

Accepted Manuscript

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PII: S0309-1740(08)00195-2

DOI: [10.1016/j.meatsci.2008.06.012](https://doi.org/10.1016/j.meatsci.2008.06.012)

Reference: MESC 4504

To appear in: *Meat Science*

Received Date: 26 February 2008

Revised Date: 30 May 2008

Accepted Date: 10 June 2008



Please cite this article as: Sepúlveda, W., Maza, M.T., Mantecón, A.R., Factors that affect and motivate the purchase of quality-labelled beef in Spain, *Meat Science* (2008), doi: [10.1016/j.meatsci.2008.06.012](https://doi.org/10.1016/j.meatsci.2008.06.012)

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1 **Factors that affect and motivate the purchase of quality-labelled beef in**
2 **Spain**

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10
11 **Abstract**

12 The aim of the present study was to identify the factors that affect and motivate the purchase of
13 quality-labelled beef in Spain. For this purpose a total of 364 surveys were carried out on buyers
14 of beef in three Spanish cities. The sample was divided into three groups of buyers according to
15 the frequency with which they buy beef with a quality label. A logistic regression analysis was
16 used to estimate the differences between groups. The results showed the importance of the
17 production region as a quality aspect. In general terms, variables such as income level and
18 lifestyles would seem to be the variables that enable us to discriminate between quality-labelled
19 beef buyers and non-buyers, whereas beef purchasing habits, a greater appreciation of
20 production systems and attitudes towards quality-labelled beef, are the variables that may
21 explain the differences that exist between regular and occasional quality-labelled beef buyers.

22
23 **1. Introduction**

24
25 Over the past decades, the problems experienced in the field of animal production have led to
26 food safety issues in the beef sector and this has forced governments and the industry to react

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27 to recover consumer confidence. Amongst other things, this has meant that the concept of
28 quality in the food sector in general and in the beef subsector in particular has become more
29 important for all involved in the agro-food chain (Barreiro, 2003). Quality is, however, a
30 subjective term, the meaning of which varies depending on who it is used by (Becker, 2000).
31 Whilst primary producers and agro-industries take into account the characteristics of a product
32 to assess its quality using technical indicators, consumers, on the other hand, use cues and
33 experiences, to infer quality from the meat's attributes (Becker, 2000; Grunert, Harmsen,
34 Sorensen & Bisp, 1997; Bello & Calvo, 1998; Maza & Ramírez, 2006). In general, it is
35 considered that colour, price and freshness of meat are search attributes, due to the fact that
36 they are known before purchase, whilst taste and tenderness are experience attributes because
37 they are only known after consumption; however the greatest problem arises in the case of
38 credence attributes, that is, those attributes that cannot be known even after having consumed
39 the product or, on occasions, those with a high cost due to the adverse effects that they may
40 cause on the consumer. Amongst these, are animal welfare and environmentally friendly
41 production methods, food safety or origin (Becker, 2000). These are attributes that are
42 important for consumers (Brunso, Ahle Fjord & Grunert, 2002) and which, due to their nature,
43 must be in some way guaranteed and certified (Busch, Thiagarajan, Hatanaka, Bain, Flores &
44 Frahm, 2005), making certification an efficient instrument to resolve the problem of asymmetric
45 consumer information (Barrena, Sánchez, Gil, Gracia & Rivera, 2003; Compés, 2002).

46

47 Amongst production-related credence quality attributes of beef, animal feeding and region of
48 production or origin are some of the aspects most valued by consumers (Bello & Calvo, 1998;
49 Sánchez, Sanjuán & Akl, 2001; Bernués, Olaizola & Corcoran, 2003; Maza & Ramírez, 2006;
50 Briz & de Felipe, 2000) whilst the production systems are, in general, less relevant and only of
51 interest to specific market segments (Gellynck, Verbeke & Vermeire, 2006).

52

53 Another point of interest is that, when meat bears a label it contains a great amount of
54 information (Bredahl, 2004) and is considered as a cue that allows the quality of the meat to be
55 inferred (Bello & Calvo, 1998; Martinez, Hanagriff, Lau & Harris, 2007; Bredahl, 2004; Verbeke
56 & Viaene, 1999), consumer interest being greater when clearly identifiable quality signals such

57 as quality labels or certified quality brands are included (Verbeke & Ward, 2006). Quality labels
58 have a positive effect on the quality of the meat perceived by consumers and play a more
59 important role when credence attributes are sought (Bello & Calvo, 1998; Busch et al., 2005). At
60 the same time, a greater confidence in quality labels as a quality cue, is related to a greater
61 concern of consumers for aspects of health, nutrition and food safety (Barrena et al., 2003;
62 Sánchez et al., 2001; Bernués et al., 2003; Verbeke, Demey, Bosmans & Viaene, 2005; Briz &
63 de Felipe, 2000; Vannoppen, Verbeke & Huylenbroeck, 2001; Verbeke & Viaene, 1999), and
64 quality labels are an indication that guarantees that the meat has undergone a certain type of
65 control (Verbeke & Ward, 2006). Thus, the lifestyles of consumers would appear to be the key
66 variables that motivate the purchase of beef with a quality label (Sánchez et al., 2001;
67 Vannoppen et al., 2001).

