

1 **Sustainability and Organic Production: How Information Influences Consumer's Expectation**
2 **and Preference for Yogurt**

3 Laureati M.^{a*}, Jabes D.^b, Russo V.^b, Pagliarini E.^a

4 ^a Department of Food, Environmental and Nutritional Sciences (DeFENS), Università degli Studi di
5 Milano, Via Celoria 2, 20133, Milano, Italy

6 ^b Istituto di Consumi, Comportamento e Comunicazione d'Impresa, Università IULM di Milano,
7 via Carlo Bo 1, 20143, Milano, Italy

8 **Abbreviations**

9 ACA scale: Awareness Concern and Action scale

10 TPB: Theory of Planned Behavior

* Corresponding author: dr. Monica Laureati, Department of Food, Environmental and Nutritional Sciences (DeFENS),
Università degli Studi di Milano, Via Celoria 2, 20133 Milano, Italia; email: monica.laureati@unimi.it; telephone:
+39(0)250319179; fax: +39(0)250319190

11 **Abstract**

12 The purposes of this experimental study are to investigate consumers' attitude and general
13 knowledge about sustainability; to evaluate how information about organic production may affect
14 consumers' food acceptability and expectations; to establish whether and how much commitment to
15 sustainability influences individuals' preferences for organic products. Results showed that
16 consumers are aware of the sustainability concept, but they are not able to define it precisely thus
17 indicating that sustainability is a widespread issue in individuals' mind. This was confirmed also by
18 the lack of information perceived by respondents about sustainable products. When subjects were
19 grouped according to their sustainability level, the majority of them (74%) were defined as
20 "Uncertain". A major difference was found between "Sustainable" and "Non-sustainable"
21 individuals in the attitude, purchase intentions, and behaviors as regarding organic products.
22 Sustainable subjects were more interested in and proactive for such products. This behavioral
23 discrepancy is in line with the liking gap for organic products found between the two groups.
24 Indeed, when organic and conventional yogurts were evaluated for liking in Blind, Expected and
25 Informed conditions, Sustainable subjects had a higher expectation towards organic yogurt than
26 Non-sustainable individuals. Furthermore, Non-sustainable subjects expressed lower expectations
27 from organic samples than from conventional ones, whereas the opposite behavior was observed in
28 Sustainable subjects. Only for Sustainable and Uncertain subjects, organic yogurts produced
29 negative disconfirmation, which was associated with an incomplete assimilation effect. Hence, the
30 information about yogurt's organic origin may affect people's expectations, and this influence is
31 especially found in the case of respondents which are committed to sustainability or are uncertain
32 about this issue as compared to Non-sustainable individuals.

33 **Keywords**

34 Sustainability, organic production, liking, food choice, sensory, assimilation

35 **1. INTRODUCTION**

36 A great deal of interest in sustainability issues has been globally expressed in recent years. The
37 academic interest for the topic has enormously increased, especially in the last decade: 400 journal
38 articles about sustainability were issued in 2005, whereas in 2010 they became more than 1,000.
39 Also politics and institutions' interest is growing, as long as sustainability is a crucial issue for the
40 economic growth and development: sustainability is by far a strategic goal in economic and social
41 policies on an international ground (Bologna, 2005).

42 The term *sustainability* comes from the verb “to sustain”, namely “to carry the weight”, “to
43 support”, and it refers to the capability to live within the carrying capacity of the system we belong
44 to (Daly, 1996). According to the official definition provided in 1987 by The World Commission on
45 Environment and Development (WCED), *sustainable development* is “a development that meets the
46 needs of the present without compromising the ability of future generations to meet their own
47 needs” (WCED, 1987). Sustainability is now a positive concept in consumers' minds, but there are
48 still some contradictory aspects to be pointed out. Sustainability is an overall issue involving
49 institutional policies and companies' decisions, but also consumers' purchases and behaviors in
50 various situations of everyday life; nevertheless, consumers show poor awareness of problems
51 related to it, and it's difficult to find a unique and generally accepted definition of the concept.
52 Furthermore, a widespread inconsistency between beliefs, opinions, values, and behaviors is
53 noticed: consumers have developed behaviors and habits in contrast with their intentions, attitudes,
54 and opinions (de Barcellos, Krystallis, Saab, Kugler, & Grunert, 2011; Vermeir & Verbeke, 2006).
55 Scientific literature directed little attention to consumer's perception of the sustainability concept as
56 well as to the understanding of its influence on hedonic expectations.

57 Despite being one of the strongest food preference and consumption determinants, the hedonic
58 dimension remains the most difficult aspect to assess objectively (Pagliarini, 2002). When
59 approaching the crucial moment of a food product choice, consumers retrieve information stored in
60 memory and coming from previous experiences with the same product or a similar one. This aspect

61 is part of the decision-making process. After consumption, the sensory and hedonic properties of a
62 chosen product, along with other variables such as the brand and the packaging labels, may result in
63 changes in consumer expectations (Deliza & MacFie, 1996). A confirmation is generated if, at the
64 moment of the choice/consumption, the product characteristics meet consumer's expectations. A
65 mismatch between expected and actual product characteristics results in a disconfirmation, which
66 can be either positive (when product characteristics are better than expected) or negative (when
67 product characteristics are worse than expected) (Cardello & Sawyer, 1992). According to the
68 selection/consumption/re-selection model proposed by Deliza & MacFie (1996), a confirmation and
69 a positive disconfirmation of the expectations will result in consumer's satisfaction followed by a
70 repeated choice of the product with increased expectations for it, whereas negative disconfirmation
71 will likely lead to dissatisfaction and product rejection with a consequent expectations decrease.

72 Consumer's expectation is often measured in terms of disparity degree between expected and
73 perceived product performance (Anderson, 1973). Over the past decades several works have been
74 carried out in an attempt to investigate whether and how information about food products influences
75 hedonic expectation. In most of these studies, consumers were given food samples and asked to
76 answer questions about their liking degree under different information circumstances: the blind
77 condition (*i.e.* consumers taste and judge the product without any kind of information); the expected
78 condition (*i.e.* consumers do not taste the product and judge it only on the basis of a written or
79 visual information); and the informed condition (*i.e.* consumers taste and judge the product after
80 having read a written information and/or seen an image). This approach has been used to investigate
81 the effect on consumer's product evaluation of (i) health and nutritional information (Saba et al.,
82 2010), (ii) country of origin (Caporale & Monteleone, 2001; Stefani, Romano & Cavicchi, 2006;
83 Caporale, Policastro, Carlucci & Monteleone, 2006), (iii) brand (Di Monaco, Cavella, Di Marzo &
84 Masi, 2004; Lange, Martin, Chabanet, Combris & Issanchou, 2002); and (iv) price (Ares, Giménez
85 & Deliza, 2010). All these studies reported that quality perception can be affected by the
86 expectations induced by the information. Different predictive models (*e.g.* assimilation and

87 contrast) have been suggested in an attempt to reveal the effect of discrepancy between expectations
88 and actual product performance on acceptability (Anderson, 1973). When expectations are
89 disconfirmed, the assimilation model is generally applicable, which means that hedonic ratings
90 move towards the expectations when information is provided.

