

21 **Abstract**

22 Considering the great impact of texture on consumers' liking of several
23 products, it is important for food companies to understand how consumers
24 describe the texture of food products. The aim of the present study was to get
25 an insight on consumers' texture vocabulary in three different Spanish-speaking
26 countries: Argentina, Spain and Uruguay. A free listing task was carried out in
27 each country with 107-120 consumers. Participants were asked to list all the
28 texture characteristics of food products they knew about. Between 80 and 112
29 terms were elicited by consumers, comprising mainly words related to texture
30 characteristics of food products. By simultaneously considering frequency of
31 mention and average order of elicited terms, the most familiar texture terms in
32 each country were identified, being the most frequently used texture terms
33 similar. Results from the present work would contribute to a greater knowledge
34 of the vocabulary used by consumers to describe the texture of food products
35 and show the existence of cross-cultural differences in word usage within a
36 same language.

37

38 **Keywords:** *consumer studies; texture; vocabulary; language; sensory*
39 *descriptors; free listing.*

40

41 **1. Introduction**

42 For decades, consumers have been considered only capable of hedonic
43 judgments (Stone & Sidel, 1985; Meilgaard, Civille, & Carr, 1999). However, in
44 order to design, promote and market food products that meet consumer sensory
45 expectations, food companies need information about how consumers perceive
46 the sensory characteristics of the products (ten Kleij & Musters, 2003). In the
47 last years several methodologies for gathering information about consumers'
48 perception of the sensory characteristics of food products have been developed
49 (Risvik, McEwan, & Rodbotten, 1997; ten Kleij & Musters, 2003; Narain,
50 Paterson, & Reid, 2004; Popper, Rosenstock, Schraidt, & Kroll, 2004; Pagès,
51 2005; Faye *et al.*, 2006; Adams, Williams, Lancaster, & Foley, 2007; Perrin,
52 Symoneaux, Maitre, Asselin, Jourjon, & Pagès, 2008; Ares, Barreiro, Giménez,
53 & Gámbaro, 2010). In this context, understanding how consumers describe the
54 sensory characteristics of food products is highly valuable for food companies.

55 Texture is a complex sensory property that involves several widely different
56 parameters (Szczesniak, 2002). Considering the great impact of texture on
57 consumers' liking of several food products (Szczesniak & Kahn, 1971; Bourne,
58 2002; Szczesniak, 2002) and its complexity, it is crucial to get an insight on
59 consumers' texture vocabulary.

60 Several consumer studies were carried by Szczesniak decades ago, revealing
61 that texture is a discernible characteristic of food products and that consumers'
62 awareness of this sensory property is similar to that of flavour (Szczesniak &
63 Kleyn, 1963; Szczesniak & Kahn, 1971; Szczesniak, 1990). Furthermore, several
64 studies have been carried out to identify consumers' texture vocabulary in
65 different languages. Studies carried out by Yoshikawa, Nishimaru, Tashiro, &

66 Andyoshida (1970), Szczesniak & Kleyn (1963) and Rohm (1990) in Japan,
67 USA and Austria respectively, concluded that the most frequently used terms in
68 the three languages were similar; being Japanese the language with the richer
69 textural vocabulary. Furthermore, Lawless, Vanne, & Tuorila (1997) compared
70 sensory texture terms in Finnish and English and used principal components
71 analysis to reduce the number of terms and concluded that texture dimensions
72 are consistent between these two cultures. However, since these studies were
73 carried out decades ago, they should be repeated to identify changes in
74 consumer vocabulary; particularly taking into account consumers' changes in
75 lifestyle, food consumption patterns and consumers' greater sophistication and
76 awareness of food quality.

77 Understanding consumers' texture vocabulary could contribute to the
78 elimination of differences between descriptions of products obtained from
79 consumers and trained panels (Carr, Craig-Petsinger, & Hadlich, 2001), and
80 could allow the selection of terms commonly used by consumers to apply them
81 in other consumer tests like intensity or just-about-right scales or check-all-that-
82 apply questions.