68
69 Although beef with a quality label, compared to beef without it is perceived by consumers as a
70 more expensive product (Wachenheim, Alonso & Dumler, 2000), in developed countries the
71 relationship between the purchase of quality-labelled beef and level of income is not clear. For
72 example, whilst Wachenheim et al. (2000) and Angulo, Gil and Tamburo (2005) reported that a
73 high percentage of buyers of quality-labelled beef were to be found in the high-income range,
74 Martinez et al. (2007) found that income does not significantly affect the purchase of this type of
75 meat. Their findings do not coincide in terms of age either. Whilst Wachenheim et al. (2000)
76 and Martinez et al. (2007) agree on the significant influence of age, in the sense that the older
77 the buyers are the greater the probability is that they will purchase quality-labelled beef, Angulo
78 et al. (2005) found that although age is linked to the willingness to pay a higher price for quality-
79 labelled beef, it does not play a highly significant role.

80
81 This study aimed to identify those factors that most affect and motivate the purchase of quality-
82 labelled beef in Spain. For this purpose we analysed variables of a socio-demographic type,
83 beef purchasing habits, consumer lifestyles, perceptions and attitudes towards quality-labelled
84 beef and the level of importance attributed to production factors and origin.

85

86 **2. Methodology**

87

88 The information was obtained from questionnaire-based personal surveys carried out on a
89 representative sample of the population formed by 364 beef buyers residing in Madrid (n= 122),
90 Zaragoza (n= 121) and León (n= 121), three Spanish cities that are representative of three city
91 sizes: large, medium and small, respectively. For a confidence interval in the results of 95.5%
92 ($Z= 2$) and assigning intermediate p and q values (p= 0.5 and q= 0.5) an overall sample error of
93 5.2% was obtained, which is considered acceptable. To achieve representativeness, the
94 sampling that was carried out during the months of March and April 2007, was stratified with
95 equal allocation between cities and proportionate allocation by age ranges in each of them.

96

97 Prior to the design of the questionnaire, a “focus group” was developed in Zaragoza with the
98 participation of 9 beef buyers, mainly women over the age of 30 who were responsible for
99 purchasing beef for their households. The information obtained allowed an improved
100 questionnaire to be designed as well as providing greater insight into the results after analysis
101 (De Carlos, García, de Felipe, Briz & Morais, 2005).

102

103 The closed-type questionnaire comprised questions with different types of measurement scales
104 in the responses. To judge the level of importance that consumers assign to a series of
105 production factors and to a set of both search and credence quality attributes that may influence
106 the purchasing process, a measurement scale of 1 to 5 was used, in which 1= none or very little
107 importance, 2= little importance, 3= average importance 4= quite a lot of importance and 5 =
108 great importance. To measure the attitude of respondents to quality-labelled beef, the 5-point
109 Likert scale was used, whilst to obtain information on the lifestyles of the buyers, a discrete
110 measurement scale from 1 to 5 was used, in which 5 was the maximum level of concern with
111 regards to a series of given statements (See appendix I). The SPSS 14.0 version statistical
112 package was used for data analysis.

113

114 In order to identify the most determining factors that affect and motivate the purchase of beef
115 with a quality label by consumers in the cities of León, Madrid and Zaragoza (Spain), the 364
116 respondents were divided into 3 groups of buyers depending on their habit of purchasing

117 quality-labelled beef, which is the general variable to be compared. The first group, which has
118 been termed regular buyers, is characterised by those who always or normally purchase beef
119 with a quality label. The second group, designated as occasional buyers, is characterised by the
120 fact that they occasionally buy beef with a quality label, depending on price or availability.
121 Lastly, the third group comprises non-buyers and is termed as such. The socio-demographic
122 characteristics of each group in the sample are shown in the table 1.

123

124 In the sample in general, females, the absence of children under the age of 14 in the
125 respondent's household and university studies are the characteristics with the highest
126 percentage of participation and this is a situation that can be seen when describing each one of
127 groups; whilst characteristics such as the age range of the respondents and level of income
128 have a more dispersed distribution. In the case of age range, this is logical because a
129 proportional allocation by age groups was carried out in each city.

130

131 In an attempt to discover some type of bivariate relationship, all of the variables under study,
132 including the socio-demographic ones, were crossed with the general variable to be analysed,
133 that is, types of buyers, following the detection of atypical data and missing completely at
134 random analysis. The bivariate analyses employed were contingency tables with chi-squared
135 tests and multiple comparison of means tests such as Bonferroni, Tamhane, Dunnett's T3,
136 Games-Howell and Dunnett's C after applying Levene's homogeneity of variances test (Uriel &
137 Aldas, 2005).

138

139 In the blocks of questions in which the respondents rated the level of importance of production
140 factors and a series of search and credence quality attributes, as well as attitudes (Likert's
141 scale) and lifestyles (discrete scale), factor analyses were applied in order to summarise and
142 reduce the information (Hair, Anderson, Tatham & Black, 1999; Uriel & Aldas, 2005). The
143 method of extracting factors used was that of Main Components and the factor scores in each
144 analysis were estimated by means of the regression method and were consequently used to
145 carry out bivariate analyses of means comparisons according to the methodology indicated in
146 the previous paragraph.

147

148 Having identified the variables statistically significantly associated with the different groups of
 149 beef buyers, the variables to be taken into account to develop the logistic regression models
 150 were then selected.

151

152 *2.1 Specification of models and definition of variables*

153

154 To identify the factors that determine the differences between the three groups of buyers, a
 155 binary logistic regression (logit) between each pair of groups was carried out, as shown in the
 156 table 2.

