



“RESEARCHING TODAY TO BRING TOMORROW CLOSER” WWW.IRTA.ES



62th EAAP, Stavanger, 28th Aug.- 2nd Sept. 2011





Results from the consumer test carried out within the ALCASDE project.

Núria Panella-Riera

S23: Consumer studies of the consequences of stopping piglet castration

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Facing new EU policies towards animal welfare improvement. The relative importance of pig castration.

Z.Kallas, J.M.Gil, N.Panella-Riera, M.Blanch, G.Tacken, P.Chevillon, K.De Roest, M.A.Oliver

Acceptability of meat with different levels of boar taint compounds for Spanish and English consumers.

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S23: Consumer studies of the consequences of stopping piglet castration

ContentsIntroductionObjectivesM & MStudy 1Study 2IRTA

CONTENTS

1. Introduction
2. Objectives
3. Material and Methods

Study 1: Facing new EU policies towards animal welfare improvement. The relative importance of pig castration.
Results & Conclusions

Study 2: Acceptability of meat with different levels of boar taint compounds for Spanish and English consumers.
Results & Conclusions

3

Contents **Introduction** Objectives M & M Study 1 Study 2 IRTA



INTRODUCTION

- ❑ Surgical castration of entire males' pigs is carried out:
 - To encourage the deposit of fat
 - To prevent aggressive behavior problems
 - To avoid the risk of obtaining meat with **boar taint**

Boar taint → Off-odour and flavour mainly related to the accumulation of **Androstenone** and **Skatole** in the fat tissue

→ Mainly accumulated in the fat tissue of **entire male pigs**

→ Consumers react differently to this smell and therefore it can affect consumers' acceptability of pork



There is an associated **MEAT (sensory) QUALITY** problem

4

Contents **Introduction** Objectives M & M Study 1 Study 2 IRTA

- ❑ Social concern for **ANIMAL WELFARE** has increased: Castration carried out without anesthesia could have a negative impact.



The EU is considering banning castration without anesthesia by 2018 and promoting the raising of entire males.

 **Food Safety - From the Farm to the Fork**

European Declaration on alternatives to surgical castration of pigs

The European Commission and representatives of European pig farmers, meat industry, traders, retailers, scientists and NGO's committed themselves to plan to voluntarily **end surgical castration** of pigs in Europe by January 1st, 2018.

There are some exceptions December 2010

5

Image source: <http://fulplateplanet.wordpress.com/2011/01/29/thats-what-you-get-for-asking/happy-pig/>

Contents Introduction Objectives M & M Study 1 Study 2 IRTA

Stop Castration

ANIMAL WELFARE

Trade-off

MEAT QUALITY


Avoid Boar taint

6

Image source: <http://fullplateplanet.wordpress.com/2011/01/29/thats-what-you-get-for-asking/happy-pig/>

Contents Introduction Objectives M & M Study 1 Study 2 IRTA

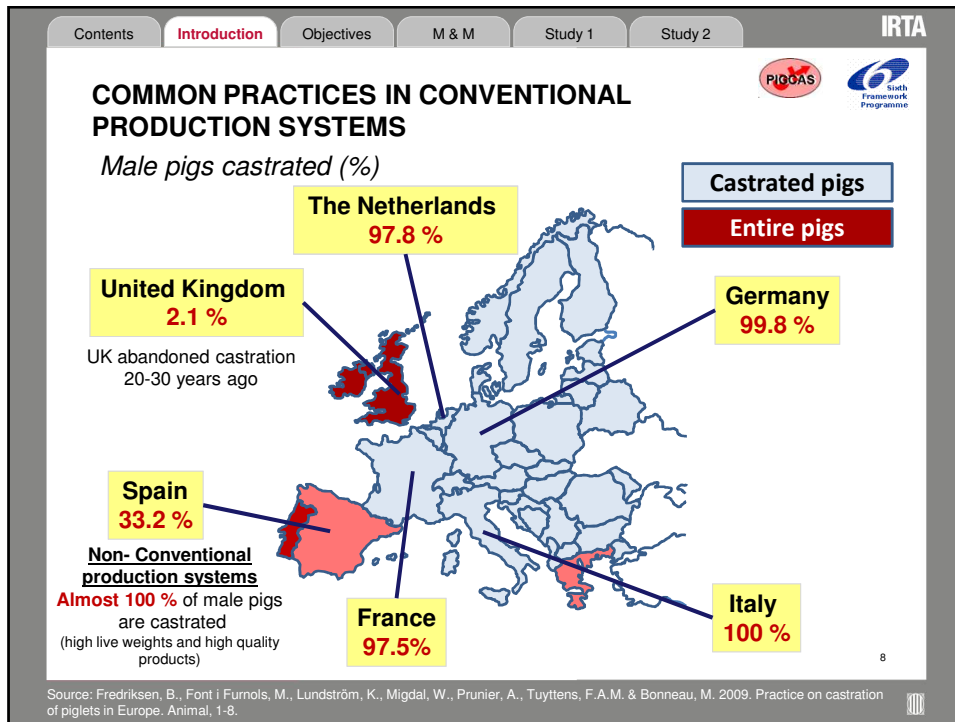
In the European context...