91 Some studies have been undertaken about hedonic expectations and food sustainability using bread
92 (Kihlberg & Risvik, 2007; Kihlberg, Johansson, Langsrud & Risvik, 2005), cheese (Napolitano,
93 Braghieri, Piasentier, Favotto, Naspetti & Zanoli, 2010a), meat (Napolitano, Braghieri, Piasentier,
94 Favotto, Naspetti & Zanoli, 2010b), beer (Caporale & Monteleone, 2004), and pineapple (Poelman,
95 Mojet, Lyon & Sefa-Dedeh, 2008) as experimental products. In this context, the understanding of
96 how and whether sustainability drives consumers' preferences is a crucial subject which needs to be
97 systematically explored, especially in the food domain.

98 Based on the above considerations, this study is intended (i) to assess consumers' understanding
99 and attitude towards sustainability; (ii) to evaluate the influence of information about organic
100 production on consumers' food acceptability and expectation; (iii) to establish whether and how
101 much commitment to sustainability drives individuals' preference for organic food. As compared to
102 previous studies in literature, our approach included the administration of a questionnaire devised to
103 explore consumer's general knowledge, attitudes, beliefs and behaviors related to sustainability
104 combined with the hedonic evaluation of a food product under different consumption situations.
105 The respondents were grouped according to their sustainability level (namely their propensity and
106 willingness to perform sustainable actions) using the answers provided to the questionnaire, which
107 included several questions concerning sustainability (*e.g.* respect of the environment, enhancement
108 of local production, promotion of clean and green energies), and food (*e.g.* enhancement of organic
109 cultivation, contrasting GMO food, enhancement of free-preservatives food products). The same
110 consumers were also involved in a hedonic test and were asked to express their liking degree for
111 conventional and organic yogurt samples in blind, expected, and informed conditions. Among the
112 several meanings of sustainability related to food, the concept of organic production was chosen as

113 reference in this study. This choice is based on data showing increased organic food products
114 purchases in the European market, corresponding to 8% in 2010. In Italy, this increase is especially
115 prominent in organic yogurt purchases, with a percentage of 27.5% in 2010 (Ismea/GfkEurisko).
116 For this reason, yogurt was chosen as experimental product in the present study.

117 **2. MATERIAL AND METHODS**

118 *2.1. Subjects*

119 One hundred and fifty-seven (100 females and 57 males) regular yogurt consumers aged between
120 20 and 42 ($M=23.6$; $sd=2.8$) were recruited among the students of the Faculty of Agronomy
121 (Università degli Studi di Milano) and the Faculty of Communication, Public Relations and
122 Advertising (Libera Università di Lingue e Comunicazione IULM). The subjects' recruitment was
123 based on yogurt liking degree and consumption frequency. Only individuals who reported to like
124 strawberry yogurt and to consume it more than once-twice a month were involved in the study.

125 *2.2. Samples*

126 Eight commercially available full-fat-milk, strawberry-flavored yogurts were used as experimental
127 samples: three organic yogurts (Fattoria Scaldasole Srl, Como, Italy; Parmalat SpA, Parma, Italy;
128 Esselunga SpA, Italy) and five conventional yogurts (Yomo-Granarolo SpA, Milano, Italy;
129 Parmalat SpA, Parma, Italy; Latteria Sociale Merano, Merano, Italy; Müller Italia, Italy; Esselunga
130 SpA, Italy). Samples were stored at 4 °C and served at room temperature during the tasting
131 sessions. Yogurt samples were purchased in local supermarkets: for a given brand all samples were
132 chosen from the same batch and across brand the difference in shelf-life was no more than few
133 days. The strawberry-flavored yogurt was selected because it is the most popular yogurt in Italy and
134 it is available in a large variability of brands both from conventional and organic production.

135 *2.3. Procedure*

136 *2.3.1. Consumer Test*

137 Participants were involved into two tasting sessions performed in two different days one week
138 apart. Each session lasted about 30 min. The sessions were held during mid-morning and mid-

139 afternoon at the sensory laboratory of the Department of Food, Environmental and Nutritional
140 Sciences (DeFENS, Università degli Studi di Milano) and designed according to ISO guidelines
141 (ISO 8589, 2007). Data were collected using Fizz v2.31g software program (Biosystemes,
142 Couternon, France). Consumers were asked not to smoke, eat or drink anything, except water, for
143 one hour before the tasting sessions.

144 According to Deliza & MacFie (1996), yogurt samples were evaluated under the blind, expected,
145 and informed condition. During the first tasting (day 1), participants performed the blind and the
146 expectation test. Firstly, they were asked to rate the liking degree of the eight yogurt samples under
147 blind conditions (*i.e.* without any information about the product). The only information provided to
148 the participants was that they were about tasting strawberry yogurt samples. Thus, for each product,
149 participants received about 20 mL of yogurt served in plastic cup coded with 3-digit numbers and
150 judged them in individual booths under white light at room temperature. Participants rated yogurt
151 samples liking degree using a 100-mm unstructured, linear scale anchored at the extremes with the
152 terms “Extremely disliked” (left of the scale) and “Extremely liked” (right of the scale). After
153 tasting each yogurt, participants were instructed to rinse their mouth with mineral water.

154 After a short break, they all rated the expectation liking score of each product induced by the
155 relevant image and the information about its organic origin without tasting the sample (expectation
156 test), using a 100-mm unstructured, linear scale anchored at the extremes with the terms “Extremely
157 disliked” (left of the scale) and “Extremely liked” (right of the scale). Every participant was shown
158 on a screen the image of the package of each yogurt sample without the yogurt brand. The original
159 packages of the yogurts were modified by removing the brand imagery in an attempt to decrease the
160 brand effect on consumer’s expectations. In the case of the organic samples, the following
161 information was provided: “Product made with organic farming techniques and sustainable
162 manufacturing processes”. The image of each conventional product was shown without providing
163 any information.

164 After a one week interval, the same participants were invited again to the tasting center (day 2) and
165 performed the informed test. Apart the fact that participants were provided with the product image
166 and information about the organic production in the case of organic yogurts, the procedure was
167 exactly the same as for the blind test.

168 In order to balance the effects of serving order and carryover, the presentation orders of the
169 samples (yogurts, images of the package, or yogurts associated with the image of their package)
170 were chosen according William Latin squares (Macfie, Bratchell, Greenhoff & Vallis, 1989).

171 2.3.2. *Questionnaire*

172 At the end of the second tasting session (day 2), participants were administrated a questionnaire
173 devised to assess their general knowledge, attitudes, beliefs and behaviors related to sustainability.

