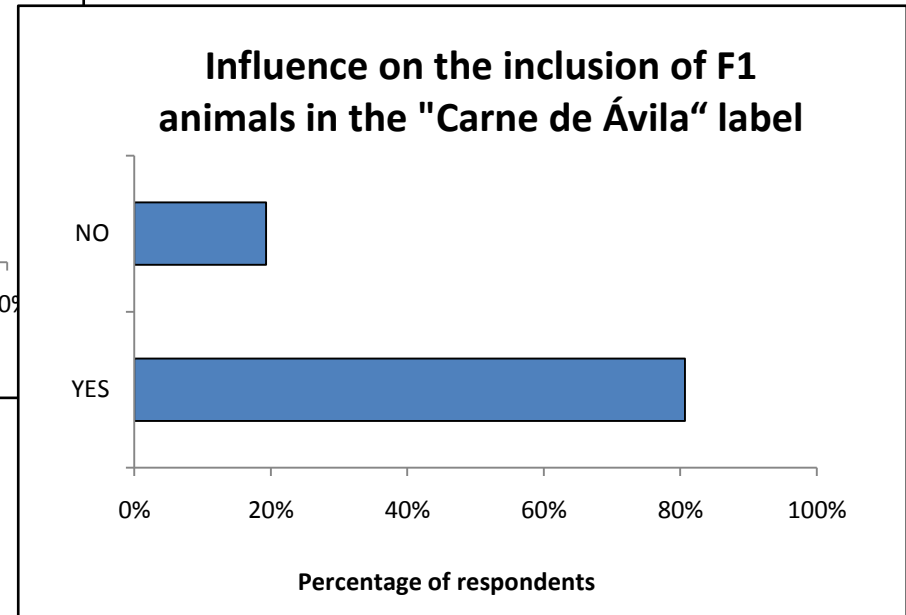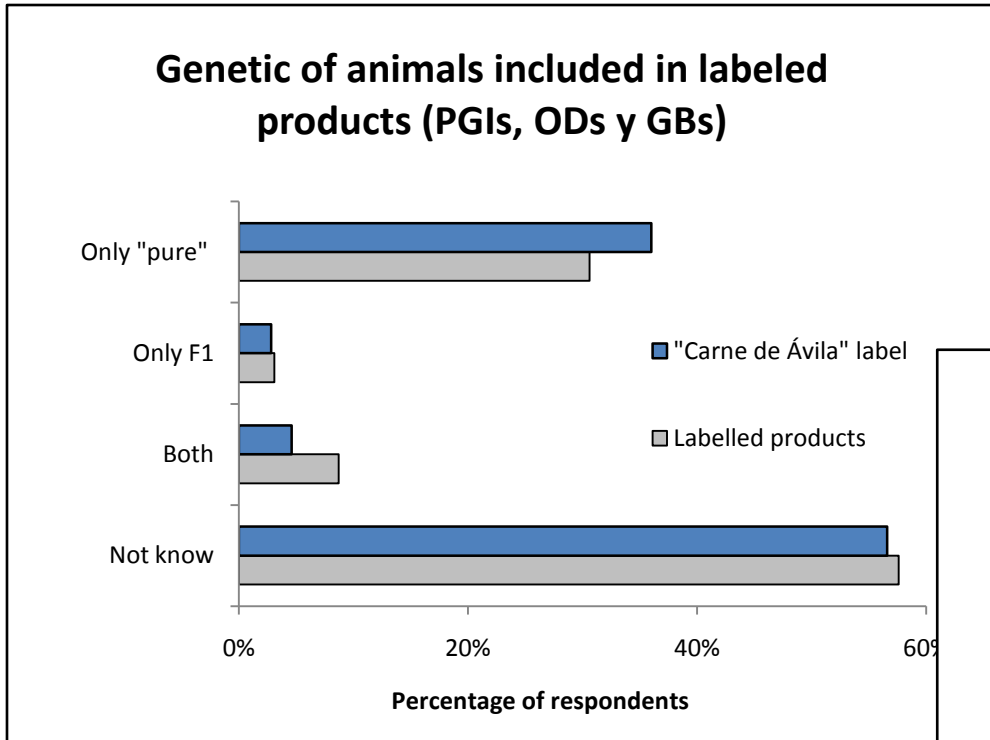
Conclusions

- Beef **flavour** is the **most important quality component** for consumers. It is **followed by tenderness and juiciness**.

- Color, unexpectedly, does not seem to be an important component of beef quality from consumers point of view. Maybe it is a feature that consumers think that is ensured.

- According to consumers criteria, the **factors that influence the most** the final **product quality** are **nutrition** and **health conditions**, followed by **production system** and **animal welfare**. Breed appeared in a third level of importance.

Conclusions

- **Sensorial quality is only one of the components of meat quality**. Security guaranty is also very important.

- In general terms the study have drawn a consumers profile that,

    - Has a **lack of knowledge on the relevance of genetics in the quality of the products**. On the one hand, he states that breed is not an important criterion when buying beef but, on the other hand it maintains that there are differences in beef quality among "pure " and F1.

    - **Does not consider breed a key factor when buying beef products** (labeled or not). There is an important **lack of knowledge on indigenous cattle breeds**.

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