83 According to Dubois and Giboreau (2006) an inventory of the linguistic
84 resources used in different languages and different senses is needed. Spanish
85 is the second most important language in terms of native speakers in the world,
86 with over 350 million native speakers. The large number of consumers who
87 have Spanish as a first language makes the understanding of consumers'
88 vocabulary in that language necessary. Lists of texture words in Spanish have
89 been published by Badui (1988), Anzaldúa-Morales (1989) and Pedrero &
90 Pangborn (1989), but the listed terms are not based on consumers' texture

91 vocabulary. Therefore, texture vocabulary among Spanish-speaking consumers
92 has not been sufficiently studied and neither the hierarchy or frequency of word
93 usage nor the cultural differences between different Spanish-speaking countries
94 have been extensively analysed. Cross-cultural differences in consumer
95 perception of texture terms have been reported by Varela, Salvador, Gámbaro
96 & Fiszman (2008). According to these authors the terms *crujiente* (crispy) and
97 *crocante* (crunchy) have different meanings and evoke different perceptions for
98 Spanish and Uruguayan consumers.

99 In this context, the aim of the present study was to get an insight on consumers'
100 texture vocabulary in three Spanish-speaking countries: Argentina, Spain and
101 Uruguay.

102

103 **2. Materials and methods**

104

105 **2.1. Participants**

106 The study was conducted in the cities of Buenos Aires (Argentina), Montevideo
107 (Uruguay) and Valencia (Spain). Buenos Aires and Montevideo correspond to
108 national capital cities and Valencia corresponds to a regional capital city.
109 Participants were recruited in each city using a convenient intentional and
110 reasoned sampling with predetermined quotas (Guerrero *et al.*, 2010).
111 Convenience consumers' samples are usually used in qualitative studies when
112 the aim of the research is to get a gross estimation of results related to a
113 research subject and involves recruiting available participants who meet specific
114 criteria (Kinneer & Taylor, 1993). In the present work, instead of randomly
115 recruiting participants, specific quotas were defined to avoid differences in the

116 participants' age and gender distribution between the three countries, to include
117 in similar proportion male and female participants, as well as participants
118 younger and older than 35 years. The age limit was selected considering that
119 people younger than 35 years old comprise the 35-44% of the adult population
120 in the three considered countries (Instituto Nacional de Estadística, 2001; 2004;
121 Instituto Nacional de Estadística y Censos, 2001).

122 One-hundred and ten participants were recruited in Buenos Aires, one-hundred
123 and twenty participants in Montevideo, whereas one-hundred and seven
124 participants were recruited in Valencia. All participants were randomly recruited
125 at shopping areas, universities campuses and public places. To minimize the
126 influence of food awareness in the results, the percentage of participants
127 recruited in food-related institutions in the three countries was lower than 10%.

128 The first criterion for selecting participants was their interest in participating in
129 the study. At recruitment stage, no information about the specific aim of the
130 study was provided. Secondly, age and gender quotas were considered to
131 select consumers. Participants' age should range between 18 and 80 years old.
132 Besides, in each city a minimum of 20 males and females should be more than
133 35 years old and a minimum of 20 males and females should be 34 years old or
134 less. Table 1 shows the gender and age distribution of the recruited participants
135 in Buenos Aires, Montevideo and Valencia. No significant differences were
136 found in the gender and age distribution of the consumer samples recruited
137 from Buenos Aires, Montevideo and Valencia ($\chi^2 = 1.7$, $p = 0.89$).

138

139 **2.2. Free listing task**

140 Free Listing is a simple qualitative technique widely used in anthropology
141 (Russell Bernard, 2005) and introduced to food consumer science by Hough &
142 Ferraris (2010). It consists of asking participants to “list all the X they know
143 about”, where X could be anything from fruits to brands or animals (Russell
144 Bernard, 2005). According to several authors, the items with the higher number
145 of mentions are the ones most relevant for consumers (Henley, 1969).
146 In the present study participants were asked to list all the texture characteristics
147 of food products they knew about. They were given a sheet of paper with written
148 instructions and were asked to complete the task in less than 15 min.