 = 250 millions

125 million of male pigs
77 % are castrated
without anaesthesia

7

Source: Fredriksen, B., Font i Furnols, M., Lundström, K., Migdal, W., Prunier, A., Tuytens, F.A.M. & Bonneau, M. 2009. Practice on castration of piglets in Europe. *Animal*, 1-8.



Contents Introduction Objectives M & M Study 1 Study 2 IRTA

Given these different scenarios across Europe...

What are consumers' attitudes towards piglet castration...

What is the acceptability of meat with different levels of boar taint...

... in different EU countries?

9

Contents Introduction **Objectives** M & M Study 1 Study 2 IRTA

OBJECTIVES

ALCASDE
Alternatives to Castration and Dehorning

Work Package 1.3:
'To provide research results to support EU policy on the consumer demand and acceptance of castration of pigs'

↳ **'To analyze the relative importance of animal welfare (pig castration) attribute vs. hedonic quality cues of the fresh pig meat related to boar taint, in six EU countries'**
-UK, FR, IT, NL, DE, ES-

↳ **'To study consumers' acceptance of pork with different levels of boar taint in Spain and United Kingdom'**
- UK, ES (Preliminary results)-

10

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

GENERAL MATERIAL & METHODS




Consumer test in 6 EU countries. 822 respondents
*Selected for consuming pork >1 time/month;
by age and gender according to each country profile.*

Spain (n=133) ES Barcelona	The Netherlands (n=132) NL Utrecht Ede-Wageningen	France (n=139) FR Cain Paris
United Kingdom (n=146) UK Reading	Germany (n=132) DE Mainz Munich	Italy (n=140) IT Matelica Reggio Emilia

11

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

Consumer test

- The data were obtained from **self-completed questionnaires** in controlled environment in 2009.
- The questionnaire asked for extensive information on the socio-economic characteristics of consumers, attitudes, preferences and opinions towards animal welfare.


Structure of the test

1. Pre-questionnaire	→	Attitudes and preferences	Study 1
2. Sensory test	→	To eat cooked pig meat	Study 2
3. Kitchen test			
4. Post-questionnaire			

12

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 1




12. In your opinion, how important are the following aspects in considering animal welfare in pig production?

Animal Welfare Aspects	<i>(1- not important 9 very important)</i> <i>I don't know= Do not answer</i>								
Housing/living conditions	1	2	3	4	5	6	7	8	9
Medical treatment	1	2	3	4	5	6	7	8	9
Clean environment	1	2	3	4	5	6	7	8	9
Healthy conditions	1	2	3	4	5	6	7	8	9
Natural living conditions	1	2	3	4	5	6	7	8	9
Less transportation	1	2	3	4	5	6	7	8	9
Do not castrate/ entire male	1	2	3	4	5	6	7	8	9
Slaughtering	1	2	3	4	5	6	7	8	9
Feed quality	1	2	3	4	5	6	7	8	9
Space	1	2	3	4	5	6	7	8	9
Outside access	1	2	3	4	5	6	7	8	9

12

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 1



Q17. According to your opinion, what is the most important element when buying fresh pork meat?
*Indicate the degree of superiority of the **most important** element.
 In case of equality of elements mark 1.*

Gender of the pig									Pig origin								
9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	

Analytical Hierarchy Process (AHP)

- is a technique for organizing and analyzing complex decisions,
- and is a suitable method to assess individuals' preferences for the attributes of the 'complex goods and services'

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 1 – Analytical Hierarchy Process (AHP)

Q17. According to your opinion, what is the most important element when buying fresh pork meat?