174 The questionnaire had been administered and validated in a previous study on a representative
175 sample of 800 Italian consumers aged 18-65, within a research on sustainability and food
176 consumption conducted at IULM University of Milan “Istituto di Consumi, Comportamento e
177 Comunicazione” in 2009-2010 (Castelli, 2010; Russo, Milani & Castelli, 2011). The questionnaire
178 is based on the Theory of Planned Behavior (TPB) (Ajizen, 1991), which has been proven to be a
179 proper theoretical framework for understanding sustainable and ethical consumer behaviors
180 concerning food (Bissonette & Contento, 2007), although contrasting data are provided by scientific
181 literature (de Barcellos et al., 2011). According to the TPB, behavioral intention is the most reliable
182 indicator for predicting behavior, and it is in turn related to different variables, such as beliefs and
183 attitudes towards the behavior, social norms to perform the behavior and perceived control over it.
184 According to these assumptions, the topics included in the questionnaire were based on all of the
185 specific psychological constructs indicated by the TPB, except for the social norms, which were not
186 considered by the present study.

187 The purposes of the questionnaire reported in Appendix 1 were to collect information about
188 participants’ general attitude and awareness about sustainability and to group subjects according to
189 their sustainability level. The questions were related to: a) individuals’ socio-demographic

190 information; b) general knowledge about sustainability; c) intention to adopt a sustainable behavior;
191 d) actual sustainable behavior; e) sustainability and food choices in terms of opinions and beliefs. In
192 addition, the level of awareness, concern and action for ethical consumption behaviors was rated
193 through a scale adapted from the Awareness Concern and Action (ACA) scale introduced by
194 Freestone and McGoldrick in 2008 (Freestone & McGoldrick, 2008). The Italian version of the
195 ACA scale has been proposed and validated in 2010 on a representative sample of 800 Italian
196 consumers (Castelli, 2010).

197 2.4 Data Analysis

198 2.4.1 Questionnaire

199 Two scales have been used to group the subjects according to the sustainability level: the actual
200 sustainable behavior scale (“Recently, how often have you performed the following actions?”) and
201 the ACA scale (“For each of the following items, please indicate the statement which best fits with
202 your experience”). The choice to use the first scale was based on the above mentioned national
203 study results (Castelli, 2010; Russo et al., 2011), whose results showed that the actual sustainable
204 behaviors scale is highly associated with those investigating other constructs from the TPB and
205 used in the present questionnaire. The statistical approach adopted to group participants is described
206 in the results section.

207 2.4.2 Consumer Test

208 Data were subjected to Analysis of variance (ANOVA) considering *Participants* (nested within
209 Sustainability Level), *Sustainability Level* (Non-sustainable, Uncertain and Sustainable), *Method of*
210 *Production* (Organic and Conventional), *Samples* (the eight yogurt samples, nested within Method
211 of Production), *Conditions* (Blind, Expected and Informed) and the 3-way interaction *Sustainability*
212 *Level by Method of Production by Condition* as factors and hedonic scores as dependent variable.
213 *Participants* and *Samples* were considered as random effects in the model, whereas the other factors
214 were considered as fixed effects. Since the dataset was not balanced, ANOVA was performed using
215 the GLM (Generalized Linear Model) procedure (type III SS). Least-Squares means (LS-means)

216 and relevant standard errors were computed for each factor. LS-means are predicted population
217 margins; that is, they estimate the marginal means over a balanced population. When the ANOVA
218 showed a significant effect ($p < 0.05$), t -tests were used as multiple comparison test (pdiff SAS LS-
219 means option).

220 In order to establish whether a hedonic disconfirmation took place, t -tests were performed on the
221 differences between the blind and expected mean hedonic ratings for both organic and conventional
222 yogurts. A disconfirmation occurs when this difference is significantly different from zero. In order
223 to establish whether the disconfirmation was associated with an assimilation or a contrast effect, t -
224 tests were carried out on the differences between the informed and blind mean hedonic ratings.
225 When this difference is significantly different from zero, it means that there was a significant effect
226 of the information on hedonic scores. Furthermore, in case of negative disconfirmation, if this
227 difference is higher than zero, an assimilation effect occurs; if the difference is lower than zero, a
228 contrast effect occurs. In the assimilation case, when the difference between expected and informed
229 liking is significantly different from zero, the consumers do not completely assimilate towards their
230 expectation and assimilation is not total (Siret & Issanchou, 2000).

231 All statistical analyses were performed using SAS/STAT statistical software package version 9.3.1.
232 (SAS Institute Inc., Cary, USA).

233 **3. RESULTS**

234 *3.1 Questionnaire: Participant Segmentation According To Sustainability Level*

235 As above mentioned, subjects were grouped according to the sustainability level on the basis of the
236 actual sustainable behavior (TPB) and the ACA scales. Both scales have been tested for
237 consistency. Cronbach's alpha for the TPB scale was $\alpha = 0.69$ (15 items) and $\alpha = 0.86$ (14 items) for
238 the ACA scale (Cronbach, 1951). For each subject, an ACA and a TPB index were calculated as
239 mean of the scores over the different items for each of the two scales (ACA: 25th percentile=3.17,
240 75th percentile=3.92; TPB: 25th percentile=3.00, 75th percentile=3.53). Pearson's correlation test has
241 been performed to investigate the relationship between the ACA scale and the TPB scale, which

242 have shown to be significantly correlated ($r=0.314$, $p<0.01$). Then, the distribution frequency of
243 such scores was calculated for each index. The subjects with a score within the 25th percentile of
244 both distributions were defined as “Non-sustainable” (19 subjects; 12%), whereas the subjects with
245 a score over the 75th of both distributions were defined as “Sustainable” (23 subjects; 14%). The
246 rest of the subjects were defined as “Uncertain” (115 subjects; 74%). The groups’ size matches with
247 the results of the previously mentioned study (Castelli, 2010; Russo et al., 2011) conducted on a
248 representative sample of Italian consumers aged 18-65, pointing out that the 10% of the population
249 are non-sustainable subjects, and the 12% of the population are sustainable subjects. Values
250 describing the distribution of the present consumers’ group (N=157) and of the wider group
251 (N=800) are as follows: ACA₁₅₇: M=3.54, sd=0.55, asymmetry=-0.032, kurtosis=-0.136; ACA₈₀₀:
252 M=3.72, sd=0.68, asymmetry=-0.386, kurtosis=-0.034; TPB₁₅₇: M=3.29, sd=0.42, asymmetry=-
253 0.124, kurtosis=0.574; TPB₈₀₀: M=3.03, sd=0.46, asymmetry=-0.111, kurtosis=0.342).