149

150 **2.3. Data analysis**

151 All the words elicited by participants were considered for the analysis. First, the
152 number of terms elicited by each participant was counted. The average number
153 of elicited terms was determined for consumers in each country, as well as the
154 total number of elicited terms. Chi-square was performed to study differences in
155 the total number of terms elicited in Argentina, Spain and Uruguay, whereas
156 analysis of variance was carried out to investigate significant differences in the
157 average number of elicited terms between consumers of the three countries. A
158 5% significance level was considered.

159 Then, the elicited associations were qualitatively analysed for each country. A
160 search for recurrent terms was performed, grouping different word classes for
161 the same term (i.e. adjectives and nouns).

162 Categories mentioned by more than 5% of the participants were considered and
163 their frequencies were determined by counting the number of participants that
164 used those words in each country. Chi-square was performed to study

165 differences in the associations of Argentinean, Spanish and Uruguayan
166 consumers. This analysis was performed in the country x term matrix,
167 considering the number of participants who mentioned each term in each
168 country. In the considered matrix, rows corresponded to countries and columns
169 to categories; with the crossing of a certain category and participant
170 corresponding to the number of participants who elicited that term in that
171 country. A 5% significance level was considered.

172 Then, the rank of each elicited term was determined for each consumer. Cluster
173 analysis of categories and participants was carried out to evaluate if participants
174 grouped texture terms into natural clusters. Only terms mentioned by more than
175 10% of the participants were considered in this analysis (Hough & Ferraris,
176 2010). Hierarchical cluster analysis was performed on the participants x
177 categories matrix, as suggested by Hough & Ferraris (2010). In that matrix rows
178 corresponded to participants and columns to categories; with the crossing of a
179 certain category and participant corresponding to the rank in which the
180 participant elicited that term. Manhattan distances and average aggregation
181 method were considered.

182 All data analyses were performed using XL-Stat 2009 (Addinsoft, NY, USA).

183

184 **3. Results and Discussion**

185 In the three countries, participants were able to complete the free listing task,
186 suggesting that they had a clear representation of food texture, in agreement
187 with previous studies that reported universal texture awareness (Szczeniak &
188 Kleyn, 1963; Yoshikawa *et al.*, 1970; Szczeniak, 1971; Drake, 1989; Rohm,
189 1990; Lawless, *et al.*, 1997).

190 As shown in Table 2, the maximum, minimum and average number of words
191 elicited per consumer in Argentina, Spain and Uruguay was similar. The
192 relatively large number of words elicited in the three countries indicates that
193 consumers' had a clear representation of several texture characteristics of food
194 products and use various terms to describe the texture of food products.
195 According to the analysis of variance, no significant differences ($F=0.56$,
196 $p=0.57$) were found in the average number of words elicited by consumers in
197 the three countries. Besides, no significant differences ($\chi^2=2.9$, $p=0.24$) were
198 found in the total number of words elicited in Argentina, Spain and Uruguay
199 (166, 153 and 184 respectively). These results indicate that consumers from the
200 three Spanish-speaking countries considered had similar texture awareness.
201 The great majority of the elicited words were related to food texture, suggesting
202 that consumers had a good understanding of the concept. However, there were
203 a few mentions of other non-texture characteristics. Some consumers elicited
204 flavour characteristics, such as sweet (2 mentions in Spain and Uruguay) and
205 salty (2 mentions in Uruguay). There were other mentions to appearance
206 characteristics (shiny -1 mention in Argentina and Uruguay- and colour -1
207 mention in Argentina-), hedonics (tasty -2 mentions in Uruguay and 1 mention in
208 Argentina- and yummy -1 mention in Uruguay-). A similar behaviour was
209 reported by Nuessli Guth & Wagner (2009) when studying consumers' taste
210 vocabulary. These authors reported that, apart from mentioning taste terms,
211 consumers elicited some words related to other senses.
212 In the three countries, for each texture word consumers elicited different word
213 classes, i.e. they elicited nouns and both feminine and masculine adjectives or
214 nouns. For example, in Argentina for *Dureza* (*Hardness*) three different words