1 The respondent had to indicate which of the two elements prefers.

2 A nine-point scale was used to measure the strength of this preference by means of verbal judgments.

Gender of the pig									Pig origin								
X	8	7	6	5	4	3	2	X	2	3	4	5	6	7	8	9	

Absolutely more important

Strongly more important

Moderately more important

Slightly more important

Equally important

Slightly more important

Moderately more important

Strongly more important

Absolutely more important

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 1 – Analytical Hierarchy Process (AHP)

Q17. According to your opinion, what is the most important element when buying fresh pork meat?

Attributes	Levels
Gender of the Pig	Female
	Entire male (Non-castrated)
	Castrated male with anaesthesia
	Castrated male without anaesthesia
Taste & odour	Could be Unpleasant
	Normal
Pig origin	Imported
	National
Price	6.00 €/Kg
	7.00 €/Kg
	8.00 €/Kg
	9.00 €/Kg

16

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 1 – Analytical Hierarchy Process (AHP)

Q17. According to your opinion, what is the most important element when buying fresh pork meat?

Pig origin									Gender of the Pig								
9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Imported									National								
9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
Female									Entire male (Non-castrated)								
9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	
...									...								
9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	

17

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 2 – Sampling

Structure of the test

1. Pre-questionnaire
2. Sensory test → To eat cooked pig meat
3. Kitchen test
4. Post-questionnaire

Study 2

Type of meat:


Code	[AND] (µg/g pure fat)	[SKA] (µg/g pure fat)	Determination of AND: GC-MS (Ampuero <i>et al.</i> , 2011)
FE	< 0.2	<0.03	Determination of SKA: HPLC-Fluorescence
BT020	0.20 ± 0.07 (0.04-0.29)	0.06 ± 0.02 (0.02-0.08)	
BT107	1.07 ± 0.40 (0.58-2.28)	0.18 ± 0.07 (0.11-0.39)	

18

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 2 – Sampling

- ✓ Samples: *Longissimus lumborum*
(1st lumbar vertebra- last rib)
- ✓ Cooked in hot plate
(Surface temperature: 180 °C;
Core temperature: 80 °C)



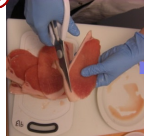


Type of meat:




Code	Description
FE	Meat from gilt
BT020	Meat from entire male- Low levels of Boar taint
BT107	Meat from entire male- Medium levels of Boar taint

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 2 – Sample preparation

- 1  Defrosted during 24h at 4 °C
- 2  0.5 cm thick
- 3  0.5 cm of fat

Cooking

- 4 
 - > hot plate at 180 °C
 - > greased with maize oil
 - > meat turned upside down regularly
 - > until the core T was 80°C
- 5 
- 6 

20

Contents Introduction Objectives **M & M** Study 1 Study 2 IRTA

STUDY 2

- Hall test
- Sessions with 10-12 consumers
- Sensory test questionnaire:

✓ How delicious do you find this product?

not good at all		really delicious
1	2	3
4	5	6
7	8	9

✓ What do you think of the odour?
✓ taste?

not at all pleasant	very pleasant
1	2
3	4
6	7
8	9

✓ Strength of odour
✓ Abnormal odour
✓ Strength of taste
✓ Abnormal taste

✓ Socio-demographic questions (age, gender)

✓ Are you partially responsible for **cooking** in your household?
✓ When you eat pork meat, do **you eat it with the fat** or without the fat?

✓ Data analysis with **SAS system**: Freq and Mixed procedures.

9-point scale
Intermediate level (5) missing

21

Contents Introduction Objectives M & M **Study 1** Study 2 IRTA

STUDY 1 - RESULTS




Facing new EU policies towards animal welfare improvement: the relative importance of pig castration

Z.Kallas, J.M.Gil, N.Panella-Riera, M.Blanch,
G.Tacken, P.Chevillon, K.De Roest, M.A.Oliver.