254 *3.2 Questionnaire: General Knowledge About and Attitudes Towards Sustainability*

255 When asked “Have you ever heard about sustainability?”, only 3% of the responses were negative.
256 As concerning the question “In your opinion, what is the meaning of sustainability as referred to
257 food?” the three items most frequently highlighted were “Integrating the conservation of natural
258 habitats with the economic system survival” (chosen by 69% of subjects), “Being aware of life
259 quality in daily consumer choices” (57%), and “Guaranteeing the farming animals health and
260 welfare” (43%).

261 When asked “In your opinion, how much sustainable the following actions are?”, the three items
262 which were rated the highest were “Performing waste separation”, “Saving electric energy” and
263 “Purchasing seasonal food” (these items were considered very or extremely sustainable by the 95%,
264 90% and 77% of the respondents, respectively). “Consuming organic food” (ranked #9 among 18
265 items) was considered very or extremely sustainable by the 43% of the respondents, a lower
266 percentage than the actions “Buying local food” (62%), “Buying zero-mile products” (60%) and
267 “Buying Fair Trade products” (46%).

268 *3.3 Questionnaire: Intention to Adopt Sustainable Behavior*

269 When asked “Thinking about food purchase, are you willing to perform the following actions
270 within the next month?” the respondents answered “Buying seasonal food” (93%), “Buying meat
271 from animals raised without growth hormones and antibiotics” (65%), and “Buying eco-products”
272 (65%). As for the action “Buying organic food” (ranked #11 among 14 items), only 32% stated that
273 they would probably or certainly perform this action during the following month. It needs to be
274 pointed out that a relevant percentage (35%) declared that wouldn’t certainly (9%) or probably
275 (26%) perform this action.

276 *3.4 Questionnaire: Actual Sustainable Behavior*

277 The percentage of answers provided by respondents to the question: “Recently, how often have you
278 performed the following actions?” is reported in Table 1. As shown, “Recycling” is the most regular
279 sustainable action, followed by the “Use of public transportation” and the “Purchase of seasonal
280 food” (more than respectively 87%, 81%, and 80% of the subjects declared to perform these actions
281 at least three/four times a week). “Eating meat” (non-sustainable action) is performed by a
282 relatively high percentage (63.7%) of subjects. “Organic food consumption” is not too much taken
283 into consideration (only about 16% of the respondents declared to consume organic food at least
284 three/four times a week).

285 *3.5 Questionnaire: Sustainability and Food Choices in Terms of Opinions and Beliefs*

286 As for the question “Considering the choice of food products, how important are the following
287 factors for you?”, results revealed that product quality is the most popular purchase criterion (for
288 98% of the respondents this item is very or extremely important), followed by health, intended as
289 food safety (96%) and health care (89%). Sustainability criteria are less frequent. Again, the organic
290 origin of the product is not a major factor in consumer’s decision-making; only 37% of respondents
291 (ranked #16 among 24 items) consider it very or extremely important.

292 When asked “Considering sustainable food products, please indicate how much you agree with the
293 following statements”, subjects mostly feel these products as safe (only 6% of respondents agreed

294 or somewhat agreed with the statement “I think that sustainable food products are less safe than the
295 conventional ones”) and as high quality products (only 7% of the respondents agreed or somewhat
296 agreed with the statement “in my opinion, the quality of sustainable food products is low”).
297 Nevertheless, respondents reported that information about sustainable food is poor (72%) and
298 confusing (43%).

299 *3.6 Questionnaire: Awareness Concern and Action Scale*

300 The percentage of answers provided by respondents for each item of the ACA scale is reported in
301 Table 2. Subjects are more interested in and pro-active for “Recycling” and “Respect of the
302 environment” (respectively 89.2% and 88.6% of the respondents declared to be active on these
303 issues), followed by “Enhancing renewable/alternative energies” (63.1%), “Enhancing local
304 production” (60.5%) and “Preserving natural resources” (58%). As for the remaining items, most of
305 the subjects developed a knowledge and understanding of the issues, they are interested in them yet
306 they have not undertaken any action to promote most of the sustainable issues displayed. Once
307 again, only a small proportion of respondents (36.9%) declared to be active on the “Enhancement of
308 organic cultivation”.

309 *3.7 Questionnaire: Results on Sustainable and Non-Sustainable Subjects*

310 The descriptive analysis performed on the whole subjects’ sample was conducted also for the two
311 subgroups, in an attempt to draw a more detailed profile of Sustainable and Non-sustainable
312 individuals. The Uncertain group was not considered at this stage since their percentages of answer
313 were comparable to those of the total group. A summary of the main results is reported in Table 3.
314 The most frequently chosen items were often the same for the two groups; however, for each item
315 the percentages were lower for the Non-sustainable group, meaning that there was more diversity in
316 the answers within this group than within the Sustainable group. A major difference was found
317 between Sustainable and Non-sustainable subjects when attitudes, purchase intentions, and
318 behaviors towards organic products were considered. Indeed, 44% of the Sustainable respondents
319 considered as a very or extremely sustainable action the consumption of organic food. The

320 percentage was 26% for Non-sustainable subjects. In addition, 70% of Sustainable subjects stated
321 that they would probably buy organic food during the following month and 70% declared to be a
322 regular consumer of organic food. In the Non-sustainable subjects' group, only 6% of the
323 respondents stated to be willing to buy organic food during the following month, and only 16% of
324 them consume it frequently. As regarding the most important criteria in the choice of food products,
325 the organic origin is considered important by 66% of Sustainable subjects, and only by 11% of
326 Non-sustainable subjects. If we consider the actions proposed by the ACA scale, the 5% and 82% of
327 Non-Sustainable and Sustainable individuals respectively are interested in and proactive for the
328 "Enhancement of organic production". Information about sustainable products is considered as
329 "confused" by 25% of Sustainable subjects, and by 42% of Non-sustainable subjects; also, it is
330 considered as "poor" by 62% of Sustainable subjects, and by 74% of Non-sustainable subjects.

331 *3.8 Consumer Test: Influence of the Information about Organic Production on Consumer's* 332 *Expectation*

333 Hedonic evaluation of yogurts in the three different experimental conditions (Blind, Expected and
334 Informed) has been performed to investigate the influence of sustainability information – intended
335 as food grown according to organic production principles – on consumers' preference.

336 ANOVA results showed a significant effect for the main factor *Condition* ($F_{(2,3589)}=17.52$,
337 $p<0.0001$). Ratings in the expected condition were the highest, followed by those in the informed
338 condition and then those in the blind condition, which received the lowest score. The main factor
339 *Method of production* was not significant, even though organic yogurts (LS-means=49.0) received
340 lower hedonic scores than the conventional ones (LS-means=53.4).