215 were elicited: *Duro* (masculine adjective, i.e. *Hard*), *Dura* (feminine adjective,
216 i.e. *Hard*) and *Dureza* (noun, i.e. *Hardness*). This same behaviour was
217 observed in Spain and Uruguay for almost all the elicited terms, being always
218 the adjectives, and in particular the masculine adjectives, the most frequently
219 mentioned. This is an interesting result that could be considered when selecting
220 attribute names that will be evaluated by consumers, since it could be better to
221 consider adjectives as descriptors in sensory or consumer studies. For
222 example, it could be more natural for consumers or trained assessors to ask
223 them to rate how hard a specific food is than to ask them to evaluate its
224 hardness. The fact that consumers elicited masculine adjectives more
225 frequently is relevant for Spanish language, since adjectives have a gender,
226 which does not happen in English, language in which most scientific
227 publications are written.

228 Regarding the fact that consumers elicited masculine adjectives more
229 frequently, it would be interesting to perform further studies on the subject and
230 to evaluate if this issue is related to the fact that consumers associate the words
231 with specific food products, especially in the case of feminine adjectives that
232 need a feminine noun to make sense.

233 In order to quantitatively analyse results from the Free listing task, all word
234 classes for the same texture term were considered as one to determine
235 frequencies of mention, being the masculine adjective selected to name the
236 term. No significant differences ($\chi^2=5.5$, $p=0.06$) were found in the number of
237 texture terms elicited in the three countries (c.f. Table 2). The number of texture
238 terms elicited in the three countries is similar to that reported by Szczesniak &
239 Kleyn (1963) for American consumers (78 terms) and Rohm (1990) for Austrian

240 consumers (104 terms), suggesting consensus in the number of texture terms in
241 Occidental cultures despite speaking in different languages. On the other hand,
242 the number of terms elicited in the three Spanish-speaking countries considered
243 was lower to that reported by Yoshikawa *et al.* (1970) for Japanese consumers
244 (406 words), who use different words to describe subtle texture differences,
245 mainly because in Japan there are a lot of different cooking techniques that lead
246 to a high food texture diversity.

247 It should also be pointed out that the total number of texture attributes
248 mentioned in the present study was similar to that reported almost 50 years ago
249 for American consumers, suggesting that the richness of consumers' texture
250 vocabulary in Occidental cultures might have not increased in spite of some
251 changes in lifestyle, consumption patterns and increasing globalization (e.g.
252 influence of eastern cuisine). This last hypothesis, however, is difficult to prove,
253 as lifestyle and cultural external influences could well have changed the most
254 frequently used terms, rather than the total number, but due to the absence of
255 any previous study for Spanish consumers, the comparison is not feasible.

256 Apart from identifying the terminology used in each country to describe the
257 texture of food products, it is also important to determine which were the terms
258 most frequently used by consumers. According to Guerrero *et al.* (2010),
259 frequency of elicitation is related to the importance of a concept in consumers'
260 mind; in this case it could be related to the relevance of each texture term for
261 consumers. In Argentina a total of 27 words were mentioned by more than 5%
262 of the respondents, whereas the number of words mentioned by more than this
263 percentage of consumers was 29 in Spain and 31 in Uruguay. The terms

264 mentioned by more than 5% of the consumers in at least one of the studied
265 countries, as well as their frequency of mention, are presented in Table 3.

266 *Cremoso (Creamy)* was the most frequently mentioned texture term in the three
267 countries, being mentioned by more than 50% of the participants. This indicates
268 the importance of creaminess as a texture characteristic and could be attributed
269 to the relationship of creaminess to consumers' liking of several food products
270 (Elmore, Heymann, Johnson, & Hewett, 1999; Richardson-Harman *et al.*, 2000
271 Tournier, Martin, Guichard, Issanchou, & Sulmont-Rosse, 2007).

272 Considering results from the three countries, apart from *Cremoso (Creamy)* the
273 most frequently mentioned texture terms were: *Suave (Smooth)*, *Duro (Hard)*,
274 *Áspero (Rough)*, *Blando (Soft)*, *Fibroso (Stringy)*, *Crujiente (Crispy)*, *Líquido*
275 *(Liquid)*, *Rugoso (Rugous)*, and *Crocante (Crunchy)*. These terms are in
276 agreement with those reported by Szczesniak & Kleyn (1963), Rohm (1990)
277 and Yoshikawa *et al.* (1970), suggesting that the main texture dimensions are
278 consistent across cultures, as suggested by Lawless *et al.* (1997). The most
279 frequently mentioned terms could be considered as those that are more
280 relevant for consumers and those that are more commonly used by them to
281 describe the texture characteristics of food products. These terms should be
282 considered when evaluating texture characteristics of food products with
283 consumers, by using intensity or check-all-that-apply questions.