157

158 In the three models in each comparison, P_i measures the probability that a respondent belongs
 159 to group $G_i = 1$ whilst $1 - P_i$, measures the probability that a respondent belongs to group
 160 $G_i = 0$. Thus, $P_i / 1 - P_i = e^{Z_i}$ is the odd ratio of $G_i = 1$ being observed rather than $G_i = 0$ being

161 observed, bearing in mind the whole set of explanatory variables X_j . Applying the Ln to e^{Z_i}

162 $Ln(e^{Z_i}) = Z_i$ is obtained, where Z_i expressed as a multiple linear regression (see table 2), is

163 the Ln of the odd ratio. Moreover, by the partial derivation of e^{Z_i} in relation to X_j

164 $\partial e^{Z_i} / \partial X_j = e^{B_j}$ was obtained, where e^{B_j} is the odd ratio of $G_i = 1$ being observed rather than

165 $G_i = 0$, when an explanatory variable X_j increases by one unit whilst the rest of the

166 explanatory variables remain constant. The explanatory variables (x_j) initially selected to build

167 the models were those that in the bivariate analyses showed a statistically significant

168 relationship with the groups of buyers (Table 3). The factors obtained during factor analyses

169 were also included (See appendix II) since they contain summarised information on several

170 parameters that are considered potentially discriminating, whilst also reducing possible

171 multicollinearity problems, by grouping together explanatory variables that are correlated one

172 with another.

173

174 As can be seen in Table 3, the socio-economic variables included level of income since the
175 bivariate analyses indicated a significant dependency relationship with the groups of buyers. At
176 the lower income levels there is a prevalence of non-buyers of quality-labelled beef, at average
177 income levels we find the occasional buyers whilst the regular buyers of beef with a quality label
178 are found in the highest income levels.

179

180 In terms of age, the highest frequencies of non-buyers belong to the youngest age strata or that
181 of the over 65 years old, whilst the greatest frequencies of regular buyers are to be found in the
182 age stratum from 35 to 64; although age has been identified as a variable that could be linked to
183 the consumption of quality-labelled beef (Wachenheim et al., 2000; Martinez et al., 2007), this
184 variable just like the gender of the respondent, level of academic qualification, the number of
185 persons forming the household and the presence in the household of children under the age of
186 14, were not taken into account for inclusion in the models since in the bivariate analyses they
187 were not found to have a statistically significant dependency relationship ($\alpha= 0.05$) with the
188 groups of buyers; for greater certainty, prior logit models were performed in which their
189 parameters were estimated, and the result obtained confirmed that they are not determining
190 variables in helping to explain the differences between the groups.

191

192 Having selected the variables to be taken into account for the development of the models (Table
193 3), we proceeded to estimate the initial parameters for each model or comparison between
194 groups, including all of the variables in the same step or block. In this manner a global overview
195 of the most significant variables that may help to determine the differences between the groups
196 compared in each model was obtained. With the aim of improving estimates, the final selection
197 of variables and models was carried out employing the Wald's regressive method, based on the
198 initial variables selected (Silva & Barroso, 2004), taking into account that between each final
199 and initial model there would be a certain consistency between the β parameters and their
200 significance. The parameters were estimated through maximum likelihood method. The final
201 models were selected taking into account the following criteria: i) Nagelkerke R square and the
202 classification table; ii) Wald statistics for the selection of the most significant variables (Hair et
203 al., 1999; Uriel & Aldas, 2005; Silva & Barroso, 2004). In each case the best-fit model that gave

204 the greatest possible number of variables was chosen since, rather than looking for predictive
205 models, explanatory models that would help to identify the determining and motivational factors
206 in each case were sought.

207

208 **3. Results**

209

210 Having applied regressive methods for the final selection of variables, the estimates of the three
211 models are shown in Table 4, which gives the β coefficients for each variable and their
212 respective *odd ratio*, i.e., e^{β_j} , as well as their significance level obtained by means of the Wald's
213 test. The values shown are those of the estimates obtained by applying the Wald regressive
214 method.

215

216 Together, models 1 and 3 attempt to identify the variables that may discriminate between
217 quality-labelled beef buyers (regular and occasional) and non-buyers, whilst model 2 aims to
218 establish the differences that may exist between the two groups of quality-labelled beef buyers.

219

220 In general terms, variables such as level of income and the “active social life” lifestyle, would
221 seem to be the variables that enable us to discriminate between quality-labelled beef buyers
222 and non-buyers, but not between the two groups of quality-labelled beef buyers. To discriminate
223 between the latter, frequency of beef purchases, frequent place of purchase, a greater
224 appreciation of production aspects and a more positive attitude towards quality labelled as an
225 indicator of guarantee and tradition, are the most significant variables that may explain the
226 differences that exist between regular and occasional quality-labelled beef buyers.

227

228 With regard to production factors (Fig. 1), storage, animal feeding and the production region or
229 origin are amongst the aspects that are most valued by regular buyers of quality-labelled beef,
230 the latter having been previously described (Bello & Calvo, 1998; Sánchez et al., 2001; Bernués
231 et al., 2003; Maza & Ramírez, 2006; Briz & de Felipe, 2000). Unlike animal feeding, the
232 production region is less valued by occasional buyers, followed by the non-buyers and there are

233 statistically significant differences between the mean of the three groups ($\alpha= 0.05$). This
234 variable is thus decisive when establishing the differences between the three types of buyers.

235

236 In model 1, the factors that significantly affect and seem to determine the differences between
237 regular buyers of quality-labelled beef compared to non buyers of this type of meat, i.e. between
238 groups G1 and G3, are high income levels, the importance placed on the production region as
239 an aspect of quality, the “guarantee and tradition” factor and the “active social life” lifestyle.