341 Despite the main factor *Level of Sustainability* was not significant, the 3-way interaction *Level of*
342 *Sustainability by Method of production by Condition* was significant ($F_{(10, 3589)}=2.50$, $p<0.01$). LS-
343 means hedonic scores for each group of subjects by condition (Blind, Expected and Informed) and
344 method of production (Organic and Conventional) are reported in Figure 1 a-c. Considering the
345 blind condition (Figure 1a), no significant differences were found whatever the comparison was (no

346 difference among the three groups for both the organic and the conventional products and no
347 difference between organic and conventional products for each group of consumers). Considering
348 the expected condition (Figure 1b), Non-sustainable subjects expressed the expectation of a lower
349 preference for organic yogurts as compared to Uncertain ($p<0.001$) and Sustainable subjects
350 ($p<0.01$), which in turn showed a comparable behavior. As for conventional yogurts, Sustainable
351 and Non-Sustainable subjects did not differ significantly, whereas Uncertain subjects were
352 comparable to Non-sustainable but not to Sustainable subjects. Furthermore, within each group of
353 subjects, differences in liking for the two types of products have been found: Non-sustainable
354 subjects had a lower expectation from organic samples than from conventional ones ($p<0.05$). An
355 opposite behavior has been observed for Sustainable subjects as they had a tendency to expect the
356 organic yogurts as better than the conventional ones ($p<0.07$). For Uncertain subjects there was no
357 significant difference between expectations for the two types of products. As concerning the
358 informed condition (Figure 1c), Non-sustainable subjects expressed a lower preference for organic
359 yogurts as compared to Uncertain subjects ($p<0.05$), whereas the difference between Non-
360 sustainable and Sustainable subjects was not significant. As for conventional yogurts, Sustainable
361 subjects judged such samples as significantly less liked as compared to Uncertain and Non-
362 sustainable subjects ($p<0.05$). Comparing LS-means hedonic scores of organic and conventional
363 yogurts within each group of subjects, Non-sustainable and Uncertain subjects assigned
364 significantly higher values to conventional yogurts than the organic ones ($p<0.001$), whereas
365 Sustainable subjects judged the two types of yogurts as equally good.

366 The influence of organic production information on Sustainable, Uncertain and Non-sustainable
367 consumers' expectations is reported in Table 4. As shown, the difference between blind and the
368 expected liking scores (B-E) for organic yogurts was negative and significantly different from zero
369 for Sustainable and Uncertain subjects, suggesting that a negative disconfirmation of expectations
370 occurred for these consumers. The significance of the difference between informed and blind liking
371 (I-B) scores was then calculated in order to establish whether the negative disconfirmation was

372 associated with an assimilation or a contrast effect. This difference was positive and significantly
373 different from zero for Uncertain subjects and marginally different from zero for Sustainable
374 subjects, suggesting that the negative disconfirmation was associated with an assimilation effect.
375 Furthermore, the significance of the difference between the informed and the expected liking (I-E)
376 scores was calculated in order to establish whether assimilation was complete or not. As shown in
377 Table 4, the assimilation effect was negative and significantly different from zero, suggesting that
378 the information provided in the informed condition was not completely effective in reducing the
379 difference between expectations and actual perception. The difference B-E was not significantly
380 different from zero in the case of conventional yogurts for both Sustainable and Non-sustainable
381 subjects, suggesting that these products met consumers' expectations. On the contrary, for the
382 Uncertain group a disconfirmation of expectation was seen, which was associated with a marginally
383 incomplete assimilation effect.

384 **4. DISCUSSION**

385 The present study results offer interesting highlights on two different issues: the influence of
386 sustainability information on consumer's preferences towards a specific product, and whether being
387 "sustainable" makes any difference in the impact exerted by information on individual's
388 expectations.

389 When subjects were divided according to their sustainability level, the majority of them (74%) were
390 defined as "Uncertain" towards sustainability issues. This is in agreement with a larger survey
391 carried out on Italian population (Castelli, 2010; Russo et al., 2011). For this uncertain group, there
392 was no difference in expectation (expected condition) between the two types of yogurts (organic vs
393 conventional). However, sustainable subjects had a higher expectation towards organic yogurt than
394 the Non-sustainable individuals. Furthermore, Non-sustainable subjects expressed lower
395 expectations from organic samples than from conventional ones, whereas the opposite behavior has
396 been observed in Sustainable subjects. Hence, sustainability awareness, positive attitude, and pro-
397 active behaviours on these issues may influence individuals' expectations about "sustainable"

398 products. The results of the experiment in the expected condition reflect the actual purchase
399 situation where the consumer is in a “complete informed” condition but he/she can’t taste the
400 product before the actual purchase. In line with this assumption, Langen (2011) and Chryssohoidis
401 & Krystallis (2005) reported that – for some consumers – the positive attitude towards sustainable
402 behaviour is also revealed by food products choice. These results are also supported by the fact that
403 the information about sustainability – intended as food produced according to organic production
404 processes – had an influence on products’ preference for Sustainable and Uncertain subjects.
405 Indeed, organic samples produced a negative disconfirmation on consumers’ expectations, which
406 was associated with an assimilation effect, thus meaning that information about products affected
407 hedonic scores since consumers tended to modify their perception towards their expectations in an
408 attempt to reduce the gap between expectation and actual perception. However, the hedonic
409 discrepancy between expected and perceived liking for organic products was not totally assimilated,
410 suggesting that information about sustainability can’t fill the liking gap. This outcome was not
411 observed for Non-sustainable subjects (12%) whom expectations for organic yogurts were
412 confirmed. This means that for Non-sustainable subjects liking scores for organic yogurts were
413 comparable in all the three conditions tested (Blind, Expected and Informed), suggesting that their
414 preference was not influenced by the organic origin information. This may probably be ascribed to
415 the fact that Non-sustainable subjects are less involved in and pro-active for organic production
416 issues as indicated by the questionnaire results.

417 The effect of organic production information on hedonic judgements for beer was also investigated
418 by Caporale & Monteleone (2004), who reported an overall positive effect of organic information
419 on expected liking. The same results were found by Napolitano et al. (2010a), who observed an
420 increased liking level for cheese, when the organic origin information was given. Napolitano et al.
421 (2010b), when studying the information effect about welfare of cattle on acceptability for beef meet
422 by regular and non-regular users, reported a high expected liking induced by the information in both
423 groups. In these studies, a negative disconfirmation was associated with an assimilation effect, as in

424 the present case. However, the assimilation was complete for meat but not for beer and cheese.
425 Contrasting results were found by Poelman et al. (2008), who reported no influence of information
426 about organic production and fair trade origin on pineapple liking. The discrepancy found in
427 literature might be ascribed to the different nature of the food products tested, to the way the
428 information about organic production was given, or to the specific consumers' target involved in the
429 study. In this context, it should be stressed that participants involved in the present experiment were
430 only university students.