284 Despite the fact that results were similar for Argentinean, Spanish and
285 Uruguayan participants, some differences were also identified. According to chi-
286 square test, significant differences were found between the countries in the
287 number of participants who mentioned the texture terms ($\chi^2 = 269$, $p < 0.0001$),
288 suggesting the existence of cross-cultural differences in consumers' texture

289 vocabulary, even within the same language. The influence of cultural
290 background on consumers' vocabulary was not surprising. However, it is
291 interesting to notice that differences between Argentinean and Uruguayan
292 consumers' responses were found, even when cultural differences between
293 these two countries are very small.

294 As shown in Table 3, the term *Crujiente* (*Crispy*) was mentioned by 39% of
295 Spanish participants, whereas it was only mentioned by 13% and 10% of
296 Argentinean and Uruguayan consumers. Meanwhile, the term *Crocante*
297 (*Crunchy*) was mentioned by 20% of Argentinean and Uruguayan participants
298 but only by 3% of Spanish consumers. This is in agreement with results
299 published by Varela *et al.* (2008), who reported that most Spanish consumers
300 are not familiar with the term *Crocante*, whereas Uruguayan consumers seem
301 to indistinctively use the terms *Crujiente* and *Crocante*. Furthermore, Spanish
302 consumers mentioned more frequently the terms *Líquido* (*Liquid*), *Blando* (*Soft*),
303 *Duro* (*Hard*), *Ligero* (*Thin*), *Pastoso* (*Pasty*), and *Gelatinoso* (*Gelatinous*) than
304 Argentinean and Uruguayan consumers. Differences were also found between
305 Argentina and Uruguay, two neighbour countries in South-America. Uruguayan
306 consumers mentioned more frequently the terms *Cremoso* (*Creamy*), *Suave*
307 (*Soft*) and *Arenoso* (*Gritty*) and less frequently the terms *Rugoso* (*Rugous*) and
308 *Untuoso* (*Unctuous*) than Argentinean consumers. These results show that
309 consumers in different countries might show different familiarity with the elicited
310 texture terms and stress the importance of understanding the vocabulary used
311 by consumers to describe the sensory characteristics of food products, in
312 different languages but also in different cultures.

313 The order in which each term was mentioned could also provide information
314 about the relative importance of the considered term for consumers (Henley,
315 1969). The average order in which each term was mentioned was determined in
316 each country. Figure 1 shows the rank of terms according to their frequency of
317 mention and the average order in which they were elicited for the three
318 countries, for those terms mentioned by more than 5% of the participants.
319 Considering frequency of mention, a term ranked 1 was the one that was
320 mentioned the most, while a term ranked 1 according to order of mention was
321 the one with the lowest average order score. As shown in Figure 1, the terms
322 *Tierno (Tender)*, *Elástico (Springy)*, *Duro (Hard)*, and *Poroso (Porous)* showed
323 the lowest average order in Argentina; whereas in Spain the terms with the
324 lowest average score were *Liso (Even)*, *Ligero (Thin)*, *Rugoso (Rugous)*,
325 *Cremoso (Creamy)*, and *Untuoso (Unctuous)*; and in Uruguay *Suave (Smooth)*,
326 *Cremoso (Creamy)*, *Áspero (Rough)* and *Duro (Hard)*. As previously mentioned,
327 the terms which showed the lowest average order of mention were different in
328 the three countries, confirming the influence of cultural background, e.g. food
329 habits and cooking techniques, on consumers' texture vocabulary.