240

241 The households with the two highest levels of income compared to the lowest level of income
242 increase the probability of the regular purchase of quality-labelled beef. These results are
243 congruent with those obtained by Wachenheim et al. (2000) and Angulo et al. (2005) and could
244 be due to the fact that quality-labelled beef is perceived as having a higher price compared to
245 beef without this quality label, probably because it is assumed that quality-labelled beef
246 undergoes more controls which in turn implies higher costs.

247

248 Furthermore, in the buying process, regular buyers, compared to non buyers of quality-labelled
249 beef, place greater importance on the production region as a production aspect for obtaining
250 quality beef which indicates that the higher the value a consumer places on the production
251 aspect, the more probable it will be that they will regularly buy quality-labelled beef. This result
252 is logical if we consider that frequently quality labels are linked to a production region, as is the
253 case of the Protected Geographical Indications – PGIs and guarantee quality brands.

254 Furthermore, a more positive attitude towards quality-labelled beef being a traditional product
255 that provides greater guarantees is linked to regular buyers and these results coincide with
256 those obtained by others (Barrena et al., 2003; Sánchez et al., 2001; Bernués et al., 2003;
257 Verbeke et al., 2005; Briz & de Felipe, 2000; Vannopen et al., 2001; Verbeke & Viaene, 1999)
258 and is due to the quality labels acting as a cue of a guarantee that this type of meat has
259 undergone a certain type of control during the production process (Verbeke & Ward, 2006); on
260 the other hand, in the case of persons with a lifestyle that is more marked by habits such as
261 eating out or more frequent travelling, the probability of their buying beef with these quality

262 labels decreases. It is also important to consider that, although it is not a determining factor, a
263 type of lifestyle that is characterised by a “healthy life” is positively linked to regular buyers.

264

265 Although it is insignificant, it is important to underline that a greater confidence in credence
266 attributes such as the brand, label and for receiving information on the quality of the beef at the
267 time of purchase, is associated more with regular buyers of quality-labelled beef whilst on the
268 other hand, a greater confidence in beef search quality attributes such as direct appraisal
269 (colour, fat, gristle, freshness...) and the appearance of the establishment, is related more to
270 non-buyers; this result is to be expected since quality labels have a positive effect on the
271 perceived quality of the beef, especially when credence attributes are sought (Bello & Calvo,
272 1998; Busch et al., 2005).

273

274 When discriminating between regular buyers and occasional buyers of quality-labelled beef
275 (Model 2, groups G1 and G2), variables such as frequency of purchase, frequent place of
276 purchase, level of importance given to the production region, value placed on production
277 systems and a more positive attitude towards beef with a quality label offering greater
278 guarantees compared to beef without such a quality label, are seen to have a significant
279 influence.

280 As far as frequency of beef purchases are concerned, it was detected amongst the
281 respondents, that a frequency of once a week compared to those whose purchases were more
282 sporadic, is more linked to regular buyers than to occasional buyers. If it is taken into
283 consideration that a more positive attitude towards the factor of having a “healthy life” that,
284 amongst other things, implies eating fruit and vegetables frequently, is negatively linked to
285 regular buyers but positively linked to occasional buyers, as shown in model 2, this may explain
286 why occasional buyers buy beef more sporadically, although it cannot be stated that there is a
287 significant effect of this factor.

288 In relation to the frequent place of purchase of beef, regular buyers placed more importance on
289 butcher’s shops as the frequent place of purchase and quite a lot less on the
290 super/hypermarkets, whilst occasional buyers placed more importance on super/hypermarkets
291 and less on butcher’s shops. Thus, a respondent who has bought quality-labelled beef whose

292 frequent place of purchase is the butcher's shop, is more likely to be a regular buyer of this type
293 of meat, whilst if the frequent place of purchase is super/hypermarkets, the respondent is more
294 likely to be a occasional buyer. In relation to production aspects to obtain quality beef, the
295 regular buyers place more importance on the production region and on the production system
296 factor than occasional buyers do.

297

298 A very interesting and highly significant aspect is the attitude of the two types of buyers towards
299 the "guarantee and tradition" factor. A more positive attitude of buyers towards quality-labelled
300 beef being a traditional product that offers greater guarantees to consumers, is more linked to
301 regular buyers whilst a less positive attitude towards this factor is linked more to occasional
302 buyers. This indicates that regular buyers and occasional buyers differ in that the former have a
303 more positive attitude towards this factor. On the other hand, factors concerning lifestyles and
304 level of income were not found statistically significant when distinguishing between the two
305 types of buyers.

306

307 In model 3, as in model 1, variables such as the level of income, level of importance placed on
308 the production region as an aspect for obtaining quality beef and the lifestyle termed "active
309 social life", seem to be the variables that help to discriminate between occasional buyers and
310 non-buyers of quality-labelled beef and, in particular, the level of income has a highly significant
311 effect in that occasional buyers are more associated with higher levels of incomes than the non-
312 buyers.

313

314 As far as the model fit measures are concerned, in general, the Nagelkerke R square and the
315 classification tables show a proper fit for the three models. In the case of Nagelkerke R square,
316 it shows a better fit for model 1, with a square R of 0.663 compared to 0.429 for model 2 and
317 0.304 for model 3. In line with the above, the classification tables (Table 5) also show a better
318 total prediction for model 1, followed, in order of importance, by model 2 and lastly, model 3.