22

Contents Introduction Objectives M & M **Study 1** Study 2 IRTA

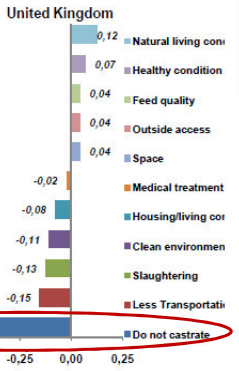
RESULTS

Q12. In your opinion, how important are the following aspects in considering animal welfare in pig production?

12. In your opinion, how important are the following aspects in considering animal welfare in pig production?

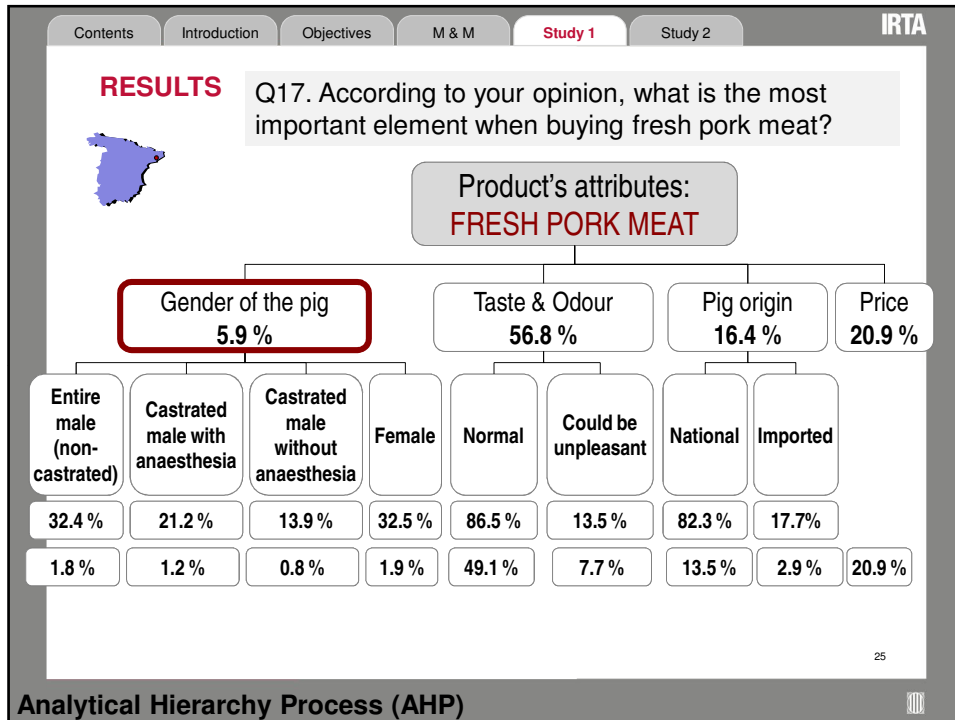
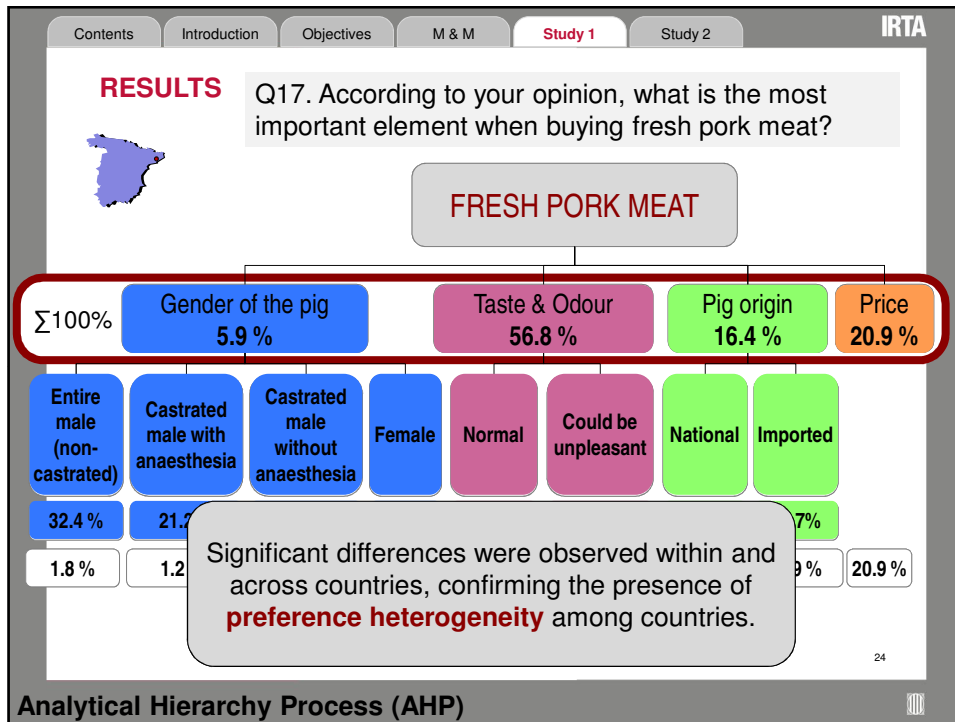
Animal Welfare Aspects	(1- not important)	(2)	(3)	(4)	(5- very important)				
Housing/living conditions	1	2	3	4	5				
Medical treatment	1	2	3	4	5				
Clean environment	1	2	3	4	5				
Healthy conditions	1	2	3	4	5				
Natural living conditions	1	2	3	4	5				
Less transportation	1	2	3	4	5				
Do not castrate/ entire male	1	2	3	4	5				
Slaughtering	1	2	3	4	5				
Feed quality	1	2	3	4	5				
Space	1	2	3	4	5	6	7	8	9
Outside access	1	2	3	4	5	6	7	8	9