330 Despite the fact that Hough & Ferraris (2010) and Picard, Dacremont, Valentin
331 & Giboreau (2003) reported that a strong relationship exists between average
332 order and frequency of mention in free listing tasks, this was not found in the
333 present study. Average order and frequency of mention were not significantly
334 correlated to each other. The correlation between these two parameters
335 explained less than 10% of the variability for the three countries. In the present
336 study, some terms were mentioned by just a small proportion of the consumers
337 but got a low average order score, due to the fact that average order was

338 calculated considering only data from consumers who elicited the term. On the
339 contrary, some other terms were mentioned by a high proportion of participants
340 but got a high average order. In the three countries there were some terms that
341 were mentioned by a high proportion of consumers and that showed a low
342 average order score. These terms might correspond to those more salient and
343 relevant in the consumers' mind. Therefore, the consideration of average order
344 of mention might make sense for those terms mentioned by a high proportion of
345 participants.

346 Thus, in the present study both frequency and order of mention provided
347 information about the relevance of each term for consumers when describing
348 the texture of food products. The most frequently mentioned terms that also
349 showed a low average order might be the most relevant for consumers and
350 those that are more commonly used in their everyday life to describe the texture
351 characteristics of food products. Therefore, the consideration of both frequency
352 of mention and average order might be recommended when analysing results
353 from free listing tasks. Considering simultaneously these two variables the most
354 relevant terms might be those with high frequency of mention and low average
355 order, i.e. terms with low rank according to both frequency of mention and
356 average order in Figure 1. Therefore, taking into account both values and
357 looking at Figure 1, the most relevant texture terms in the three Spanish-
358 speaking countries considered seem to be the following: *Cremoso (Creamy)*,
359 *Suave (Smooth)*, *Duro (Hard)*, *Rugoso (Rugous)*, *Blando (Soft)*, *Crocante*
360 *(Crunchy)*, *Crujiente (Crispy)* and *Tierno (Tender)* in Argentina; *Cremoso*
361 *(Creamy)*, *Crujiente (Crispy)*, *Suave (Smooth)*, *Áspero (Rough)*, *Duro (Hard)*,
362 *Blando (Soft)* and *Rugoso (Rugous)* in Spain; *Cremoso (Creamy)*, *Suave*

363 (*Smooth*), *Àspero* (*Rough*), *Duro* (*Hard*), *Blando* (*Soft*), *Crocante* (*Crunchy*) and
364 *Líquido* (*Liquid*) in Uruguay. Further studies should be carried out to check that
365 this criterion was able to adequately identify the most relevant texture terms.
366 Cluster analysis of terms mentioned by more than 10% of participants in each
367 country was performed and results are shown in Figure 2. Dendrograms did not
368 show any natural grouping, suggesting that differences in rank between terms
369 were not related to the similarity between texture terms. In general, terms were
370 not sorted in major texture groups. This result is not in agreement with Hough &
371 Ferraris (2010) who reported that cluster analysis for consumers' rankings for
372 fruits gave a natural measure of the distance between them in consumers' mind
373 and allowed the identification of groups of fruits based on their characteristics.
374 In the present work, considering results of cluster analysis it could be concluded
375 that consumers elicited terms according to their familiarity and the importance
376 they gave to them in their everyday life, instead of eliciting the terms according
377 to the sensory characteristics to which they are related. Differences between
378 results of the present study and those reported by Hough & Ferraris (2010)
379 could be due to the fact that in the latter study a specific food category was
380 considered, rather than a sensory property which comprised several different
381 dimensions. Further research is necessary to understand differences in average
382 order and frequency of mention of terms elicited in free listing studies.

383

384 **4. Conclusions**

385 Free listing allowed the identification of consumers' texture vocabulary in three
386 Spanish-speaking countries, showing high awareness of this term. Even though
387 some differences existed between consumer samples from the three countries,

388 the most frequently used texture terms were similar. In order to confirm the
389 differences in consumers' texture vocabulary between the three Spanish-
390 speaking countries further studies should be carried out to overcome the
391 limitations of the present work derived from the fact that small convenient
392 consumer samples were considered.

393 Considering results from cluster analysis it could be concluded that consumers
394 mainly elicited texture terms according to their relevance in their everyday life.
395 By simultaneously considering frequency of mention and average order, the
396 most familiar texture terms in each country could be identified.