319

320 Models 1 and 2 show a good capacity of overall and group forecasting, whilst with model 3, in
321 spite of providing a reasonably acceptable overall forecasting, the group forecasting works

322 much better in the group of occasional buyers. This difference of predictive capacity could be
323 due to the fact that in model 3 the size of the group of occasional buyers was 54.0% larger than
324 that of the non-buyers, although it could also be due to the non-inclusion of other variables,
325 which may be discriminating and which were not taken into account in the model.

326

327 **4. Conclusions**

328

329 It can be concluded that there are clear differences between regular buyers of quality-labelled
330 beef compared to occasional buyers and non-buyers, but not between the occasional buyers
331 and the non-buyers. The importance placed on the production region as a sign of the quality of
332 the beef would seem to be the key variable that enables discrimination between the three types
333 of buyers, which indicates that there is a clear relationship between the purchase of quality-
334 labelled beef and its origin, thus ratifying the importance of certification as a sign of quality and
335 its relationship with credence attributes.

336

337 Furthermore, variables such as level of income and lifestyles can, in principle, help to
338 differentiate between buyers of quality-labelled beef and non-buyers but not between the two
339 types of buyers of quality-labelled beef, for which other variables related to buying habits,
340 placing greater value on production systems and a more positive attitude towards quality label
341 compared to beef without this quality label, are those which allow us to distinguish between the
342 two groups. If the positive link that exists between regular buyers and considering quality-
343 labelled beef as a traditional food that offers greater guarantees, are taken into consideration, it
344 is noteworthy the role played by the different quality labels such as Protected Geographical
345 Indications – PGIs in giving consumers confidence, whilst they also lead to an appreciation of
346 traditional products.

347 Due to the fact that no clear differences were found between occasional buyers and non-buyers
348 of quality-labelled beef, it would be useful for future research to concentrate on determining
349 other variables that may help to explain the differences.

350

351 **Acknowledgements**

352

353 This research was supported by a grant from the CSIC Spain Research Project No. 2006/0665
354 and another grant from the BSCH – University of Zaragoza. The authors thank to Dr. Manuel
355 Salvador of the University of Zaragoza for the contribution in the statistical analysis.

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390 **Appendix I**– Rating scales of aspects related to beef quality. Questions included in the survey.

391

392 **Rating scale of the importance attributed to beef quality aspects related to the**
 393 **production systems.**

394

395 What level of importance do you consider the following aspects have in obtaining quality beef?
 396 Mark with an X.

	None or very little (1)	Little (2)	Average (3)	Quite a lot (4)	A lot (5)	Missing (0)
1. Region of production / origin						
2. Animal feeding						
3. Production system, grazing, stabling...						
4. Production that respects animal welfare						
5. Animal breed						
6. Type of slaughter /processing /packaging						
7. Storage time and means						
8. Environmentally friendly production methods*						

397 ***Note:** The environmentally friendly production methods was not included in the factor analysis
 398 due to the fact that the missing data associated with the variable did not have a random pattern
 399 in relation to the groups of buyers, and this could thus bias the results.

400

401

402

403 **Rating scale of the importance given to attributes related to beef quality in the**
 404 **purchasing process.**

405

406 What level of confidence do you assign to the following aspects to receive information on meat
 407 quality? Mark with an X.

	None or very little (1)	Little (2)	Average (3)	Quite a lot (4)	A lot (5)	Missing (0)
1. Direct appraisal (colour, fat, gristle, freshness, ...)						
2. Labelling						
3. Brand						
4. Price						
5. Establishment appearance						
6. Protected geographical indication						

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414 **Scale to rate attitudes towards quality-labelled beef. Likert scale.**
 415

Beef with a quality label compared to other beefs...	Totally disagree	Disagree	Neither agree nor disagree	Agree	Totally agree	Missing
	(1)	(2)	(3)	(4)	(5)	(0)
1. Provides greater guarantees for consumption						
2. Tastes better						
3. Is considered a traditional product						
4. Has a regional identity						
5. Has a higher price						
6. Raises prestige of purchaser						

416

417

418

419 **Scale to rate the lifestyles of respondents**

420

421 Indicate the degree with which you are in agreement with the following statements, on a scale of
 422 1 to 5 where 5 represents the greatest degree of agreement.

lifestyles of respondents

1. I have a healthy diet: ____
2. I frequently eat fruits and vegetables: ____
3. I am interested in information related to food: ____
4. I sort rubbish adequately for recycling: ____
5. I travel and enjoy travelling frequently: ____
6. I usually eat out: ____

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441 **Appendix II**– Results of factor analysis of the factors included in the models.

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444

Factor analysis for beef quality aspects related to the production systems.

Variables.	Factor 1 Production system
Production aspects that affect beef quality	
Type of slaughter /processing /packaging	0.80
Production that respects animal welfare	0.79
Production system, grazing, stabling...	0.78
Storage time and means	0.74
Animal breed	0.74

445 **Rotated component matrix.**

446 **KMO= 0.76. Percent of explained variance = 59.5%**

447

448

449

Factor analysis for the attributes related to beef quality in the purchasing process.

Variables.	Factor 1 Credence attributes	Factor 2 Search attributes
Aspects for receiving information on beef quality		
Brand	0.82	0.07
Labelling	0.78	0.13
Protected Geographical Indication	0.73	0.10
Establishment appearance	0.21	0.71
Direct appraisal (colour, fat, gristle, freshness, ...)	0.15	0.66
Price	-0.06	0.71

450 **Rotated component matrix.**

451 **KMO= 0.64. Percentage of explained variance= 56.0%**

452

453

454

Factor analysis for the attitudes towards quality-labelled beef.