431 The second issue addressed by this study is the "factual" presence of sustainability in consumer's
432 life. The specific question was whether and how much sustainability affects consumers' life and
433 preferences when buying goods and using services. As previously pointed out, most of the
434 respondents developed sustainability awareness, but when questioned about sustainability meaning,
435 most of them gave very broad and general definitions (*e.g.* "life quality care in daily actions" or
436 "good, high-quality, and healthy food production"), no matter how much they are committed to
437 sustainability. Only a reduced percentage of the subjects in each group associated the term with
438 proper sustainable concepts (*e.g.* reduced presence of pesticides and antibiotics in food), thus
439 confirming that sustainability is a widespread but not deeply understood concept. Furthermore,
440 results show that most of the respondents usually perform actions with both practical and economic
441 implications, such as waste separation, use of public transportation and purchase of seasonal food.
442 In the food purchasing decision-making process, quality and health seem to be the most powerful
443 triggers, followed by product's convenience, taste, and appearance. The factors related to
444 sustainability concept are considered less important overall. Indeed, considering the results obtained
445 from the whole group of consumers, the specific action of "Buying organic food" is not taken into
446 such a consideration by respondents, which even hardly declare to have the intention to perform it.
447 One reason might be that organic products are usually more expensive. Indeed, high prices are
448 perceived as the biggest problem for over 40% of European respondents (Napolitano et al., 2010b).
449 In this respect, 35% of respondents perceive sustainable products as too expensive. When analyzed

450 as separate, the questionnaire results for Sustainable, Uncertain and Non-Sustainable subjects
451 change considerably, and this difference is mainly due to the attitude towards organic food products
452 and production: Sustainable subjects show a stronger awareness as regarding organic food and they
453 are willing to buy and consume organic products. This behavioral discrepancy is in line with the
454 liking gap for organic products found between the two groups in the expected condition.

455 Finally, the present experiment results show that the intention to behave sustainably is observed as
456 generally low, even if sustainable products are perceived as safe, healthy, and high-quality, thus
457 suggesting that people are quite aware of the sustainability concept, perform some “good
458 propositions”, but still they show a certain reluctance level towards the introduction of these
459 practices in their every-day life. This could depend on the lack of information perceived by
460 respondents about sustainable products, as shown also by Grunert, Bech-Larsen, & Bredahl (2000).

461 It should be pointed out that this evidence could be due to the university students consumer specific
462 target. This aspect, as well as the reduced number of total individuals considered, is a clear
463 limitation of the study, which can’t be considered as representative of a larger community.

464 Nevertheless, this aspect sounds quite alarming because the subjects involved in the experiment are
465 supposed to be the more informed and aware about the issue for the young age, cultural level, and
466 the attendance to university courses where sustainability is studied, investigated, and debated.

467 Consequently, in this context, it is a key task to devise projects and strategies directed to foster
468 stronger sustainability awareness among the younger and future consumers.

469

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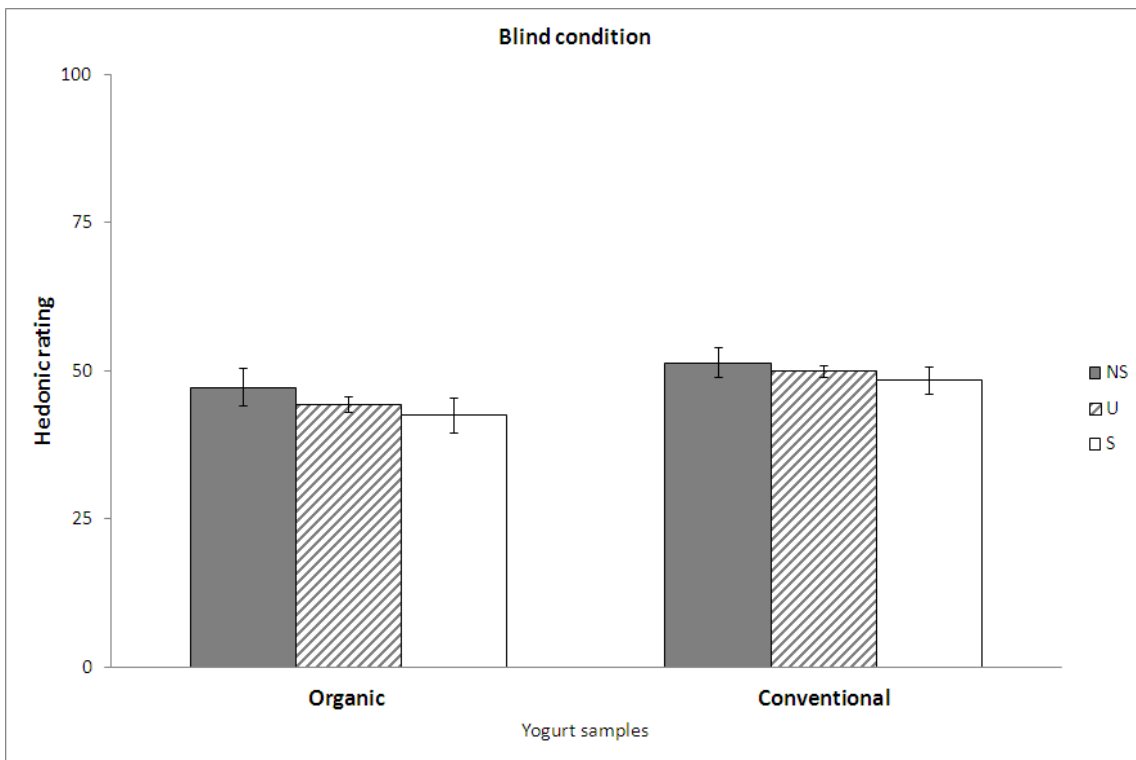
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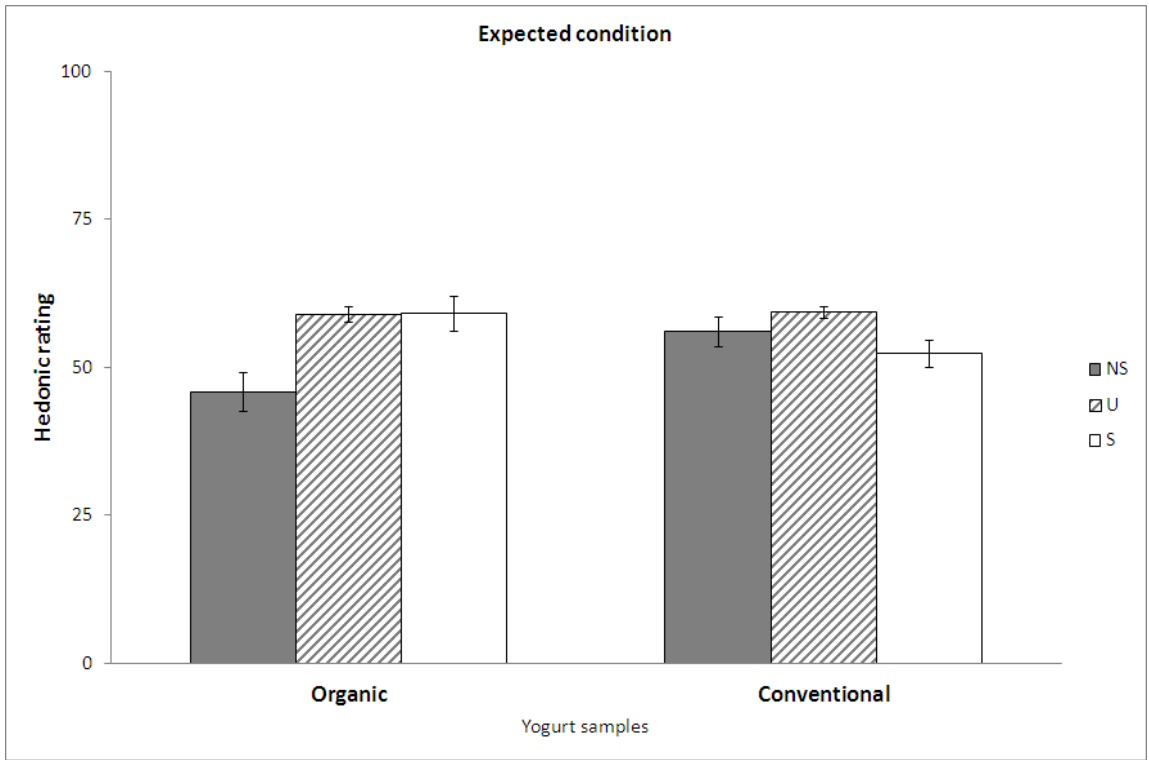
557 **Figure caption**