397 Results from the present work contribute to a greater knowledge of the
398 vocabulary used by consumers to describe the texture of food products in
399 Spanish. The terms identified as most relevant for consumers could be used
400 during consumer studies in which intensity or CATA questions are considered
401 for evaluating texture characteristics. Besides, texture terms could also be used
402 to communicate appropriately the sensory characteristics of a food product to
403 consumers.

404 Further research should be carried out in each of the three countries to
405 investigate the meaning that consumers give to the identified texture terms,
406 which products they relate them to and in what context they use them.

407

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561

562 **Figure captions**

563

564 **Figure 1.** Rank of terms according to the frequency in which they were
565 mentioned and the average order in which they were elicited in: **(a)** Argentina,
566 **(b)** Spain and **(c)** Uruguay.

567

568 **Figure 2.** Cluster analysis of terms listed by more than 10% of participants in:
569 **(a)** Argentina, **(b)** Spain and **(c)** Uruguay.

570

571 **Tables**

572

573 **Table 1.** Gender and age distribution of the consumer samples in each city.

574

Participants	Buenos Aires (Argentina)	Valencia (Spain)	Montevideo (Uruguay)
<i>Total of participants</i>	110	107	120
<i>Females</i>			
18 – 34 years old	29%	30%	25%
more than 35 years old	27%	23%	24%
<i>Males</i>			
18 – 34 years old	24%	24%	25%
more than 35 years old	20%	23%	26%

575

576

577 **Table 2.** Total number of words elicited in the Free-listing task, in the three
578 countries.

Country	Total number of words elicited	Number of elicited terms (*)	Number of words elicited per consumer		
			Average	Minimum	Maximum
Argentina	166	103	5.6	1	16
Spain	153	80	6.0	2	21
Uruguay	184	112	5.9	2	18

579

580

581 (*) In the present study consumers elicited different word classes (nouns,
582 masculine and feminine adjectives) for each texture word. Therefore, the
583 number of elicited terms considers all word classes related to a texture word as
584 a single term.

585

586 **Table 3.** Frequency of mention of texture terms mentioned by more than 5% of
 587 the participants of at least one country.

Texture term	Frequency of mention (%)		
	Argentina (n=110)	Spain (n=107)	Uruguay (n=120)
Cremoso (Creamy)	51	57	59
Suave (Smooth)	43	31	59
Duro (Hard)	35	57	32
Áspero (Rough)	34	23	39
Blando (Soft)	24	46	20
Fibroso (Stringy)	24	19	20
Crujiente (Crispy)	13	39	10
Líquido (Liquid)	12	26	18
Rugoso (Rugous)	25	15	9
Crocante (Crunchy)	20	3	20
Untuoso (Unctuous)	23	10	6
Arenoso (Gritty)	9	11	18
Pastoso (Pasty)	5	20	8
Grumoso (Lumpy)	4	14	14
Gelatinoso (Gelatinous)	4	18	9
Seco (Dry)	10	8	12
Granuloso (Grainy)	9	14	3
Jugoso (Juicy)	7	10	8
Liso (Even)	6	7	12
Tierno (Tender)	12	8	4
Gomoso (Gummy)	7	12	4
Viscoso (Viscous)	3	14	5
Esponjoso (Spongy)	8	5	8
Granulado (Granulated)	5	2	11
Consistente (Consistent)	4	3	8
Elástico (Springy)	6	5	4
Pegajoso (Sticky)	2	5	8
Espeso (Thick)	1	7	6
Sólido (Solid)	4	4	6
Grasoso (Greasy)	5	1	8
Firme (Firm)	7	1	4
Húmedo (Moist)	7	0	5
Harinoso (Mealy)	7	5	0
Astringente (Astringent)	4	2	5
Frágil (Fragile)	4	6	1
Chicloso (Chewy)	0	2	8
Ligero (Thin)	2	7	0
Adhesivo (Adhesive)	2	5	2
Poroso (Porous)	5	1	2
Homogéneo (Homogeneous)	1	2	5
Aflanado (Egg-custard like) (*)	0	0	6

588 (*) This expression is typical of Uruguay and refers to a firm texture similar to
 589 that of an egg-custard.