Variables.	Factor 1 Guarantee and tradition	Factor 2 Social prestige
Beef with a quality label compared to other beefs...		
Provides greater guarantees for consumption	0.82	0.02
Has a regional identity	0.77	-0.12
Tastes better	0.67	0.01
Is considered a traditional product	0.60	0.35
Has a higher price	0.10	0.74
Raises prestige of purchaser	-0.08	0.78

455 **Rotated component matrix.**

456 **KMO= 0.65. Percentage of explained variance= 56.4%**

457

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459

Factor analysis for the lifestyles of respondents.

	Factor 1 "Green, healthy life"	Factor 2 "Active social life"
I have a healthy diet	0.82	-0.14
I frequently eat fruits and vegetables	0.78	-0.16
I am interested in information related to food	0.59	0.07
I sort rubbish adequately for recycling	0.58	0.16
I travel and enjoy travelling frequently	0.21	0.80
I usually eat out	-0.21	0.78

460 **Rotated component matrix.**

461 **KMO= 0.62. Percentage of explained variance= 56.6%**

462

463 **References**

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465 Angulo, A. M., Gil, J. M., & Tamburo, L. (2005). Food safety and consumers willingness to pay
466 for labelled beef in Spain. *Journal of Food Products Marketing*, 11(3), 89-105.

467 Barreiro, D. (2003). Las marcas de calidad en el sector vacuno, *Eurocarne*, 117, 103-121.

468 Barrena, R., Sánchez, M., Gil, J. M., Gracia, A., & Rivera, L. M. (2003). La certificación como
469 estrategia para la recuperación de la confianza del consumidor en la adquisición de la
470 carne de ternera. *Economía Agraria y Recursos Naturales*, 13(1), 7-29.

471 Becker, T. (2000). Consumer perception of fresh meat quality: a framework for analysis. *British*
472 *Food Journal*, 102(3), 158-176.

473 Bello, L., & Calvo, D. (1998). Propuesta de un modelo positivo del proceso de compra de carne
474 de ternera y evaluación de las preferencias de los consumidores. *Revista Española de*
475 *Economía Agraria*, 183, 201-220.

476 Bernués, A., Olaizola, A. M., & Corcoran, K. (2003). Extrinsic attributes of red meat as indicators
477 of quality in Europe: an application for market segmentation. *Food Quality and*
478 *Preferences*, 14(4), 265-276.

479 Bredahl, L. (2004). Cue utilisation and quality perception with regard to branded beef. *Food*
480 *Quality and Preference*, 15(1), 65-75.

481 Briz, J., & de Felipe, I. (2000). Hábitos y percepciones del consumo de carne en España.
482 *Eurocarne*, 88, 51-61.

483 Brunso, K., Ahle Fjord, T., & Grunert, K. G. (2002). Consumers food choice and quality
484 perception. Aarhus V, Denmark: The Aarhus School of Business.

485 Busch, L., Thiagarajan, D., Hatanaka, M., Bain, C., Flores, L. G., & Frahm, M. (2005). The
486 relationship of third-party certification (TPC) to sanitary/ phytosanitary (SPS) measures
487 and the international agri-food trade. United States: United States Agency for
488 International Development, Raises SPS Global Analytical report 9.

489 Compés, R. (2002). Atributos de confianza, normas y certificación. Comparación de estándares
490 para hortalizas. *Economía Agraria y Recursos Naturales*, 2(1), 115-130.

491 De Carlos, P., García, M., de Felipe, I., Briz, J., & Morais, F. (2005). Analysis of consumer
492 perceptions on quality and food safety in the spanish beef market: a future application in

- 493 new product development. In *Proceedings XI th congress of the EAAE, "the future of*
494 *rural Europe in the global agri-food system"* (pp. 16), 24-27 August 2005,
495 Copenhagen, Denmark.
- 496 Gellynck, X., Verbeke, W., & Vermeire, B. (2006). Pathways to increase consumer trust in meat
497 as a safe and wholesome food. *Meat Science*, 74(1), 161-171.
- 498 Grunert, K., Harmsen, H., Larsen, H., Sorensen, E., & Bisp, S. (1997). New areas in agricultural
499 and food marketing. In B. Wierenga, A. Tilburg, K. Grunert, J. B. Steenkamp & M.
500 Wedel (Eds.), *Agricultural marketing and consumer behaviour in a changing world* (pp
501 3-30). Norwell: Kluwer Academic Publishers.
- 502 Hair, J., Anderson, R., Tatham, R., & Black, W. (1999). *Análisis Multivariante (5ª ed.)*. Madrid:
503 Prentice Hall Iberia.
- 504 Martinez, S., Hanagriff, R., Lau, M., & Harris, M. (2007). Factors affecting demand for branded
505 beef. In *Proceedings 39th Annual Meetings Program Southern Agricultural Economics*
506 *Association* (pp. 14), February 4-6 2007, Mobile, United States.
- 507 Maza, M. T., & Ramírez, V. (2006). Distintas consideraciones en torno a los atributos de calidad
508 de la carne de vacuno por parte de industria y consumidores. *ITEA*, 102(4), 360-372.
- 509 Sánchez, M., Sanjuán, A. I., & Akl, G. (2001). El distintivo de calidad como indicador de
510 seguridad alimenticia en carne de vacuno y cordero. *Economía Agraria y Recursos*
511 *Naturales*, 1(1), 77-94.
- 512 Silva, L. C. & Barroso, I. M. (2004). *Regresión Logística*. Madrid: La Muralla.
- 513 SPSS. Statistical Package for the Social Sciences, version 14.0.
- 514 Uriel, E., & Aldas, J. (2005). *Análisis Multivariante Aplicado*. Madrid: Thomson Editores Spain.
- 515 Vannoppen, J., Verbeke, W., & Huylenbroeck, G. (2001). Motivational structures toward
516 purchasing labeled beef and cheese in Belgium. *Journal of International Food &*
517 *Agribusiness Marketing*, 12(2), 1-29.
- 518 Verbeke, W., & Ward, R. (2006). Consumer interest in information cues denoting quality,
519 traceability and origin: An application of ordered probit models to beef labels. *Food*
520 *Quality and Preference*, 17(6), 453-467.
- 521 Verbeke, W., Demey, V., Bosmans, W., & Viaene, J. (2005). Consumer versus producer
522 expectations and motivations related to "superior" quality meat: qualitative research