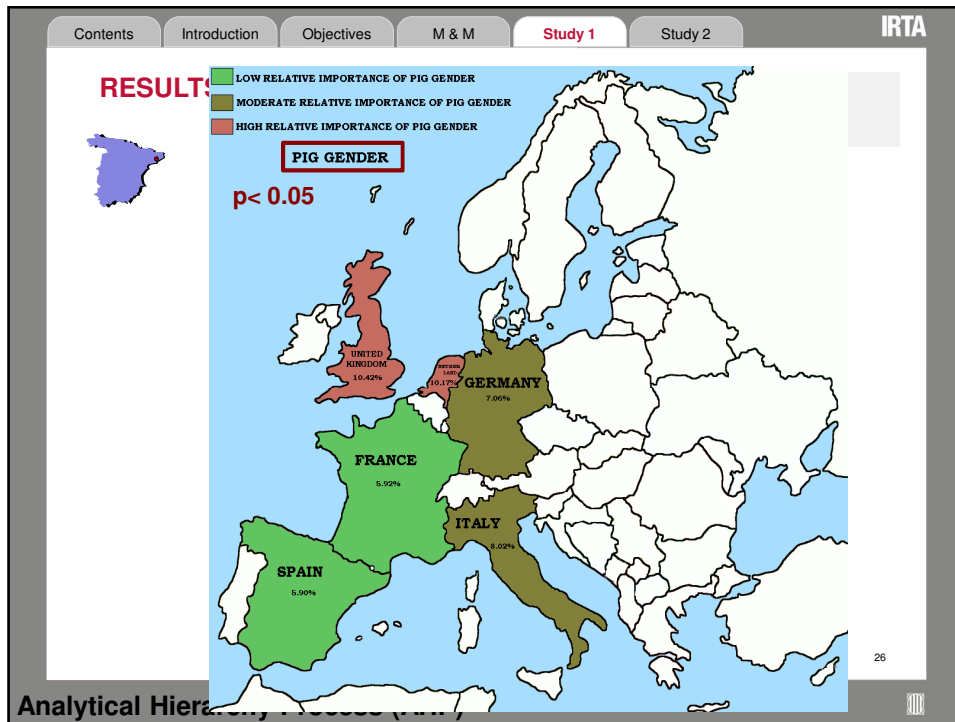
“Do not castrate” received the lowest value in all the studied countries compared to the other animal welfare aspects.