558 Figure 1 a-c. Consumer test results: LS-means hedonic ratings provided by Non-Sustainable (NS),
559 Uncertain (U) and Sustainable (S) subjects and relevant standard errors for organic and
560 conventional yogurt samples under the three experimental conditions (Blind, Figure 1a; Expected,
561 Figure 1b; Informed, Figure 1c)

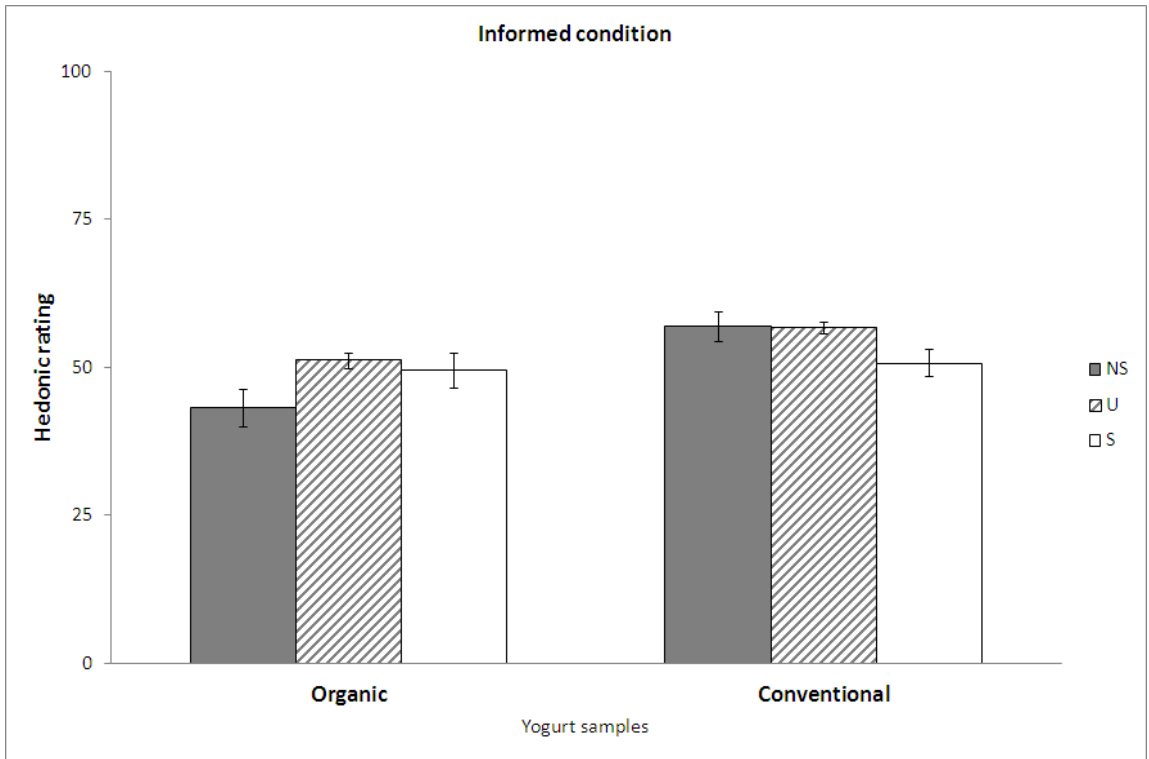
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568 Table 1. Questionnaire results: Percentage of answers to the question “Recently, how often have
569 you performed the following actions?” (Never=0 times, Rarely=2-3 times a month, Sometimes=1-2
570 times a week, Often=3-4 times a week, Always=every day). In the last column the sum of the
571 percentages of answers “Often” and “Rarely” is reported. S=sustainable action; NS=non-sustainable
572 action.

| Action | Never | Rarely | Sometimes | Often | Always | Often/Always |
|---|--------------|---------------|------------------|--------------|---------------|---------------------|
| Recycling (S) | 3.2 | 3.8 | 5.7 | 11.5 | 75.8 | 87.3 |
| Using public transportation (S) | 5.7 | 8.3 | 4.5 | 20.4 | 61.1 | 81.5 |
| Buying seasonal food (S) | 0.0 | 3.8 | 15.9 | 45.2 | 35.0 | 80.2 |
| Eating meat (NS) | 1.9 | 13.4 | 29.9 | 21.7 | 42.0 | 63.7 |
| Saving electric energy (S) | 10.8 | 12.7 | 21.7 | 22.3 | 32.5 | 54.8 |
| Buying regional food (S) | 3.8 | 15.3 | 34.4 | 39.5 | 7.0 | 46.5 |
| Avoiding GMO food (S) | 25.5 | 24.8 | 8.9 | 14.6 | 26.1 | 40.7 |
| Avoiding preservatives in food (S) | 6.4 | 22.3 | 36.9 | 32.5 | 1.9 | 34.4 |
| Buying local food (S) | 5.1 | 27.4 | 40.1 | 23.6 | 3.8 | 27.4 |
| Eating organic food (S) | 15.9 | 37.6 | 30.6 | 13.4 | 2.5 | 15.9 |
| Leaving the lights on when unnecessary (NS) | 36.3 | 38.2 | 14.0 | 9.6 | 1.9 | 11.5 |
| Eating exotic food (S) | 15.3 | 50.3 | 26.8 | 7.6 | 0.0 | 7.6 |
| Mixing waste (NS) | 65.6 | 19.7 | 8.9 | 2.5 | 3.2 | 5.7 |
| Buying Fair Trade products (S) | 41.4 | 42.7 | 10.2 | 5.1 | 0.6 | 5.7 |
| Buying clothes from ethical fashion (S) | 60.5 | 28.0 | 7.6 | 3.2 | 0.6 | 3.8 |