- 523 findings. *Journal of Food Products Marketing*, 11(3), 27-41.
- 524 Verbeke, W., & Viaene, J. (1999). Consumer attitude to beef quality labeling and associations
525 with beef quality labels. *Journal of International Food & Agribusiness Marketing*, 10(3),
526 45-65.
- 527 Wachenheim, C., Alonso, C., & Dumler, M. (2000). Marketing a branded fresh beef product.
528 *Journal of Food Products Marketing*, 6(1), 53-79.

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Table 1

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Socio-demographic characterisation of the sample.

Variable	Types of Buyers			Sig ($\alpha=0.05$)
	Regular buyer n=107 (%)	Occasional buyer n=153 (%)	Non buyer n=99 (%)	
Gender				
Male	32.7	24.8	32.7	Ns.
Female	67.3	75.2	67.3	
Presence of children < 14 years old				
Yes	21.5	22.9	19.2	Ns.
No	78.5	77.1	80.8	
Age of respondent				
15 – 24 years	11.2	11.8	16.2	Ns.
25 – 34 years	12.1	19.7	24.2	
35 – 49 years	29.0	27.6	21.2	
50 – 64 years	24.3	21.1	16.2	
=> 65 years	23.4	19.7	22.2	
Academic qualifications				
No qualifications	5.6	7.2	10.2	Ns.
ESO (Secondary school)	21.5	17.8	17.3	
BUP/ Bachiller/ FP1 ("A" levels/Professional training level 1)	27.1	27.0	27.6	
University degree	45.8	48.0	44.9	
Family income/ month				
Less than 900 €	7.4	11.1	17.7	0.014**
Between 901- 1800 €	28.4	31.0	38.0	
Between 1801- 3000 €	26.3	33.3	30.4	
More than 3001 €	37.9	24.6	13.9	

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538 **Table 2**

539 Model approach.

Comparison	General model for all comparisons
<p><u>Model 1</u></p> $G_i \begin{cases} G_i = 1 = G1 = \text{Group of regular buyers} \\ G_i = 0 = G3 = \text{Group of non buyers} \end{cases}$	$P_i = \text{Prob}(G_i = 1) = \frac{1}{1 + e^{-z_i}}$ $1 - P_i = \text{Prob}(G_i = 0) = 1 - \left(\frac{1}{1 + e^{-z_i}} \right)$
<p><u>Model 2</u></p> $G_i \begin{cases} G_i = 1 = G1 = \text{Group of regular buyers} \\ G_i = 0 = G2 = \text{Group of occasional buyers} \end{cases}$	$\ln \left[\frac{P_i}{1 - P_i} \right] = Z_i = \beta_0 + \beta_1 X_{i1} + \dots + \beta_j X_{ij}; \text{ where}$ <p>β_0 = constant of the model β_j = estimated parameter for the variable X_j X_j = explanatory variables, and</p>
<p><u>Model 3</u></p> $G_i \begin{cases} G_i = 1 = G2 = \text{Group of occasional buyers} \\ G_i = 0 = G3 = \text{Group of non buyers} \end{cases}$	$\frac{P_i}{1 - P_i} = \text{odd ratio} = e^{z_i} = OR_i$ $\frac{\partial OR_i}{\partial X_j} = e^{\beta_j}$

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541 **Table 3**

542 Specification of the variables included in the models.

Explanatory variables	Description
Socio-economic variables	
income_I1= High income level.	1= High income level. More than 3,000 euros a month. 0= Low income level. 900 euros or less a month.
income_I2= Average to high income level.	1= Average to high income level. Between 1,801 and 3,000 euros a month. 0= Low income level. 900 euros or less a month.
income_I3= Average income level.	1= Average income level. Between 901 and 1,800 euros a month. 0= Low income level. 900 euros or less a month.
Beef purchasing habits	
purfreq_h= High purchasing frequency (purchase of beef more than once a week).	1= High purchasing frequency. 0= Sporadic purchasing frequency.
purfreq_w= Weekly purchasing frequency (purchase of beef once a week).	1= Weekly purchasing frequency. 0= Sporadic purchasing frequency.
purfreq_l= Low purchasing frequency (purchase of beef less than once a week).	1= Low purchasing frequency. 0= Sporadic purchasing frequency.
freqplace= Frequent place of purchase of beef.	0= Traditional butcher's. 1= Super/ hypermarkets.
Beef quality aspects	
improdeg= Level of importance of the production region.	Discrete continuous variable. Importance placed on the production region to obtain quality beef.
imfeeding= Level of importance of animal feeding.	Discrete continuous variable. Importance placed on animal feeding to obtain quality beef.
fprodsist= Production system quality attributes factor.	Continuous variable. Factor scores of individuals with regard to production system quality attributes.
fcreequats= Credence quality attributes factor.	Continuous variable. Factor scores of individuals with regard to credence quality attributes.
fserquats= Search quality attributes factor.	Continuous variable. Factor scores of individuals with regard to search quality attributes factor.
Attitudes towards quality-labelled beef	
fttradguar= Tradition guarantee factor.	Continuous variable. Factor scores of individuals with regard to tradition and guarantee factor.
fsocipres= Social prestige factor.	Continuous variable. Factor scores of individuals with regard to social prestige factor.
Lifestyles	
fgrenlife= "Green, healthy life" factor.	Continuous variable. Factor scores of individuals with regard to "green, healthy life" factor.
factillife= "Active social life" factor.	Continuous variable. Factor scores of individuals with regard to "active social life" factor.