Animal Welfare Aspect	Value
Natural living conditions	0.12
Healthy condition	0.07
Feed quality	0.04
Outside access	0.04
Space	0.04
Medical treatment	-0.02
Housing/living conditions	-0.08
Clean environment	-0.11
Slaughtering	-0.13
Less Transportation	-0.15
Do not castrate	-0.71

23





Contents Introduction Objectives M & M **Study 1** Study 2 IRTA

CONCLUSIONS

1. Lack of information about the relationship between animal welfare and “**gender of the animal**” and as a consequence, about pig castration. Across all countries, the relative importance of this attribute was only ranked from 5.90% to 10.42%.
2. Three basic groups were identified on the basis of their relative importance of **animal gender** attribute:
 - In United Kingdom and The Netherlands: this attribute was relatively more important.
 - Italy and Germany showed a middle position with a moderate weight.
 - In Spain and France this attribute was relatively less important.

27

Contents Introduction Objectives M & M Study 1 **Study 2** IRTA

STUDY 2 - RESULTS




Acceptability of meat with different levels of boar taint compounds for Spanish and English consumers

N.Panella-Riera, M.Blanch, Z.Kallas, J.M.Gil,
M.Gil, M.A.Oliver, M.Font i Furnols.




Barcelona Reading

28

Contents Introduction Objectives M & M Study 1 **Study 2** IRTA

RESULTS

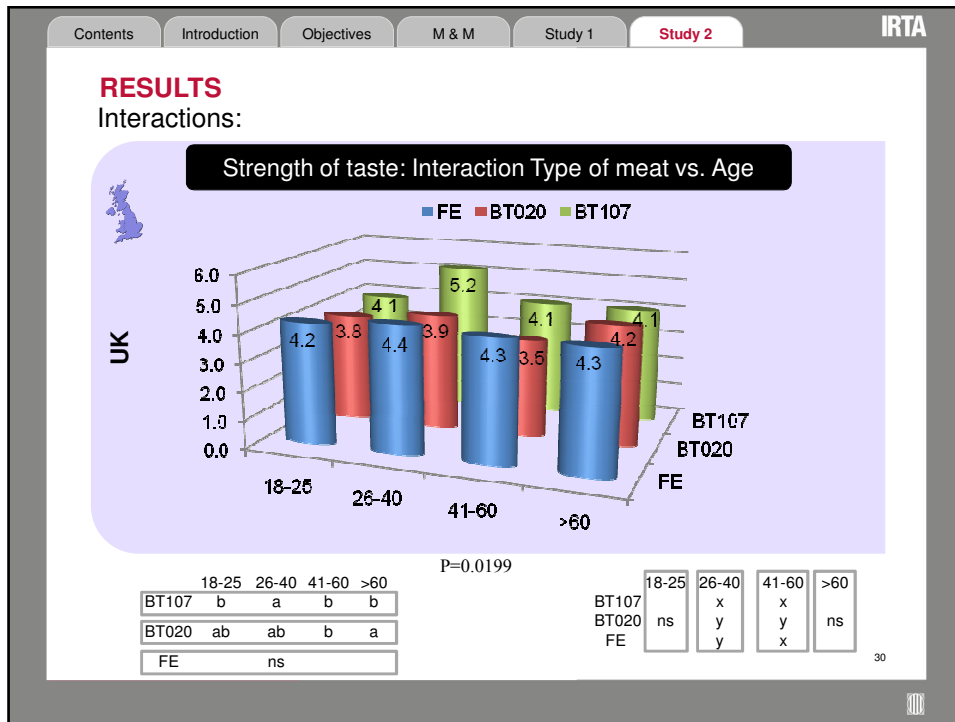
Interactions of Type of meat (TM) vs. Age, Gender, Being responsible for cooking at home (C) and Eating pork with or without fat (F).