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576 Table 2. Questionnaire results: Percentage of answers to the question “For each of the following
577 items, please, indicate the statement which best fits with your experience” (1= I am not aware of
578 this issue/I have never paid attention to it, 2= I am aware of this issue but I am not interested in it,
579 3= I am aware of this issue, I am interested in it, but I haven’t done anything for it, 4= I am
580 interested in this issue and I have done something for it, 5= I am interested in this issue and I have
581 taken a significant action). In the last column the sum of the percentages of answers “4” and “5” is
582 reported.

| Action | 1 | 2 | 3 | 4 | 5 | 4+5 |
|--|----------|----------|----------|----------|----------|------------|
| Recycling | 0.6 | 1.3 | 8.9 | 28.7 | 60.5 | 89.2 |
| Respect of the environment | 0.0 | 1.3 | 9.6 | 49.7 | 38.9 | 88.6 |
| Enhancing renewable/alternative energies | 0.0 | 7.0 | 29.9 | 38.9 | 24.2 | 63.1 |
| Enhancement of local production | 1.9 | 11.5 | 26.1 | 37.6 | 22.9 | 60.5 |
| Preserving natural resources | 1.9 | 5.7 | 34.4 | 41.4 | 16.6 | 58.0 |
| Supporting local economy | 2.5 | 10.2 | 36.3 | 35.7 | 14.6 | 50.3 |
| Enhancement of free-preservatives food products | 0.0 | 10.2 | 45.2 | 23.6 | 21.0 | 44.6 |
| Enhancing sustainable production labels (i.e. ecolabels) | 5.1 | 14.6 | 39.5 | 24.2 | 16.6 | 40.8 |
| Enhancement of non-industrial farming | 6.4 | 15.3 | 41.4 | 21.7 | 15.3 | 37.0 |
| Enhancement of organic cultivation | 3.2 | 21.7 | 38.2 | 26.1 | 10.8 | 36.9 |
| Promoting environmental sustainable production | 3.8 | 12.1 | 47.8 | 26.8 | 9.6 | 36.4 |
| Contrasting the New Developing Countries exploitation | 2.5 | 9.6 | 52.9 | 23.6 | 11.5 | 35.1 |
| Contrasting GMO’s food | 3.8 | 21.0 | 42.0 | 19.1 | 14.0 | 33.1 |
| Promoting workers’ rights | 2.5 | 14.6 | 51.0 | 21.7 | 9.6 | 31.3 |

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587 Table 3. Questionnaire results: Percentage of answers provided by sustainable (S) and non-
 588 sustainable (NS) subjects (for each question the items which were most frequently indicated by
 589 respondents as well as the item concerning organic production, when applicable, are reported)
 590

| Questions/Items | S | NS |
|---|------|-----|
| Have you ever heard about sustainability? | 100% | 59% |
| In your opinion, what is the meaning of sustainability as referred to food? | | |
| <i>Integrating the conservation of natural habitats with the survival of economic system</i> | 65% | 79% |
| <i>Conservation and protection of water resources</i> | 52% | 42% |
| <i>Guaranteeing the health and welfare of animals in farming</i> | 48% | 53% |
| <i>Reduction or elimination of pesticides, hormones and antibiotics in livestock and agriculture</i> | 43% | 47% |
| In your opinion, how much sustainable the following actions are? | | |
| <i>Performing waste separation</i> | 95% | 90% |
| <i>Saving electric energy</i> | 91% | 75% |
| <i>Buying zero-mile products</i> | 86% | 37% |
| <i>Purchasing seasonal products</i> | 78% | 53% |
| <i>Consuming organic food</i> | 44% | 26% |
| Thinking about food purchase, are you willing to perform the following actions in the next month? | | |
| <i>Buying seasonal products</i> | 100% | 89% |
| <i>Buying eco-product</i> | 83% | 47% |
| <i>Buying meat from animals raised without growth hormones and antibiotic</i> | 83% | 37% |
| <i>Buying organic food</i> | 70% | 6% |
| Recently, how often have you performed the following actions? | | |
| <i>Recycling</i> | 100% | 79% |
| <i>Saving electric energy</i> | 100% | 79% |
| <i>Using public transportation</i> | 96% | 79% |
| <i>Consuming organic food</i> | 70% | 16% |
| Considering the choice of food products, how important are the following factors for you? | | |
| <i>Quality</i> | 96% | 95% |
| <i>Attention to health</i> | 91% | 84% |
| <i>Food safety</i> | 91% | 84% |
| <i>Organic farming origin</i> | 66% | 11% |
| For each of the following items, please, indicate the statement which best fits with your experience | | |
| <i>Respect of the environment</i> | 96% | 79% |
| <i>Recycling</i> | 91% | 84% |
| <i>Preserving natural resources</i> | 91% | 32% |
| <i>Enhancement of organic cultivation</i> | 82% | 5% |
| <i>Promoting environmental sustainable production</i> | 70% | 53% |

594 Table 4. Consumer test results: Expectation effect on organic and conventional yogurt samples
 595 hedonic ratings (E=expected liking, B=blind liking, I=informed liking) for Non-sustainable,
 596 Uncertain and Sustainable individuals.

| Yogurt | Group | B-E | | I-B | | I-E | |
|--------------|-----------------|---------|-----------------------------|---------|------------------------|---------|-----------------------|
| | | Lsmeans | <i>p</i> | Lsmeans | <i>p</i> | Lsmeans | <i>p</i> |
| Organic | Non-sustainable | 1.5 | <i>n.s.</i> Confirmation | | | | |
| | Uncertain | -14.7 | <0.0001 Disconfirmation | 7.0 | <0.001 Assimilation | -7.7 | <0.0001 Incomplete |
| | Sustainable | -16.6 | <0.0001 Disconfirmation | 7.0 | <0.10 Assimilation | -9.6 | <0.05 Incomplete |
| Conventional | Non-sustainable | -4.6 | <i>n.s.</i> Confirmation | | | | |
| | Uncertain | -9.3 | <0.0001 Disconfirmation | 6.7 | <0.001 Assimilation | -2.6 | <0.10 Incomplete |
| | Sustainable | -4.0 | <i>n.s.</i> Confirmation | | | | |

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