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544 **Table 4**

545 Estimate of parameters. Summary of the SPSS outputs.

Variables in the Equation		Model 1		Model 2		Model 3	
		β	e^{β}	β	e^{β}	β	e^{β}
Constant (β_0)		-6.55*	0.00	-3.99*	0.02	-2.70**	0.07
Socioeconomic	income_l1	4.94***	139.97	1.66	5.26	3.50***	33.12
	income_l2	3.79***	44.44	1.07	2.91	3.00**	19.98
	income_l3	0,89	2.44	-0.42	0.66	1.53*	4.61
Buying habits	purfreq_h	-0.17	0.84	0.97	2.64	not included	
	purfreq_w	1.46	4.29	2.73**	15.29	not included	
	purfreq_l	0.85	2.34	2.09*	8.10	not included	
	freqplace	-0.84	4.34	-1.15**	0.32	not included	
Beef quality aspects	improdeg	1.53***	4.64	0.81***	2.24	0.37*	1.44
	imfeeding	-0.45	0.64	-0.44	0.65	not included	
	fprodsist	not included		0.69*	1.99	not included	
	fcrequats	0.27	1.31	-0.27	0.76	not included	
	fserquats	-0.11	0.89	-0.22	0.81	not included	
Attitudes towards quality-labelled beef	fttradguar	1.08*	2.95	0.98***	2.68	not included	
	fsocipres	0.28	1.32	0.14	1.15	not included	
Lifestyles	fgrenlife	0.41	1.50	-0.22	0.80	not included	
	factilife	-0.83**	0.44	not included		-0.85*	0.43

546 **Note:** - Wald's test on β coefficients; *significance at 0.1; **significance at 0.05; ***significance at
547 0.01. Significance of variables was obtained from Wald statistic.

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Table 5

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Classification tables.

Model	Type of buyers	% of correct group forecasting^a	% of correct overall forecasting^b
Model 1	Non buyers	83.8	88.2
	Regular buyers	91.1	
Model 2	Occasional buyers	79.4	76.6
	Regular buyers	73.2	
Model 3	Non buyers	54.1	77.1
	Occasional buyers	99.7	

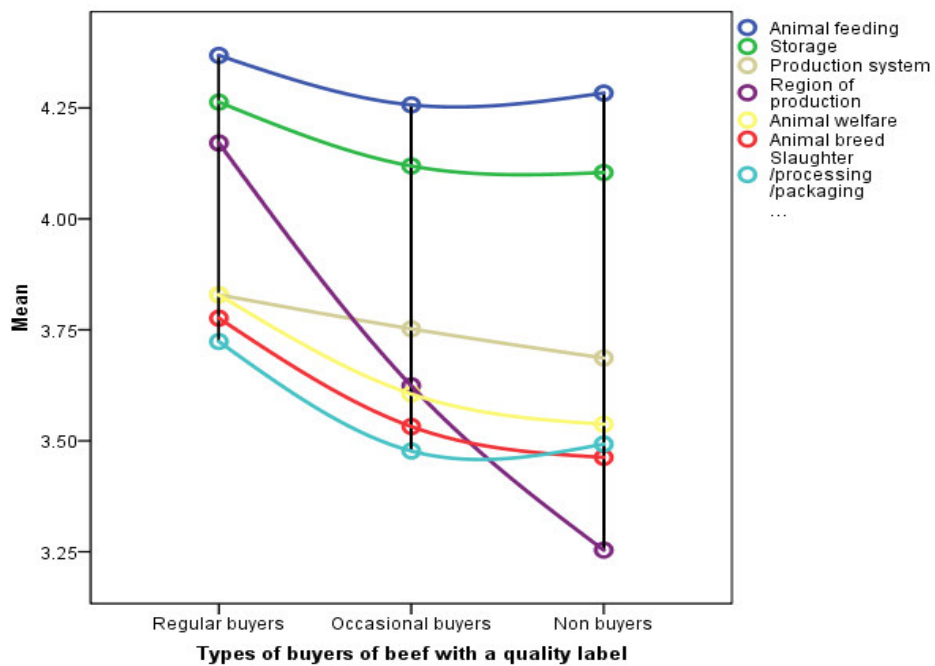
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^a Percentage of individuals appropriately classed in the group. Cutoff point 0.5.

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^b Percentage of individuals appropriately classed for the sample as a whole. Cutoff point 0.5.

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553 **Fig. 1.** Levels of importance of production aspects.

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