	SPAIN				UNITED KINGDOM			
	TM x Age	TM x G	TM x C	TM x F	TM x Age	TM x G	TM x C	TM x F
Delicious	ns	ns	ns	ns	ns	ns	ns	ns
Odour	ns	ns	ns	ns	ns	ns	ns	ns
Taste	ns	ns	ns	ns	ns	ns	ns	†
Strength of odour	ns	ns	ns	ns	ns	ns	ns	ns
Abnormal odour	ns	ns	ns	ns	ns	ns	*	†
Strength of taste	ns	ns	*	ns	**	ns	ns	**
Abnormal taste	ns	ns	ns	ns	ns	ns	ns	ns

ns P>0.1; † P<0.1; * P<0.05; ** P<0.01

TM: Type of meat; Age: Age groups defined as 18-25; 26-40; 41-60; >61; G: gender of the consumers; C: Responsible for cooking; F: eating pork with the fat.

29



Contents Introduction Objectives M & M Study 1 **Study 2** IRTA

RESULTS

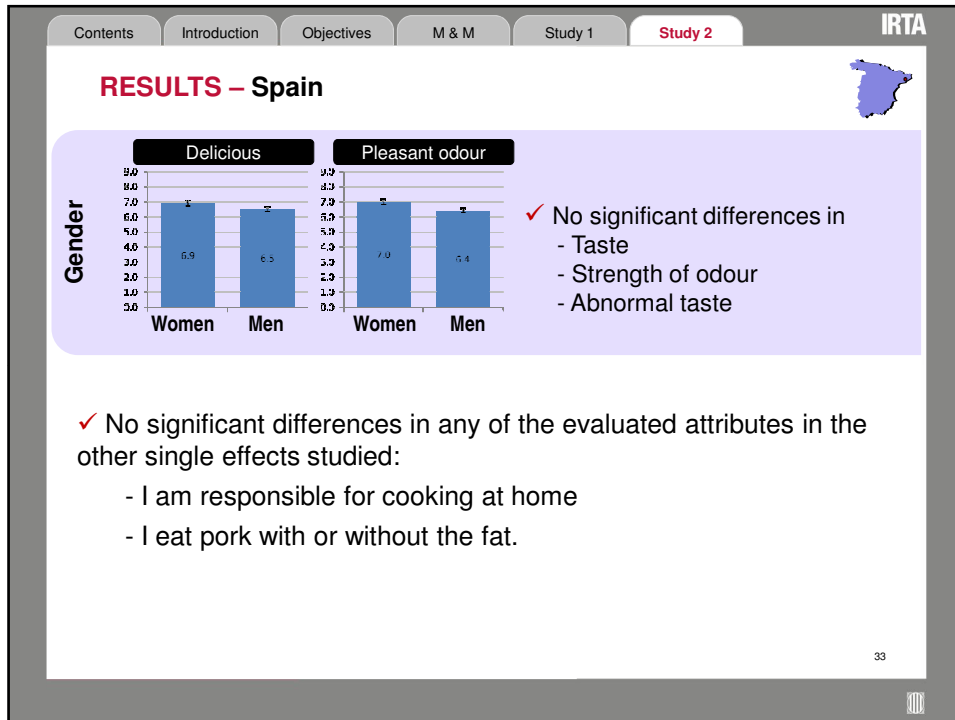
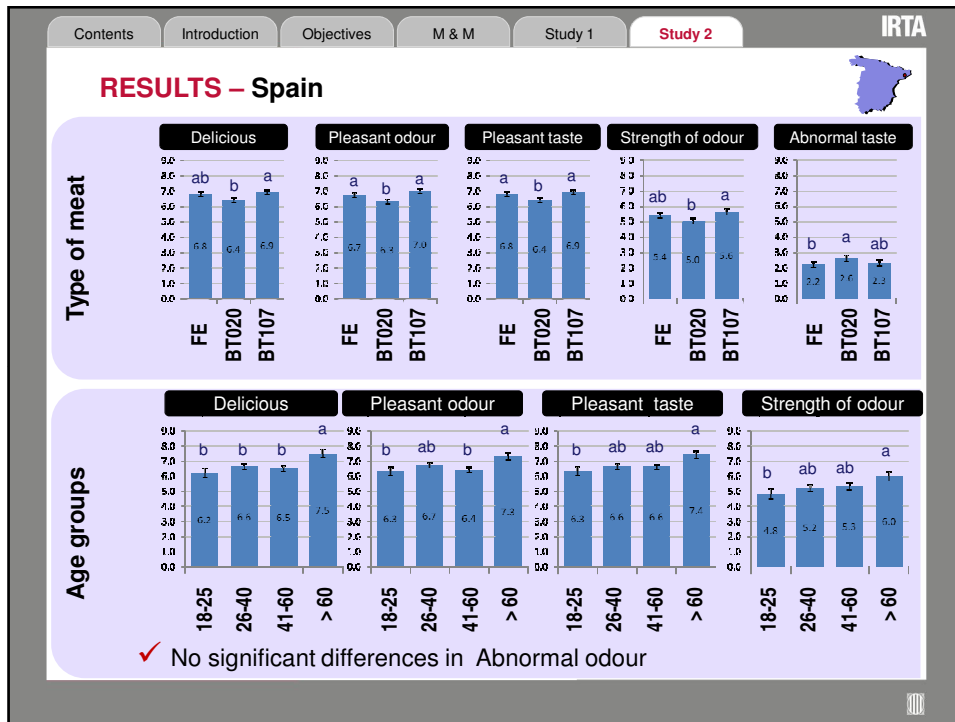
Significance levels of single effects studied: Type of meat (TM), Age, Gender, Being responsible for cooking at home (C) and Eating pork with or without fat (F).

	SPAIN					UNITED KINGDOM				
	TM	Age	Gender	C	F	TM	Age	Gender	C	F
Delicious	*	*	*	ns	ns	ns	ns	ns	ns	ns
Odour	**	*	**	ns	ns	†	ns	ns	ns	ns
Taste	*	*	†	ns	ns	ns	ns	ns	ns	ns
Strength of odour	*	*	ns	ns	ns	†	ns	ns	ns	ns
Abnormal odour	ns	ns	ns	ns	ns	ns	*	ns	ns	ns
Strength of taste	ns	ns	†	†	ns	ns	ns	ns	†	ns
Abnormal taste	*	ns	ns	ns	ns	ns	ns	ns	ns	ns

ns P>0.1; † P<0.1; * P<0.05; ** P<0.01; *** P<0.001

TM: Type of meat; Age: Age groups defined as 18-25; 26-40; 41-60; >61; G: gender of the consumers;
C: Responsible for cooking; F: eating pork with the fat.

31



Contents Introduction Objectives M & M Study 1 **Study 2** IRTA

RESULTS – United Kingdom

Age group	Score	Significance
18-25	2.4	b
26-40	3.4	a
41-60	2.8	ab
>60	3.1	ab

✓ No significant differences in Delicious, Odour, Taste, Strength of odour.

✓ No significant differences in any of the evaluated attributes in the other single effects studied:

- Type of meat
- Gender
- I am responsible for cooking at home
- I eat pork with or without the fat.

34

Contents Introduction Objectives M & M Study 1 **Study 2** IRTA

CONCLUSIONS

Very few significant interactions were found between type of meat and the other effects studied (Age, Gender, Being responsible for cooking at home and Eating pork with or without fat).

In Spain,

meat with moderate levels of boar taint (BT107) received better score than meat with low levels of boar taint (BT020), and meat from gilts (FE) was closer to the meat with medium levels than the meat with low levels of boar taint.

Consumers > 60 years old scored better the meat than the other groups.

In United kingdom,


in general, consumers aged between 26 and 40 years old found the meat with more abnormal taste than the 18-25 years old group.

Contents Introduction Objectives M & M Study 1 **Study 2** IRTA

CONCLUSIONS

4. Further research is needed to understand why meat with an average of 1.07 $\mu\text{g/g}$ AND on pure fat basis was accepted at the same level than meat from gilts, while meat with lower AND levels (1.07 $\mu\text{g/g}$ AND on pure fat basis) was less accepted .

36




Contents Introduction Objectives M & M Study 1 Study 2 IRTA

But ...

Do the consumers really know what's the meaning of castration and its relationship with the pig welfare ?

Why the meat with medium levels of boar taint (1.07 $\mu\text{g/g}$ AND on pure fat basis) was scored close to meat from gilts?

37



Contents Introduction Objectives M & M Study 1 Study 2 IRTA

**Thank you for
your attention**

Any questions ?

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Product Quality
IRTA-Monells

